# Tele-Audiology Today: Background, Current Practices, and Case Examples, presented in partnership with Salus University Recorded Apr 8, 2020

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- [Christy] At this time, it is my pleasure to introduce our guest speaker today. Dr. Samantha Kleindienst Robler is the Director of Audiology at Norton Sound Health Corporation in remote Northwest Alaska. Her clinical and research interests include innovating and improving tools that address accessibility to hearing healthcare including telemedicine and health technology development, and application in the clinical setting. As well as addressing global hearing health and public health policy in the hearing healthcare delivery system. Welcome, and at this time, I'll hand the mic over to you.

- [Samantha] Good morning. Thanks for having me here this morning, or evening or afternoon for people who are dialing in. I'm honored and humbled to be talking to you about this topic that I've been passionate about for a long time. And in light of the current events, we're seeing a lot of barriers come down around doing this technology and I'm hoping to talk to you guys today about ways that you can be starting this yourselves if you're not currently. Just my presenter disclosures, receiving honorarium. I'll be talking and mentioning equipment, I don't have any financial gain or any reason, financial or non financial, to be talking about certain technologies. Sponsoring content disclosures. Okay, so, as many of you probably read when you signed up for the talk, you know, intended to talk about current practices in tele-audiology, current solutions that we are using in Alaska on the regular and then some workflows and examples and processes that potentially use individuals could be incorporating into your own practice. With the current circumstances in the world today with COVID-19 and social distancing, and workflow changes to keep providers and patients safe, I know a lot of you are here today asking the question, how do I do this? And so I have sort of drastically modified what I'm gonna talk about today to address the immediate need, so I hope that that is helpful. Before we get started, could we have the two polling questions, Kimberly? Okay, so I wanted to just pull a little bit from you guys, what type of work setting best represents you just to give me a sense of who you guys are, and

what your needs may be. And then also, give me a sense for how much you have experience with any tele-audiology that you've done or are currently doing or any sort of any telehealth applications. Okay, looks like a lot of people are in hospital clinic setting, some in private practice, some in education, and majority do not have experience at all. Okay, well then I think that this will be helpful today. I think that's probably about all the votes. Kimberly, should we go back to the presentation. Okay, so I'll go over a little bit of foundation just to give some background and a frame of reference. But as most of you probably know, the idea of telehealth is healthcare at a distance, right? So this use of some sort of electronic or communication medium technology to provide healthcare over a separation between a provider and a patient. The concept of telehealth is not totally new. You know way back before electronic communication, you know, people would raise flags and say, hey we have infectious disease here, don't come, leprosy. That's converted to close circuit TVs and telephones and now what we have today which is internet and VTC and smartphone and FaceTime and all of that. The first idea of telemedicine came out in the late 70s conference or 60s, first conference was in the 70s, the first programs and funding towards it in the late 90s.

But it really didn't take off because of cost and technology barriers until the late 2000s. And even to this day, we've not utilize it to its maximum potential until the need really hit. I wanna talk to you guys about types of telehealth or the benefits of telehealth first and then I'll go into the types. This is me probably talking into the choir at this point 'cause you all are aware of the need but telehealth does increase access to providers. And in particularly where I work, its a specialty care, we've seen significantly reduction in wait times for appointments because if you can triage patients through telemedicine, then you get patients in to see their providers as they need to so you just have a much more efficient use of the health care structure. We see much better follow up and so we reduce loss to follow up from anything from post hearing aid fittings to newborn hearing screening programs. And we see this increased timeliness of care whereas someone may not have otherwise received it because they couldn't access it in

person. For sure, telemedicine for us has increased communication between providers and patients and even between providers and providers. We see a decreased cost of care overall, a significantly reduced travel burden, both for providers at times and the patient. And then certainly in the times of today with the circumstances of COVID, we're seeing new benefits of providing care in a situation where it's not safe for provider and patient to enter the same room. So the evidence, I just have two quick slides on evidence. I'm not gonna spend a lot of time here, I'm gonna breeze over this, I might talk more about it in the part two series as people are interested. But the takeaway that I want you guys to have is that there has been bits of research in almost all aspects of tele-audiology.

So from video otoscopy, to how to do an ABR, to how to do some CI programming to tinnitus therapy programs, speech and noise testing, diagnostic audiometry. 2010, you know, just wanna pull on Hall, this is a highly referenced review article. It's a little dated but there's not much in terms of that much comprehensive review since this time, but there are a few more current ones here I've listed that target certain areas, so audiological management, for example, or overall systematic review of the rehab, current status of rehab for tele solutions. And so, there's a lot in the literature, there's a lot of evidence there that you can reference data to show that it's valid description of how they did their programs. And like I said there's a lot of various programs out there. VA is another big one who do a ton of telemedicine to reach their veterans. So, I won't digress into each of these, but the references are cited, there's just a ton of literature. So depending on your certain area of clinical need or interest, we can go down that rabbit hole of what is the evidence that's there. While there is an in depth and there's a lot of room for more evidence to be generated, there's enough there to say that it is feasible, it is possible to do tele-audiology, you know, we can do this very easily. Let's go on to types of telehealth. Some of you may know this pretty well, some may not so I'll spend some time. Synchronous real time telehealth is, as it sounds, the idea of the patient provider is connecting directly through video capability. The benefit of this tends to be that immediate feedback for the patient, tends to be more highly

reimbursed, it also tends to rely more heavily on broadband and so it can be sometimes more costly, a little bit more cost prohibitive. In terms of audiology, there's two models that we use a lot up here for real time synchronous and one is really to support a facilitator. So we have a community health aide which is a trained professional in the state of Alaska who is like the eyes and ears for a provider in that local village. We'll help them, we'll do a case history with a patient, we're able to do the counseling on VTC but we're working with a health aide to collect diagnostic OAEs and an automated hearing test. We're increasing the quality of the data collected, we're interpreting those results in real time, and we're providing a care plan. So that's one example of a real time use. And then the other one that we use it for is much like other people might be more familiar with and that is dial into a computer, taking control over it, and collecting information.

So this could be for example, an ABR, cochlear implant mapping or something we do a lot of which is hearing aid programming. Asynchronous or store and forward as it's called is just think of like an email with a lot of digital data in it. Basically, you have a patient and a facilitator together, The facilitator is collecting a bit of information based on the specialty and the need, using whatever program to compile that information, then sends it for like an email package, to a console to a provider. These tend to be great in terms of time efficiency. So, a provider can see more patients with this model, it tends to be more efficient for this but on the specialty side. It's much lower bandwidth. And so those are the two incentives here for store and forward, this is what we do a lot of in Alaska. The biggest drawback really, is it has historically been reimbursement. In terms of audiology, this is a bulk of what we do based on our clinical need, but we'll collect things like otoscopic images, tympanograms, OAES, diagnostic or screening, automated hearing thresholds and vitals, we also can get the digital images. And in that, they will collect that information and send it to us and we will review it and we provide a consultation. Because we deal with such a high rate of audiologic disease, we partner a lot with ENT. We do all of that on telemedicine, we probably do eight to 10 of these on average per day. Also, it's a model we rely really

heavily on. Hybrid is as it sounds, a kind of a combination of both real time and asynchronous. We've used this quite a bit in replace a field clinic travel, where we have to travel and provide services in person. But instead of that, we've done like sort of these VTC clinics where we're dialing in, we're seeing patients in person, but we're having the health aide help us collect that data and send it to us so we can review. So that's an example of a hybrid model, and we've done that both from the audiology side and the ENT side where I've supported remote ENT clinic, and that's been really fun and interesting. Remote patient monitoring. Most of you might be familiar with this as well. So this idea of someone has a device at home and they're tracking their blood sugar or their blood pressure or their oxygen saturation levels, EKGs. And they're either doing that and tracking it themselves or they're locked into a system that's with whoever's managing their chronic care, and they're red flagging if the levels aren't good. But I really like remote patient monitoring, and I look to see this getting used more just because it really moves us away from that visit centric model to a patient centric model, we're seeing a patient more over time than just between each visit. MHealth is also as it sounds, this idea of using mobile technology for the provision of health care.

