How Are You? Virtual Health in the 21st Century with Dr. Alison Müller

Nerdin' About Podcast Transcript, Season 2 Episode 4

Michael
Hey everyone welcome to Nerdin' About, I'm Space Michael, and with me as always is someone whose party trick is that she knows all of the collective nouns to all of the animals, and that is Dr. Kaylee Byers.

Kaylee
You really set the bar high with all of the collective nouns. I do know a couple of them.

Michael
There's only like two right? There's the gaggle of fish?

Kaylee
Murder of crows. The mischief of rats.

Michael
There's a parliament of...

Kaylee
Owls. Yeah, there you go. So actually, if anybody's listening and they have any of their own favorites, you should tweet at us on our socials @NerdNiteYVR, and let us know what they are.

Michael
We're just a gaggle of nerds right now.

Kaylee
I was going to say if ever there was a collective noun for us it would be probably something like a gaggle or a giggle of nerds, and to join into our gaggle or giggle of nerds today, we are overjoyed to introduce you to Dr. Alison Müller. Dr. Müller is a postdoctoral fellow at UBC, where she studies how virtual health interventions can facilitate health care communications with patients during COVID-19. Hi, Alison, how are you doing?

Alison
I'm doing pretty good. Yeah, I don't mind this rain, because it turns into snow on the mountains.

Kaylee
Yeah, and maybe one day, we'll be able to go to those mountains.

Alison
We can go, you just have to book ahead.

Kaylee
Speaking of booking and appointments, we're going to talk a little bit today about health care and appointments for health care, and you specifically work in the field of virtual and digital health. So, what is digital health?

Alison
Very good question. So, digital health, and just virtual care in general, is the delivery of care remotely that uses technology. So, this can include text messaging, mobile apps, video chat, basically anything that's uses a virtual medium in order to facilitate communications between a patient, and their health care provider, even something like medical chatbots, or clinical diagnostic tools using Artificial Intelligence also fall under the virtual care category. So, it's pretty broad, but my research mainly focuses on patient care and communicating with health care professionals via this wonderful application called WelTel, which isn't really an app, it's cool, it uses a different set of technology. So, patients don't actually need the internet in order to be able to communicate with their health care provider.

Kaylee
Oh, that's very cool. So, what are the aims of WelTel? Is it to set up a communications link between patients and a health care provider?

Alison
Yes, WelTel is a hub for health care providers. It's being used throughout BC as well as in Rwanda and Kenya, but it's essentially an interface that health care providers will use in order to communicate with their patients. What's really exciting is that it uses SMS text messaging. So, we are able to reach remote areas that have cell service, but don't necessarily have internet service. So, it's text messaging, it's very easy, and we can use additional services. So, we can do video chats, and we use Zoom in order to do video chats, but what's exciting about having this hub is that all of the information is in one secure place that the health care practitioner can look at and see what communication has happened in the past, because everything that's in a text is something that you can go back and read, and it also allows for semi-automated messages to be sent out. So, for example, during COVID, they're checking in on people every day. So instead of having to physically call each patient, you can send out a text message to their phone, and then they can respond "okay", or "not okay". WelTel has natural language processing where they can recognize that, and if something is okay, then the health care practitioner doesn't need to reach out, but they know that the patient has responded, but if they respond with something like "not okay", then an alert comes up on their dashboard, and then they can then communicate with the patient. So, it takes a lot less time away from the health care provider, when something is going awry, or when a patient wants to reach out.

Kaylee
So, it's kind of like a triage when you go to the hospital and they see what might be up with you. They go "Oh, that's more serious, and you get to go in right away, and you over here, maybe you can wait a little while longer, or maybe you actually don't need any care."

Alison
Yeah, exactly. It's just nice to reach out to a patient and ask "Are you okay?" or "How are you?" I believe we use "how are you?" because it's not specific. If someone else ends up looking at your phone, they're not going to assume that it's affiliated with a health care provider. It's welcoming, because when you ask someone how they are, they take a moment to self-reflect. So, this is a friendlier way of communicating with a health care provider, and then taking the time to self-assess before things get really bad, and you may say "Oh, actually, I do need medical care". If I had taken the time to self-reflect, I might have come up with an issue sooner.

