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Pediatric Connectivity: Access to Video Games

Presenter: Kat Tribulski, AuD

It's my pleasure to welcome back Dr. Kat Tribulski. Today's presentation is on pediatric connectivity.

We also have other courses on the same topic from Dr. Trabulski.

So if you haven't heard those courses just yet, they are in our audiology online course library. But at this time I hand the mic over to you. Hi everyone. Thank you so much for having me back. Today we're going to talk about pediatric connectivity a little bit more, but today specifically we're going to be looking at access to video games.

Just a brief bio and here are my disclosures and feel free to read through the limitations and risks of the presentation. Our learning outcomes for today is to describe how to pair pediatric hearing aids and cochlear implant processors to different game systems, identify what type of Bluetooth signal is being used by those, and articulate why direct streaming is beneficial for those with hearing loss. In terms of our agenda for the day, I'm going to be discussing three video game consoles and how you can direct connect to those consoles with a variety of pediatric devices. For those of you who are maybe not as familiar with the video game world, console systems are tower like systems that plug into a television. There are thousands of ways to play video games in general, there's mobile on your phone, on a tablet, on a PC.

But there's so much information within connectivity and a wealth of knowledge already out there about how to connect to a phone, a PC, a tablet that I really wanted to focus in on console activity and how to pair today on that because that's where I didn't find a ton of information personally. I also want to share that all of the connectivity examples that we'll be going over today were things that I've tried myself from my what I call basement experiments. I know that sounds very Frankenstein esque. I assure you it's not. I am personally a gamer and love all forms of video games and when my patients, families, other providers ask me well, how can I connect to that, how can I do this?

I've actually kind of put it out there and luckily work for a clinic that does have loaner devices and did a lot of the troubleshooting and failed forward so that you don't have to. And so all of these examples today as well as the resources which you can see as well are really, really great for any of your families. Whenever approaching any audiology, online topic or just in general, I think it's really important to know the why. Why are we examining this? Why is it an important subject to evaluate I think that's really helpful in the pediatric sphere because I can not only tell my patients, but the families, here's why this is important and this is why we need to look at this area.

The big question is why do we need to direct connect to these video game systems? The simple answer is pediatric patients need a better SNR than their adult counterparts to score similarly on speech recognition tests testing. Also, pediatric patients are often in noisier environments than their adult counterparts. We look at SNR loss clinically, often using things like the bkb, sin, the quicksand words and noise testing to kind of figure out, well, at what point is the patient having a breakdown, at what point is there an SNR loss and what can we do to overcome that? This graphic that you see is actually from a article from the Hearing Review and it kind of breaks down what the SNR loss number is to the degree and what sort of interventions would be the most helpful and goes all the way from not having an SNR loss to severe and that devices can overcome an SNR loss, but only so much.

And often. Specifically in pediatrics, we advise our patients on the use of remote microphones, HAT systems, FM systems, good communication strategies, and that helps improve the SNR in the classroom. But an improved SNR isn't only needed in the classroom. It's needed all the time for them to be able to communicate and score similarly to their adult peers. So if we need it in the classroom, why not use it all the time that we can?

As to why video games one, they're fascinating, but there's around 3.3 billion video game players worldwide, with the latest billion of that 3.3 joining within the last eight years, which means that our

younger population is joining this video game market very, very quickly. There are the top three selling video game consoles are the ones we're going to touch on today. The Microsoft Xbox series S, as in Sam, X as in X ray, the Sony PlayStation 5 and the Nintendo Switch. While these consoles share some game libraries and things like that, most people in the video game sphere would kind of recognize that PlayStation 5 and Xbox Series S and X are more graphic based. And the Nintendo Switch often boasts that it's a much more family friendly option.

So you get a really big array. But over 90% of kids in the United States specifically over the age of two play some sort of video games. And over three quarters of American households have at least one game console in the home. Some have even more self reporting. Over the age of 8, many kids are recording an hour and A half to two hours a day of playing video games.

So it's taking the place of TV time, it's taking the place of other activities and is really becoming part of the day to day. There was also an article just about a year ago now published by the World Health Organization. And ASHA assisted with some of that information as well that there is a population now of those playing video games and having noise induced hearing loss, unfortunately from unsafe listening levels. And so if there is a group or a population that is acquiring hearing loss from video games, they're probably after identified going to want to continue to play. And we need to be sure how to do that in a safe way to help limit noise exposure and keep that loss to a minimum.