You can think similarly, so blood pressure, blood sugar, digital scales, biometric data wear. You know, all these things are all that can connect to your smartphone via Bluetooth, hearing testing apps, other smartphone apps, teenagers trackers, otoscopy. All of these can be done via your mobile phone and so that's this idea of mHealth. And then e-consult is something I've added in, its something we're doing more of particularly now in the light of COVID. So this idea of verbal, audio only telephone consults. And then also virtual check ins, so things like patient portal or messaging technologies, things that you might do with your patients or you might do for your own healthcare. And then we also use e-consults historically for provider to provider communication too. I would be remiss if I didn't also mention tele-supervision and education. Many of you who are in that university setting might be turning to this now for your students. This is something we've done up here in Alaska where we're

supervising over VTC and store and forward, reviewing data store and forward back and forth. It's doable, it's possible, it can actually allow your students to have more rich and diverse experiences and of course we need it now. So it's enabling your students to maintain their education and their program. So, ASHA does have some language out and some guidance on how to do that, and so you can feel free to see their website, but also think training of paraprofessionals. Obviously, audiology online is a prime example for continuing education. So those are the types of telehealth, now I'll go into models a little bit. So obviously you have your provider to provider model, you have provider to remote clinic, this is what I'm historically good at. This idea of a patient showing up into a small rural or local clinic and then the specialty of the provider at the larger regional site dialing in to that local site, and that's for both real time and store and forward and hybrid models.

But now, more important than ever is this kind of direct patient model in the home as we ourselves stay home and as our patients stay home. It is a newish model to me too but I'm gonna talk to you about things that we're doing and barriers we're breaking down to get into this model of care for our patients. I'll talk a little bit about Alaska. I usually have a lot more slides on this and I've moved a lot of this into part two so that I can focus more on you know what you guys are hoping to get out today and that is how do I do telehealth and how do I do it now? But in Alaska, we are a big state, and let me just get the marker here. This is Anchorage, so this is our sort of state hub, and this is the capital Juneau. Here's Fairbanks and this is Nome, this is the regional hospital that I work for, and then these other like sub regions. These little where these stars go out to, this is the small local clinics in each of those communities. And then you have the regional center and then you have the state. And so that's kind of like how our healthcare structure looks overall. But Alaska is massive, it's a fifth the size of the United States. And so when you think about here's Nome, lemme get my marker. You know, here's Nome, and when you descend a patient to Anchorage for surgery, this is an hour and a half flight. The state is large and 75% of the state is not on the road system, which means we're flying between each of these places, or boating or

snow machining. So we 100% rely on telemedicine to provide care otherwise we wouldn't be able to meet our patient's demand. If you zoom in on my region again, so here's Nome, that northwest corner there, and these are our 15 rural communities that we serve, three of which are on islands. Diomede right here is in between Russia and Alaska and is only accessible by helicopter. Back in the day you used to land there via plane on the sea ice but we've not had good enough sea ice in a while to do that. You know, Unalakleet right here is where I lived for four years. A small rural, one of the small communities, it's about 700 people mostly Alaskan Native and is a sub region of Norton Sound. And so just to kind of make sure you're getting a sense of the visual picture. So these are examples of three rural clinics. So, kind of the starting point of our telehealth structure where the health aides reside and the patient resides. You have sub regional clinic here where we have some specialty services that handle part of the state needs so audiology is there for example because we have such a high burden of hearing loss, infection mediated hearing loss, and then dental is here for example. And then here's our regional hospital that's new from 2014 and then you have the state hospital here in Anchorage. Again, so when we're traveling providers between these communities, we're going by small aircraft, boat or snow machine, carding equipment and hopping in these small planes to travel there to see our patients in person or flying them in.

And so because of that, we travel everybody through a workflow, not travel, I'm sorry, we move everyone through a workflow of store and forward first. What can we handle on store and forward? Video teleconference. You know, so like this idea of remote dialing into a computer or video conferencing, and then in person if we need to. But we push everyone through this workflow because we just really wouldn't be able to triage and meet everyone's need otherwise if we just intended to see everyone in person, for example, and so we're able to see people faster and reduce wait times by going through this process for efficient health care for our patients. So services that we provide on the regular right now, video otoscopy, tympanometry, acoustic reflexes, OAEs, medical and surgical management, so think tubes and otoplasties,

mastoidectomies, things like that, cochlear implant, hearing aid, programming and when needed, fittings, troubleshooting, counseling, oral rehab, newborn hearing screening. And then things that we do have that we're novices at or we're just really in development, implant mapping, we're just starting that right now, balance assessment, we're working on with some mobile technology. And to some degree, direct to patient models is not something we've had to depend on before and we have some new barriers we're tackling with that, but it's exciting for me 'cause it's sort of like my wheelhouse. But we don't have great data where we live and so, how do we build some these VTC models when the patient's at home and so we'll talk a little bit about that.

And then just really quickly, I usually have like 10 slides on this alone, but AFHCAN is an acronym for Alaska Federal Healthcare Access Network. And it is the creation of multiple entities through the 90s, it went live clinically in the early 2000s. And is this cart based system that has peripherals on there for like 10 specialties, and so audiology and ENT are an example, cardiology, dermatology, dental, vision, PT uses this, all kinds of stuff. So, in 2019 alone, just our corporation, we did 15,000 cases just store and forward, that doesn't include VTCs. And our top encounters for this type of illness in our otologic just because of the need and because we can capture a lot of information about a ear just through videotoscopy, tympanometry, and automated audiometry and OAEs alone. And then behavioral health, we do a lot of ETCs for behavioral health in the state. Case examples, I have a audiology today article out too that goes into this. And I could spend some time talking more about workflows that lead into this but I thought it prudent to share ways that we use telemedicine to address clinical need and where I've been like, aha man, thank goodness we had telemedicine to take care of these. And then I'm gonna spend the latter half of this talk going into the quick steps and like things that you guys can do that are more applicable to you. I had a case of a gentleman in a remote community that ended up having bilateral cholesteatomas. I was in the field for this one so I was in person with him in the field, and he just happened upon me because he's like, yeah, my ears just

sort of draining and is bugging me. I look in his ears, there's just no eardrums, like just I'm looking right into the middle ear space and I see what it looks like cholesteatomas. Immediately concerned he's got a max conductive hearing loss bilaterally. And so I send this ENT, I send this console to ENT and within an hour, they responded and they're like, yeah, we need to do surgery relatively immediately for him. But he is very hesitant to do that. He didn't think these are going to be his findings and he was really hesitant so I had ENT dial in VTC and give him some pre-surgical counseling, and he hopped on a flight that next week and got both cholesteatomas removed, the TMs repaired and he is fit with hearing aids now. And that's just an example of how we used telehealth, both store and forward and real time to not only expedite his care, but help him in making his clinical decision and help him in determining what his clinical need was and how he was gonna pursue that. And so, he didn't have to wait for ENT in person to come to Nome or fly to Anchorage and then have an eval and then fly back for surgery.

We're able to skip all those steps. With sudden sensorineural hearing loss, I can't tell you how many of these we've done where a patient has a sudden unilateral hearing loss and we do an audiogram and if they can see audiology in person, we do diagnostic, full diagnostic, and if not, then we do automated hearing testing. Sometimes we have a baseline test available, sometimes we don't, and we use that with ENT to immediately start prednisone taper or whatever the treatment plan should be. I had an individual who had to go down for intratympanic steroid injection, but all of that was streamlined using telemedicine. We've had a couple cases where audiological or logic symptom was the presenting symptom for something more serious like a brain tumor and nasopharyngeal carcinoma. We use telemedicine, as an audiologist, we saw a concern, we use telemedicine to consult with that ENT, and advocate for management, that individual would get seen for imaging right away. In the case of the brain tumor I've listed here, he had a lung cancer that had just gone undetected and that had already metastasized to the brain before it was ever detected and that was through an asymmetrical hearing loss. And so that was really interesting to have

caught that and then he used telemedicine, he would write down for a care managed appointment, imaging ENT and oncology, and then from there we managed audiology needs from there using telemedicine only to reduce his travel. And then we had an SOM case, is a really interesting one, I think I included this one in that Audiology Today article. An adult gentleman only came in just for like kind of a muffled hearing in one ear and he had this fusion that really had no reason to be there. And so we sent that to ENT, they were concerned, we got imaging on this individual and he ended up having a carcinoma, nasal pharyngeal carcinoma. And again, so telemedicine to get that individual scheduled for the care they needed right away. Not a lot of waiting, not a lot of extra appointments.