Michael
So, what happens if somebody just responds with an emoji? So, somebody texted me, "how are you?", and I just respond with the head with the X'd out eyes, like we talked about earlier. Nobody seems to understand what that is.

Alison
So, we do let people know when they're enrolling that it is text message base. So, we cannot recognize emojis, it does show up as a question mark, or gobbledygook, and that would be registered as "not okay", because it doesn't fall under the "okay" category. So, it's essentially like an unrecognized response, and then the health care practitioner can be like, "We're sorry, we couldn't recognize your response."

Kaylee
So, it seems quite involved, but how did virtual health start?

Alison
So, the very first instance was actually done with nurse's own phones. So, my supervisor, Dr. Richard Lester was in Africa, and he noticed that lots of people had cell phones, not necessarily internet, but they were using cell phones regularly, and one of the issues with health care just in general is adherence to care. So, we know very often we'll get given antibiotics, and then you start feeling better. So, you don't take the full antibiotic regimen, which you should always go to the end of your antibiotics, even if you feel better. So, these were HIV patients that we wanted to see regularly, and see how their health was doing. The idea was just to send them a text message. So, nurses would send them text messages from their phones, just to remind them about appointments, ask how they're doing, and if they have any concerns or need any care. So, this was published in The Lancet in I believe 2010, and it was the very first example of this being used. It wasn't in an internet hub or anything, it was literally just nurses text messaging, and then it moved into a hub in 2013, and we've been working on it ever since. So, incorporating the natural language processing in order to be able to recognize different forms of the word, "okay", different forms of the word "not okay", so it's able to separate it out. We're also working on something else called ConVIScope, which takes that to a further level where it categorizes conversations based on topics. So, using Artificial Intelligence learning technology to recognize if someone's talking about a specific disease, such as diabetes, or cardiovascular disease, versus if they're talking about their finances, for example. So, we can actually separate out conversations using Artificial Intelligence and visualize this using this technology that we're currently developing. But it started with nurses text messaging patients.

Michael
So, Alison, I actually went through the contact tracing experience earlier this year. What was really interesting is I would talk with my friends, because somebody physically called us all, and asked us how we were feeling. For me, I really liked that experience, because I was talking to somebody on the phone, whereas my friends found it really frustrating, and they probably would have liked text messages. So, while I can see how this system would be more effective. Like it's saving time from a nurse actually spending time on the phone, but then there's me procrastinating because I'm talking about my day, and I'm just lonely, I want to have a conversation. Is there data that this is actually more effective than a phone call?

Alison
So that's a very good question. We're actually doing contact tracing using WelTel in Rwanda right now. So, what's really exciting is that both the case, and their contacts are put into the database, and it's at a national level throughout all of Rwanda. So, when someone becomes positive, the system just sends out the message, and provides information on how they can contact a person to talk to on the phone, because it's an initial mode of communication. So, they're able to receive that at any time. They're given the information that's required, and then they can proceed on to a phone call, because all of the information required to safely quarantine and answer any questions does need to be an in-person phone call, and that's what's happening in Rwanda. Initially, that first contact of "you are a contact, please get in touch with us", is very much a good step forward, and it also reduces the burden of nurses because if there's 600 cases a day happening in BC, that's phone calls to all of those contacts, and nurses taking time out to actually get ahold of these people. If it's a text message that's just sent out and then they're receiving the phone calls, and whoever doesn't respond to the text message, there's a record of it. It's like, we sent it to these people, they haven't responded or they haven't contacted us, well, then let's contact them, but that might take numbers from 600 people down to 30 people that they have to try to get a hold of, because the key is to get a hold of people as quickly as possible. Because this is the first time something to this scale has happened. There's no real research assessing that, but because we have access to our WelTel database information, and then there's also the information that's coming locally through the province, now research can be done to compare. You always need a control study when you're doing a scientific study, so that can be our control. Technology from the 1940s, the telephone, versus technology now, and if this is actually helpful.