But also to those who may have congenital hearing losses, be it syndromic, non syndromic, whatever have you to make sure that they're also getting access in a safe way to not add that additional component of a hearing loss on top of what they already have. When delving into a subject like connectivity and Bluetooth, it can be daunting. There is a lot of technical terms and it's just a confusing topic in general to many. So I like to start with a familiar pediatric hearing aid topic. Obviously for our cochlear implant recipients, they don't have their cochlear implants verified in this manner.

But for hearing aids, I think a very familiar idea is verification mismatch. So whenever you measure the threshold of an individual patient, however you measure it, you want to make sure that you're matching how you measure your real ear to coupler difference in the exact same way. And then as you're verifying it, you won't have an error of gain settings. Your settings won't be too high, too low. You'll be at a really good level.

Now there can be some mismatch. For example, if you measure your threshold with a headphone, but you're measuring your RECD with an ear mold, you are going to have some gain discrepancy on the way that you set the device. And I think this principle translates really, really well to Bluetooth because you can see when matching Bluetooth signals, a similar idea starts to populate. One thing that's a little different is obviously if there's a gain discrepancy, you can still wear a hearing aid. With a Bluetooth discrepancy, it actually won't connect.

And so you have to pair like to like for all of the numbers on this slide. 4.2, 5.2. There is so much Research and information out there with different numbers and different versions of Bluetooth. Don't let that overwhelm you. The reason I included the numbers I did on the slide is these are the numbers that I see most often published with our pediatric hearing devices.

Just to make you familiar with them. There are absolutely articles out there that say Bluetooth le starts at 5.0. All you need to know is to match, like to like. So if you're going to have a patient wear a device with Bluetooth Classic, and that is what the hearing device has in terms of Bluetooth, then whatever system you are connecting it to also has to have that like version of Bluetooth. If they match, it'll be able to connect.

So Classic to Classic Bluetooth Low energy, which is what Bluetooth LE is to Bluetooth LE will match and Bluetooth LE will match to auracast. And we will be discussing oracast a little bit later today. But if there is a mismatch Bluetooth Classic to le, you won't be able to connect. And so that's something that

you're going to need to keep in mind as we move forward. In terms of pediatric hearing devices, this is not a comprehensive list by any means.

I know that this is just what I see most often in the clinic and are some of the very popular pediatric devices. So when dealing with what streaming signal these devices have, as you can see from this list, most of them use Bluetooth Low Energy, specifically Advanced Bionics. Their Sky CI Marvel does use a variation of Bluetooth Classic and Low Energy, so that one you can actually use. Use both systems, depending on what you're connecting with. I also want to point out on this list for the MED EL Sonnet 2, it is not the Sonnet 2 processor itself that allows for the connectivity.

It's the audio stream device. The audio stream device, some people call it a boot, some people call it a battery cover. It actually slides onto the bottom of your Sonnet 2 processor over the battery pack, whether it's rechargeable or disposable. And that's what allows for that Bluetooth connectivity. So it's not just the processor.

You do need that extra component with any of our pediatric hearing devices, be it cochlear implant, be it hearing aid. You kind of have to think about when we're delving into connectivity here, what's the goal of having a patient wear a device? The primary goal for many pediatric hearing devices is audibility, whether that be for oral, oral language, whether it be speech awareness, whether it be speech understanding, or whether it just be sound awareness for safety, that is the goal as to why this patient is wearing that most often. And so if that's the primary goal, anytime we're doing something additional like streaming or adding anything to the device, we don't want to take away from that primary goal of where. And that's important to look at because actually all of these pediatric devices, you as the audiologist or hearing instrument provider, are actually going to set the streaming ratio whenever you get to the final screen.

For most of these devices, you can turn on indicator lights, you can turn on volume control, you can enact the program button, but that's also the part where you can actually set the stream streaming ratio. Most of these devices do have a default, and the default is sufficient for a lot of pediatric patients out there, but it's actually going to allow for what percentage of streaming is going in and what percentage of the surrounding environment are you still hearing. So it's important that you make sure when you're setting that streaming ratio that you're either using something as a default, but to make sure whatever they're streaming, the primary focus of wearing the device, whether it be safety, hearing, understanding that you're not taking away that communication outlet. For many of my teenage patients, I try to, even though I know that some of them would love streaming 100% and turning the world off, I let them know that typical hearing individuals, whenever they're streaming, even with noise cancellation, they often can still hear loud impulse sounds in the world around them to communicate safety needs. And so that's something that they need to do as well.

