Going Viral: Testing, Diagnosis and Treatment of COVID-19

with

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EPISODE 5: SPECIAL POPULATIONS

ANGELA LECLERC: Hello and thank you for joining us today.

My name is Angela Leclerc, I'm a PA working in Critical Care in Portland, Maine. You are tuning in to the Going Viral: Testing, Diagnosis, and Treatment of COVID-19 podcast series, developed by the American Academy of Physician Associates and supported by an independent education grant from Pfizer. The goal of this series is to provide education and tools to assist PAs and other clinicians in providing patient-centered care in the early recognition, diagnosis, and management of patients presenting in the outpatient setting with symptoms of COVID-19.

The COVID-19 pandemic is now entering its third year, and while cases are abating, new variants continue to emerge along with the threat of new surges in infections. In addition to having three effective and approved vaccines in the United States, new therapeutics have arrived in the clinic that have the goal of preventing serious illness, hospitalization, and death.

Throughout the pandemic, PAs have played a critical role in helping combat COVID-19. As diagnosis and treatment shift to the outpatient setting, PAs are ready to meet the challenge on the frontlines. This is the fifth and final episode in a five-part podcast series, where we will discuss special populations in more detail. I'm proud to be joined by Steph Podolski, who is a PA working in Hospital Medicine in Augusta, Maine, with a Master's of Public Health, and Dr. Sam Wijesinghe, who is a PA and Clinical Assistant Professor of Medicine at Stanford University with a Doctorate in Health Sciences.

Before we get started, let's highlight what we have covered thus far – testing and diagnosis, risk stratification, social determinants as it relates to risk, access, treatment response, and treatment options, including oral antivirals and monoclonal antibodies. We are looking forward to rounding out this discussion with questions around special populations. The data is fairly sparse for many of our special populations, and it's just now becoming available through retrospective analyses.

In my practice in critical care, many of our patients admitted to the ICU with COVID-19 had significant underlying comorbidities. We had patients with cancer, organ transplantation, autoimmune disorders on disease-modifying therapy, and

even pregnant patients requiring ICU management of their COVID-19. These special populations are ubiquitous, and at increased risk of serious illness and comorbidities from COVID-19. Steph, could you help us define what we mean by special populations?

STEPHANIE PODOLSKI: I'd be happy to. So as you highlighted, Angie, in general, our special populations, as it relates to COVID-19, are those who are symptomatic and appear to be at increased risk for developing severe sequelae of COVID-19. It's been strongly recommended by the scientific community that everyone should get vaccinated for SARS-CoV-2, unless absolutely contraindicated. The special populations that we will discuss are a group of folks that are more vulnerable than most and are high priority in vaccination efforts for prevention of severe disease from an acute COVID-19 infection. These groups have been defined as individuals with specific medical comorbidities, such as obesity, hypertension, asthma, COPD, diabetes mellitus, obstructive sleep apnea, chronic kidney disease, liver disease, neurological disease, psychiatric disease, and other underlying conditions, pregnancy, delivery, and breastfeeding, individuals with compromised immune systems, for example cancer patients, solid organ transplant patients, geriatric population, pediatric population, HIV patients, etcetera. There is a whole list of our special populations, as it relates to COVID-19, available to you via many resources on the CDC, NIH website, that I would recommend reviewing.

ANGELA LECLERC: Yeah, those websites are really helpful. I've visited those in the past. Steph, how can patients who fall into these special population categories access COVID-19 treatment?

STEPHANIE PODOLSKI: That's a great question. The first thing that they could do is contact their primary care provider, or in this case, most likely every patient that falls within a special population also likely has a specialist, for example a transplant team, oncologist, OB/GYN, pediatrician, or geriatrician. Management of a COVID-19 infection overall for special populations is similar to the management used for the general population. Some therapeutics are not available for individuals that are pregnant, as we previously mentioned, and similarly for those with severe hepatic or renal disease. Each therapeutic option should be considered in the provider-patient relationship, and shared decision-making should always occur before treatments are considered.

I would like to highlight one specific thing, coming from public health prior to my clinical practice as a PA, I think it's so important for us to highlight that prevention of infection is still the mainstay of how we beat this pandemic. Vaccination efforts for the special populations happen to be our best line of defense - for all of us, of course - but most importantly for our special populations, especially those who are significantly immune compromised, and as we've highlighted before, there are a lot of therapeutics that are not in fact available for our pregnant populations. Personal preventative measures, including masking, distancing,

frequent hand washing with soap and water, or use of hand sanitizer, should still be implemented.

