

## What PPE is

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PPE just stands for personal protective equipment. It's what our healthcare workers, Doc's, nurses, respiratory therapists need to be wearing, while they're in the presence of someone who is either known or suspected to have an infectious agent. And that's not just COVID-19 anything. The problem has arisen that there just simply isn't enough of it to go around in the United States at the time that this pandemic has really been ramping up. We've certainly heard stories, somewhat horror stories out of places like Italy and China, and now at a place like New York City. And so we wanted to make sure that Doc's nurses in West Texas, we're protected as much as we possibly could. We knew they didn't have such a shortage as other places, but we knew there were some shortages.

## How Williams became involved

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So, from my perspective, I want to protect our healthcare workers, I'm going to do anything I possibly can to do that, because many of them are my friends, nurses, doctors, etc. I want them to be as protected as possible. Even if I don't know them. I still want, my goal, my mission at this moment is to make sure they're protected. I became involved in this mainly because as people started talking about what kinds of needs there were, they seemed like opportunities for collaboration we already had with the College of Engineering to make a difference. So as communications started to emerge from variety of different places about a week and a half ago, I reached out to my colleagues at the College of Engineering, Dean Sacco and And others in the college to see what they thought they could do. Because we recognized, we could make a difference, we could be part of the solution, and we could keep our healthcare workers safe.

## How the 3D printing idea started

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Well, so the idea was that if there wasn't enough PPE around and other pieces of equipment and we've moved on to other projects, was it something that we could actually make and construct and that would help our healthcare workers stay safe. So the first place where we started was in 3d printing, because we recognize that there was the capacity in 3d printing to essentially make anything you want, based on a on a common model. So to give you an example, the first thing we recognized was missing was sufficient face shields. So these are plastic shields, clear plastic shields that will cover the whole face area for As a nurse or a physician, and the reason why those are important is they protect the boat the face underneath, but also any equip any masks goggles that peovus.40l-24 JJET 00.25002 0 612 792 reW\*ñBT#1 12

keep their PPE safe. We think that there are needs for that Probably all of our hospitals. So that's one place where we can make a difference.

How Rural areas are impacted even more

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Yeah, so the first place where we really became aware of that was when we were contacted by Don Hillman who's emergency medicine doc in Monahans Texas Ward Memorial Hospital. And he reached out saying we need a lot of stuff. We don't have what we need here. Can you guys help us. And so, in fact, one of our first shipments of face shields went to Monahans went also to Pecos, Texas, because he recognized that of a staff of I think it's about 60 Ward Memorial, that they didn't have enough face shields for all of their folks. And I'm sure that they, you know,

decision whether one person gets a ventilator or not or another. So we think that in that situation, there might be an emergent need for some of the products that we're producing.

## How the consortium was formed

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Yeah, so so we call it the West Texas 3d COVID-19 relief Consortium. What we recognized was that this was not something that any one group could solve every problem West Texas has a large area, I've actually been learning I'm not from West Texas, learning a lot about the geography of West Texas over the last few days. So we recognize that we would probably be much more successful if we had partnerships and group members in different locations, they would know more about the needs those locations, and they would also perhaps be able to do some of the manufacturing in those locations, shorten transport lines, etc. And I would say that it wasn't a you know, we didn't set out to to just say, Hey, we need all these different types of people. What happened was just people started volunteered their time, they found out about what we were doing. And they said, I want to help I want to be part of this. This is what's so incredible about this. This this activity everyone just wants to be part of a solution. You want to look after our health care workers. And I can tell you I've never been more proud of being in West Texas. And then I am now because of the incredible response that we've seen. So we have colleges and universities down in the Permian Basin, businessmen, just members of the public, every department, I think, here at TTU HSC. And over at TTU has stepped up in some way to offer assistance. I couldn't be more grateful. And I think our health care workers will will be safer because of that.

## How rapidly the project has evolved

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Yeah. So I got involved week ago Thursday, so that today is Tuesday. So what's 12 days ago, when I heard actually about a project that was going on at a different medical school that has an engineering focus. And so at that moment, I reached out to our Sacco over at the College of Engineering to say, hey, let's, let's think about what we could do. And the response was immediate. And that's Sunday, which is a week ago, eight, nine days ago. And we actually had a meeting zoom meeting on a Sunday and we had about 30 people show up talking about what they'd already done what they were planning on doing. And we already had the first masks being constructed. So we already had some some ideas of what we were going to be able to do. And we had our second, just overall group meeting just on Saturday, three days ago, and there were already 60 people on that call, and obviously, everyone couldn't be there on a Saturday. And so we probably have at least I couldn't even tell you exactly what number it is, but at least 100 people who are involved at this stage, and I think we need more, we probably need to reach out to some commercial partners to see if we can hand off maybe some of the manufacturing part because you know, 3d printing is a relatively slow process for some of the things we're doing. And I think we may have some partners out there who could help us to do those things quicker. Another project just to give you an idea of how quickly this this goes is, on Saturday at four o'clock, we had our meeting at five o'clock, on Saturday at four o'clock, an idea came in that we could make these plexiglass boxes that you put over a patient. And if you need

to intubate them or to, you know, take care of them. And the reason why this is so important is that protects, really provides a lot of protection for the physician or the respiratory therapist or the anesthesiologist whoever it might be. By literally by about 10 o'clock that night, a group had mocked up a model for that. And we've already got those being tested in the hospitals. I think those are going to be really useful and we want to make sure we get some of those out to all of our rural partners because we think this will protect our doctors really well. And then the other thing I'll just talk about is another amazing project. And for this, I have to give all the credit to Roy Mullins and Joe Dannemiller and his son Mark over at TTU. And the idea that if you run out of ventilators, and you don't have ventilators, to put people on if I need them, so there were models coming out of MIT and other other universities, have sort of emergency type ventilators, things that will keep people alive until they get on to a ventilator, well, literally in about a 12 hour span. That team and their co workers put together a model for a ventilator based on a on another model that we can, we can produce and we expect to have prototypes of that ready by probably Thursday, maybe Friday of this week. So that's how that's how it's evolved.

## The sterilization process and new research being conducted

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So So for any of these items that we're talking about, many of them will need to be sterile when they are used. But what Min Kang over at TTUHSC. And other groups Rob Duncan and his colleagues have been thinking about is can we reuse equipment that has already been used? And how would you sterilize that? So those groups are looking into different ways to re sterilize or sterilize these equipment. Currently, the model that's being used is using hydrogen, hydrogen peroxide gas, and I know over engineering that are keen on exploring whether ozone gas could be used. And there's also teams looking at UV but UV radiation, at least the models we've looked at haven't been quite as effective. Although I know there are some larger scale UV potentials that we could



commerce, they have stepped up and I think that the people of the Permian Basin are going to be really well served by that group that has taken that leap.