TRANSCRIPT

S1.E10 – Despatches from America: COVID-19 and Skin

(Music)

Associate Professor Alvin Chong: Welcome to Spot Diagnosis, a podcast about all things dermatological. I am Associate Professor Alvin Chong, Specialist Dermatologist and Director of Education at Skin Health Institute., and I am your host. This episode was made possible with the support of the Australasian College of Dermatologists as well as the Skin Health Institute.

(Music)

We have made it to the last episode of season one, and we are very proud to present something very special.

On 6th September 2020, I interviewed two eminent dermatologists from the US about their experiences dealing with the COVID-19 pandemic. Professor Kanade Shinkai is Professor of Clinical Dermatology at UCSF Department of Dermatology and Chief Editor of JAMA Dermatology. Dr Esther Freeman is both an epidemiologist and dermatologist at Massachusetts General Hospital at Harvard, a member of the American Academy of Dermatology COVID-19 Task Force and director of the international COVID-19 Dermatology Registry.

Our guests shared their extraordinary experiences dealing with COVID-19 as the pandemic hit. We learnt about the cutaneous manifestations of COVID-19, including "COVID toes". And we discussed how dermatological patients on biologic mediations and immunosuppression were managed. Our guests also shared their insights and experiences dealing with the many challenges of COVID-19.

This podcast was recorded on Zoom, in the middle of the stage 4 lockdown in Melbourne.

There are a number of papers which our speakers will refer to during this podcast, and we have placed links to some of these papers for your reference on the Despatches from America podcast page on spotdiagnosis.org.au.

I hope you find this podcast to be informative and inspiring, like I did.

(Music)

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Associate Professor Chong: Welcome to COVID-19 and skin - despatches from America. If you're in Australia, good morning. If you're joining us from the US, good evening. This presentation has been made possible by the Skin Health Institute, Victoria and the Australasian College of Dermatologists.

I'd like to start the traditional way by acknowledging the owners of the lands on which we are meeting today and pay my respects to the elder's past, present, and emerging. I'm meeting with you today on the lands of the Wurundjeri people of the Kulin Nation, and I pay my respects to the elders.

My name is Alvin Chong. I'm a specialist dermatologist, director of education at Skin Health Institute, and adjunct associate professor at University of Melbourne. With me is Dr. Aaron Robinson, dermatologist at Skin Health Institute and honorary senior lecturer at the University of Melbourne. He's going to be my co-host and moderator.

Associate Professor Chong: In the last six months, our world has been turned upside down by the coronavirus pandemic. At last count, there have been 26 million confirmed cases and nearly a million people dead. The US has had 6.2 million cases and 190,000 deaths. The numbers continue to grow in many countries.

Last week, in India, there were 83,000 cases diagnosed in 24 hours. Yesterday, Amnesty International reported that a staggering 7,000 healthcare workers have lost their lives to COVID-19. In other countries, we're seeing second waves. New Zealand, who were famously free of disease for 111 days are now in partial lockdown again. Australia has been spared the high numbers. We've had 26,000 cases and 700 deaths, but I'm speaking from Melbourne, "Germy" Melbourne, the epicenter of the Australian second wave. We have been in stage for a lockdown for about four weeks now.

Economies all over the world are struggling. Psychologically, people are battered, and it has been very challenging, to say the least. The COVID-19 virus is deadly. It is insidious, and it is going to be with us for a very long time. How do we continue to provide a clinical service in the grips of a pandemic? What are the cutaneous manifestations of COVID-19? How common are these cutaneous manifestations? What does it mean when a patient presents with perniosis in this time? What about our patients who are immunosuppressed on biologics, what do we do with them?

These are complex and difficult questions, and to help us answer these, we are very fortunate to have with us two eminent dermatologists from the US. Firstly, Professor Kanade Shinkai. Professor Shinkai is the Professor of clinical dermatology and faculty member of the University of California

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San Francisco, UCSF, Department of Dermatology. Kanade specializes in medical dermatology. She is passionate about medical education and now serves as the vice-chair for education for that department. She's also the current editor-in-chief of JAMA Dermatology. Welcome Professor Kanade Shinkai.

Professor Kanade Shinkai: Thank you so much for having me.

Associate Professor Chong: Our next guest is Dr. Esther Freeman. Esther is one of the rising stars of dermatology. She is trained as an epidemiologist with a PhD from the London School of Tropical Medicine, as well as being a dermatologist. Currently, she's the director of Global Health Dermatology at Massachusetts General Hospital in Boston, the chair of the Clinical Guidelines Committee at the American Academy of Dermatology, and a member of the AAD COVID-19 Task Force. She directs the COVID-19 dermatology registry, which is an international effort with over 1,000 cases from 40 countries. She has published seminal papers on the cutaneous manifestations of COVID-19. Welcome, Dr. Esther Freeman.

Dr Esther Freeman: Pleasure to be here, thank you.

Associate Professor Chong: This is where I want to just pause the proceedings momentarily for a moment. We want to remember the lives lost to COVID-19 worldwide and reflect particularly on the 7,000 healthcare workers, many doctors and nurses who have lost their lives in the line of duty, caring for the sick. Each one of them would have been someone's son or daughter, someone's parent, brother, or sister, husband or wife, friend and colleague. Let us now pause for a moment to remember these people who have died helping others and pay our respects. We will not forget them.

(Moment of silence)

Associate Professor Chong: Thank you for this, ladies and gentlemen. There are going to be four themes in our meeting. The first is life during COVID-19. What is it like being a clinician? The second theme is cutaneous manifestations of COVID-19. The third theme is management of immunosuppression during the pandemic, and the fourth theme is challenges and lessons learned.

We'll start with life during COVID-19 or what we call COVID normal. I'd like to ask our guests, can you tell us what was your life like as academic dermatologists and how has the COVID-19 pandemic affected your work as clinicians? Maybe Kanade can start us off.

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Professor Shinkai: Thank you. Well, here in California, we've had certainly not the hardest-hit place within the United States, but we've had about three-quarters of a million cases and 13,000 deaths since early February, which was when the first case of COVID was documented here in the San Francisco area. Though, we didn't know it until much later. It was initially believed to enter the San Francisco area in early March. Our city went into shutdown shelter-in-place March 13th, which were very stringent. Everything closed down. You weren't allowed to leave your home unless you were an essential worker or had to go to the grocery store or hospital or bank, although most banks were closed.

It was a really terrifying time. I had the unique distinction of being on hospital consult call from mid-March until mid-April and really saw a number of cases of COVID during a time when we really didn't know how we should be conducting ourselves safely to see these patients and also what to even be looking for. Getting consults on patients with viral symptoms and a rash, this was a time when there was very little testing available. Testing would take three to five days to return a result. There was a lot of different protocols that seemed to change daily.