Kaylee
So, you were talking about how it's being used for contact tracing in Rwanda. What is it being used for here in BC?

Alison
So, it's being used here for patient care, we've got quite a few sites. So, we're actually in Haida Gwaii, and it's there just as a patient communication tool to communicate with the health care authorities, and it's been there for quite a few years now. We also are in the pediatric cardiology unit at the BC Children's Hospital. So, we're doing some research there and because they have a teen population, they've actually really, really liked the whole texting aspect of communicating with their health care providers. We're also within the Mental Health Institute, the Segal Centre. So, there's research being done there, where we're still at the beginning of starting, but that's to follow patients after they've been discharged from the Segal Mental Health Centre, so we're pretty much coordinated all throughout BC. One of the upcoming potential projects that's on the radar is to be used with post-care clinics for patients that have COVID-19. So, these clinics, the first ones already up, I believe in St. Paul's, but the idea would be to follow these patients through WelTel, and using that communication service to understand the long-term symptoms of COVID-19. They want to use this as a tool to be able to communicate, because lots of patients don't necessarily live locally, right? So that's another thing that virtual care really facilitates, you don't have to travel, and especially with a pediatric population that have heart disease, they're coming from all across the province, because BC Children's is the only hospital where you have all of those experts. So instead of having to travel in order to see a physician, you can just text them, and let them know how you're doing. Then they can send out a prescription, have a video chat, determine whether or not it's actually necessary for you to come all the way to BC Children's. So, it's really nice in that regard, and then it's also something that you can if you feel comfortable, it's something where you can be in

continuous communication with your physician. So there's a record of it, and you can go back to previous texts and be like, "oh, yeah, on this day, I felt this." And that can be very useful life saving information.

Michael
So, Alison, we already talked about emojis going into the future, but where do you see this platform going? Where do you see this technology expanding into the future?

Alison
I personally would like to see it everywhere. I think the ease of communicating with a health care provider is so valuable, because so many patients fall through the cracks once they get discharged from the hospital, or once they leave. So, I would like to see it everywhere. I mean, emojis would be nice, and we do use Zoom for video conferencing. I understand that there's a lot of technologies out there that are recording health stats, for example. So, your Fitbit tracks a bunch of physiological parameters, and that data could be incorporated into virtual care. So, you can do lots of self-assessment. I know that there's a few technologies out there that are being developed like the tricorder from Star Trek. So, there was there was a prototype called Scanadu Scout where the patient would literally just put something like a white tricorder on their forehead, and it would get their oxygen levels, their temperature, and a few other basic baseline parameters, and then have a record of it. So, I don't know if it made FDA approval, but that technology is happening. So, being able to merge self-assessment technology, with virtual care to provide physicians with baseline data is fantastic, without a patient having to leave home. To be able to sit at home, communicate with a doctor on Zoom, be able to click a button and scan themselves and be like, "hey, these are my vitals." One thing that we noticed with WelTel in Rwanda is we asked them if they feel any symptoms, and one thing that they were doing in response was actually sending their temperature. So, they would take their temperature and they'd send their temperature, so there's a record of that day, this patient's temperature. So, it's really nice to be able to have access to that data, which is something that a phone call, unless you're recording it, which I don't think is the norm in a health care setting, it's nice to be able to have that. The more information a physician has, the better care they can take of you.

Kaylee
Yeah, that's really cool, though, I have to say that if there's ever a time where we all have our own tricorders, it's going to turn into me just sitting in my apartment scanning myself every five minutes, and having mini heart attacks. (laughs)

Alison
Yeah, there's a balance. Right?

Michael
Well, that brings up something interesting that I came across on your blog, because you're a science communicator, Alison. You said on your blog, that you were involved in collaborative science communication ventures with a common theme of merging science fiction with cutting edge medical research. Could you maybe expand a bit on that? How are you doing that?