If you follow the CDC rates of COVID-19 infection across the country, you can look at the maps of where there is the most concentrated outbreak at the time, and this changes on a weekly basis, and I highly recommend that healthcare providers take a look at this if you are seeing patients who are at risk in various parts of the country. There are specific measures in place for both pregnant people and for the pediatric population, and my colleague, Sam, will be touching upon the pediatric population in greater detail.

ANGELA LECLERC: Sticking with this immunocompromised theme, Sam, a portion of your practice is specifically related to infectious disease and the treatment of patients with HIV. Can you share with us how treatment and monitoring may differ for this population?

DR. SAM WIJESINGHE: For listeners, I just want to let you know that I have been practicing HIV medicine for the last seven years, so I have a number of experiences in the field. Thank you, Angie, for that question. So let me summarize some important points as you manage patients with HIV and COVID-19 infection, so people with HIV should continue their antiretroviral therapy and opportunistic infection treatment and prophylaxis whenever possible. Antiretroviral regimens should not be switched or adjusted for the purpose of preventing or treating COVID-19 infection. That's a very important point. In general, you may prescribe nirmatrelvir/ritonavir when patients are on antiretroviral for HIV infection, and then preexposure prophylaxis for people with HIV is a possibility. If you have a patient with advanced or untreated HIV who do not have COVID-19 infection and who have not been recently exposed to COVID-19 infection, may be eligible to receive the monoclonal antibodies - treatment of choice probably tixagevimab plus cilgavimab, that's the monoclonal antibody that I have seen the evidence. For our listeners, if you come across any patients with newly diagnosed COVID-19 infection, and now you find out the patient has HIV, please consult an HIV specialist to determine the optimal time to initiate antiretroviral therapy.

ANGELA LECLERC: Great, thank you. Sam, does the nirmatrelvir/ritonavir affect the HIV medications at all?

DR. SAM WIJESINGHE: Yeah, so the ritonavir is the medication protease inhibitor that we have used for HIV treatment, and it has been there for a long time, so if you have a patient that let’s say that patient is at risk for HIV, or if you find out that patient has HIV, before you start treatment with nirmatrelvir/ritonavir combination, it’s a good idea to consult with HIV specialist. That way we will be able to avoid resistance from protease inhibitors in the future, in case if this patient has HIV infection with COVID-19 infection. So that's a little bit gray area, can be a little complicated, so I encourage all our listeners who are not doing HIV

medicine to consult with an HIV specialist if you have to deal with a patient like that.

ANGELA LECLERC: Okay, great, Yeah, I'm sure they will all be very happy to call an HIV specialist and ask for assistance. Thanks, Sam. Steph, do you want to share some of the special considerations for immunocompromised patients?

STEPHANIE PODOLSKI: Yes, I'd be happy to, and the populations I'll specifically be talking a little bit more about are cancer patients and transplant patients, but the HIV population would certainly fall into this category as well, depending on where they are in the course of their treatment, as Sam previously mentioned. But I think it's important to note that any immunocompromised patient may not have an adequate response to vaccination, and this was highlighted throughout the course of the pandemic and this is also why our immunocompromised population received booster vaccinations earlier than the rest of the general population, and so as a result, additional treatment options should be considered if an individual patient who also is immunocompromised is at risk for developing severe disease, which the majority of them are.

I think an additional consideration is whether or not the treatment for their chronic condition has been interrupted, and in fact, I saw a lot of this. Folks earlier on in the course of the pandemic, because everything shut down or because clinics weren't having their patients come in, there was interruption in patients accessing their cancer care, for example, their HIV care, or even their transplant care, and one of the things that we should all consider is, has this caused worsening disease or negative health outcomes that has made their health two years later or two-and-a-half years into this pandemic more challenging and more complicated.

And so for most cancer patients with COVID-19, chemotherapy or immunotherapy should be interrupted. So in this circumstance, if a cancer patient has an acute COVID-19 infection, chemotherapy and immunotherapy will be held, and it will be held until they follow up with their oncologist, and at that point in time, it will be determined when it is safe to resume chemotherapy or immunotherapy at that point in time. We typically resume cancer treatment once transmission base precautions can be discontinued, as long as laboratory studies and patient's clinical condition and their functional status, or their ability to do what they need to do in the community, their ADLs or IADLs, is optimized, at that point in time.