Initially, there was actually a few weeks period of time where we were specifically told not to wear masks in the hospital or clinic setting. We were told not to wear masks, we didn't have enough. Indeed, there were very few masks available. This was a really interesting and challenging time to be a dermatologist. I think I had a lot of existential questions at the time. I felt it was very important for us to have a presence both clinically in the outpatient setting as well as the inpatient setting. Certainly not for non-emergency situations, but for emergency situations, we certainly wanted to be there.

It became immediately evident to us that many of the patients who were infected with SARS-CoV-2 had skin manifestations. We didn't understand what those were or what those meant in terms of whether that portended a different level of prognosis or diagnosis or severity of their disease. We were also trying to manage our outpatient or otherwise very busy outpatient setting now through new protocols and telehealth, which was an adventure.

In person, we were not certain what types of protective gear to wear and there was very limited amounts. It was not unusual to have a set of protective wear or protective gear that you would don and then doff into a paper bag, and then carry your paper bag to the next bedside and don it again. This was really an interesting time to think about how I, as a dermatologist, could really contribute to the house of medicine and to our patients.

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Associate Professor Chong: Wow, that's incredibly challenging. The lack of PPE, did that concern you? Obviously, it would have. The idea of seeing patients without any protective gear is right now insane. When it was happening around you, did you just do it?

Professor Shinkai: It's interesting. I think we, as dermatologists, are frequently exposed to many things that we would don PPE for. For example, a patient with disseminated varicella or maybe a patient with tuberculosis, certain skin infections, we have a level of protective gear that we wear in different protocols. This felt very strange to not know what evidence was available in terms of which PPE to use, whether a standard traditional surgical mask was sufficient, whether you needed an N95. Around this time, the KN95s entered the market from Asia and were much more widely available but the question was, were these sufficient?

Other forms of headgear, whether that was a face shield, like a welder's mask face shield, whether we needed to wear eye protection, whether we needed to wear gowns over our regular scrubs or clothes. We just didn't have answers. I think it was unfolding during the time with many different competing positions and interests in terms of, are we recommending that people not use PPE because we just didn't have enough to really sustain the entire healthcare system?

Every aspect of hospital operation would need to wear some level of PPE, and then those who were in direct contact with patients would need maybe potentially a different level of PPE, and then the question was, "How do we prevent people from getting infected by reusing PPE? Do we damage our PPE when we try to decontaminate it?" There's a number of studies looking at whether we could use ultraviolet light or different sterilizing protocols to disinfect PPE. Then would that actually compromised the integrity, or would it even compromise the integrity use the same N95 for repeated occurrences?

These were all questions where there was minimal evidence. It was really challenging to operate in the unknown.

Associate Professor Chong: Did any of your dermatology colleagues or trainees become infected with COVID?

Professor Shinkai: Unfortunately, we did have people who were infected. Although I think analyzing those cases most of them were actually infected through the community, through community contacts, on and off through patient care, through the contact tracing that we were able to do. We feel fortunate for that, but certainly, around the US, I have heard many stories of trainees and faculty members being infected largely through their hospital or clinic contacts.

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Associate Professor Chong: Okay.

Dr Freeman: I agree. I think it was very similar like Wild West when we started just in terms of a lot of the same PPE issues as Kanade did. I remember literally laughing out loud when the CDC guidance-- We had so few masks that the US Centers for Disease Control issued a guidance that it was acceptable for healthcare workers to wear bandanas. That was the moment where I was like, "Oh, we are in really big trouble." [laughs] If the US CDC is saying it's acceptable to wear bandanas for something that we know you should probably be wearing an N95, we're like, "We're really in trouble." I think the challenge of PPE shortage has been huge in the US.

I would love to say that here we are, six months later in Boston, and I'll show you our numbers. We had a huge wave, we were a big epicenter for COVID-19. We're actually still reusing PPE even six months later, which I think is a real statement on the situation of the US healthcare right now, is that we really, I think, should not be in a place where we're still having to resterilize and reuse PPE, both, we are. Right now, I don't wear an N95. We wear surgical masks in clinic. We have very strict policies at Massachusetts General Hospital, but unless you were doing a truly aerosol-generating procedure, you were actually not allowed to wear an N95.

I think some of this may relate to shortage. There's been a lot of debate, but we are actually all wearing just surgical masks in the clinic. I think there's been some debate, for example, around our Mohs surgeons who are doing mohs surgery around the lip. For example, when a patient cannot have a mask on, there's certainly a lot of challenges in there. The services that do wear N95s, for example, are those that where they're going into a room where a patient is intubated or they're doing an aerosol-generating procedure. We have very strict policies about who can wear an N95 versus a surgical mask.

The challenge was there was just no data, and you felt like you were just going into the complete unknown and you didn't know what level of protection you needed to be wearing. Even if you knew, it probably wasn't available. I literally had neighbors dropping off hazmat suits at my door because they knew I was going in and that we had nothing. I didn't end up using them but it was very sweet. One of my neighbors is a construction worker, and he dropped off a hazmat suit which is still in my front hall. I'm not sure what to do with it. I think this is the sense that we didn't really know it was coming.

I wanted to share with you guys just a picture of a little bit of a curve of what our hospital looked like in Boston to give you a sense of what we're experiencing. I just wanted to share with you a little bit of our experience at Massachusetts General Hospital. To give you a sense, I'm not even showing you state data. I am literally showing you just my hospital. Massachusetts General

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Hospital is one of the primary teaching hospitals of Harvard Medical School. We're one of seven Harvard teaching hospitals.

To give you a sense, we are one of many, many hospitals in Boston. This is just my hospital. Just in my hospital, we had about 350 inpatients with COVID-19 during our peak. Our peak was right around mid-April, but it started in early March. Just to give you a sense, in Massachusetts, we had 120,000 cases so far. I wanted to show you a little bit about what it was like for me during this trajectory. We went on lockdown around the same time as Kanade went on lockdown, March 13th.

Our clinic was closed at that time. We had what we call "Doc of the Day." We remained open for emergencies. Our inpatient consult service, much like Kanade, was still going in, but our outpatient service was limited to one doctor rotating through. To give you a sense of our size, we're a pretty big academic department. I think we have about 35 dermatologists. We ended up having one dermatologist staffing urgent situations in the clinic. On March 27th, our department was redeployed, and this happens in a lot of hospitals that were experiencing major waves. At Mass General, they had a whole plan for redeployment.