And so we're just detecting these things and then we're getting them managed correctly and appropriately. I think all this audiologic disease, we have tons of tubes and tons of tympanoplasties and tons of mastoidectomy and so, all that pre surgical and post surgical management happens on telemedicine. So like what might historically be a... You know, you might, let's say in the low 48, someone would travel in for an initial evaluation, then they might go in for a pre op, then they might get a surgery, and then they'll go on for post op and they'll be followed postoperatively for whatever procedure six months or three months. We do all of that with the exception of, oh, my screen timed out, we do all of that with the exception of the surgery. And so, all that happens on telemedicine, we reduce all that travel, but all that care still happens and then we manage them appropriately and timely. And then even in some cases of fitting, that island I mentioned that you can only get to by helicopter, I had an elder that desperately needed hearing aids. But with weather and the chopper, sometimes if you can get out there, you're out there for weeks. And if you leave, then you're away from your home for weeks depending on the weather and the chopper schedule. So, what I did with this gentleman, and I'll talk about in another slide, is I did a remote fitting for him, and I can walk you through the steps that I did for that. But let's change the pace a little bit and get to what most of you are here for today and is how do I get started? Like I'm paralyzed in that home, and I need help getting started

with this technology. And so, I would like to walk you through how I think about starting processes for telemedicine solutions for our patients and help you figure out what will work for you based on your needs. And so I first like to look at what is the clinical need? And then is it existing patients and for new patients? And then what technology is already available? And what technology do we need to meet this clinical need? How are we gonna set the models using that technology? And then of course the age old question, reimbursement, how do we make this sustainable? How do you argue with your healthcare administration that you can do this and that it will be revenue generating? So I'll start with clinical need. Think about this as like audiology triage two. So, for your existing patients, what might your clinical need be? Okay, are we looking at changing hearing and ear symptoms, are we looking at amplification or technology follow ups, are we looking at therapies or rehab or vestibular tinnitus, are your patients fall risks or do they have any serious audiologic issues, are you dealing with someone with bothersome tinnitus? And then the same with new patients, and so do you have new patients with those same issues? And so, do you mostly do audiological assessment or vestibular rehab? And then what of those services do you provide can we start doing on telemedicine? So the first thing I always trying to do is like what is the clinical need?

Like what are our patients need right now? So I can't go in the clinic and they can't come to the clinic but what needs do my patients have? What services do we need to try and morph into telehealth services? And then after I kind of get a sense for like, are we screening, are we doing diagnostics, are we doing rehab, once there's a sense of what areas we're trying to address and which we're gonna address first, always try for low hanging fruit, then I start to look at technology. And like look in your equipment closets, dig things out, you might have more technology than you even think you have to start. You know, we're an institution that has required and leaned on telehealth for a long time, and so in terms of equipment, I'm sort of blessed in the sense that we have a lot on our fingertips because we already utilize it a lot. But taking inventory of what you currently have, a lot of your modern day laptops have built in microphones and

cameras. What peripherals do you already have? Do you happen to have auto cams? That's a USB camera from Autometrics or Natus now. Do you have those and do you happen to have some cable laying around that you didn't even know you paid attention to that can be morphed into a type of telehealth model. Then my other tip is looking into your EHR system. You know, most of you that are in the hospital setting have an EHR, we use Cerner. And within Cerner, we have a virtual patient room. And in that virtual patient room is basically the equivalent of like a Zoom waiting room if anyone has familiarity with that, but it's a room specific to each patient in our system and you can give that link to that patient and they can meet you in this room. And so we use this a lot for provider to provider exchange, and then patient to provider exchange. Historically, again, that patient has been located in the remote clinic, but this they can have an app on their phone and you can give them the link or the room number and they can dial in and you just meet them there as the provider. And then you can be documenting simultaneously into a note for the care that you're providing. The other thing that I think goes underlooked is like patient portals. Again, you may use that for your own care.

We have a patient portal, we've highly underutilized it until now. We just pulled a high utilization report of our patients and we're working on getting more people enrolled in portal so that there can be messaging exchange, people can load images there for review, people can review their lab work. So like anything that patients can review at home and not need to come back in or overwhelm the healthcare system, calling or things like that, look to these because you may have them and may not know it already built in, or your corporation may be working on getting these live, these mechanisms up and running. So I would definitely turn to these solutions. Just see what you have. And you may be saying, okay, like, what about internet? I mean, do our patients have internet? You know, are we're gonna be able to reach everybody? And the answer is no, you won't. But there are lots of reports on internet penetration and the FCC puts a lot of reports out on broadband deployment and there's money and things that go towards in particular rural areas to help increase broadband access. You know, overall

across the United States, about 90% of the US is connected by internet. That, of course dwindles significantly when we look at rural areas, and then even more so we look at tribal areas, but it is better and it's much better than it was before. Even in the 10 years I've been serving Norton Sound, I've seen a much better ability to do more telehealth. At first, we could never do remote programming of hearing aids and things like that. And so, we've come a long way with internet connectivity, and I think particularly for you guys in urban areas, this will not be an issue. Potentially downloading an app and walking someone through the technology might be hard, but I think in terms of connectivity, you'll be fine. Rural areas a little bit more of a challenge. We're doing a couple of different things, I'm gonna get to a scenario section where I spend a little bit of time talking about scenarios. And when we get there, I'll talk to you a bit about the things that we're doing to try and break down some of those barriers in the home.

So equipment. People have a lot of questions on what equipment do I use? How do I do this? Let's talk about video teleconference equipment first, so this idea of like video. Face to face interaction with the patient. There's lots of software's out there, I've just listed a few here. I'm most familiar with something called Vidyo or V-I-D-Y-O, and Zoom, I've used BlueJeans quite a bit for conference calls. Doxy.me is out there. There's just a ton. I think if you google like telehealth video equipment, you'll just get a ton of options. And so I think my guidance to you would be to turn towards your entity, your practice or your healthcare institution and see what licenses may already be in existence. We have like, for example, video for us is something that's well established, and Zoom is something we've gotten into more with the high demand on VTC lately. But turn to that and then see what you need. I mean, a quick and dirty for sure is probably Zoom, they have a basic plan that you can just sign up for for free. You know, there is like regulation changes that have been put into effect to allow us to basically use any type of technology available to meet that need. So, the sort of barriers around having HIPAA compliant infrastructure that we've historically faced in terms of technology that complies with that as well as the cost of that type of technology has

been broken down. This PowerPoint has links so anytime you see this, there's a link to this source that you can go to to read more about it. But essentially, and you probably already read this already, you can use FaceTime, Google Hangouts, Skype, Facebook Messenger as you need to, if it enables you to provide that care if you can't use a HIPAA compliant system. My caveat to that would be we're still trying for highest level of privacy and security so if you have a system in place, that's what you should be using. But if you need to do that hearing aid check and you've tried your Zoom and you've tried your other systems and really, this person just wants to FaceTime with you, you can do that, you can do that in the media, and you should. One thing that we do is often ensure that when we're calling with someone, that they're in a private space, or that they're aware that they're talking about their health care in a place that may not be private.

So we usually have that conversation. And then consent, we usually just make sure that they're okay with virtual visits. Something else that I consider with going towards things like FaceTime and Google Hangout and Skype and Facebook Messenger is that you establish workflows that use work accounts and emails, you certainly don't wanna be calling someone from like your own Facebook Messenger, for example. And so we have generic emails where we send links to virtual rooms to get into, you know, we use work phones with work accounts on iCloud for like FaceTime logins and things like that. So just think about how you can really quickly change what your communication structure may look like. We also use the portal to communicate a lot and that portal for us integrates into our EHR and so it's like a messaging system within our EHR and so that is completely taking the personal part out of it. Let's go back to the last slide. I wanted to talk to you a little bit about hardware. You may be saying I don't have cameras, I don't have... You know, again, like look to your laptop, you have a smartphone, you know those all have cameras so start there. This doesn't have to be complicated or hard. But if your company is saying, hey, we'll buy you equipment, what do you need? There are great desktop cameras that are relatively affordable. Logitech is the one I happen to use quite a bit, they are great. I would always

recommend a headset. So right now I'm talking to you on a laptop, I always use a headset with boom mic on it so that you know that the audio quality is good. In particular, we're talking to people that have hearing loss and so you wanna ensure your audio quality is to the best of the ability. So using a headset or earphones or something with that mic close to your mouth is really important. You know, something to be thinking about for future. Pan tilt zoom cameras are great, we use a lot of these when we are in remote clinics. So I'm dialing in, I'm maybe doing hearing and programming and I'm in a camera that I can pan tilt and zoom and so I can just see easier, I can look at the hearing aid better, I can see the patient better, things like that. And so, these are great cameras, mostly used at the remote location, this is not something you put in a patient's home for example. But those are suggestions, things to think about as you think, how do we build this for like the right now but then as you start to use these systems, I think you're gonna see that they're really efficient and you can start triaging how you follow your patients through your clinic and thinking long term if you have satellite sites, for example. And then a couple of tricks that I do for people who are hard hearing, right, 'cause we deal with hearing difficulty. There's two things I've done.

