

23.02.25 Sound Medicine Hour

SM Sarah McConnell
MC Miranda Cashio
RS Renee Stanley
KA Kiera Allison
AL Alessandra Luchini
MD Michelle Doll

SM

Like everything, medicine has evolved with technology. The stethoscope is being replaced with ultrasound. And you often don't need a ride to the doctor's office anymore. You just need a solid WiFi connection and the right Zoom link. But some things haven't changed. Patients want to be heard. And they worry that in so many ways, they aren't.

KA

With imaging, you don't even need to take the time it takes to listen to a patient's heart sounds. But patients want to be heard, and more is being written by doctors and patients about the right to be heard.

SM

From Virginia Humanities, this is With Good Reason. I'm Sarah McConnell. And today, who suffers? Who suffers, and what stories do we tell about our own suffering? Doctors sometimes assume that darker-skinned patients experience less pain, or that unemployed people are more likely to have substance abuse issues. And that affects treatment. Miranda Cashio and Renee Stanley are nursing instructors at the University of Virginia College at Wise. And as they read study after study about medical biases, they wanted to disrupt any biases their students might have. So they developed a simulation that put it all on the table.

SM

Miranda and Renee, what prompted you to want your students to understand the biases they're bringing in to their work?

MC

Well, we really wanted to challenge our students' potential bias. We wanted to see if the bias that exists, you know, in the greater American culture was present in our students. And if it was, we wanted to challenge that through our simulation and our use of our mannequins. That was something that was very interesting to us. On a second note, we really wanted to introduce greater diversity into our simulation lab in terms of the types of patients that we were presenting, what they looked like visually, what their background stories were. So these two sort of desires kind of came together at about the same time. And it just seemed like a good time to do this study and introduce this to our, to our nursing students.

SM

Do you think nurses just come into the medical profession with greater biases than the population at large? Or roughly the same?

RS

No, I don't, I do not think that. That is not the case, I don't believe, no.

MC

Our students are part of their culture, you know, the American culture, the Appalachian culture. So when we were looking through the nursing literature, and there's a lot of literature out there about bias towards patients that have a problem with substance use disorder, or just bias in general, you know, we wanted to measure if our students' unconscious bias was along those same demographic factors as the greater population. And what we found was that, yes, the type of unconscious bias that our students have is the same type of bias that we see in the greater culture. Which makes sense because they, like the rest of us, are the products of their culture. But we did not find that there was any bias that extended beyond that, particularly explicit bias, meaning, you know, knowing bias, like "Oh, I don't like this type of patient." We did not see that. But we did see that, yes, they have the same type of biases that, you know, American culture in general does towards patients that are dealing with substance use disorder.

SM

You know, I imagine this kind of medical bias is the same and yet different in every region of the country.

MC

Well, yes, we in Appalachia are dealing with, you know, substance use disorder just like in the rest of the nation. There has been more of a focus on it. There's been some popular books and things that have been put out in the last couple of years that have focused on it. And sure, it's a problem here. But we want to make the point that substance use disorder is a problem everywhere right now. And so we are not immune to that here in Appalachia, for sure.

RS

Yes, I agree. Miranda. That was one thing that we were looking at as far as, of course, our students are students, they're not actual nurses. When we had our simulation prior to doing this study, that was one of the things that we noted as the faculty that are patient, our simulated patient was very stereotypical, I suppose. We, we made that patient very stereotypical of what people believe a substance use disorder patient would look like, their backstory, and so forth. This individual was unemployed, not married, they were a high school dropout.

And visually, because simulation, that's a very important thing when we're doing simulation, is to make that individual visually look the part. So they were a little bit unkempt, I believe that our patient was a tobacco user, a drinker. So we realized that the students really thought that that's the only type of individual that had, would, would have substance use disorder. Our goal was to see if we expose them to two different patients, one that had a master's degree and was a teacher, that was one of the patients that we had in our study, and then one that was of lower economic status, if that would make a difference in their care.

SM

So you created a situation where you had two different mannequins, and then watched to see how the students would register their needs, their pains, give them medicines and comfort, right?

RS

That's correct, we compare to see if the students that were exposed to the stereotypical patient treated that patient any differently as far as substance use disorder goes, as the other group. And so what I'm saying is we did not with our students find that they treated them any different. The care was the same.