We were initially redeployed as department to COVID testing. We were going to be, and we partially did actually go into one of the ambulance garages and were COVID testers. Then they redeployed us from our redeployment to the respiratory clinic, which was when we had suspected COVID cases, and it was frontline determining whether those cases needed to be inpatient or outpatient in the respiratory clinic. I think that was very challenging. I was covering Doc of the Day, so I actually did not end up in the respiratory clinic myself.

My colleagues that did, I think it was a very challenging time. I remember distinctly one of them saying the other folks there were inpatient medicine trained, and they said, "Oh, don't worry. If you don't want to wait for the radiologist, you can just read the chest X-ray yourself."

[laughter]

Dr Freeman: They were being like, "What are you talking about? There's no way I'm reading the chest X-ray by myself. I'm definitely waiting for the radiologist." Just this sense of like, "Wow, this is not in our normal scope of practice." In the meantime, while we were getting redeployed from our redeployment, we were opening telederm. At this point, we didn't really know how that was going to work. Our practice was not teledermatology practice. We really had to do that from scratch.

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We opened full-time for teledermatology with actually full clinical schedules, March 30th, which was pretty fast. It was about two weeks later. You can see we have a pretty massive peak. Again, this was just our hospital. To give you a sense of our peak size, normally Mass General has a peak capacity in the ICU of 100 ICU beds. We're a pretty big hospital. These are overall inpatient numbers I'm showing you, but at our peak, I think we had about 150 to 200 people on beds in our hospital. It was really just a challenging time.

We did actually end up opening in person for clinic in June 1. Now that I look at the whole curve, I felt very comfortable going into clinic on June 1st, but now that I look at the curve, I realized we weren't really at the bottom of our curve when I went back to clinic. Now here's a picture, I actually don't wear a gown in clinic anymore. This was actually when I first went back to clinic. I now just wear scrubs. The surgical hat is not necessary. I just wear it because it's more comfortable for me, but we do wear a surgical mask and a face shield or goggles. I happen, with my glasses, to prefer a face shield.

I'm currently at 85% volume. What we've done in our clinic is we don't allow for any double booking anymore. We don't allow anyone to hang out in the waiting room and there's no visitors. We really try to be a little bit more efficient which is why we're functioning around 85%-90% volume instead of 100%. Just to give you a sense, at Mass General, this is comparing the number of, basically, patients that we're seeing for other conditions in the emergency department. The yellow is patients that we're seeing for other conditions, and the blue is for those who we're seeing in the emergency department for COVID.

You can see a massive drop as we went into lockdown of other people coming in, COVID going up, and then now, you can see we're back up to almost normal in terms of our emergency department visits. This is also looking at, again, just my hospital, looking at our deaths. We've had 194 COVID deaths just in our hospital, but those have stayed pretty stable over that time. I'm going to stop sharing. One second. There we go.

Associate Professor Chong: It sounds like you went from dermatology to the most high risk of all high-risk things. Did any of your colleagues get sick and your trainees?

Dr Freeman: We actually did not have any COVID cases in our faculty or our trainees, and we did have some incredible residents who volunteered to go be the COVID frontline. We were not having residents-- Our faculty was who was getting redeployed officially, but we actually had resident volunteers who went in. They basically almost went back to being interns. A number of these were actually our first-year dermatology residents.

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What that means is they had done one year of Internal Medicine Training, and then they had just started on three years of dermatology. They had just finished their one year of Internal Medicine Training. No, maybe nine months before. They actually basically stopped doing dermatology and went back in as the clinical registrars on COVID floors specifically to take care of COVID patient. We had a number of Harvard dermatology residents do that, which is really incredible.

Associate Professor Chong: That is incredible, so courageous, isn't it?

Dr Freeman: Yes, really. Thankfully, nobody got sick, which is amazing. The last thing I'll say about it is I think it's a very personal epidemic for those of us in these hot zones. I, myself, lost one cousin and I had two cousins that thankfully recovered. I think everyone here in Boston knows someone who had it or did not make it. It's a very personal epidemic for us.

Associate Professor Chong: Thank you for sharing all that with us. We'll move on to our second theme now, which is the cutaneous manifestations of COVID-19. Over to you again, Esther. You are the director of Global Health Dermatology and also a director of the International Dermatology Registry of COVID-19. Can you take us through what you've learned and what you know about the skin manifestations of COVID-19, please?

Dr Freeman: Absolutely. I thought I would tell you a little bit about the founding of the dermatology registry and then some of our preliminary findings. I'm happy to obviously answer any questions about it. I wanted to tell you a little bit about the founding of it in particular. We did write a paper discussing how we started this, which was published in the Journal of the American Academy of Dermatology. That's available.

I'm looking at crowdsourcing dermatology in the age of COVID-19. I think it's important to think about what a registry can do and what it can't do because there's a lot of things that it can't do. I think a couple of reasons when we started the registry, the idea being that there was so much going on in different parts of the world, but there was no real central repository for where people were putting in information, especially in regards to dermatologic manifestations around COVID-19. Ideas with the registry that we could really reach globally very quickly and even little tiny observations that maybe weren't much of a noise in different places when you start bringing them together mean a lot more.

It's great for hypothesis generation. Certainly, around things like pernio or COVID toes, a lot of hypotheses were generated from our data. I think it's really important to understand the limitations, which is that it's not the same as a cohort study or any other larger epidemiologic base study. To be honest, as a PhD-trained epidemiologist, this was my biggest hang-up. I almost

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didn't start the registry because I was so worried that people would take it as a cohort study design, and it's not.

What I mean by that is, we don't have a denominator. If people enter cases, I cannot tell you from the registry how many cases of COVID are going to develop cutaneous manifestations because I only know what the cases that people entered. I also similarly don't know of everyone who has X condition, what percentage you're going to test PCR positive, for example. I only have what people enter in the registry. I think it's just important to know that we can't truly assess causation from the registry, and those are some really important limitations.

Just to give you a sense of how this came to be, I remember sitting-- I was in lockdown. I remember thinking to myself, "Boy, someone should really start a registry, and that should be someone who can program an international database, and it should be someone who has infectious disease training and epidemiology training and outbreak training." I remembered sitting there and being like, "Oh, that's me." [laughs] This little moment where I was like, "Oh, shoot, I guess that's really me."

I proposed the idea to the American Academy of Dermatology Task Force on COVID-19, and then quickly proposed it as well to the International League of Derm Societies. They were very supportive as well that we wanted this to be truly international. I think the speed at which this happened really shows the amount of international collaboration and people's willingness to break through barriers and red tape because, in my experience-- I run a lot of international databases in global health and, in my experience, launching something like this usually takes us about six months because there's a fair amount of international collaboration.

This, between when I proposed it to the American Academy of Dermatology going through ethical approval, going through all the programming to having the first patient entered, was nine days. It was just a completely different speed than we normally function at, and the idea of being that it's just really I think shows that the whole international community was interested in creating this and coming together in a way that's not normally possible.