Additional population that I think is very important to highlight is our organ transplantation population, so similarly to cancer patients, COVID-19 poses a lot of challenges for solid organ transplant candidates, whether they're candidates or they have in fact received organ transplantation, and so there are a lot of folks throughout the course of the pandemic who were on the list for organ transplant, and in fact received donation throughout the pandemic, and all donors were

screened for COVID-19, but there was, in fact, a risk of transmission of SARS-CoV-2 infection reported mostly with lung transplantation. It was mostly seen with lung transplantation throughout the course of the pandemic to date. I do think we're going to see more retrospective data that will really determine the risk of transplantation from an individual who is positive for COVID-19 into an individual who may not be. The current data suggests that donors cannot have acute infection at time of donation because of the risk associated with that, but that may change in the future, or it may not. There is screening that happens pre and post transplantation, and the post transplantation risk includes immunosuppressive agents to prevent transplant rejection, and that in fact also increases an individual's risk for acute COVID-19 infection, as well as progression to severe disease in the future if they become acutely infected with COVID-19.

ANGELA LECLERC: Yeah, thanks, Steph, that's all really great information. I actually did not know that about the organ transplant patients. Given their underlying disease processes and immunocompromised states, do these patients need to get treated or monitored any differently as outpatients than patients who are otherwise fairly healthy?

STEPHANIE PODOLSKI: I think it depends on the patient who is immunocompromised and how complicated their health history is. You can have folks who have received transplants who are stable, and most transplant patients, for example, will have close regular follow-up with their transplant team to have levels checked for certain medications that they may be on, etcetera, and so I would say usually, it's the usual follow-up as determined by their primary care team as well as their transplant team, and this is actually going to be more frequent than the general population. The same applies for HIV patients as well as folks with cancer, those folks will be seeing their specialists more regularly, and I do think that once an acute COVID-19 infection comes into the mix for someone who is immunocompromised, this population should be monitored more regularly and much more closely than the general population.

ANGELA LECLERC: Yeah, that makes sense. Thanks, Steph. Sam, could you recap what the recommended dosage adjustments are for patients with chronic liver disease or chronic renal disease?

DR. SAM WIJESINGHE: Yes, so let me specifically focus on nirmatrelvir and ritonavir here. If someone has a liver disease, this antiviral is not recommended. We have seen that ritonavir can lead to liver problems, we have seen that because ritonavir is a medication that has been there for a long time, so therefore caution should be exercised when administering nirmatrelvir and ritonavir to patients with preexisting liver diseases and then liver enzyme abnormalities or hepatitis, so clinicians should keep in mind that this is not recommended if your patients have severe hepatic impairment. When it comes to renal diseases, those should be adjusted, if someone has normal kidney functions, you can go with the

regular dose. Steph mentioned in a previous episode that 300 milligram nirmatrelvir with 100 milligram ritonavir should be taken twice daily, and that will be for five days, so a total of 30 tablets, and then if someone has eGFR between 30 and 60, there is a dose reduction, with nirmatrelvir we will give only one tablet in the morning and then one tablet in the evening, along with one ritonavir, so there will be a dose reduction, so total of 20 tablets.

And then if somebody has eGFR less than 30, it is contraindicated and we cannot prescribe nirmatrelvir/ritonavir antiviral at that time. And I just want to mention, if somebody has severe liver diseases or if they have eGFR less than 30, you should consider if that patient will get benefit from monoclonal antibodies.

ANGELA LECLERC: Great, Sam, thank you, so many important things to take into consideration when prescribing these medications to patients with chronic disease. Steph, I'm wondering if this might be a good time for me to ask you about what's been in the news lately with the pharmacists prescribing antivirals now. Would you be able to comment on that?

STEPHANIE PODOLSKI: Yes, I'd be happy to. So just recently, the FDA authorized pharmacists to prescribe nirmatrelvir/ritonavir, and I think that will become very state-dependent, and as some folks may already know, whether or not pharmacists are allowed to prescribe is state-dependent. I'm not sure what the specifics will be at this point, there wasn't any specifics in the FDA announcement, but the recommendation from the FDA was that patients bring laboratory studies, recent labs, and also medication lists to their local pharmacist if they're seeking a prescription from their pharmacist for oral antiviral treatments, and then depending on where they live, the pharmacist may be able to dispense some medication after review of the home medication list to ensure that there are no significant or major medication interactions, as well as their renal function, essentially, based on recent laboratory studies.