So now we're going to delve into some of our specifics on the console systems. The first one is the Microsoft Xbox. The Microsoft Xbox was released in November of 2020. It is a tower like system. There is the Microsoft Xbox series S as in Sam, and the Microsoft Xbox series X as in X Ray.

Difference between the two of these is the amount of storage that they have, the color for some reason, but also whether or not they have a disk drive. For many of these console systems, you would insert an external disk or a CD or a cartridge in order to get access to the game. One of these is completely downloadable, so it doesn't have a disk drive, the other one does. Between the two though, there's really not that much difference in terms of connectivity. For the Microsoft Xbox, they currently do not have Bluetooth access on the console themselves.

They use a proprietary system from Microsoft called Xbox Wireless, which allows you to pair Microsoft specific devices to the console so you can pair Microsoft headphones, you can pair a Microsoft

keyboard. You can also connect Microsoft controllers. So the control, the actual console system doesn't have the driver to allow for Bluetooth, but the controllers do. The controllers run on Bluetooth 5.2 with that Bluetooth 5.2, that is a Bluetooth LE or low energy system. And on the bottom of the controller there is for all of them a 3.5 millimeter headphone jack.

As you see here. That headphone jack is what we're going to be using to give access. And so you can plug in wired headphones to the bottom, but we can use that to our benefit to allow for direct connectivity. For a lot of these examples, I'm going to be mentioning using a Bluetooth adapter. A Bluetooth adapter is very similar to a hearing aid or cochlear implant accessory.

It does have its own power supply, so it does need to be charged, similar to any sort of device accessory. And many of you may be familiar with Bluetooth adapters already. I will find most of my typical hearing individuals may be familiar with this in air travel. Originally, a lot of our airplanes for entertainment capabilities would have you plug in physical headphones to their entertainment system. As many individuals moved away from wired headphones to more Bluetooth streaming wireless headphones, you couldn't access that sort of entertainment system unless you could physically plug in.

So there were a lot of devices that were marketed in airports and things like that that would still have that, that 3.5 millimeter headphone jack that you can plug into the entertainment system aboard a flight and then pair your wireless device to it so that you could still enjoy that entertainment system. Some of them have volume control, some of them don't. But that's the exact same idea that you're going to be using here. You can find Bluetooth adapters from any large retailer, online retailers, big box electronic stores. But following that idea of making sure that we're not having a mismatch, the signal for the hearing device needs to match the signal to the adapter.

So if you're having a hearing device that uses Bluetooth low energy, you want to make sure that the adapter that you purchase and are using also is on Bluetooth low energy and not a different version of

Bluetooth. For most of our hearing devices, in order to put them in pairing mode, you turn them off and on. Some have their own unique system and that will give you a certain time frame, whether it be seconds or a minute, to then connect to a device on the actual Bluetooth adapter, when it's charged and ready, each have their own directions. It's usually holding something to put it in pairing mode and then the two will talk to each other. From there, you can just use the attached 3.5 millimeter headphone to actually plug into the bottom of the Xbox controller.

It will have to stay attached to the controller. Just something to keep in mind because when you're advising families and patients on getting an adapter, they also come with different lengths of that cable that's attached to it. The shorter length is usually beneficial because it doesn't get tangled as you're playing. If the Bluetooth adapter isn't for you, or if that is something that the patients are in families are having difficulty with, you can always use a hearing aid accessory. That's what they're there for to assist with connectivity specifically for the Xbox.

Because our only way to access that Bluetooth Signal is the 3.5 millimeter jack port on the bottom of the controller. It does need to be a hearing aid accessory that has that 3.5 millimeter headphone jack backport. Some great options are the Oticon Edumic, the Cochlear Mini Mic 2 Plus and the audio streamer, the external audio stream from Med El, all of them on the bottom. A lot of people may be familiar with this specifically in educational audiology because that is also how you get the DAI input for a lot of our FM and HAT systems. But it also does have that 3.5 millimeter jack port that you can use to get to the controller.

So what you would do is many of these accessories do come with what's called an auxiliary cable, which is a male to male end 3.5 millimeter cord. It actually just looks like it has a headphone connector on each side. You would pair your devices through the manufacturer's specifications and directions to the accessory, plug in your auxiliary cable to the accessory, and then plug the accessory into the

bottom of the controller to allow for that access. And that's a good way to then help decrease that signal to noise ratio by going directly to the patient. Just like all of our hearing aid manufacturers, our cochlear implant manufacturers, there's always updates in technology, firmware updates.