One is in our VTC systems in the remote sites, I tend to use, we have a jumper speaker microphone that we can plug into it, and it just has a cord, it enables us to get closer so we like reduce the critical distance for that person listening. And then for those that are severe, more severe hard of hearing, I actually have sent out, and in each location I have a headset that is super old headphone that I can plug into that and so the patients like hearing you directly on their ears. And so that has tended to help overcome some of the auditory issues when you're talking to someone on VTC through who is hard of hearing so there can be some challenges there and that's how I've tackled that. But be thinking about that as you set this up, like who primarily are you talking to, like mild to moderate or press because his hearing loss or are you dealing with more cochlear implants due to profound hearing, and then when you set it up thinking about those caveats. So let's talk about peripherals a little bit and I already saw a question on tools that we use for otoscopy. What we use for handling the

audiologic disease, we see our high end video otoscopes, like the JEDMED or the AMD that are connected to, have really bright lights and long endoscopes and give us really nice images of the eardrum. Now, we use that in a setting where a facilitator like a trained health aide is capturing that image and sending it to us. So, that's a patient coming into a remote site. But if we're talking about home patient models, things like what you guys care about, there's a couple different things. And so if we're looking at vitals for example, Tyto is a really interesting system on the market, it's a system you can buy at Best Buy, and they market to both the patient, like parents, for example, who are caring for their kids, and also professionals, so they have a couple of different model options. And they can collect everything from temperature to otoscopic images, to vitals, blood pressure or oxygen saturation, there's lots of different things that they can do. I think they're connecting to digital scale. We're talking to them a little bit about adding in hearing screening to that.

Their otoscope is really neat, it's actually a flexible tip at the end and it's got some guidance for the parent in terms of capturing the actual eardrum in the image. So that's a neat model. Now, whether or not every parent can go to the store and buy one of those to send you information is maybe not likely, but this is something that a clinic could potentially pursue in the long term or in the immediate long term to potentially have patients borrow and return things, like that, or use to send out support staff into a home that's been cleared for COVID, things like that. So I think there's a couple different interesting solutions we can do with this technology. For otoscopy again, Tyto that I just mentioned, Cell Scope is another big one that's been around for a while. They're really user friendly. It takes a pretty decent image, you can do video in a still. They also market to the professional and to the patient so that this is something someone could buy online for 100 or $200 and attach to their phone. HearScope is another one that is Android powered otoscope. Been working with them a little bit in their development so this is almost on the market or on the market now. The last I saw was a prototype, but it's amazing that this little tool can be powered by the phone, that's awesome, and it takes a pretty decent image. And then in terms of hearing, like

so how do we do hearing at the home? You've probably all started to download and look into hearing apps. And so there's a couple that come to mind for me and that's uHear, AudCal and the Mimi's like the hot one, first one that probably comes into your search in the App Store. Some of these have been validated and some have not, and I'll talk a little bit about that in the next couple of slides. Let's talk more peripherals. And so this is more professional model audiology peripheral. Shoebox is one that people may know a lot about, it's a iPad based system that is full, basically a full audiometer. Bone, speech, ear, masking, it's a really neat tool. They also have screening measures on there. HearScreen is by De Swanepoel out of South Africa.

This is a designed to be more of a community tool or that's where it kind of came from and it's been morphing into more. They have a screening tool, they have a diagnostic hearing test, they have the hear scope, they also have like a digital noise test. So they've been building the apps, they have a vision app. So it's a really, really neat tool, it's something we used in our randomized trial up here. It tends to be a little bit more accessible in terms of cost overall. There's the Kuduwave which is basically an audiometer on the head that meets the NC standards. And then you have the GSI AMTAS system that can allow someone to do a self test on a tablet. And then there's also Creare who's in development and coming out with another basically audiometer on the head type of contraption that is controlled by a tablet. I'll walk you through how I think some of these could be used for telehealth services and mHealth services. And I probably should be saying those on every slide, but something I don't think we do well as a profession is infection control. And so I think in the times of COVID, we need to be extra careful about infection control. So when we talk about using this equipment, and we talk about basically doing any testing in today's point in time, any checking of hearing aids, we need to be following CDC recommendations and we need to be wiping equipment down, we need to be just... BTE itself could probably have quite a bit of bacteria and viral load and so we just wanna be extra cautious as a profession, mask, gloves wiping things down. Where are you putting that equipment, how are you manipulating it, things like that. And so just I will mention it just once here but as we go

through all this, when we talk about equipment and hearing aid, troubleshooting and all that, just be thinking about how you might implement infection control around that. I'd be remiss if I didn't talk about that. There is evidence for all the equipment I've talked to you about so far. There's lots of evidence on on otoscopy on still images giving enough information to make a diagnostic assessment as in a real person examined that's been done by audiologist, by ENTs post surgical things like that. And so, we know that we can definitely use a still image to get a sense of what's going on. Mobile hearing testing. The Clearwater Clinical Shoebox, that Shoebox to the iPad system and the HearScreen out of South Africa, both of those are well evidenced. And so I've included links here where they have a list of studies that have been done to validate they've both gone through the development phase and so like De Swanepoel has an article on like how to calibrate the headset, things like that, to validation and showing that it's the same.

Hearing testing apps. I know that this is like where everyone's thinking because how are we gonna get a sense for how people are hearing without bringing them in or how do we triage what's important to bring in versus what's important to stay at home? There's an article here I'm referencing, Bright 2016 is a review article of several hearing apps and research has been done to validate those apps. UHear is app out of Unitron, I think Starkey has one. There's there's several out there. UHear has been relatively well researched, not always independently but it's been shown to be valid for the most part within a certain reason. And then AudCal also has been well researched. The Mimi is like the one that pops up at the top like I said, and honestly has a pretty nice user interface. It has the ability to, you know, you look at the audiogram you're like, okay, great, that's an audiogram, the patient can PDF that and send it for review, things like that. And so, it's not been validated officially but there are some people that have like download these apps and compared them from dizziness and balance. Dr. Hain and et al have gone through and like said the pros and cons of looking at these apps and so certainly not valid from peer reviewed standpoint, technical study, but I think these are absolutely options that we can consider when we're looking at providing patient need

like in the now. I have a scenario slide where we'll all just spend a bunch of time talking about options and ideas. Okay, so you're saying to me, I'm at home now, how do I stay employed and how do I meet my patient's needs? I think the first thing that you could even think about doing is telephone call check ins. I mean, loyalty and any good hospital system that's making you go through customer service training is going to tell you that maintaining your patients loyalty is the best way to go. I mean, it's the least costly and we know it's good care. And if you can maintain loyalty with your patients, then in this time of patients staying home and not having clinics open, this is a great way to stay in touch with your patients and keep their loyalty. And it's not hard to do. I think real time VTC for hearing aid checks is low hanging fruit particularly for those practices that have models where you fit a hearing aid and then you may have so many hearing aid checks incorporated into that fitting warranty. That's a low hanging fruit, you can do that now. You can download Zoom, you could have providers calling patients.