Alison
Yeah. So that's essentially something that I was doing pre-COVID, I would attend Comic Cons, and basically talk about science fiction inspired technology that you see in real life. So, one of the best examples of that is tissue engineering. So, the idea of super soldiers is prevalent

through so much of science fiction, whether it be like genetic manipulation, or using stem cells, or cloning, or all that kind of stuff. So, I would take that and I'd be like, "well, actually, it's not that exciting." This is what's happening in real life. So, with CRISPR, for example, I look at GATTACA. Are you guys familiar with GATTACA?

Kaylee
One of the greatest movies of our time. (laughs)

Alison
It is a wonderful movie. I love it because it touches on so many very true themes that people are genuinely concerned about. It's like if we can manipulate genes that way, what does that actually mean for the future? So, I juxtapose that with what's actually happening in CRISPR. In genetic modification it's like, well, in order to modify a gene, you need to know what gene is responsible for the modification that you want. So much of what GATTACA is focused on are things that we don't know about. Like we understand that sickle cell anemia is a mutation of one thing gone wrong in your genetic code. You fix that, no sickle cell anemia, but something like beauty or physique or intelligence, a lot of that is subjective. We also don't know what genes are involved with that, because that's not a health concern. If you are predisposed to having an aggressive type of breast cancer, we know that because we've done the studies to be able to do that, but maybe in the future if you as a future parent want to prevent that from being passed on. Currently, that's very much illegal, and very much not an interest in most funding agencies. Like this idea of designer babies is very hyped up in sci-fi, but practically, there's no legal precedent for it, and it's not really that much of an interest for actual people. We don't really have the technology to manipulate something that we don't understand.

Kaylee
What year is Gattaca based?

Alison
Oh, that's a good question.

Kaylee
How long do we have to get there? Like we're not there now.

Alison
So, the amount of ethical hurdles that we as a virtual care platform have to go through just to be able to talk to patients is already enough. When you're talking about manipulating the genes of unborn babies.

Kaylee
A few extra hurdles? Yeah, just a couple extra. (laughs)

Michael
Should we go to some nerd herd questions?

Kaylee
Yeah, let's get to the nerd hard questions.

Michael
So, if you want to get in on the nerd herd questions, we post on our socials @NerdNiteYVR. Our first one comes from Danielle "Could virtual health drive inequities to health. So, for example, if people don't have access to a computer or internet, could these exasperate language barriers?"

Alison
So that's a very good question. Most people are familiar with virtual care via an app that requires internet and a smartphone, etc. So, if that's the direction of the virtual care that's being funded and being supported, that will limit access, and we do have a paper coming out that talks about actual people in Vancouver's access to smartphones and health care. I think 30% of the inpatients didn't have a smartphone. The great thing with WelTel is because it was developed with access in mind. So, we want to be able to communicate with the most rural populations out there. So, we're currently working in a very nomadic rural area in Kenya called Samburu, and we're able to communicate out there because they have a cell signal. So WelTel only requires you to have a cell signal, and Africa for the most part did a very good job of enabling cell signals throughout the continent to facilitate communication. So, you do not need the internet as a patient to use WelTel and be part of the system, and because it's an open language platform, it can be used in any language. So, we have data from conversations from the first wave of COVID in Rwanda, and so I'm able to look at conversations in English because there's some English, French, we have a few conversations in French, as well as in Kinyarwanda, which is the Rwandan language. So WelTel is able to have all of that information in the native language, so language isn't a barrier. So as long as the texting permits the characters, then it's fine. Language isn't really a barrier, as long as you're able to read, and text, and if that is a barrier, then there are additional things that need to be done socially to facilitate reading. The whole point of WelTel is to reach the furthest possible patients to give them access to care.

Kaylee
Cool. Second question comes from Lisa, "Have there been any controversies around development of this kind of virtual health, any conflicts of interest or anything like that around the development and use of these apps?"