MC

You know, one of the things that we wanted to look at was to test our students' implicit bias of what kind of demographic factors that they felt were correlated with substance use disorder. So you know, socioeconomic status, race, gender, mental health diagnosis, educational level, we looked at all these to try to determine if what we were seeing in the literature regarding bias was present in our students. And like we talked about earlier, we did find that that bias was there, they were more likely to feel that patients with lower education, lower economic status, mental health diagnosis, were more likely to have substance use disorder. And that's what's shown in the literature that is a stereotype.

Then, as Renee said, you know, we split our students into two groups, and we presented each group with a patient. The patient scenario for both of our patients was the same. They were both in a motor vehicle accident, they were both dealing with pain, and they were both substance use disorder patients. However, one of our patients we made stereotypical, meaning we made that patient sort of mirror the national stereotypes and those biases that we saw in our students in regard to those demographic factors. So that patient was a person of color, they had low education, they had low socioeconomic status, they had a history of mental illness. And then our other patient was sort of the not stereotypical patient. So that patient was a full time elementary teacher, she's Asian, she has a graduate degree. She's, you know, upper middle class, she has no mental health, history diagnosed.

But she also has issues dealing with substance abuse in terms of alcohol use and prescription pill use.

So we wanted to see, would our students' care differ between those two, based on the type of patient that we had. And as Renee said, their care was appropriate among both groups. They treated the pain appropriately. They did not deny pain medication or question the patient's, you know, truthfulness in regard to their pain rating. So we were very happy to see that. In the terms of even though they had these implicit biases, it's not affecting their patient care. They're still acting ethically and appropriate for those patients, regardless of what demographic factors were presented to them.

SM

So what's the lesson there, that medical people come into the profession with biases, but it doesn't affect their work?

MC

That was part of what we were looking at. You know, we, in healthcare are taught that we take care of our patient, it doesn't matter who they are, what they've done, or how they present. But we also know that nurses and other health care workers are human, and they're subjected to explicit biases at times, but everybody's has implicit bias. So we just wanted to see if we were going to see those biases play out in terms of affecting their patient care. Our hope was, our hypothesis was, that it would not. That they would act appropriately, and treat the patient's condition, and treat them you know, holistically as they've been trained to do. And they did.

SM

In your reading about bias and medicine more widely, have you seen instances where it actually is affecting patient care on the part of doctors and nurses in care settings?

MC

Yes, we know, for example, that people of color, typically their pain is undertreated in healthcare, nationally. And so there have been several research studies that have looked into why this is the case. And the ones that we have focused on focused on implicit bias. I would say that if you would go up to your average nurse, for example, and say, "Do you alter your pain management based on your patient's race, or ethnicity, or their socioeconomic background, or their educational level?" I would hinge my bet that the majority of nurses would tell you no. But we know from the review of healthcare records that people of color typically don't have their pain treated well.

So studies have done implicit bias testing on healthcare workers, doctors and nurses, and found that, you know, there is implicit bias that mirrors that national bias regarding feelings like certain demographic patients populations, that their reporting of pain, or

their frequency of pain medication request, is viewed as not trustworthy, or over exaggerated or, you know, something like that. So that implicit bias that we have against, particularly people of color, or people of low socioeconomic status is affecting, you know, everything from doctor ordering a pain medication, to the nurse deciding that that pain medication is appropriate for the patient, or that they should get it. So yes, that bias does exist out there. And that's one of the things that we wanted to sort of look at with our students. Obviously, they're not registered nurses yet.

They're not out there practicing. But we kind of wanted to address this bias on the front end before they go out there and practice. And I, and I want to add on top of that, it would be impossible for us to remove implicit bias from our students, or ourselves, or anyone else. What we can do, however, is we can bring implicit bias to the forefront. We can make our students and ourselves more aware of implicit bias and its existence. And we can ask our students, and ourselves, and our nurses, and our healthcare workers to reflect on their actions and their thought processes, to see if perhaps implicit bias was at work at the decisions... in the decisions that they've made.

SM

Well, Miranda and Renee, thank you for sharing your insights on With Good Reason.

MC

Thank you so much for having us. It's been a real pleasure.