You can walk them through downloading the smartphone app, and I'll give you some caveats on how I do that. I think asynchronous appointments for remote programming. Lots of technology like the latest Bluetooth technology has apps. And many hearing accompanies, for some time now, maybe six or 12 months, have been able to do remote programming. Now, whether or not that got pushed out to clinics, made it through the red tape of security, things like that, it's been a little slow on the uptake, but it's been available and now it's being pushed more and now we are sort of needing it. And so I think that the development around that will continue to grow, I know that. we're Gene, rezone and Phonak or to the, we remote program for and that's basically where you are pushing an app to, you are in the system, you are making changes in the software and then you are pushing that as a package, like almost like an app update to the patient's app and then that's being updated into the hearing aids. I think that's a really low hanging fruit that can be achievable for certain sets of hearing aids. And then maybe you have someone who has a change in hearing or an audiologic issue. You could do a VTC case history. A lot of times we can get the bulk of what we

wanna know through a case history. We can potentially have them download here, we walk them through downloading a hearing test, maybe you want to do the Mimi, maybe you wanna do the AudCal or the uHear, whichever you get familiar with and feel comfortable using. And then they can screenshot you the results or they can send you a PDF, whatever it is, you can easily walk them through, and then you can be uploading that into the health record. You know, obviously, we're interpreting these with caution, but I think in the event of a sudden hearing loss, you'd absolutely be able to help guide ENT on treatment flying less blind. I know for instance, I had a colleague who is in Anchorage and he's on call. And there was a unilateral sudden hearing loss, I think that was two days ago actually, and the audiologist is at home, contacted the patient, I think they used Mimi actually, did a hearing test and then got that hearing test to the ENT and then they started printing his own stereotyper.

And I think they'll probably do the Mimi test to look at monitor hearing over time, I think you could absolutely do it for ototopsic monitoring. In particular, if you have a baseline hearing test in the record, that's even better, because then when you get that automated hearing test from the app, you can feel more comfortable if there's a line up or no line up, things like that. I think for new patients, I think it's all fair game too. So for example, CEDRA stands for Consumer Ear Disease Risk Assessment. And this is something that I've been a small member of helping to develop this questionnaire that basically asked questions that gives a score and it's basically a risk assessment score for whether or not that person should be seen medically before pursuing hearing technology. And the idea for this came about from, you know, this over the counter model or peace at model where patients who need intervention for hearing maybe pursuing it on their own outside of an audiology or medical model, and so this is where this assessment came from. But I don't see why it wouldn't be fair game to do a CEDRA. Maybe a couple intake questionnaires, we've got a ton out there that most of us never use that could help us give us a sense for, you know, level of hearing difficulty or what the issues are. You know, we could do real time case history. Again, we can get a ton just from case history, right? I mean, most of us know what's going on in the

first 10 minutes of seeing a patient. In terms of a hearing test, I do really think that that app will give you a first indication of what's going on. I think I would definitely do this for anyone who's high risk, elder or things like that. But then I also think about the mobile device. I've got a slide up here, I think, let me... You know, take the HearScreen for example, or let's say like, we have a couple Shoeboxes, and let's say, okay, like I've got a patient at home, doesn't have a smartphone 'cause they're an elder, technology is gonna be difficult for them but they have an adult son or an adult child. One thing that we're modeling is taking this equipment and basically loaning it, having them go home or sit in the parking lot on Wi Fi, and do a hearing test through that system. And we might VTC in and walk them through that, walk them through doing that hearing test, and then have them returned on equipment. Now that works well when your community is sort of small and so I'm just thinking of your like urban settings where you might not be able to bring a patient in the building but creating a kit of like, you could do tympanometry, you could do screening if you had an autocam for example, you could walk someone through getting an image, you could remote into that computer.

That would be a great model. So if you wanted a full, if you needed like a complex case and you wanted more information, I think it will be feasible to use an autocam, a tympanometer, potentially even one that interfaces with a software so you can see what's going on in real time. And then the automated hearing screening walks him through all that. You get that data, let's say you can see it in real time 'cause you're remoting in, great, if you can't, then they drop it back off, you download all of it. I think that would give you a great sense for what's going on with that patient. The other thing that we're doing it's a little bit different, would be like if a person is coming in for other care, we've been pairing up. So let's say we know that they're being seen for this other more emergent issue but there's also audiological thing going on, we've been jumping onto that so we're reducing FaceTime and contact but also still, so we might just get images and then we might send them with a hearing screening device, or we might have them do that on their own in the waiting room or something like that so that we're

not bringing them to the booth or things like that. So, even those kinds of flows think about how you might use your mobile equipment in different locations, could be the parking lot of the hospital, could be in the waiting room while they wait for another emergent appointment or the ED, like could be for them to take home and use, something that we've done with some VTCs in behavioral health in particular, but also in audiology is just sending them with an iPad, and then there's just the icon on there, they click on it, the meeting ID is already there and they log into their room. And then we meet them there and we talked to them about whatever it could be. So in one instance that I've just done once so far, playing around with it, is I had an elder who the ear molt had dislocated from the tubing. And then they're having a hard time doing some insertion, and so I just did a quick kind of like hearing aid check counseling appointment with the elder patient and their daughter. And so that was a great example of like, okay, that was great.

And then the daughter dropped the iPad back off and we wiped it down and then we had to use again. We have automated hearing testing on all of our carts and all of our clinics. And so we're not bringing traffic through the clinic at this point but that is a model and so you may have a satellite or you may have a place where you're bringing in healthy patients and another place where sick people, just I don't know what your workflows are, but an example would be potentially bringing in someone who's healthy, who's bringing their kid in for immunizations and whatnot, but then also there's a concern for a recurring ear infection. You know, you might be able to then utilize that time with an automated hearing device or leaving a mobile device there, walking a nurse practitioner or your CMA through how to do that test and they can capture that information, get it to you, and you can provide that e-consult. And so there's just 1000 models that we can do depending on your workflow, your setting and your need. And that's what I'm just trying to, I won't be able to talk to every situation, but that's if you start thinking about what is our need, what environment are we working in, what equipment do we already have, what equipment should we get, and then how do we use those models? I think you'll start to wrap your head around how

do we start today. You know, there is OEs and I think you'll always love that integrated audio amateur standpoint. So like being able to dial into an audiometer in that remote site and control it. Getting more diagnostic information is always better, but I think in this instance, that's sort of hard right away, like you won't be able to establish that right away. But think about that in the long term too, like those are great options be able to dial in and control something ABR. My computer froze again, there we go. ABR, CI mapping, things like that. So like still working on that remote desktop application. Remote Desktop is not overwhelming, it does not have to be complicated. What we do and what we establish when I started working here was, basically, there's a couple of remote software options, but beyond that, just even Remote Desktop which is installed on all PCs, you get the name of that computer and you can log into that system. Now, we're all networked computers, that kind of breaks down some of those barriers, but you can easily remote into someone's computer and control software that's only in there, you know.

So if you guys install hearing aid software or if you install OAEs or you've got whatever you have there, you know, let's say you've got a satellite clinic that you're gonna funnel healthy patients through to provide care for PCC and audiology, wherever else, then you could easily set up something there where you're dialing in, you're reducing the provider burden, you have one person there, things like that. That's absolutely an option and it's easy to do. What else to be said about? I think the main models to think about as it fits in your scenario would be the hearing app. So this is a person staying at home, you're walking them through on a VTC how to download the app, sign in, do a hearing test. One caveat to the app in the articles that I provided for you to go over this is sometimes the headset is kind of key, quiet room of course and then the headset. So, if it's an iPhone using the headsets that come with the iPhone, or I've seen like studies validated with Sennheiser, for example, so like the best headset you can get on that person, the better. And then, mobile devices. So like, think about how you could, could you order a couple of Hearscreens and then use those to deploy either to satellites or different departments or the ED, or if you have to support the ED or things

like that. So the app and then the mobile devices that can be used in various scenarios, and I think you could even potentially do a home model if it worked. And then of course, integrated audiometry. So like, we can remote in. We have a clinic that can do automated hearing testing and send us the store and forward feedback of that. And then of course, remote audiometry and dialing in and controlling yourself by having someone put headphones on and bone and things like that. And so, I think the next thing you might be thinking about is like how do I keep up with my hearing aid patients or how do I tackle fittings? I thrive off of being able to see patients, do some diagnostic hearing testing and fit them with technology. I think that that's not off the table right now. I think you need to think outside the box a bit, I think we need to think about how do we get the highest level of best practice given what scenario you have that you're working within. So for example, with that elder on Little Diomede that we can only get to by helicopter, what ends up happening with him was, I was there in person for multiple reasons, I saw him, I got a diagnostic hearing test and I did RECDs.