ANGELA LECLERC: Yeah, I think that's great news for increasing access to the oral antivirals, to have the pharmacists be involved. I do rely pretty heavily on my pharmacist here at the hospital to assist with dosing adjustments in patients that may require that, so I would also recommend relying on your local pharmacist, if you have one in your clinic or in your town that you can lean on if you have any questions.

ANGELA LECLERC: That leads us into kind of circling back to some social determinants of health again in our special populations, and I'm going to ask you this, Sam, we know that certain races were infected at a higher rate than others, and I'm wondering which demographics of patients you would consider special populations?

DR. SAM WIJESINGHE: There are several groups that come to my mind when you talk about special populations. Obviously, racial and ethnic minority

populations I should mention about other special populations here too that we currently see quite a bit: people living in rural or frontier areas, and then people experiencing homelessness, and then essential and frontline workers I consider special populations, and then people with disabilities and people with substance use disorders and the transgender community, and then people who are justice involved - incarcerated persons. I think all these people come to my mind when you ask about special populations.

ANGELA LECLERC: Yeah, I agree. Steph, do you have any information that recent data has shown us about ethnic disparities in treatment of COVID-19 with monoclonal antibodies?

STEPHANIE PODOLSKI: Data across the board shows the pandemic has taken essentially an unequal toll on people of color, and I think this pandemic has highlighted the health inequities that exist here in the United States, and there's ongoing studies that do show that people of color in general, because of their social determinants of health, where they live, who they are, how they get to places, the transportation access, cost barriers to general healthcare has put people of color at greater risk for severe outcomes related to COVID-19. We also know that black Americans are twice as likely as their white counterparts to suffer from hypertension and heart failure. Similarly, African Americans also struggle with increased rates of diabetes, obesity, etcetera, and there is similar data comparing various populations based on their social determinants of health to their increased risk of generalized comorbidities, and then as we previously highlighted, that then increases the risk for folks to have severe outcomes as it relates to COVID-19.

So I think what we saw in 2020 was that life expectancy declined over most ethnic and racial groups, according to many CDC studies, and I think we're only going to continue to see that life expectancy rate to decline over the next few years until we are beyond the COVID-19 pandemic. And I think additionally, not surprisingly, health inequities also affect immigrants of color, and so we are a melting pot, and we continue to bring in and welcome refugees and immigrants to our country, and I think what we also see with that is those folks as they arrive here are really struggling with access mid-pandemic, and how do we at one time accomplish getting beyond the pandemic and also dealing with all these health disparities at the same time. So in short, Angie, to answer your question, research does suggest that we need to effectively address all the social determinants of health and look at an equity-focused approach to how we deliver healthcare, and until we do that, we're not going to really serve our patients in an equitable manner, and also really serve our society in an equitable manner.

ANGELA LECLERC: Yeah, very well said, that last statement, kind of to summarize the main issue. There was a retrospective analysis I think that was published a little while ago, looking at underserved areas and populations in terms of monoclonal antibody treatment, and much of what you highlighted was

the issue. It wasn't because these patients didn't want the treatment, they wanted it, but they weren't showing up for appointments and they were cancelling appointments, likely because of transportation or financial issues in receiving these treatments, so thank you for that, Steph.

STEPHANIE PODOLSKI: Thank you, Ange.

ANGELA LECLERC: Sam, have you been treating many pediatric patients, and if so, what are the special considerations there?

DR. SAM WIJESINGHE: Most children with mild or moderate disease can be managed with supportive care alone, and then nirmatrelvir/ritonavir is only authorized for pediatric patients who are 12 years or older, and then we also like to look at their weight, and it has to be 88 pounds. As far as monoclonal antibodies, there is insufficient pediatric evidence for the panel to recommend either for or against the use of monoclonal antibody in outpatient setting, so you may consider case-by-case for non-hospitalized children who meet Emergency Use Authorization criteria for high risk of severe disease, especially those who meet more than one condition that we discussed earlier. Also, if they are 16 years and older, you may consider monoclonal antibody for those children, and then I recommend consulting a pediatric infectious disease specialist in such cases if you are going to use monoclonal antibody for a pediatric population.

ANGELA LECLERC: Great, thank you, that's very helpful, Sam. What about pregnancy? Are there any treatments that are contraindicated or any special considerations?