SM

Miranda Cashio and Renee Stanley are nursing instructors at the University of Virginia's College at Wise.

SM

The stethoscope is being phased out. Turns out it's not that accurate. And my next guest says if it were just about effectiveness, a stethoscope would have been gone long ago. Kiera Allison is a Professor of Management Communication at the University of Virginia's McIntyre School of Commerce. Her book 'Sound Relations: the Culture of Listening in Modern Medicine,' explores how we make meaning of what we hear in the doctor's office, and how we as patients are heard.

SM

Kiera, the stethoscope is such a doctor symbol, but doctors are moving away from it and embracing ultrasound, which is, is not what they hear but what they see. What's your take on that? Are we losing more than we gain?

KA

Medically speaking, no. Ultrasounds are more accurate, they're faster,

and they deliver better care. But in the broader sense, we are losing another, another point of listening, another point of contact between patients and physicians. So I think when patients and doctors get upset about the loss of the stethoscope, they don't need the stethoscope in order to form a diagnosis. But they want listening to happen somewhere. And when there's less and less time for patients to describe their symptoms, and for doctors to just give a listening ear and nod along and be present.

SM

You know for years, decades, medical schools have been giving stethoscopes to first year students, first year medical students. Now some schools are giving stethoscopes and these little handheld ultrasound probes. Have you heard about that? Isn't that wild?

KA

Yeah. I wish I, I wish I still had medical school roommates who could tell me if they have the same kind of emotional attachment to their ultrasound app as to the stethoscope. Stethoscopes are, are a thing you get to use if you're a part of that profession, right? They have a stature, there's, there's a status that comes with being able to use them, knowing how to use them well.

SM

What is the origin story of stethoscopes? Who made the first one?

KA

Rene Laennec, the French physician in, I believe it was 1816, had a female patient, and modesty required that he not listen directly to her chest. So he rolled up a piece of paper and listened that way.

SM

What'd he find?

KA

He found that he heard better. It actually amplified the chest sounds. So that's where he started perfecting the instrument that became the stethoscope. It used to just be a long wooden cylinder. It was kind of awkward to use. And then it was developed over the decades and the centuries. But he eventually develops a whole physiology of diagnostics through the stethoscope, writes something like 1000 pages on the different sounds he heard and what that meant.

SM

Did people immediately embrace it?

KA

Yes and no. It was difficult to use. It took a lot of training, a lot of ear training. And so it wasn't a thing that everyone else could just pick up and do. Also, the instrument was cumbersome, you know, in

the 20th century you have the flexible plastic tubing that goes into both ears, microphone technologies, it gets easier to kind of use this instrument for an accurate diagnosis. But it was the way that physicians could hope to understand what was going on internally. So they didn't have a lot of alternatives.

SM

In your young life, have you ever had a doctor thump on your back or chest?

KA

Yes. It's funny that I have to think back to being seven years old for that, like... (laughs) But yes, I mean, I had at least one episode with acute tracheitis, and there was a lot of, you know, back thumping for that.

SM

Yeah. When, as you were working on this book, did you first get the idea for sound in medicine, and the stethoscope as a way of listening in medicine?

KA

Yeah. I was studying 19th century literature. This was supposedly the era of the birth of the clinic and the clinical gaze. Suddenly bodies are open to everybody's gaze and I was going to see deeper into character's tissues, and their hearts, and their skeleton and, and I kept looking for it, and I kept not finding it. And it took me a couple years before I realized that I wasn't seeing bodies, I was hearing bodies.

SM

How so?

KA

19th century literature is absolutely abundant with pulses, and breath sounds, and sighs, and nervous tremors. And also people speaking, but not just speaking words, people speaking in little nervous tics.

SM

So there is not just listening and medicine early on. But there are sounds coming from patients early on, and a fascination by the authors with what those sounds must be or must sound like. So in the 20th century, what is sort of the listening relationship for more modern medicine with a patient?

KA

By the 20th century, we have a couple of things sort of unfolding. Freud redefined psychology with psychoanalysis and the psychoanalytic method, where he would have extended conversations with patients. He was interested in whether they paused in a phrase, whether they

stuttered. He was interested in slips of the tongue, and phonetics, and puns. He wanted to look inside patient's brains and understand, at a physiological level, what's going on. But he knew he didn't have the technology to do that. He knew that was in the future. So he listened to them instead. So Freud is shaping your psychoanalytic method that informs a lot of 20th century psychotherapy.