And then I ordered technology for him, and then I programmed him and put his RECDs in. I sent the device to him on helicopter with extra tubing and you know, I could have done impressions that time, he didn't need impressions or I wasn't gonna pursue persons with him but dome sizes, tube sizes, ric sizes, all the peripherals, the tools for changing that out. And then when it arrived, there was a health aide there so that was my facilitator, I dialed in on the VTC so I'm there in person with him, seeing him, providing the counseling, the orientation, and then I am working with a facilitator to put it on the ear, I'm on the video, I'm seeing how it's fitting, we're changing a tubing size, the doming size, running feedback manager, you can do in situ audiometry, you know, all things like that, you can do all that in that fitting. And I was able to fit him, he didn't have to leave and travel, he didn't have to leave his home for several weeks. And I use validation measures like the cozy. We've used occasionally the AFAB although it's not as clinically relevant for us so we tend to rely on the cozy. But like all those things have helped me to do that to the best of my ability. And then he happened to fly in for, what was he flying in for, I forget now I think it was colonoscopy, but I put him on at the

same time for, I did relayer, I actually went back into his relayer, and then I also did functional testing in the sound booth. So I didn't have to do that right away and I eventually got to it but I was able to fit him sooner and follow up with him on VTC without him leaving and then only when he needed to come out and the weather was good and all of that did we fit in some of that in person stuff. How might we do it now? Like well, you saw them in person and you got already RECDs great. Well, what, for existing patients, do you already have a diagnostic audiogram on them? How old is it? Have they had any changes in hearing? Could you use that to order a technology and fit? Could you do an automated hearing test, either have them use a HearScreen which does a hearing test or have them use an app at home, compare it to some baseline you have from three years ago, things like that. Order technology for them, do counseling, do your hearing aid evaluation, and then order something, pre program it, send it to the patient, do a VTC remote programming follow ups making sure you're getting Bluetooth enabled technology so that you can push updates to them, validation questionnaires. I mean, I think all of that would enable good fittings.

And then as soon as you have that ability to bring them in for that in person follow up, you get the full diagnostic, you get the real ear, you pursue the validation testing and the verification in the booth and things like that. I think that that's absolutely on the table for things that you could start tackling right now. The next couple of slides have lots of links. I'm an expert in telehealth but like things are changing really rapidly right now and out of necessity in the right direction. I mean, barriers of being broken down that we've faced for so long. And so obviously like the waiver 1135 has helped with expanding telehealth licensure. You now we've been working on a compact that would allow us to do across the lines, across borders consulting, now that can be done. You need to be licensed in a state but you can provide telehealth across borders, not a little bit state to state but in Alaska, for example, if I needed to consult with a cardiologist in Idaho, as long as he was licensed in some state, we can receive his services and bill for it. A couple of links here. ASHA does a great job of going through some of that expansion. This Alliance for Connected Care has a lot of stuff on that, feel free to visit

and learn more about. And then of course there's the whole Act that Trump put into place and the waiver that you can read more about and understand that. But there's a lot happening that is making this much more feasible for us right now and that's from just reduction, things from licensure to coverage, what they're reimbursing for, and also what I've talked about already in terms of you can use technologies that maybe aren't HIPAA compliant, as HIPAA compliant as what's been required in the past. Reimbursement. I think this is like the age old question, and of course, a requirement for sustainability. I have to tell you, I'm not an expert, I work in a unique environment that's Indian health services. In a lot of ways things look really different for me in terms of reimbursement, in a lot of ways we have a lot better coverage from Medicaid and Medicare.

And of course, I adjust. So, I'm going to reference CPT codes and give some guidance, but there are other people that are more informed than I am and I'm gonna give you a lot of links to where you can go and I think you could always turn to your state, you can always turn to ASHA and AAA, you can always turn to your own billing centers within your hospital structures to kind of help guide you. And I also think you should know that these are changing rapidly, like I'm seeing changes in the coverage almost daily, and I'm trying to read up on and stay current, what we've put into effect, how our EHR is adding those codes in, how we're billing for those codes, the encounter types are doing, all of that. It's just really rapidly changing and it is contingent a little bit state to state so kind of just pay attention to that, know it's changing and kind of turn to your local resources to help you. And then here is just a slide full of facts. State by state, ASHA has got a couple good resources, they've come out with some help in understanding what the commercial coverages, we are seeing third party insurances cover like Aetna, Blue Cross, Blue Shield, covering for telehealth stuff, things that audiology does. The Academy has a great telehealth update that kind of summarizes everything coming out pretty well. Both ASHA and the Academy have emails that allow for people to reach out and ask questions and they will guide you in the right direction. CMS has a ton of stuff out there like historically Medicare doesn't pay for a lot of things

that we do. I think we will see that changing, I think we see ASHA advocating for that as more money gets funneled into these entities to cover for telehealth services. CMS has a lot of fact sheets out there that help understand how the flow of reimbursement and coding should go and for what scenarios. In general, I think you can think about telehealth services in a couple different types in terms of reimbursement. There's telehealth visit. And think of that as like the equivalent to in person so like VTC, real time, patient to provider. Everything you're doing in that appointment is what you could do in person. Virtual visits. Think five to 30 minute exchanges, audio and or video. And then also that remote review of images. So let's say patient portal, someone has a CellScope at the home, or they got the Tyto, they're taking a picture and they're sending it to you. That would be a remote reviewing to the patient portal, things of that. There are encounter types and codes to build for those. And then e-visits. So again, think of that online patient portal. Those are the kind of the three types. A little bit of detail here about telehealth visit. So this idea that like in person to the patient in the home, there's usually language around a lot of these, it's like, hey, you need like for a lot of this care, the patient already has to be established.

They're sort of waiving that in the sense of like they're turning a blind eye, they're not going to be auditing or regulating whether or not there's an existing relationship for the service you're providing. So what that means in the short is that they're gonna pay at the regular rate and they're gonna cover for new and existing patients. With most of these, you're putting modifiers on them and so, again, like I think your coding department can help you with this on what you put modifiers on. But the two areas I think about with this is the modifier, so is it a 95 modifier which is the newer one, which is kind of replaced that hicks picks GT code, and then there's asynchronous code GQ, and then place of services kind of where it's turning to so some of them have gotten rid of the modifier altogether, and they're using place of service. And so you might just say 02 for a telehealth exchange or if they're not reimbursing for that, you might put 11 which means you were in like a home office environment providing that service to a patient in the home. Again, turn to that Academy and the ASHA resource, they kind of

walk through all of this to help you understand and if it's still not making sense to you, then they have some direct resources to help guide you. But the takeaway is for sure, there is reimbursement for audiology to do telehealth services. Here I'm providing you some codes and descriptions of what those codes are, and in what scenarios you can build for them. And you should be able to get the slide deck and reference all this, I won't go into these individually. This is again, like kind of that storm forward e-visit, you're looking at portal images or tympanometry data, or you're viewing that audiogram that you're interpreting and providing a management on. This is kind of like a telephone visit, so like if you're doing a telephone consult to a patient. And then more importantly is documentation. And we have a lot of templates for this. And so I've kind of broken it down for each type of visit. I generally focus on what is the history and I usually try and focus on whatever is the problem at hand, what decision making is going in, what management's happening.

And then for anything virtual like real time video, I'm doing starting to stop time so that there's, because you build for a certain length of time, and so you wanna make sure that what code you're billing for, you've documented the start and stop time just for auditing purposes. For VTCs, we have forms built into our structure that help us cover the documentation required. But essentially, you wanna document who's present. So we always say something like, I Samantha Kleindienst Robler, I'm attending the session in person via VTC. John Smith, healthy level three is facilitating from Little Diomede. He has collected with my guidance X, Y, Z measures, I have interpreted in real time and provide it. So I have some language in there that says who's present and where. And then like you would document anything like chief complaint, problem history, what your exam is, and then the medical decision making or your management. The same is true for store and forward. Again, we use forms to help us with a lot of that, like what we're reviewing. So if you're reviewing, like you'll say like I reviewed digital images, tympanometry, OAEs, automated hearing, testing, and vitals. And then this is my assessment, and this is my plan, that type of thing. So you wanna have all that documented. And then we're pretty good, I'm not always good about this,

but depending on the level of telehealth I've provided, so whether it's telephone call versus VTC, I'm gonna say that the person consented to it and that this mode is being used because other mode's not available. And this is particular for phone calls. So if I'm billing for a phone call, I'll usually say something like VTC was attempted but technology unavailable, and so we communicate with patient via phone. So, I don't know if that's always required, but that's something that we're doing just in advance of auditing and like understanding what type of technology we're using. So that's just a recommendation I have in terms of documentation. Okay, that was a lot, I threw a lot out at you, not a lot of pausing. It's kind of hard not to have a dynamic conversation with you guys but I wanted to poll, after having talked to you about clinical need, so what are your clinical needs? What your immediate clinical need? What do your patients need? What is your low hanging fruit for services you could provide from home? What technology do you have available or ready? What could you easily get your hands on? How are we gonna provide those models? Are we doing it real time or telephone or e-visit?