Alison
So, I'm not really aware of anything specific regarding conflicts or conflicts of interest, but I do know that there are a lot of apps out there. So, one that some of the listeners might be familiar with is Babylon. So, Babylon Health, they actually have an office down here in Vancouver, and it's an app, and it allows patients to reach out through the app to a health care provider that is supported by the app. So, it's not their familiar health care physician, it's just someone that's employed by Babylon to communicate with their patients. So, the Rwandan government actually made an agreement with Babylon health, for something called Babel that the Rwandan government is paying for through the citizens health insurance, so that they can use Babel if they want. Now, WelTel is also in Rwanda, and they're actually being used complimentary. So, because Babel is a patient reaching out to a physician, that's very different from a health care provider, reaching out to a patient to notify them. So, what's happening is that initially, it's the health care provider that through WelTel is messaging the patient, if the patient is saying that they're not okay, or would need additional care, they are then directed through Babel to a physician. So ideally you would want health care providers to have these virtual care interventions complement each other. So yeah, there's going to be competition in any field where there's a market.

Kaylee
Please don't buy everything, Facebook.

Alison
Yeah, exactly. Right? Competition drives innovation, and even now, we have three different companies that have a vaccine that's on approval, like we need the competition to drive innovation. So that's very, very exciting. There is conflict of interest, just in general, when you're publishing an academic paper, while you also have a share in a company, but it's something that's public, it's something that's acknowledged by the publisher by the granting agency like anything in academia. So, it's out there for the public to make their own decisions about whether or not it's been skewed.

Michael
So, our final question comes from Natalie "Has virtual health affected anxiety around seeing a doctor? So, some people are anxious when they go into the doctor's office. Just being in the doctor's office makes them anxious. Does this app, this virtual health alleviate some of that anxiety?"

Alison
That's a very good question. So, for our group, we actually have a focus group like questionnaire that we distribute to patients, health care providers, etc., that actually asked about how they feel about using this service. It's been overwhelmingly positive; I think we have over 98% of the patients that have used that would recommend it. So, it's not even just that they've appreciated the platform, but that they would recommend it throughout their health care.
So, there is definitely a genuine physiological reaction, if you're nervous to go to a doctor's office, that's something that can affect blood pressure readings. So, we currently can't do blood pressure readings through WelTel, but maybe with another technology, we'd be able to have that information. Another thing that's been observed is because we're communicating with teenagers, through BC Children's, what's happened is that they'll go in, they'll have a meeting with their doctor, and they'll talk a little bit and then they'll go home, and then they'll actually ask a question that they didn't feel comfortable asking through text message. The other thing that text message allows you to do is it allows you to construct, and think about your question, and be able to ask it in a way that you feel comfortable rather than blurting something out, or worrying that you're going to say something silly or not have your thoughts together. So that's the good thing about text messaging is you can take the time to ask, and this is something that we've noticed a lot, especially with the teenager population, they're far more comfortable texting than they are necessarily face-to-face. There was a study published by the Canadian Medical Association, it's a national poll that Canadians are very satisfied with overall virtual care that's been happening across the country. So, it's something, especially now because there's so much Zoom calling, people are much more comfortable being at home communicating. So, I think it's been overwhelmingly positive based on just generic thoughts, as well as our analysis, and our surveys that we've conducted.

Michael
Nice. Should we nerd out?

Kaylee
Oh, yeah.

Michael
So, if you want to get in on the nerd outs, you can hit us up on our socials @NerdNiteYVR, you could email us Vancouver@nerdnite.com. Our first nerd out comes from Trevor, who's nerding out about 70s Latvian comedies. Which reminds me when I was in a sketch comedy group, we did this sketch that was a Perfect Strangers sketch, which was a sitcom based out of Chicago, but Russia also had a Perfect Strangers sitcom as well. It had all the same characters, even some of the same storylines but Russian actors speaking in Russian. I wonder if there's a Latvian Perfect Strangers show.

Kaylee
Very interesting. Very specific.

Michael
What about you? Alison?