Where are we now? We're at over 1,000 cases from 40 different countries. The cases started coming in really very quickly, and we're so appreciative of other registries around the world like the Global Rheumatology Alliance that provided some insight into their registry experience as well. What are we seeing? We'll talk a little bit about some of our papers. Pernio, like lesions of the feet and hands, otherwise known as chilblains or COVID toes are the most commonly entered symptom, followed by morbilliform eruptions, but we have many, many more. I think we might have as many as 30 different conditions that people have entered into the registry.

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Dr Freeman: I'll start with pernio, chilblains, I put that first, [laughs], and then we'll talk about some of the other manifestations as well. I wanted to talk a little bit about probably one of the more famous dermatologic manifestations of COVID-19 otherwise known as COVID toes. I prefer pernio. I'm not sure in Australia. Do you guys use pernio or do you use chilblains? It seems to be a bit of a--

Associate Professor Chong: Chilblains, pernio, interchangeable.

Dr Freeman: Interchangeable, fair enough. We published our first paper in the Journal of the American Academy of Dermatology back in May, looking at our first 318 patients. More recently, we've actually published on our first 716 cases. I just wanted to show you some pictures. I think you've probably seen many of these pictures before. We get these purple, tender, erythematous lesions, sometimes itchy. Many of my patients have been enough tender that they can't wear shoes for about a week. Other patients don't find it to be as painful.

I do think it's really important to see lesions in different skin colours. Roxana Daneshjou just published a journal in the American Academy of Dermatology case reports a series of images in skin of colour, which I think is really important to highlight. It's a little bit more subtle in darker skin tones. I just wanted to make sure you had seen that. The typical story I would get from a patient-- To be clear, at Massachusetts General Hospital, I myself care for many of these patients because, in our peak, I was getting as many as 20 cases of pernio a day. Normally, I might get one case of pernio in three months so it was a very, very different and wild ride at the time.

The typical story would be someone who'd have gotten the COVID-19, maybe lost their sense of smell and about two to four weeks later would develop these lesions. They would become very painful and tender, and they last a very long time. Usually, somewhere around four to eight weeks, so they can persist a long, long time. I think the most telling paper on this topic was actually this really nice paper looking at SARS-CoV-2 in skin biopsies from seven children that was published in the British Journal of Dermatology. This electron microscopy image, these are toe biopsies.

This electron microscopy image in the lower right is probably one of my single favorite images in dermatology right now. That is an electron microscopy image of a coronavirus. You can see it's very characteristic circle, the little white arrow is pointing to it. That is actually a coronavirus sitting in someone's toe. The point that's particularly relevant is this is sitting in someone's toe when they are PCR negative. There's a lot of question of maybe this isn't related to SARS-CoV-2 because my patients are testing negative, but this isn't a patient testing negative and you're actually seeing the coronavirus sitting in their toe. I think this is very helpful evidence.

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I did review the guidelines that your group had recently come out with regarding pernio and COVID-19, which I thought was very interesting. One thing I wanted to just highlight as a discussion topic or as a thought-provoking question is around PCR testing and pernio. In the registry, if I look at our most recent numbers, we have about 530 cases of pernio in the registry from many different countries. 15% of those who were tested by PCR were PCR positive. Now we don't know that all of them are necessarily by nature of being PCR positive infectious, but if we take PCR positivity to probably be a relatively good marker of infectivity.

If we don't have PCR test patients when they come in with new-onset pernio, you are going to miss some PCR positive patients. A thought question I just have for you, and there's no right answer to this question, I just pose it as a thought question is, what is the cost in your setting of doing a PCR versus the societal costs of missing a case that might be actively viral shedding? There's not a right answer to that. It's a thought question because in some places, you may not be able to access a PCR but if you have a relatively inexpensive or accessible PCR, you are going to catch some cases that are still actively shedding virus. I think that my perspective is a public health hat of how do we stop transmission.

I would just say as well, I think it depends a little on the clinical scenario, and I'll talk to you a little bit about test timing. If you have a patient that comes in and they say, "You know what, doc, my toes have been purple for a month. Maybe I lost my sense of smell two months ago, maybe I didn't, but my toes have been purple for a month. I've been around my whole family, everyone's fine, I've had it for four weeks and now I'm coming in because it won't go away." That person to me, probably the relative utility of PCR testing them might be relatively low. They've had purple toes for a month. The likelihood that that person is PCR positive is probably pretty low.

It's very different to me than if someone comes in and says, "Doc, my toes turned purple yesterday," or, "My toes started swelling yesterday and it's really just started." That's a patient that I would be much more likely to PCR test because it's new-onset, so I think the timing is really critical.

I wanted to show you, and this isn't even hot off the presses. You guys are the first people I'm showing this data ever. It was just added, I think, yesterday in the Journal of the American Academy of Dermatology. I got special permission from Dirk Elston, who's the editor, to show you these graphs because no one has seen them yet [laughs] so here I go. This is not even hot off the press, it's not even available online yet, but it'll probably be available next week. This is a new paper for us titled Timing of PCR and Antibody Testing in Patients with COVID-19 Associated Dermatologic Manifestations.

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What you'll see is that for all of our skin manifestations, if you're PCR testing sooner, they're more likely to be PCR positive. Those that are getting PCR negative tests, those tests are usually occurring later. This is a biased group because maybe the patients who are getting tested sooner are sicker so there might be other reasons that they're getting tested sooner. In general, if you take time zero as the date of your skin symptoms starting, the PCR positive tests are happening sooner.

Now if you look at pernio only, we see the same trend. Patients who are testing PCR positive, the green bar is for pernio, are on average getting their tests done median eight days after their pernio starts. Those that are getting the negative tests median are 14 days after their pernio starts. If we shift over to the far right graphs, these are a little different. Here, we're not looking at positivity and negativity anymore. Here, we're looking at PCR positivity and antibody positivity because, again, when you do the test really matters.

Here, what we're seeing is that the median antibody positivity is around 30 days for all skin manifestations. If you look at the subset that's just pernio, the median antibody positivity is at 27 days. The reason I bring this up is that a lot of people are antibody testing folks 15 days after they've had a skin manifestation and that may be too soon. We don't really know, but I think it's just important to know that there are these longer time lags.

Dr Freeman: I wanted to talk about some of the other, and this is actually briefer, some of the other dermatologic manifestations we've seen. This was our paper on our first 716 cases from 31 countries, and I will tell you now that we're at around 1,000 cases. The ratios are about the same so it hasn't changed dramatically now that we're at 1,000 cases.