Do you have a portal that you can get going and encourage your patients to enroll in and send you stuff? And then the reimbursement piece. After kind of having gone through each of those and thrown a lot of suggestions out at you, I'd like to pull and kind of see where you guys are at with how this is helping, so Kimberly, could you throw that polling question up for me. Sorry. Oh, there we go. Okay, great. So the questions are, thinking of these quick steps that I've gone over with you guys, like how many feel like they could implement something right away? And then how many of you are still feeling like, I still have no idea where to start? And please be honest. It won't be a reflection, or it might be a reflection of me, but I hope that I can still guide you. And then, if you still have specific questions regarding your program or solutions that you can put in place with your program. Okay, so it looks like about half feel like they have an idea of something they can do right away, which is good. And then about half still have some specific questions for their program and then about 8% are still like, I have no idea what to do. Okay, that's really helpful for me because there is part two to

this talk, and I'm gonna mention something at the end, but you have the ability to give me some real time feedback in the evaluation of this and I'd like you guys to talk to me about specifically what your needs are. And I'm also giving you my contact information to reach out but I am gonna tailor next Wednesday's lecture to what you guys bring to my attention. So I'm gonna give you more of the background and some things I skipped over in this talk to give you the quick and dirty, but I wanna have the opportunity to talk to each of you about well, to you as a cohort about your specific needs that are helpful to you in the immediate need with everyone at home. Okay, thanks Kimberly, we can go back to the talk, that was helpful. Okay, I said I was gonna talk a little bit about telehealth programs. I'm gonna have one slide, I'm gonna talk more about this on next Wednesday's call. But ultimately, this has kind of changed for me in what I talk about. 'Cause normally, we build telehealth programs over half a year or maybe even a year, you know. You might run through an implementation process of like, needs assessment and this and then that, and then the purchasing equipment, and then evaluation, implementation evaluation, and then do it all over again. In the light of COVID, I think we've seen a lot of things go through systems much quicker.

We've seen it happen with our EHR rollout and all kinds of things. And so I think there's kind of two caveats to building a program and that is like what can we do right now to meet the demand and then what might we do long term to build systems and take advantage of the fact that you're gonna try things you've never had an opportunity to try that you may incorporate into the rest of the way that you practice because at the end of the day, I hope I'm not the first or the last to tell you that these systems can be much more efficient, time saving and help you see more patients. But in general, for me, and there's a couple of questions in the assessment on this, but the team is so crucial and that's even true for now. So like you are in a private practice, you're trying to get telehealth to ground, if there's three of you, someone looks at reimbursement, someone looks at equipment, someone looks at existing infrastructure, someone looks at the EHR, someone talks to the billing office. You like break it down, break it up, each contribute, and then that becomes really crucial. In terms of long term, I can't tell you,

it's like a stool, like the foundations are training, expertise and relationship. You will not have a successful telehealth program unless you have great relationships and I'll talk more about this next week. Obviously, you need a needs assessment. You definitely need to identify models that are gonna work in your environment. And I don't know all the environments that exist for you guys, but you take a look at that. What environment do you work in, how are you gonna utilize the equipment to the best of its ability, can you integrate with your EHR, does your company already integrate, things like that. We always wanna look to continuity of care and connected care when you look at telehealth. So sometimes I see disconnected telehealth of like, maybe your insurance carrier has a tele doc and you call them and that can be great, you're at home, you have an ear infection that you need treated, but those are usually like isolated, that's not going to your primary care to get connected care. And so I think there's ways to build telehealth models that allow for connected loyal care. Patient workflows, how do we run a patient through it?

How we do the workflow for the electronic exchange? And then of course, you need to evaluate for sustainability, and back in the day, I'd say you need to evaluate for reimbursement and market potential, although I think that that's gone away just out of sheer need. You certainly need buy in from your admin and staff, but again, let's just kind of move on, there's lots to be said about building a program. Next week, again, I'll give a little bit more on foundation and research if time allows. I wanna spend more time describing what we do up in Alaska just to give you more foundation. I wanna spend more time talking about case examples and discussion. I really wanna focus on what your asks are, and so in that feedback opportunity, if you can put in what some of your specific questions are and needs are, I wanna be able to help you know what can you do right now and help you walk through that process. And then I'll spend some more time talking about telehealth programs, development equipment, components, things like that. And then I thought I might dive a little bit into over the counter research, patient driven market, sell fitting hearing aid because we may be able to partner with that as audiologists and providers to maximize some of these self fitting

opportunities to meet our patient demand. But we'll see what time allows and what feedback you guys give me in terms of what would be helpful for you, in addition to what I said I talked about anyway. There's about five minutes left, I wanna give you my contact information and then I also wanna have a time for questions, and then the last couple of slides have the references that were kind of smattered throughout the PowerPoint. I do see that there's a couple of questions in the queue here so let's just look at those. How do you weed out malingering using hearing test through an app? I think it's a great question. I've not had to face that issue before, I think a couple of things that we can consider would be case history, I think that's going to help you understanding what's going on, I think potentially having them do the test a few times, like let's say, you get something like this kind of fishy, this doesn't match up with what they're saying, or how am I able to easily talk to them on VTC? So you might say, hey, do you mind doing that test again for me, or I'd like to see you do this test. We're going to do this. I'm not getting great results with this, let's have you practice a couple times, we're gonna do it three times in a row, or we're gonna do it a couple days in a row and let's just see how much fluctuation you get. I mean, this may be an example of, depending on how high eminent the need is, you may need to bring a patient in or defer seeing them, but that would be a case by case for me.

The next question, what's the super old headset that you use for most severe hearing loss patients? In our sound booth, we have the Sennheiser, is it the HD-480, I will get back to you on that question. Let me take a picture of this so I know. And I will find out which we use. HDA-280s are the ones that we use which I believe are calibrated with the, I think Shoebox has those, I think HearScreen has those and I think those are often used. I have been using some of those validated hearing screening apps as the HD-280s if I'm not mistaken. Okay, the next question I have. Okay, a little bit more on tele-audiology in infant diagnostic assessments and newborn hearing screening. Very briefly, to try and get through all the questions, then I can try and bring this up a little bit more when I talk next week, but what we've done is we have an issue with loss to follow up because our patients live so far away. And so what we've done in particular

is images otoscopy, I'm sorry, otoscopy, tympanometry and OAEs with the VTC with a family, we do risk assessment and things like that. If they're not high risk, no family history and things like that, then that might just be how we, if they pass all that we might consider that done. If for a ABRs right now, we are still flying patients in for automated ABRs. We have not really been able to work through getting equipment of that level into all of our region, but this seems to really work for us in terms of that initial appointment we do with the OAEs if we still see issues, we fly somebody in. I have an example I'll talk about next week of like a unilateral hearing loss that I couldn't get them to come in, it was subsistence time and all that but they would come into the local clinic and so we did the OAEs, they didn't pass so then I flew them in and we identified the unilateral hearing loss. And so I didn't lose them, I still had to fly them in for one encounter, but that's an example. And so, I can talk a little bit more about that. The name of the remote desktop program? It's actually Remote Desktop. What I'll do is I can include a screenshot of that in the next Wednesday's call, or maybe I could create a PDF and send some more of this listed out to you guys, but it's called Remote Desktop Connection. And you usually see like a blue monitor with like a circle with green arrows in it.