DR. SAM WIJESINGHE: Yeah, I think it's a very important topic. So when we look at the guidelines from CDC, American College of OB/GYN, and Society for Maternal Fetal Medicine, it is safe to say in general that therapeutic management of pregnant patients with COVID-19 should be the same as for non-pregnant patients. They recommend against withholding treatment for COVID-19 from pregnant or lactating individuals because of theoretical safety concerns, so this is something I think it is very important our listeners to know. Please manage your patients, whether they are pregnant or not, the same way, and then when it comes to monoclonal antibodies, it can be considered in pregnant people with COVID-19.

One other thing that I would like to alert here, that primary care providers or healthcare providers should review patients' entire medication list when they treat patients with COVID. Now, although pregnancy is not contraindicated, another medication that the patient is already on might be contraindicated with nirmatrelvir/ritonavir. For example, if the pregnant patient is on nifedipine for their hypertension, nirmatrelvir/ritonavir may increase the nifedipine level leading to hypotension, so therefore clinicians who are doing women's health, they should

be aware that concomitant use of antiviral and certain other drugs may result in potentially significant drug interaction, so please keep that in mind.

ANGELA LECLERC: In terms of the pregnant population, are there any special considerations for them in regards to oral antiviral treatment?

DR. SAM WIJESINGHE: Yes, I am glad that you asked that question, and I actually have been reading about this to find out what's the recommendation on that, and I actually see conflicting information on that, when I was preparing for this podcast, I wanted to make sure that I provided the right information, so I reached out to a couple of OB/GYN physicians. They continue to see patients with pregnancy and they also treat patients with COVID, so they actually mentioned that they prescribe ritonavir and nirmatrelvir to their patients, so I think it is safe to say there are some conflicting information right now, but clinicians are okay to prescribe, but I highly recommend that you consult with experts in the field before you do that.

ANGELA LECLERC: Yeah, I think that's a really important recommendation in terms of consulting with a specialist, just as the data is not very robust and it's likely that we will have more data through the ongoing analyses at the RECOVERY trial that's looking at multiple treatments for COVID-19 and reporting out data as they have it, so thank you, Sam.

Steph, do you have any information on recommendations with the oral antiviral drug nirmatrelvir/ritonavir in patients who are lactating or taking oral contraceptives?

STEPHANIE PODOLSKI: Sure, so there's no available data on the presence of nirmatrelvir in human or animal milk. There's also no data on the effects in the breastfed infant or the effects on milk production, and so because of that, there are some concerns with the lack of data that ritonavir, specifically, is present in human milk and that there may be adverse outcomes on the infant if breastfeeding with their parent who is on nirmatrelvir/ritonavir.

So at this point, it's recommended that breastfeeding individuals should follow practices according to clinical guidelines and avoid exposing the infant to COVID-19, and likely avoid breastfeeding if possible, however, this should be discussed between the breastfeeding patient and their healthcare provider, and determined on a case-by-case basis as to whether or not the breastfed milk is more beneficial to the infant than holding off on providing breastfed milk for the period of time where the lactating patient may require treatment with nirmatrelvir/ritonavir.

Additionally, contraception, specifically for folks who are taking combined contraceptive agents, the use of ritonavir may actually reduce the efficacy of the combined hormonal contraceptive agents, and it's advised that patients using

combined hormonal contraceptives use an alternative contraceptive method or additional barrier method for contraception for the duration of time that they're requiring treatment.

ANGELA LECLERC: Back to you, Sam. Many of these special populations that you and Steph have been discussing have inequitable access to treatments. What is your experience with mitigating barriers to access for these patients?

DR. SAM WIJESINGHE: Yes, thank you, Angie, for that question. So I try using data-driven approaches when I take care of my patients, so I work closely with community institutions and leaders with diverse backgrounds, and then I advocate for culturally-responsible preach, and then reducing stigma, I think that is a very important thing that we need to keep in mind, including stigma associated with race and ethnicity. So these are the steps that I try to do to mitigate barriers to access, and then I do my part so that all people have the opportunity to attain the highest level of health possible, so those are some of the things that I try to do within my community, in a small town.

ANGELA LECLERC: Wonderful, Sam, thank you for sharing those strategies with us. Steph, moving from Sam's small town West coast to our small town East coast and fairly rural state, has anything been done to increase access to treatments, either oral treatments, appointments, or infusion centers here in Maine?