We are now, for example, with pernio up to 535, I believe. What we will see is if you look at the first column is those that are laboratory confirmed. Obviously, we're on more solid ground when we talk about those that have lab confirmation. Here, you'll see that pernio actually then comes in number two after morbilliform as being the most common. We have morbilliform and then pernio and then urticaria, macular erythema and then we also have the vesicular retiform purpura and papulosquamous eruptions. One thing that's important to point out in the registry is about 50% of our cases are entered by dermatologists, which also means that 50% of our cases are entered by non-dermatologists.

We don't collect photos intrinsically with every case for ethical reasons. I could not have you upload a photo that might be identifiable of someone's face. We are not able to confirm every diagnosis that's put into the registry. We do rely on the entering clinicians' best judgment. This is

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why other types of studies and cohort studies are really important in COVID-19 in terms of really classifying some of this morphology in more detail.

What I really wanted to highlight from this paper, so this is an image from this paper and I really credit Joanna Harp, who is an inpatient dermatologist working in New York during COVID-19, during the massive New York surge. She was doing all of the inpatient COVID-19 dermatology in New York for one of their major hospitals at the time. She really got to see a lot of this firsthand. She actually helped us create this figure. She was one of our co-authors, so I credit a lot of this visualisation to her.

You'll see that pernio, in general, goes with a relatively mild form of COVID where only 16% of our patients that experienced that symptom in the registry were hospitalised.

I'd like you to contrast that on the other end of the spectrum with retiform purpura, which I do think is more of these end-stage where you've got these thrombotic events. 100% of those patients were hospitalised and 82% of them had ARDS, so you're very sick. Certainly, not all skin manifestations go with the same degree of severity of COVID-19. This was really telling, I remember there was such a contrast between inpatient and outpatient dermatology.

My colleagues, who were running the inpatient service at Mass General were saying, "What are you talking about with pernio? We haven't seen any pernio. We're seeing all these inpatient cases and we're seeing no pernio." I was saying to them, "I've literally only seen pernio. The only thing I've seen for the last four weeks are 30 cases of pernio a day." It is really incredibly telling that on the inpatient side, there was just not very much of this and probably because most of these folks were actually controlling the virus very well.

I do believe, and time will tell us, there's so much to left to learn. We're ultimately going to find out that these, in some ways, are people who are controlling the virus. It's somehow a hallmark of a robust immune response that we don't quite understand yet. I suspect that's what we're going to find out, but I don't think we know that yet. Then I think that's where I will pause right now.

Associate Professor Chong: Can I can ask Kanade, what do you—JAMA Dermatology has actually published a number of series of cases as well who've had-- The European studies - basically of young people or children with pernio who all test negative even though it is in a period of a pandemic, and the conclusion from there was that not all pernio is that concerning.

Professor Shinkai: First, I want to commend Esther for her tremendous leadership in this area to really capture information about what we were seeing, what both dermatologists and non-

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dermatologists were seeing on the skin of patients who were infected with SARS-CoV-2. It's just tremendous work. What's very challenging is really understanding exactly what Esther brought up, which is the timing of testing.

Another component of the testing that is incredibly problematic is that for one of the first times ever, at least in the United States, we were allowed to actually develop our own SARS-CoV-2 testing in our own hospital systems. Rather than having nationally standardized tests, pretty much every hospital had its own homegrown version in an effort to really disseminate the capacity to test patients at all.

This was also a very unusual move by our government and governing bodies, and it begs the question of the sensitivity and specificity of the testing, number one. Then two, Esther brings up an excellent point about when we test patients relative to their usually respiratory symptoms, is what brings a patient towards either a respiratory clinic or a screening tent or fever versus when their skin manifestations presents. So this data is really very novel and important to help us understand that.

I too have had that experience of being on the inpatient side, having done a little bit of outpatient clinic as well, but really did not see COVID toe at all or the perniosis in the hospital, not once. I had even had a patient who's quite famous here in San Francisco. He's a local star, a gentleman who was hospitalized at our institution for 72 days and for a good portion of which, she was intubated. During this time, he had multiple different rashes. I was just waiting for his perniosis develop but he did not develop it at least to my knowledge.

I did wonder whether he would go through this progression of different skin manifestations and whether that tells us something about the natural history of the rashes relative to the course of infection. An important thing for me when I think about infection is that some of these skin manifestations are not specific. As dermatologists, we're certainly used to seeing cases of urticaria eruptions, morbilliform eruptions, maculopapular reactions, seeing enanthems in the mouth that really are not particularly telltale for a particular virus or other infection.

I think that was something that we certainly saw a lot of during the COVID-19 era. I'll also just mention for what this is worth, I saw many adults with exanthems, enanthems, and unusual papular vesicular eruptions during the immediate peak of COVID-19 who were all COVID-19 negative that I could not ascribe a diagnosis too. Usually, with a viral prodrome of fever, malaise, myalgia, and these very viral looking eruptions, a kind of a grainy exanthem, as opposed to that more blotchy, a drug-related maculopapular eruption with no drug trigger.

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It wasn't like we could attribute it to a medication. That was a very unusual observation for what it's worth. I know at least one dermatologist who saw dozens of cases like that during that time. In terms of the perniosis, certainly, there's no question that I too might see three or four cases of perniosis in a year as a medical dermatologist and certainly, there were significant rises in the numbers that we have to explain.

I don't deny that has something to do it with COVID-19. It's just the question is what, who, and when are really the critical questions here in terms of determining what that means. Whether that means that patients have mild viremia. They might even have undetectable levels of viremia which is why we're not detecting it on a nasopharyngeal swab or a pharyngeal swab or that it may require perfect technique because the test itself is not easy to administer.

Whether that means that patients don't generate a humoral immunity to the virus and which is why their serologies remain negative. There probably are some patients who fall into that category, but I think there's no question that there is some association between the virus and the skin findings and the ultrastructural microscopy photos are probably our best evidence to show a direct relationship by seeing the viral particles in the vascular endothelium. I think that that is such important work.

As you know, ultra electron microscopy is not easy to do so I think there were only a handful of cases in which that's been documented but it's so important to help us really begin to really identify the true relationship between this virus and the skin manifestations. Finally, I think that there's probably a number. We do some random testing of people for various settings for various reasons and have discovered asymptomatic carriers or asymptomatic shedders. For example, we have a number of patients that we asked about the example of Mohs surgery.

We test all of our patients for nasopharyngeal swab for SARS-COVID-2 the day before they come to their Mohs appointment because if they need to take the mask off in order to have their surgeries done. We've actually captured a number of patients who are completely asymptomatic but are positive by the pharyngeal swab. I think that speaks to the fact that there are a number of asymptomatic people.