Question on apps provide providing more information on asymmetrical hearing loss on a new patient. Outside of doing a self directed hearing test that gives you an indication of hearing loss, a very symmetrical hearing loss, I'm not aware of an app. We do have like Seija, for example would be someone talking about differences in here and you can do questionnaire intake. I'll just circle back with you on that one, like I do know like David Cipolla out of Mayo, Jacksonville is got a neat algorithm where he calculates noise history into an asymmetrical hearing loss and what is the risk that that is significant that needs medical management outside of noise induced hearing loss? So I would say a combination of like getting the automated hearing testing with a history would help you for that. I'm not sure if that's answering your question or not. Alice, how do you handle making impressions, is the health aide trained to do that? I have had a health aide make impressions once, that was a health aide I had a long

relationship with and a lot of trust and she had gone through a bunch of training with us to do some extra odd tech stuff. In general, we tend to reserve impressions by the audiologist, and we do that on that in person visits. So like I said, like sometimes we see a person once, we might get the diagnostic hearing of how, we might do the impression, we will do everything we need to do possibly in person including RECDs right then and there, and then that way that enables telehealth following for anything else. In terms of someone needing impressions right now, we may have to turn to like what I've done for humanitarian work, which is looking at like those instant molds or like the kits that over the counter places are sending to health aides or to patients in the home to try and do. We can look into that, I've not done a lot of that yet, but that's not off the table, I don't think, especially depending on how long the situation goes that we're having a patient kind of like they would take their own dental impression, they take their own ear impression and work with you and the company to ensure that it's a good fit and things like that. Pdf handout is... Sorry, these are jumping around, I don't know where they're going, maybe people are leaving.

Testing kids under two or three, I'm mostly relying on OAEs. And so, I have not really got... In terms of patient in the home models, we've not done a ton for pediatrics. We do a ton with pedes in telehealth at our remote clinic or satellite clinic, but have not pursued a lot of hearing assessment in kids under two and three where you need visual, VRA or CPA. You could potentially look to having a parent assist if they're old enough, like I've definitely done that in a remote clinic where a health aide is facilitating. You could have set up a CPA scenario, SLPs are doing a ton of therapies over VTC and using parents as facilitators. We could turn to them for some suggestions on how to set up condition play scenarios, I think it's totally possible. It's a little bit hard because it would be better to be able to control like Remote Desktop into their laptop and control software you download to their computer so that you're controlling stimulus, but I don't think that's off the table. If they don't have professional headphones, I think you can absolutely do it, I think you can do it with whatever headset they have at home. I think you just try and pursue the best headset possible. If

they have a Bose, super aural gray, if they have, for iPhones, I think using the headsets that come with the iPhone have tended to show better reliability. If you need a hearing test to do something for a patient, I don't think you should hold off because you can't get them a professional headset or put them in front of a calibrated portable hearing screening system. Tympanometry for remote testing. So a couple of ideas to throw out there. Like, is it, or not Interacoustics, Autometrics, Autometrics has that Bluetooth system, I know Autometrics is like something that VA has used a lot of and so all of their devices are Bluetooth operated through a software, and so I would suggest looking towards technologies that can be controlled by Bluetooth. And so, we happen to use an integrated system that's the path which is now also owned by Natus but it used to be Sentiero Path Medical, it's now what's rebranded as the AuDX by Natus through Biologic, but it has like tymp screening and diagnostic reflexes, screening and diagnostic OAEs and automated audiometry.

And that's just been a pretty profound tool that we've launched to each of our sites. In the short term, any Bluetooth tympanometer, if you could put that with, I mean, and you could even do a GCI or GSI, I'm sorry, and put that with a nurse practitioner, your training in the primary care, who's doing an OAE screening and attempt to tell you what could be going on potentially. So, right now in our primary care, they have an OAE and a tympanometer, and so they're doing otoscopy, tympanometry and an OAE if there's an ear issue that's helping guide antibiotic stewardship. And then if it's more complex than that, then they're involving audiology, and we're either coming down if we need to, or we're figuring out the next best solution. So in terms of tympanometry, like I said, the new rebranded AuDX is not off the table, I would say even the table top or the old handhelds, they're not even market available anymore, but any of that that you're still calibrating could be feasible depending on the model that you need it for? Yeah, with lending out iPads, how do you ensure you get them back? That's a really good one and that's raised some concern. There's always that risk. We've tended to have facilitators help us with that, we have a sign out process, people are giving over their contact information and all that, it's kind of the same way like remote patient

monitoring, and things like that. So, you know, it is a risk, you could potentially take an ID or something in exchange where they come back and grab it. I could try and come up with a few more suggestions to help with that if you're worried about not getting your iPads back. Have you tried a phone app called Hearing Test? Hearing Test has been validated. It is in a couple of those hearing app reviews I gave you, I have not personally tried it myself. I think I heard that it may not have been as user friendly for example is like the Mimi. I've just downloaded a bunch and tried a few of them, that's not one that I've tried though. Can also do a hum test to help screen for possible sensory hearing loss in combination with a home screening app. Sure, I'm not 100% sure what I am following but that's possible. You should reach out to me on my email and we could talk more about that, I'd actually like to know more about your thinking. Have you considered using ear scanning verse impressions, any experience with that? Ally has a great idea. Ear scanner, they're out there, about five years ago I was working with Phonak on that. We hadn't made much progress, but I think... We aren't doing it, I think it's a great idea though, and I think it's totally possible. I have not had an experience and I don't know exactly like say how good a fit of in ear mold is from an ear skin.

But yeah, that's a great question. Bluetooth headphones are okay. My initial reaction to that, I have not, I can't recall, I would say you should probably try and wire in if possible just because those are so many different types of Bluetooth headset. And then also, I don't know about calibration, I know that like some apps have calibrated with the headset that comes with the phone, for example, and which one for example, has figured out how to calibrate a headset to a smartphone. So, my gut reaction without any evidence behind it is probably best to go wired if you can. Clementine home. I have not heard of Clementine home but I am going to research it, thank you for your suggestion. Android based hearing apps do you recommend, a lot of them are not available for Android? Yeah, Adco, I thought could be on Android. I also thought UHear could but I could be mistaken because I don't have an Android. By far the best professional app is HearScreen for Android, they've based everything on Android. Like

I think if you purchase their phone and headset and software package, you're looking at somewhere between six and 800 so not unfathomable in terms of cost for a hearing test device. But let me get back to you on Android, I probably should have been less biased on the iPhone side. But it's a good question, Priscilla, buddy, I will get back in touch with you on that. But I was under the impression... And look at that Bright article too 'cause I'm pretty sure that they have a table in there that speaks to which apps are on which platform and several of them are on both iPhone and Android. Now, whether or not they work equally as well, I'm not sure. The top two telemedicine encounters for the state of Alaska is audiologic and behavioral health. Yeah, great comment from Phoebe on Apple's development in an audiogram app. I think Apple bows all of our big six hearing aid manufacturers are all going to be competing to come out with A, hearing tests mechanisms and B, technology to meet those patient's needs. And so I think you're gonna see a lot of competition in the market which I think is good in a lot of ways for technologies that patients can use to hear better and I think that they're gonna compile that with hearing, testing solutions.

Like I know, recently, Dr. J. Hall was talking to me about some company called Lively that he consults for, they've got a hearing test with questions built into it and then it guides them on technology to pursue, that's with Harvey Abrams too. So, I think there's a lot of cool technology out there that is kind of on this telehealth/OTC type of model and I'm totally on board with you Phoebe in terms of what these companies are gonna do and come out with that are gonna help guide us. I mean, I think a lot. In our EHRs too, EHR is a little archaic, but I think our technology market like Google and Apple may come out with better technological advantages that will help push healthcare forward. Yeah, and then Caitlin saying that the Mimi, which is kind of that top app coming up for hearing testing is also on Android possibly. And like I said, I haven't seen research on that Mimi yet, I think probably 'cause its relatively new, so that's probably needed just to... But I think in general, like automated hearing testing has been shown to be valid within a certain range. And I think outside of interpreting these audio grams of caution and repeating them if needed, I think that it can really

serve a need in the pinch. We are almost 15 minutes over. I can stay just a few minutes longer if there are any other specific questions. Otherwise, please, you have an opportunity to give feedback so I'd love to hear both good and bad about the talk itself, but what you may wanna see in that Wednesday lecture because I'm still fine tuning that. I'll cover the things I said I was gonna cover but I'd like to specifically tailor it to be addressing the questions and the need that you guys have at hand. So it would help me better help you serve you guys and meet your needs.

- [Christy] Thank you so much Dr. Robler. We appreciate your expertise and the time that you've put into providing this reference in this course for us, it was surely helpful and I know that many of our members will be looking forward to next week. I'm gonna go ahead and end the classroom, and we'll leave the floor open for any other last minute questions for Dr. Robler as well.