Then if you leap ahead, you have pain medicine. 1970s, the beginning of narrative pain as a diagnosis. So in the 70s, Melzack and McGill develop their pain questionnaire, which is clusters of words. So for example, you have to circle the words. Is it a pulsating pain? Is it burning? Is it scalding? Is it constricting? Is there pressure? Is it cauterizing? All these, these different words that patients could give to their pain, and based on the words, the idea is you can come up with a diagnosis.

SM

But not words like 'unbearable' or 'excruciating.'

KA

Oh those are there too, right? So there's the words that are diagnostic. But on the other side of this movement is a sense that pain is a narrative experience. And one of my early mentors at UVA worked in one of these clinics, because this pain doctor had the insight that these patients understood their pain as a story. So my professor, mentor is in there listening to what the patients are saying. The idea is we can't, the medical establishment can't understand their pain without hearing the patient's story of their pain.

SM

Do you remember an instance that your mentor described where he was just really struck by a patient's story?

KA

So pain isn't just pain, right? If I ask my students like, what's a pain that you can actually celebrate, feel good about? They'll be like, "Oh, workout pain. That means I'm getting stronger." So pain, depending on how you spin it in your brain, the story you tell around it, can be unbearable, or it can be something that we actually live with and even enjoy. On the flip side of that is the pain that we don't know, which is terrifying, because it's unknown, but also because we don't have a language for it. And we don't have a chronology. So if we experienced pain that is just, is new, we don't know how long it's gonna last, we don't know its trajectory. That is terrifying in a way that a familiar pain like the headache that I experience whenever the weather does this, that's annoying, but it's not frightening in the same way.

SM

So what happens after this period in the 70s, where doctors are starting to find the narrative voice for patient's pain?

KA

Well, pain clinics are kind of their own silo. But they belong to a larger movement, because in the 1970s, you have the proliferation of patient's rights. And so patients want to be heard. They want agency within their own medical practice. So now you have a paradox. Medical imaging, which is really taking off by the end of the 20th century, you know, you had computerized tomography, which can give you multi-angled dissections of different parts of the body. Then you have MRIs, and then fMRIs, functional MRIs, which are showing you the brain in motion.

So medical imaging means that doctors can see more. It means that the listening-based diagnostics of the 19th century are becoming less necessary. Sound takes time. With imaging, you don't even need to take the time it takes to listen to a patient's heart sounds. But patients want to be heard, and more is being written by doctors and patients about the right to be heard. And probably the culmination of these two forces is in the 1990s, the development of neuro psychoanalysis by a cluster of neurologists who realized that MRIs supplement, but they do not replace, the wisdom of psychotherapy, and that they had to both look into their patient's brains and hear what their patients are saying.

SM

So with the pandemic, came the rapid rise in telehealth. Now all of a sudden, we're all talking to our doctors via Zoom.

KA

Yeah, it's it's been an amazing phenomenon. I know that for a lot of patients, it allows them to speak from the privacy of their own homes. There is limited privacy at doctor's offices. And, and yeah, it's not always easy to get there. So telehealth solves a lot of those problems. In terms of the experience of listening, again, I think it does two things. It eliminates the possibility of physical examination, and therefore the use of the stethoscope and other kind of in person diagnostic methods. But on the other hand, it means that doctors have to listen to what the patients are saying. So in some ways, it's a resurrected conversation within medicine. Doctors have to spend that 15 minutes listening to you.

SM

Have you had a telemedicine experience during the pandemic?

KA

Yeah, early in the pandemic when I woke up being sure that I had COVID. Actually, I had hypochondria, but yeah, I connected with a doctor I'd never seen before, but she was great. And it was actually

really, for me, it was perfect. It was like a perfect study in what I'm interested in, because she listened to me talk about my symptoms. But then she also said this thing she's like, "You don't sound like somebody who's short of breath." And I was worried that I was short of breath because of course I'm feeling nervous and whatever. But she could hear from the way that I was speaking that this was probably not, not real. I was not actually dealing with COVID symptoms.