Whether those people have skin findings they might feel so well, they might not even think to report it. I think there's probably a lot of reporting bias, testing bias, or bias testing of because people didn't have access to testing, and a real challenge in terms of determining the prevalence as well as the true associations between all of the skin symptoms that we're seeing and this virus.

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Dr Freeman: There are two recent papers I just wanted to briefly share with you. One was this concept of patients with asymptomatic or mild COVID-19 actually having a robust T cell immunity rather than perhaps they're not actually mounting an antibody type response at all. I thought that's in "Cell". I thought that was a very interesting paper.

The other one that I thought was very interesting and relevant is for patients with mild COVID-19 the idea that their antibodies if they do have them, decay very rapidly. I think both of these highlight points that Kanade was making about timing. Also as you were saying, maybe with these asymptomatic individuals, some of them may not test PCR positive or some of them may not ever test antibody positive. I think those are just some really interesting developments that I wanted to share.

Professor Shinkai: Yes, absolutely. To build on that, I think there are some very important questions about whether serologic positivity confers any immunity to the virus. If so, what does that mean? If we have a person who tests positive for serology, does that mean they will have durable immunity over time? I think there are some big questions that need to be answered.

Associate Professor Chong: We'll move on to our next theme then. Thank you very much for a very, very thorough, and interesting exploration of this topic. I think we're going to find out a hell of a lot more in the next 12 months or so. The next theme we have is really on immunosuppression and in this current pandemic. We all have patients on biologics or psoriasis, heavily immunosuppressed patients. All kinds of autoimmune skin diseases.

There was a recent paper published in The Australasian Journal of Dermatology, which is a consensus on the use of biologic and immunomodulatory treatment in the time of COVID. I would like to ask, Kanade and Esther, what your opinion is on how patients on immunosuppressive drugs and biologics should be managed during this era. Maybe you can kick us off Kanade?

Professor Shinkai: It's such an important question. I'll just start by saying I think more data is needed. There have been a number of efforts towards this end. The first effort has been the gathering of many experts to develop consensus statements largely that are mostly disease-based but some are from the American Academy of Dermatology, which I'll let Esther talk about since she was involved in that work, the National Psoriasis Foundation. Making some general recommendations about if you have a patient who is not on immunosuppression, is now the time to start them on immunosuppression. If so, which one is the best?

For me, I think the jury is still out in terms of the evidence needed to really answer this question. One of the things I'm very struck by that might take time to gather is really comparing our patient

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population, meaning patients who are immunosuppressed for dermatologic reasons, versus those who are immunosuppressed for other reasons.

For example, for an organ transplant recipient or a stem cell transplant recipient or a patient with rheumatologic disease not affecting the skin. Whether that risk of either developing COVID or dying of COVID is different from that of the general population. I think we really need to parse out the data in context of the general population.

I think that data is not going to be available until we see very large database studies. For example, an insurance database study or medication claim study that's going to really look at that question. Hopefully, we'll have the granularity to really identify the true risks for our patients because as you know, for example, a patient who is immunosuppressed for skin disease even has different risks of developing opportunistic infection than those who have rheumatoid arthritis and are on exactly the same medications because the underlying immunology is just different.

One of the things I was struck by early in the pandemic is it seemed like every disease organisation created a registry of their own patients in isolation, which I think is certainly an important aim to capture what is happening with that patient population but again, lacks the context of comparing that to general risk. I think one thing that has really driven that point home was just published this week, a series of papers published in the JAMA Network about patients with dexamethasone that was given to them as part of protocols for sepsis protocols or critically ill management patients in ARDS actually did better in terms of survival.

I think that's important data to suggest that there may be a role for broad corticosteroid use in COVID. The question is when? If you're already on it, does that give you increased risk of even contracting the virus itself, or is it enough to just be on it, and will that help you throughout your course of disease infection? We don't know the answer to that. It certainly is not necessarily translatable into our very large patient population with dermatologic disease who are on systemic corticosteroids. It was specifically dexamethasone.

I think there is some important information there we can certainly hypothesise based on the mechanism of action. However, I think ultimately we're going to need some rigorous science. Ideally to prospectively study this but at some point, it may initially come out through retrospective analysis of large databases to provide that context of the relative risk for our patients.

Associate Professor Chong: Thank you. Esther?

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Dr Freeman: Yes, I agree. It's really a challenging area. I think multiple different disease-specific registries is something we've been dealing with in our fields. One thing we actually did was to start a collaboration between all the different registries. For example, on PsoProtect is the psoriasis registry for COVID-19. SECURE-AD is the atopic dermatitis registry for COVID-19. One thing we did is we actually established a collaboration across eight registries pretty much right at the very beginning. We've actually gone ahead and shared our data and work actively.

I'm currently working with two other registries in collaborations with the idea being trying not to silo this work because I think that's what's so hard is that if you have one registry, you had some patients on biologics and another registry that has another group. You really want to understand about the medications, not just the diseases. I think it is really important. We are at least collaborating. We've done a couple of things. An example in our registry, if you click off that your patient has pre-existing psoriasis, you actually get a little bubble that says, "Did you want to also enter this in the psoriasis registry?" Even if you don't, we'll still collaborate with them.

If you enter a case in the psoriasis registry, you can let us know if that case has also been entered in our registry because you also don't want the double count cases, which is one thing that we were very worried about. Now we're all talking to each other, which I think is important. I agree with Kanade that the registry data is probably not the best way to answer this. I think we can take little bites at the apple. I love your idea about these larger drug databases I think are probably going to give us more powerful information. I'll share my screen again. I think my last little share screen just some of the guidelines around immunosuppressives just to give you a sense of what's out there.

I'm the chair of clinical guidelines for the American Academy of Dermatology. On a normal day, I oversee the American Academy of Dermatology guidelines on things like psoriasis, melanoma, actinic keratoses. Right now we're doing atopic dermatitis. That's my normal job. It's not really my normal job. It's one of my extra normal jobs [laughs] that I do on the side. I was in that role when COVID-19 hit. Very quickly we found ourselves in a place where we were needing to create guidance for the United States in an area where there was no evidence.

I did author this piece pretty early on the epidemic. You can see was published April 9th. That was pretty early for us, about how do we create guidelines when there is no evidence? It's one thing if you have an evidence-based process and it's quite another when there is no evidence to filter in to the evidence-based process. I think it's really important for people to recognise as Kanade mentioned that many of these are consensus statements, which is totally different than an evidence-based guideline. This is really like expert opinion because we don't truly have the data we would need to do a proper assessment.