Alison
Yeah, I'm nerding out about historical forensic science. So, I got given a book called The Poisoners Handbook that is focused on the 1920s, and crime and poison in New York City, and evolution of chemistry and science to be able to analyze bodies, and figure out what poisoned them. Then I'm able to see that in actual practice through Murdoch Mysteries, which is a phenomenal Canadian television show. It's so good, it's set in the 1890s, but what's really cool is that Murdoch is using technologies that we're very familiar with, in order to analyze crime scenes, mysteries, and solve crimes. It's cool, because you're seeing how technology and science evolved, and what they used it for. It's been interesting to see the parallels of what I'm reading in the book versus what's happening in Murdoch Mysteries. It's fantastic, like the most recent one was, there was an issue with someone being convicted of being guilty when they were innocent, because the previous investigator didn't use fingerprints, because fingerprints were just not the norm. But Murdoch's like, "everything must be fingerprinted", right? But in the 1890s, that wasn't a thing. So, it's really cool to see how those technologies have evolved, and now we just take them for granted,

Kaylee
You know what I find really interesting along those lines is some medical entomology, and this is going to sound so dark, but I've always found it really fascinating. You look a body and you go, "huh, there's a particular species of fly here, which means that this body must have been here for five days."

Alison
That's awesome. That's very CSI Grissom,

Kaylee
What about you, Michael, you nerding out about any crime things? Looking to solve some mysteries?

Michael
Actually, I am, on a TV theme. So, I'm nerding out about X-Files right now. So, when the Arecibo Observatory in Puerto Rico collapsed, it reminded me about sci-fi shows that use it as a location because it's so just majestic, so cool. The X-Files did it because it's a radio observatory that has the ability to send and receive signals from space, they actually did send a message in real life to interstellar inhabitants with that telescope, or in the hope of

reaching interstellar inhabitants. But it got me back into the show again, it's one of my favorites, and here's why it's so great. So, A: It's filmed in Vancouver in the 90s, and it's probably the best thing that's ever been filmed here. So, it's a great time capsule of that time period. You can figure out filming locations. B: It's a show of two diametrically opposed scientific forces, which is the scientific method in Scully and Mulder, who is this intelligent savant that has this burning passion for the truth, and he isn't afraid to entertain wild ideas. I love the convergence of those two characters and how they grow with each other, and how they need each other

Kaylee
The physical convergence or the intellectual convergence. (laughs)

Michael
Well, actually, maybe both. The third thing that makes the show so great is that it's a bit of a frightening show in that the pursuit of a conspiracy, and what it can do to a person but also a society. The show basically has this large conspiracy that aliens are here, but then there's this web of truth and untruth in the untangling of that main conspiracy, because there's all these other conspiracies that lead Mulder and Scully down these rabbit holes, which really just make the main conspiracy just that much more confusing. The truth that we know that they're seeking just gets much muddier. So, the show narratively does a really good job of hooking you into what's real, what's not real and who really to trust, and as a science communicator, I think my main takeaway is that we need to trust each other as science communicators just like Mulder and Scully, keep each other in check. Overall, I think that leads to a stronger trust in science because there's always holes in the truth, and I guess that's what we're always fighting against. So yeah, X-Files perfect pandemic catch up for me.

Kaylee
So, wait, which one are you? (Laughs)

Michael
I'm probably Mulder. I'm Spooky probably. You're the pragmatic Scully. You're always keeping me in check with "we need to do this", And I'm like, "let's do this wild idea". And you're like "mmm well"...

Kaylee
Remember time? (laughs)

Michael
What about you? What are you nerding about?

Kaylee
Well, okay, that was really cute. I am also going to start off nerding about something that was on TV, but then I'm going to take us somewhere a little different. This is a bit of a holiday themed wildlife disease nerd out. It's almost the holidays here, you're going to hear this in March. We're recording it quite a way in advance. Last weekend, I watched the Claymation Rudolph the Red Nosed Reindeer, which is a 1960s film. It's a holiday classic. My brother and I always watch it together. Although to be honest, it's pretty misogynistic, but I deal with it because I love the Humble Bumble so I put up with it. Love me some Rudolph the Red Nosed Reindeer. Today I was flipping through Twitter and came across some reindeer disease info which felt very on

theme, and it had me thinking about Rudolph getting Chronic Wasting Disease. Now Michael, do you remember what Chronic Wasting Disease is?