So she was actually able to do a little bit of diagnostic listening through, through that, through that medium. And you know, there is also that that other thing that when you meet with a doctor in person, even if you're talking to them, they're not necessarily visibly listening to you. They're behind their desk. They're scribbling notes. With Zoom call, you're just face to face. Which is interesting, I mean, in some ways, it's like you actually have their full attention there they are looking at you. Which is, I don't know, some people would say, that's not actually how conversation goes. We usually shift our eyes, we have a little bit more mobility, but it's a different conversational experience,

SM

It may be leading to something better.

KA

Yes. And you don't have telehealth replacing on site treatment. You have telehealth supplementing it. You still have the on site doctors, but they're getting extra surveillance, and expertise, and advice from the people who are Zooming from another hospital.

SM

And I don't think doctors should feel nervous about, as we're able to do more on our own, let's say with COVID, we can test and say "Do we have it, don't we?" Or we could repeatedly test and see if we're in stages of developing it. I wish we had tests at home for rapid strep, and flu, and all the other things so that we could spend our time with a doctor's office looking at the bigger picture, or what do we do now?

KA

Yeah, yeah, and that's, that's another thing that frustrates a lot of physicians. And as much as they spend a lot of time just charting symptoms. We can all track our symptoms, if we have the technologies we can do that. Doctor's work is to interpret. And it's to interpret in the ways that machines can't. No, no one, nothing yet replaces physician's kind of hearing a patient's account, and then looking at the cluster of symptoms, and saying, "Based on everything you're telling me, this is what I think this could be." So right. I mean, if we get to the phase where we can all just do the basic test on ourselves, and we connect with the physician, and that the work of that doctor is just to help talk us through the meaning of, of what we've captured, then that seems to me the best use of medical

expertise in the first place. And it's I think, fundamentally what most patients, at least this one, I do. Yeah.

SM

Kiera Allison is a Professor of Commerce at the University of Virginia. Her forthcoming book is tentatively titled 'Sound Relations: The Culture of Listening in Modern Medicine.'

SM

This is With Good Reason. We'll be right back.

SM

Welcome back to With Good Reason from Virginia Humanities. Alessandra Luchini is a professor and Director of the Biosciences PhD program at George Mason University. She and her team devised a new technology to find markers in blood and urine that can catch cancer, Lyme disease, and other illnesses sooner than previously thought. Luchini has been named an outstanding faculty member by the State Council of Higher Education for Virginia.

SM

Alessandra, you and colleagues developed a remarkable capability of detecting early cancer in urine. What first gave you the inkling this might work?

AL

My colleagues and I got the inspiration for a technology looking around what was available for the scientific community. And tried to use it for the opposite purpose. So let's start from the problem first. Being able to diagnose a disease early would help us, and this is the case for cancer and infectious disease, is to have a higher chance of successful therapy, and therefore a better quality of life for patients suffering from any disease. The problem however, is that traces of disease in bodily fluids are very, very faint. So it's very hard to identify markers of disease. And so we needed a solution to this very important issue. And so we got the inspiration from similar to what has been used for the COVID vaccine to deliver drugs. And so we use nanoparticles that are made of hydrogen material that is very similar to soft contact lenses as a trap to capture markers of disease in bodily fluids such as blood or urine.

SM

Can this practically now be used in the field?

AL

So one of our great goals, or great efforts in our research, is to try and translate what we discover and perfect on the bench, on the laboratory bench, for patient's benefit. So we envision a future where we can use a cup of urine and do very sensitive molecular analysis and diagnose diseases, including infectious diseases and possibly cancer

and other illnesses.

SM

This was also useful with Lyme disease. So the same technique conceivably could be used with the urine of people who have been infected with Lyme disease?

AL

Sure, it was thanks to a high school student who came to the lab to do a summer internship. Temple Douglas is the name of the student. Inspired by Temple, we pursue Lyme disease as a goal of our research. We've understood how a big important problem Lyme disease was, and what terrible suffering this disease creates in patients and in many, many Americans every year. And one of the big controversy is that after the tick bite, because Lyme disease is transmitted for a tick, patients harbored bacteria that creates the disease. One of the main issues is that in later stage of the chronic phase, later stage phase disease, the origin and cause of symptoms is not completely understood. And, and one of the main reasons is that we lack analytical and laboratory tools to understand whether the issue is persistent infection, or whether the issue is more likely an autoimmune situation whereby our body fights its own cells.