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I think it's just important for people to understand the quality that these are. These are not really true guidelines. I did want to bring up some of the preliminary data from some of the registries. This is a registry that was actually very helpful to us, the Global Rheumatology Alliance. They launched about a week or 10 days before us and very kindly shared a lot of their pitfalls in their process. They've done a nice job looking at biologics. Interestingly here, they found that anti-TNFs had a decreased out of hospitalisation in patients with rheumatic disease. It's interesting if you look at their glucocorticoid data, which is the opposite of what Kanade was just telling us.

I think there's still so much that's unclear because we've heard a lot more data coming out in favor recently of steroids. It's a question of what do we mean by that? I think just to share the American Academy of Dermatology guidance which we wrote and there's more details on the American Academy of Dermatology COVID-19 resource page. Our real emphasis when we built, this was really when we were at our peak, was to try to keep patients unnecessarily out of the emergency rooms and overburdening the health system and to think about the fact that you have to balance the risk of immunosuppression with the fact if you take someone off, they're going to flare.

We felt very strongly that people should not just come off their immunosuppressive therapy and it should be a real discussion one on one based on the risk profiles of that patient. There's more details on the American Academy of Dermatology website. I thought I would also highlight some more other guidance. This comes from the National Psoriasis Foundation. This has been a nice one. If you go on their website, it's much more detailed than we have from the American Academy of Dermatology. They have 22 different key recommendations.

It does follow a similar reasoning, which is that patients who are not infected with COVID should continue their biologic or oral therapies for psoriasis in most cases. It talks about the concept of shared decision-making. Then they go into a lot more detail.

Associate Professor Chong: Thank you. Look, I completely agree that the data is still scant, but I think overall it is less worrying than when initially COVID hit because when it first hit, everyone thought, "Oh my God, if you're immunosuppressed, you're going to die" That certainly isn't the case. The current evidence is keeping in that. I too have patients who are doing very well. I did have one patient with severe eczema who decided that he wanted to stop immunosuppression. Lo and behold, he was hospitalised twice in a span of four weeks because he just got severe infective flares. That's pretty counter-intuitive.

Professor Shinkai: If it's okay if I just interject, I think another important point is that we're in such an unusual time in world history where we actually have the capacity to shelter in place. That is quite unusual. I think there is actually an exposure bias happening. I think if you are an

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immunosuppressed patient, you are much more likely, at least in the States, you're going to utilise all of the gifts of technology that you can have your groceries delivered, your medications delivered. You can pretty much have anything under the sun you need. If you need a cookie, you can have it delivered to your home. [chuckles]

That provides an incredible protection for these patients. What still remains to be seen is what will happen when we try to reenter these patients back into a normal society with or without masks back into the workplace, back onto public transportation, back into the clinics. I think these are questions that are still remaining. I think we're still in a sheltered shelter and I think that that is an important caveat to some of the data that we're receiving.

Associate Professor Chong: Thank you, Kanade. Thank you. We're going to go and do the last section, which is really on challenges. Both of you are teachers of dermatology. Teaching is one of the things that we do on a bedside. In Australia for a while, we basically just ground to a halt because we just couldn't go into a room and see patients together. Virtual teaching really took off. Esther and Kanade, can you tell us what was it like for you to be teachers during this period? Are you still teaching? How are you teaching?

Professor Shinkai: We've had to be incredibly flexible and creative and also really acknowledging the stress on our learners. Our learners weren't redeployed as in Esther's case but I think our trainees, our medical students were equally terrified to come to work as they were dissatisfied with their education. I think that was a very difficult tension to manage as a medical educator. It also taught us some of the real joys of what you can accomplish on Zoom as we're seeing happening here and using technology to creatively teach.

For example, you can actually do a lot of observation of residents on Zoom, because if you're all on a Zoom video visit with a patient, you can actually observe your resident counseling and speaking to the patient and so you can actually provide very rich feedback. Usually, I'm not in the room as they're carrying all of this out. I think these are important opportunities that we can work with our learners. We've had a lot of fun gamification of teaching over Zoom and other platforms. I think one of the most difficult things has been the mandates for social distancing in our clinic.

We just have not been able to reintroduce all of our learners back into the clinic. When I say all of our learners, that of course includes our dermatology resident physicians, our registrars, our medical students, but also all the primary care trainees. Even other specialists who come in to work with us because usually, it's a more the merrier approach. Now we've had to be very careful limiting our numbers. This has mandated a lot of very complex scheduling to orchestrate so that we can really maximise the number of learners within the limits of social distancing.

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That has been a really challenging thing. Also, there was an entire class of medical students and residents who really lost about three months of their education. We're now playing catch up for them and that's been a source of anxiety for students and administrators alike. It's challenging. One of the things I always really cherish as an educator is saying if you can really show something, so you see it with your own two eyes, you'll never forget it. My normal inclination is, "Oh my gosh, the individual in room three, everyone needs to go in there in that room and see that patient and burn that clinical exam into your mind and just remember that is disease X."

It's just a real joy of teaching. Now we have to think twice, how many people do you want to potentially expose the patient to and also expose our learners to by having these contact points in the clinic space? These are all things that we're grappling with. Then, of course, there's the added stress of having to do the recruitment of new residents completely virtually which is how it's going to happen in the upcoming months

Dr Freeman: In particular, I usually mentor some of our medical students one-on-one for our research here. I was very lucky to have a truly incredible research fellow who's a Harvard medical student who was here working with me who ended up doing all of our COVID research with me. That was really incredible because it was just an incredible training opportunity for her and for me to have a buddy that was working on this at all times of night and day during the peak. However, a lot of my trainees are applying to dermatology residency this year.

A lot of what Kanade was talking about, the trainees that I mentor were very lucky they were taking a year off already. They had already done their dermatology rotation. They had already met people, had the experience. A lot of our folks, our medical students who are interested in applying in dermatology, might not have a home dermatology program. They were really relying on the idea that they were going to have an away rotation at a place where the dermatology program and all of those got canceled.

It's very possible that you could be a medical student who wanted to go into dermatology and you don't even have any dermatologist who's able to write you a letter of recommendation. That's a really tough situation to be in. I think it's going to be a really hard year for a lot of our trainees

Associate Professor Chong: I think we're going to have to wind this up soon. Perhaps I can just let you tell us, Esther and Kanade, what are the real take-home messages from your experience working in the pandemic, and things that you think we can and learn from?

Professor Shinkai: I think there is an incredible opportunity for dermatologists to really lead this work. I remember reading a case series out of Wuhan, China that looked at a couple of hundred

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patients of patients affected with SARS-COV-2. They had reported a rash incidence, the prevalence of less than a percent. I think that speaks to the fact that if you don't get dermatology experts looking at these patients and systematically examining them, we're going to not understand the true prevalence and perhaps prognostic value of rashes in this patient population. I think it's a real opportunity.

