

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 people are wearing underneath them. And so that was really where the first project started. We had some open source models of face shields. Some of the folks John Carrell, Chase George others. Over the College of Engineering Bryson Seekins, Bryson Seekins was a student just started making models based on what was available online online. And we also had a group down in the Permian Basin, who got involved almost immediately and started doing the same thing. So at this stage, we've come up with a good model for a face shield, we started distributing those, and those will keep people safe and

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, are doing exactly what they need to do to have those on hand. The problem was, in an emergency like this, they weren't able to ramp up quickly. And, of course, probably many of those hospitals would find it more difficult to find the suppliers or small facilities.

Ventilator shortages and solutions

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The other thing that Don made us aware of was that in many of these hospitals, there may not be many of the respirators that might be needed to keep patients alive patients with advanced COVID-19 infection. And so we started to think about, well, can we at least provide something that would give them the confidence that they can keep patients alive. And the the goal, of course, would be that COVID-19 patients wouldn't necessarily stay in those locations. But if they are there, and they need to be transported elsewhere, and need to be intubated, and on a respirator, or in a ventilator, we can help to do that. So one of our other projects has been to try to come up with models for splitters that could, in a pinch in an emergency situation, allow more than one patient to be on one ventilator. And again, colleagues here, Chase, George was one of the leaders on that project. And some folks down in the Permian Basin by George Nnanna at UTPB. And Mark Marish. They have really stepped up and started making those. And now we're getting them tested to make sure that they will actually do what we expect them to do.

Testing the products

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We are we're obviously very worried about producing something that might not be up to standards. So the face shields, I think, are pretty straightforward. We're doing some tests on face masks. So we're actually trying to make masks that our colleagues in the healthcare system can work and use, because at this moment, I believe at least at UMC here in Lubbock, everyone is expected to wear a mask during the day. And so we want to make sure that they have at least the best possible mask available. These aren't the N 95 masks that you've heard about. These are masks that will provide sufficient protection for people who aren't seeing COVID-19 patients. And so we're very careful about what we produce, to make sure that we test them out make sure that they perform the way that the we expect them to do. What we're really perhaps more concerned about is a situation where in an emergency, someone might have to make a

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 put, we could use. So you know, maybe we don't have to make Everything new, maybe we can reuse some of the equipment that's already been used.

Meeting as many rural needs as possible

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Yeah, so so one of the things that's a little bit tricky for us and you know, we're almost a bunch of academics trying to get into a system where we can understand what the needs are, and how do we come up with the right way to distribute any products that consortium produces? So we've asked Brian Norman, who's the chair of industrial engineering, and he's working with Billy Phillips here at the Office of Rural Health, to try to come up with a basically a needs assessment. How many rural hospitals are there out there that might need help? How do we reach out to them whoever contacts, how do we make sure that we have a system that will get equipment to the right place and here I'll just certainly mention to two efforts. One is a group called the West Texas aviators. Which is a bunch of enthusiasts, flying enthusiasts who put their planes available for flying equipment around West Texas as it's needed. And then Angel Flight here in Lubbock. Has they were the first group flying some equipment down to Monahans yesterday, and has offered to do that. So that collaboration is really to say, Where are the

needs? What are what are they? How much are they? And how do we how do we try to fill those needs? And the other thing I'll just say there is and I'll really give credit to the folks down in Odessa who've been really thinking very, very forward way is, and maybe we don't have to make everything and maybe we can find sources that are you know, maybe maybe untapped for some of these pieces of equipment. So again, that will help us to meet the needs are. What will keep me awake at night is thinking that there's somewhere that just doesn't have what they need and we could get it to them, well we just don't know who they are yet. So, so we're trying to figure out how to fulfill all those needs with with limited resources, of course.

The importance of this group

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I think the most important thing I can just say about this is that, you know, you have a lot of expertise in this group. But none of them have expertise in dealing with an emergency like this. And you could sit back and hope that it's going to be better in the future. But this is a group of people who said, No, I'm not going to sit back, I'm going to step up, I'm going to take a lead, I'm going to offer whatever I can to, to make this a success, to protect our healthcare system to protect our doctors, our nurses, and everyone else who's taking care of our patients because those could be us fairly soon if we're unlucky. I think that's the most important thing about this. Every, every university, every group that's involved in it has stepped up to say we want to help you just tell us what you need. What I'm trying to do with my with a group of the leaders in the in the consortium is to try to identify what those needs are, make sure that we have the best impact we possibly can. So we can get through this together.

How the Permian Basin is involved

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So we were first contacted by George Nnanna, who's the chair of engineering down at University of Texas Permian Basin, asking what he could what he could do to help because he had heard from Don Hillman in Monahans, about the needs over there. Well, what George did in an amazing way was he recruited exactly the right group of people, businessmen, and other working with their Chambers of Commerce. And they have ramped up so fast to start producing face shields and anything else that consortium works. And they're they're coming up with their own models of some things. And they're probably moving towards being somewhat independent. We're also trying to do with the folks down in Odessa is to say, would it make sense for them to be more receptive and more responsible for many of the communities that are right by them? And because it doesn't totally make sense that if we're thinking about, you know, what are we going to do in Amarillo, what are we going to do elsewhere? If we've got a really good functioning group down in the Permian Basin, maybe they can do a lot of the work down there, we can still help them. If there are products we have, we can still get them to them. But they can do a lot of the communications down there. And you know, everyone from the presidents of the universities, to the businessman down there to the chambers of

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.