STEPHANIE PODOLSKI: That's a really great question. So for folks who are not familiar with Maine, the majority of the state is rural, where the really small southern portion of the state is where the majority of the population lives, and so I really have been pleased with how wonderful Maine has done throughout the course of pandemic. Early on in the pandemic, Maine was holding weekly COVID-19 briefings for the general public, as well as for healthcare providers, and in addition, they increased provider education, so there are monthly webinars that are still ongoing for clinicians with updates on COVID-19 vaccines and therapeutics. Maine has also provided free supplies, testing, masks, and treatments to underserved populations, including our refugee and immigrant populations, our rural and underserved, and it has also increased and expanded access to our federally qualified health centers.

The last thing that I've seen here is that the local PA, NP and physician organizations have all made efforts to increase educational resources to their members, as well as clinicians, and have made those resources free and available to clinicians in order to spread the word, and there have been grassroots provider efforts to bring care to the homeless in our more urban communities, as well as our more rural communities, etcetera, and you know, this is not just going on here in Maine, but this is happening across the country, in many different parts and corners of the country where folks need access to care.

ANGELA LECLERC: Great, Steph, thanks for sharing that. I want to share a little case presentation about a patient, and then Sam or Steph, maybe both of you or one of you could answer the question. Recently, there was a 43-year-old female patient with a history of sarcoidosis and ulcerative colitis, who called in with a positive home antigen test and was also symptomatic of COVID-19. She was deemed a candidate for nirmatrelvir/ritonavir, and in reviewing her medications for interactions, this treatment would have likely increased the levels of her oral mesalamine that she relies on to keep her ulcerative colitis at bay. Ultimately, we ended up cutting her oral mesalamine dose in half and starting her on mesalamine enemas for the duration of the nirmatrelvir/ritonavir therapy, which was a total of 10 days that we ended up cutting her back. This is not a unique situation, where we're having a lot of these drug-drug interactions in patients who either are just older and have polypharmacy or are heavily reliant on certain medications to keep their chronic illnesses at bay. Then Sam or Steph, are there any tools that you have come across that are helpful in identifying drug interactions for patients like this one, that they are required to be on the medications for chronic illnesses?

DR. SAM WIJESINGHE: Yes, indeed, I think this is a very, very important thing we should discuss. Recently, I actually had a patient with COVID, and I was prescribing nirmatrelvir and ritonavir – and then my electronic medical records, it has an interaction checker itself, on the EMR itself, so then it flagged not to prescribe the antiviral nirmatrelvir/ritonavir. So there was interaction between nirmatrelvir/ritonavir and flecainide that he is already on for his heart condition, so then obviously, that was not recommended, so I couldn't prescribe nirmatrelvir and ritonavir, so I was very, very glad to see that EMRs have that capability to do that interaction, you know, check between the drugs. Because it's a novel virus and all these treatments are new, I like to do two system checkups. I actually use my EMR and then I also use my Epocrates interaction check, just to make sure that it is a safe medication to prescribe. I use Cerner EMR Outpatient system, and then that has a capability to find out some of these interactions and contraindications.

ANGELA LECLERC: Great, thank you. I had totally forgotten about the Epocrates resource. Steph, do you have anything to add?

STEPHANIE PODOLSKI: I think another common resource that many of us use is UpToDate, which has a medication interaction check through Lexicomp, and I think that's something we all commonly use, and our pharmacists use it as well, but it's pretty readily available, and there's a whole section on COVID-19 therapeutics that makes it pretty easy for people to navigate.

ANGELA LECLERC: Yeah, another great resource, too. Sam and Steph, thank you for joining the discussion about treatment options for special populations, and for your contributions to this series overall.

DR. SAM WIJESINGHE: Thank you, Angie and Steph, and it was great collaborating.

STEPHANIE PODOLSKI: Thank you, Angie, it's been a pleasure.

ANGELA LECLERC: I also want to thank our listeners for joining us. We really appreciate you. Thank you.

RESOURCES

For Providers

- COVID-19 Treatment Guidelines: Special Populations (NIH)
- Coronavirus disease 2019 (COVID-19) (UpToDate)
- SARS-CoV-2 (Epocrates)
- COVID-19 Drug Interaction Checker (University of Liverpool)
- COVID Data Tracker (CDC)
- COVID-19 Health Equity (CDC)

For Patients

- COVID-19 Information for Specific Groups of People (CDC)
- COVID-19 Test to Treat Initiative (HHS)