Michael
Basically, it has to do with the corpses? I believe it was in moose, was it?

Kaylee
It can be.

Michael
I think that's where I first learned it. It's basically rotting away the corpses, right?

Kaylee
Well, it can lead to corpses for sure, it can get you to the corpse part, and then the rotting does happen after. So, a primer: Chronic Wasting Disease is a disease that affects cervids. So, deer, elk, caribou, and it's caused by a misfolded protein or misfolded proteins, and those are called prions. So, if you haven't heard of Chronic Wasting Disease, you've probably heard of another prion-based disease called mad cow, right? That's sort of a similar thing. So Chronic Wasting Disease is devastating. It's a devastating disease for these animals. It affects the brain, it leads to death, and then the rotting, of course, as we've learned. That happens, it's not ideal, and it's super hard to manage. So, there's a lot of priority around keeping it out of healthy populations of deer and cervids. So, in Canada, Chronic Wasting Disease has been spread throughout our cervid population since 1996. It's infectious, so it can be transmitted from animal to animal, and usually through infected secretions, like urine, feces and saliva that have the misfolded protein. So that's Chronic Wasting Disease. So back to reindeer. I was reading this tweet, and I went to a new paper that was published that was talking about Chronic Wasting Disease first being documented among reindeer in Norway in 2016. It was sort of weird, it of popped up, and they found that it was a different strain that was found in North America. Researchers were like, "What's up with that? How did it emerge? And how did it spread?" This new study that just came out today, was published in Scientific Reports, and it's led by Dr. Mysterud, and it discusses how a behavior of reindeer could have potentially played a role. So, the researchers looked at reindeer using photos and videos, and found the animals engaging in something called antler cannibalism. (laughs) Right? I was like, "Yes, I will read this tweet and this paper". So, while this has been known to occur, they found before that reindeer and other cervids might gnaw on antlers, but antlers that have already been shed from the animal or on a dead animal, they were actually seeing them eating these antlers or gnawing on these antlers of other live reindeer. So perhaps if you had a misfolded protein, and this was a behavior that was happening, and they were gnawing on the antlers, and it happened to be in the antlers, that was one potential way that it could have spread, but to know that the next step is to find out whether these prions are in the antlers of infected reindeer. So poor Rudolph, I'm going to be following this very closely. So that is my nerd out.

Alison
Wow. (laughs)

Kaylee
It took a left turn, a sharp left.

Michael
Next time that you're around some kids watching Rudolph, you're going to be "Actually these reindeer could have Chronic Wasting Disease, and let me tell you all about Chronic Wasting Diseas let's just pause Rudolph for a second. Kids sit down, they eat each other's antlers, okay?" The kids are just looking at each other side eye, "Can we just watch the cartoon?"

Kaylee
That woman obviously has no children, and doesn't know how to speak to us.

Michael
Well, Alison, thank you so much for joining us on Nerdin' About tonight. Where can people find out more about your science communication, and about the work that you're doing?

Alison
So, I have a blog online, it's AlisciencePHD.com. I will be updating it. It's been a little while, but it's been a little busy with our COVID-19 research. That's where I publish on science fiction inspired medical tech. I also will be doing something a little bit more basic on just understanding how scientists do day-to-day experiments like cell culturing, PCR etc. So that's coming soon. I have Twitter @AlicesciencePhD.

Kaylee
Awesome. So, you should go and check out all of those places to follow Alison. Thanks again, Alison. This was a lot of fun. Thank you, everybody, for listening. We really appreciate you hanging out with us. If you like this podcast, you can like us on Apple podcasts. You can leave us a review, and you can get in touch with us on our socials @NerdNiteYVR on Twitter, Instagram and Facebook. We'll be back in a couple of weeks, but until we meet again, let me just ask, "how are you doing?" Take care of yourself.

Transcribed in part by otter.ai