SM

That's wonderful. I know so many people of all walks of life who've ended up with lingering ill effects of Lyme disease. It's such a, it's such a devastating, but hard to pin down sort of problem.

AL

It is, and that leaves very elusive traces in patients. And thanks to our research, we were able to use urine to find molecules that derive from the bacterium itself, and therefore speak to the cause of lingering symptoms.

SM

What about tuberculosis? This technique of detecting traces of the disease in urine is also very useful for tuberculosis. Why is that?

AL

So currently, tuberculosis is diagnosed with the sputum, which is a thick expectorate that people with tuberculosis produce. And then this sputum is analyzed in the laboratory. But children, the elderly, immunocompromised, a lot of patients are not able to produce sputum. And if they're not able to expectorate naturally, physicians try to either induce the sputum, or performing a procedure which consists in inserting a tube either in the nose or mouth of the child and pushing it all the way to the lungs to inject the fluid and recollect it from the lung.

And so obtaining the correct specimen, according to current standards

to identify tuberculosis, is very hard in certain instances. And so my colleague and I, since we are, have been working with urine as a diagnostic biofluid for a while, we thought, "why don't we try to extend that to tuberculosis, and see if we can see again traces of the bacterium, even if it seems a little bit counterintuitive that a disease that is a lung disease would leave us detectable markers in the urine. But so it happens that if we are able to apply the correct and high sensitive technology, we can use urine as a way to eavesdrop at the molecular level what is going on in the body in terms of disease. In all organ systems of the body.

SM

You're doing a lot of this with your students. You have a wonderful rapport with your students, and really foster creativity in them.

AL

Working with students is the source of continuous inspiration. Students bring energy, enthusiasm and passion to the cause of research, and in general bio, biomedical sciences. And I love to work with the students and interact with them in a way that helps them identify their scientific and professional goals, and then foster an environment that supports them to reach those goals. So, I believe creativity is a very important part of the scientific endeavor. And I'm always been extremely attentive and interested in creativity in study creative minds, and in practicing creativity. This point of view comes from my interactions with my grandfather, who was a very important figure in our family. He was interned in a Nazi concentration camp for two years during World War Two, in the Wietzendorf concentration camp.

And the story that he is told in the family is a story of shock when grandpa came home in 1946, and my dad who at the time was five could see this yellowish ghost-like figure, extremely skinny, walking tentatively in the house. My grandpa had missed the family dearly, but for fear of transmitting diseases and parasites, walk in the front yard in his house with a stick, keeping away the family to protect them. And then he made the fire burning his worn out clothes, which he wore for two years in the concentration camp. My grandfather lived to be 96. And we had, him and I had a lot of chances to speak about this experience. And what he always said that what helped him to survive the dehumanized condition of the concentration camp was a creative effort. He wrote poetry, he drew sketches of houses, practicing the training he had in architecture, and that was what kept him alive. He would say creativity is the basis of human identity and the highest product can give rise of highest products of the spirit. And to honor his legacy and to live at the full possible life, I certainly tried to foster creativity and to practice.

SM

You know, you're so right. We, we seldom mention the creative part of

scientific discovery, but so much is just a little tiny idea, and a curiosity, and a willingness to pursue, right?

AL

Absolutely. And also extremely important is cross fertilization of ideas, practices, and technologies that were developed from, for one purpose, they can be extremely helpful to solve other issues.

SM

So are you alarmed by the emergence of new AI like ChatGPT?

AL

The recent emergence of large language models, such as the ChatGPT have certainly surprised me. And I am amazed on how well they do in certain instances. And they will revolutionize the way we teach, the way we learn. I think they pose a good challenge for us to use it and to help students understand that the knowledge, and their learning process informs how they live and eventually who they are. And we certainly don't want to delegate that to a computer.

SM

Absolutely. Alessandra, thank you for talking with me on With Good Reason.

AL

Thank you very much, Sarah. It was a pleasure being here.

SM

Alessandra Luchini is Director of the Biosciences PhD program and a professor at George Mason University. She has been named an outstanding faculty member by the State Council of Higher Education for Virginia.