I have two other thoughts. One is putting my editor hat on is that we had a tremendous influx of submissions during the peak of COVID, April, May, June, we were getting about 200% submissions. If you look at the published reports in the dermatology literature I wrote out, if you type in COVID and rash into PubMed, you get 141 hits. If you type COVID and skin, you get 571 hits. If you type in COVID toes, you get 25 hits. That's in contrast to if you typed COVID toe into Google, you will see 2 trillion hits. There's really I think an opportunity to think about how we can rigorously study this entity though I don't hope there will be additional waves. I can only guess that there might be.

I think that might be a time for prospective study and also poising ourselves, as Esther has done, to bring together groups of researchers to really crowdsource. I love that word, to crowdsource our talent and what we're seeing to really maximise that effort. One thing I just meant to throw into the ring of discussion is something we haven't really touched on very much is about telemedicine. I don't know what the situation was there in Australia. In the US, we have changes to essentially the way our governing body allows telemedicine. There was rapid opening of telemedicine in mid-March of which many academic centers implemented within weeks.

To be a very robust telemedicine clinic, you could basically do an entire clinic on telemedicine although, for me, it always took a little bit longer than seeing the patients in person. I'm not really certain why that is. The question I always ask myself is are these the patients we really need to be seeing? By increasing this arm of access to patients, have we actually truly expanded our access to dermatologic care? I'm not convinced. I would like someone to study this question because I'm actually worried that telehealth may actually exacerbate current disparities in access to dermatologic expert care. I think that's a very critical self-reflection for our specialty.

Even though it allowed us to continue to do our work, I am still uncertain whether those are the patients who needed us most. I think that is a very important question about our resources. I have a feeling telemedicine will be here to stay. I would like to see this question answered to make sure that we're thoughtfully implementing telemedicine to the patients who needed them.

Associate Professor Chong: Esther, any take-home messages?

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Dr Freeman: What Kanade was saying about health disparities, I think we see this in the data and it's still very distressing to me. Something we've been working on very actively from the beginning is knowing, in the US and worldwide, that COVID-19 is really hitting places that are at a disadvantage socioeconomically. If you look at our skin data, it's not necessarily coming from these places actually hardest by COVID-19. I think that shows us a lot about disparities in access to medical care and disparities in access to dermatologic care. I think that's a really important point. I certainly echo what Kanadewas saying there. I think we're seeing that in dermatologic data as well is that we should be seeing more. I think it's a symbol of the fact that we're not reaching those patients successfully. That's one point.

I wanted to just end on a high note and just say for me, one of my COVID silver linings is actually been the amount of international collaboration and the fact that it's relatively easy for me to come, here I am on a Friday night on a vacation weekend here, and I'm able to come and just pop in and talk to all of you. That's been really nice to be able to build those international bridges and to be able to collaborate with a lot of people that I didn't know before that are running these different registries around the world.

It's been a real pleasure for me to get to know a truly global group of dermatologists and really to be inspired by so many of our wonderful colleagues doing such strong work around the globe. That's been a small COVID silver lining.

Associate Professor Chong: Thank you. I've never heard the term COVID silver lining before but now I have.

Associate Professor Chong: I think that's what we have time for. Firstly, I want to thank Esther and Kanade on behalf of the Australasian College of Dermatologists and the Skin Health Institute Melbourne. Thank you for sharing your knowledge and experience with us and being so generous and open with it. Can I please ask the remaining audience members or 85 of you to unmute yourselves and just give a round of applause to our guests in the usual manner just like clapping.

[Applause]

Associate Professor Chong: Now, I also want to thank the team at the Australasian College of Dermatologists, particularly Sarah Steadman and Kevin Turner. Thank you for setting this up and for publicising it. My team at the Skin Health Institute, in particular, Aaron Robinson for being cohost, Peter Monaghan, Jo Coughlin in the Education team. One final thanks to Dr. Sarah Arron from California for introducing me to Kanade. Thank you. I'll leave on a note of hope. It's unusually a scene from one of my favorite movies, which is the Two Towers from Lord of the Rings.

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As you know, Frodo is the ring bearer and this is the second book and he has been through hell and he's despairing. He says to his good friend, Sam Gamgee, "I can't do this, Sam." Sam replies, "How could the world go back to the way it was when so much bad has happened? But in the end, it is only a passing thing this shadow, even darkness must pass. A new day will come. When the sun shines, it will shine out the clearer." Thank you for your attention, ladies and gentlemen. Stay safe and I look forward to seeing you all face-to-face when the darkness has passed. Thank you.

(Music)

And with that extraordinary episode, the first season of Spot Diagnosis comes to a close.

Thank you all for listening. It is hard to imagine that The Spot Diagnosis podcast series was only released in early March 2020 –perfectly timed as the coronavirus pandemic hit. However, we were able to find a global audience in 37 countries. Spot Diagnosis has been downloaded 3000 times and has made it onto the resource list of several medical schools.

This podcast has been a labour of love and I would like to thank a few people today. Dr Tom Kovi, the co-host of Spot-Diagnosis, was my research and education fellow and we started this journey together. Tom has now taken on a position as Dermatology Registrar and will not be able to keep working on Spot Diagnosis after this season. I would like to thank him for his hard work and enthusiasm, and I wish him well in the future.

I am very fortunate to work with Ms Jo Coughlin at the Skin Health Institute. Jo is our editor, producer, coordinator and is the reason why we can continue to do what we do. You're amazing, Jo. Thank you.

I also want to thank Peter Monaghan, Director of Education at Skin Health Institute. Peter has had to quickly learn about podcast production, publication, metrics and has supported Spot Diagnosis most whole-heartedly.

To the team at Skin Health Institute – thank you for your faith in us.

I want to thank our guests: Drs Peter Foley, Tori Mar, John Su, Belinda Welsh, Katherine Armour, Kanade Shinkai, Esther Freeman. Thank you all for your generosity and openness, and for giving up your time.

I would like to thank Madi Chwasta, Riordan Davis, the Team at Balloon Tree Productions for their help in producing this.

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Special thanks must go to Dr Karen Freilich, the podcast pioneer behind Humerus Hacks, for inspiring me to consider doing a dermatology podcast, Dr Sunny Singh for being a great sounding board for ideas.

Finally – a big thank you to you all, the listeners. Thank you for your attention. If you like what you hear, please rate us, recommend us to your friends and colleagues.

We welcome any feedback, and if you have ideas for podcasts that you would like to hear, please let us know on spotdiagnosis.org.au – we would love to hear from you.

Please stay tuned for Season two, where we at Spot Diagnosis will continue to explore the world of dermatology.

Thank you and stay safe.

(Music)

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