SM

COVID-19 taught us we need to be better prepared, and my next guest is working with a team of experts to develop the Virginia Infection Prevention Training Center. They're creating a curriculum around disease prevention for everyday people, and for doctors. Michelle Doll teaches internal medicine at Virginia Commonwealth University. She's been named an outstanding faculty member by the State Council of Higher Education for Virginia.

SM

Michelle, what gave you the idea to start an infection prevention program? What was the need?

MD

So, I think COVID-19 had exposed needs around infection prevention, education, and training nationwide. I would say the idea to develop this center was not mine. This is a recognized need nationally. And so

there was federal funding available for infection prevention, training and education. And the vision here is that there would be a one stop shop of sorts for anyone interested in additional infection prevention training, whether you work in a hospital, whether you work in a clinic somewhere, whether you are provide direct patient care, or provide other services within the healthcare system, we wanted a very accessible educational program available. There are some infection prevention training that is required.

But we recognize that a lot of people would be doing this program, you know, in their spare time, after hours. And so we wanted to make it fun, engaging, practical, useful. One of the biggest problems at present are bacteria or yeast that come in the blood as a result of a line that somebody has placed within their bloodstream to give medications and somebody who is ill in the, usually in a hospital. And so those central line associated infections have been on an increase since COVID. And they have as of yet not really come back down.

SM

You're talking about when you insert, let's say, a tube into somebody's vein, there's infection coming into the patient from a dirty line?

MD

So the line itself does not go in to a person dirty, of course. We do everything we can do to make that as clean as possible. The issue is that even our skin, of course, is not sterile. There are organisms on our skin that can certainly eventually track down that line and cause infection, and bloodstream infection. We know that there's some aggressive bacteria that is considered to be normal flora on anyone's skin. Staph aureus is the best example of that. If you've heard of somebody tell you they have a staph infection, and how bad it was, you know, this is one... this we call this an infectious disease a 'bad bug.'

This one is very aggressive. But it is, in fact, our normal flora. And so that is one of the targets for a lot of our preventive efforts, is to keep that particular organism out of the bloodstream in somebody who has a line. So one of the, for example, there's a, there is a antimicrobial gel that we use in our dressings that sits on top of that entry site of the line that helps prevent bacteria from getting in there. We bathe our patients daily with a special antimicrobial treatment, essentially. The substance within that is called chlorhexidine. And that's been shown to prevent the staph from, and other organisms from building up on the skin and causing a problem within those lines. We do all kinds of things to try to prevent it. But there are instances in which we fail. And there is bacteria that gets introduced into that space.

SM

And is it more likely to be from the patient's skin, or from the providers skin? Or is it a toss up?

MD

That's a great question. And in truth, so we think we know the answer to these things. But transmission is of course invisible. We don't see the actual bacteria moving through the system. And so we make a lot of assumptions. So we knew that staff, for example, lives on the skin. And we, the assumption is that most of those infections are going to come from the patient's own flora, or the bacteria that are already living on the patient. So some of the things that we do like that, bathing is targeted at reducing that risk on the patient themselves. However, remember that the healthcare providers within the environment also, in theory, have the same organisms on their skin. And so that's where that piece of hand washing becomes so important. And when we hand wash, we're not necessarily sterilizing our hands, right? We are just decreasing the burden of bacteria, the number of sub bacteria there that could go on to cause a problem.

SM

Name another area that is maybe widespread and simple, but really needs attention in infection prevention.

MD

Within the health care environment, we know that despite our best cleaning efforts, cleaning all of these surfaces, we know that there are certain bacteria that build up on surfaces and become a risk for cross transmission. Hand hygiene is one of the best ways to break those links. So if your hand is taken from your computer, or not touching this other surface, and then going on to touch something in patient's room, then you you break all of those potential chains. And I think it's very difficult for the general public to get their heads around, why is it that healthcare providers cannot be bothered to wash their hands? We all know this is important in theory, it's supposed to be very easy to do. What makes it hard in health care is just the sheer number of opportunities you have to wash your hands in the course of a shift. So they've done studies around this where they followed, for example, a nurse in the course of her work. And they marked down every time she, she or he should have washed their hands. And you get, you know, hundreds of opportunities during the course of a couple of hours of your shift where you should be washing hands. And so it's that level of frequency that is difficult to pull off when you have a lot of other tasks and activities that need to happen on a timely or urgent basis during the course of your shift

SM

And do latex gloves solve that problem?

MD

So gloves do not solve the problem. If you have a misunderstanding

about the purpose of gloves, you could, in theory, have somebody put on gloves at the start of their shift. They think they're being clean. But in reality, they're touching every surface with those gloves, and there's no hand hygiene occurring between. So that's like the worst... the opposite of what we're trying to achieve, right? So yes, gloves have a definite role in infection prevention. But we always have to remind people that they don't replace any of the requirements for hand hygiene. So we ask people to put on gloves if they're going to do an activity that's going to be contaminating with, with fluids or, or secretions. But we want hand hygiene both before they put on the gloves and after they take the gloves off. And studies have shown that there's some confusion around that among providers, that that is one of the needs for ongoing education, of when are we using the gloves, and are we using them appropriately?

SM

Who is your primary target? You have tiers of people you're trying to reach. People, let's say in nursing homes, who are dealing with a lot of different patients are very sensitive to infection. And then, of course, people in hospitals and doctors offices.

MD

Right, we are most comfortable ourselves and most expert in the area of the acute care hospitals. But one of the goals of this program is to develop guidance for outside of acute care. One of the issues is that the data to guide recommendations is just not at the place in some of those settings outside of the hospital that it is in the hospital. So one of the founding fathers of hospital epidemiology and infection prevention is Dr. Richard Wenzel. He is still a professor emeritus at Virginia Commonwealth University, and spent most of his career at the University of Virginia. And there he kind of developed this system of looking for patients with risk factors, doing surveillance, finding the infections, and then from there, from those observations, beyond the risk factors then identifying the things that you could do to prevent infections in those that were at this higher risk. And so that kind of process is the basis for what all we have done. That had its birth in the acute care hospital setting. And we are still working on extrapolating that experience to, to other facilities, and then recreating that same evidence base within those other facilities to inform practice there.

SM

What do you and your colleagues worry about most? I know, for instance, you recently taught an online course about monkeypox. But where do you think the biggest threats are likely to come next?

MD

I don't necessarily have original ideas in this area. But if you ask experts in emerging diseases, for example, what they're worried about, they will often cite a novel respiratory virus is the thing that they

feel like is most likely to stress our system. So something along the lines of COVID-19, you know, God forbid, maybe even worse than COVID-19. This is the fear. And respiratory viruses, as we have seen, as we know, they pass very easily, potentially from person to person, and can cause a lot of strain on the healthcare system. And so that, being prepared for something like this is one of the things that we all worry about. I think we, we know, you know, within infectious disease, there is this realization that we are going to continue to see emerging diseases, meaning that we're going to be seeing more infections that maybe used to be clustered in one specific area, but now are able to overtake other populations that they previously were not seen within. Monkeypox is an example of that. A lot of things about our world today facilitate, or make it easier for, these infections to find new niches, find new populations, find their way into areas that they were not before. And we want to be as ready as possible.

SM

Let me go back to nursing homes for a minute. Because when we had COVID, it seemed like the early and persistent, terrible losses were coming mostly among the elderly who were clustered and served by others, right? In these gatherings of people. So we can imagine that were this to happen again, we'd have the same problems. So it's not so much how many, how many times can we wash our hands, but are there enough workers to help out, and how do we stop infection from one unit to another?

MD

Right, so of course, staffing is so important. That's one of the challenges that we are dealing with currently. And it affects everything we do in infection prevention. So if staffing is stretched such that the critical tasks like the, you know, delivering the medicine on time, and all of these things. Those things kind of fall... all of these things that need to happen with a limited workforce makes attention to detail and infection prevention very problematic. I think nursing homes are going to be in a better position. I think we understand better today, than certainly we did in 2020, what is the role of PPE in these places. And we really have seen that the PPE is protective. And I think that we in the very beginning, certainly there would have been potentially asymptotically infected persons within that environment. You know, without PPE, that would have really facilitated spread in that space. So I think that we have learned a lot from this pandemic. And I do think that nursing homes are going to be poised better in the future because of all of this.

SM

Michelle Doll teaches internal medicine at Virginia Commonwealth University. She has been named an outstanding faculty member by the State Council of Higher Education for Virginia.

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