Things can always be changing. So I felt it really important as I was reviewing all of this connectivity with you to kind of share, well, what does 2025 have and what's next for these hearing aid consoles as well as we continue throughout the year to counsel our patients in terms of what's next for the Microsoft Xbox, they published some information saying that they're moving away from hardware to software and subscription based systems. Many things are subscription based nowad, but because it's subscription based, hopefully this is going to allow for a lot more phone usage to maybe access some of those subscriptions with mobile access. There's already so much information about how to connect this hearing aid or this cochlear implant to this type of phone or that phone that might be moving forward a better intermediary. It's not at this time overall for the Xbox, but there's already some apps available for specific games that allow communication features.

And so that moving forward may be a transition of instead of using these intermediary devices that we can be moving more towards using a mobile phone as an intermediary. The other thing that Xbox has shared is their focus for 2025 is on accessibility and convenience and accessibility in terms of when a console publishes that, they're talking about accessibility overall. So not just hearing accessibility, which I think is our main focus, but motility vision. But the fact that they have that as one of their big goals for 2025 makes me really hopeful that a lot of the newer games coming out and any updates or firmware updates may allow for some sort of other connectivity options. As we continue, the next console I want to discuss is the Nintendo Switch.

The Nintendo Switch was released in March of 2017. So of the consoles we're discussing today, it is the oldest and uses the oldest version of Bluetooth. It uses Bluetooth 4.1 or Bluetooth Classic. If you

look back to the previous slides, I had labeled Bluetooth Classic AS 4.2. That's because the Nintendo Switch was actually released even before some of our hearing aids were using that Bluetooth Classic.

And so the hearing aid Bluetooth is actually one version past the Nintendo Switch. That's okay though, because like many of our hearing devices, you can absolutely do a firmware update. The Nintendo Switch does allow for wireless connectivity to the Internet and as soon as you're on Wi-Fi you can update to a newer version. It unfortunately doesn't go all the way to Bluetooth LE, but will update to that 4.2 to allow for some connection. This device, unlike the Microsoft Xbox, can be used in two ways.

It can be used as a console where it actually connects to a dock and then transmits information to the television through an HDMI cable, or it can be used as a handheld gaming device like the Microsoft Xbox. The Nintendo Switch also has a 3.5 millimeter jack on the bottom of the device. When you're using it in handheld mode, the controllers are actually attached to the side and if you turn the device over, you'll see that there is that 3.5 millimeter jack in the bottom. One of the nice things about Nintendo is it also isn't locked proprietarily, so you don't have to get Nintendo products to be able to pair to it. It allows for a lot of aftermarket and third party vendors to connect to their system.

So if you have a hearing device that is using Bluetooth Classic, you can simply go to the home screen, select system settings, and there is a section for Bluetooth Audio. You would put your hearing device in pairing mode and then you can pair directly to the Nintendo Switch because it is Bluetooth Classic. A lot of our newer released hearing devices are beyond that and on Bluetooth LE or the Low Energy. So it's only going to direct connect to some of our older hearing aid models. But that's still a great way where we don't need this additional piece or part to connect.

For the Nintendo Switch, very similar to the Xbox, we can use a Bluetooth adapter that matches the signal to the hearing device and plug it in to the bottom of the device if you're using it in handheld mode. If you are using the device as a console itself, the actual dock that it sits in also has that 3.5 millimeter

access to it. Unlike having the Xbox though, if you are using it as a console, that actual Bluetooth adapter is going to be sitting not in the controller but on the actual dock itself. So that's important too. A lot of these Bluetooth adapters do have a radius of signal.

Many of them are 50ft to 100ft, which is more than sufficient if you're close to the television. But to be mindful that you may be, the best seat in the house that's closest to the TV is reserved for the one who's using the Bluetooth adapter. If you're using it in handheld mode, it's absolutely fine because it'll be closer to you. So you would pair your hearing device again, often by turning them off and on to the Bluetooth adapter. Make sure the adapter obviously has power and then plug it in to that 3.5 millimeter headphone jack back.

And so you would be able to direct connect that way again, keeping in mind if you are using it handheld, the length of the cable that you are using. The Nintendo Switch also allows us to get access through our accessories. The Oticon Edge mic, the mic, I'm sorry, Microsoft, the Cochlear Mini Mic 2 Plus and the fine Tuner audio streamer from Med El that have the 3.5 millimeter jack will allow you to connect using that auxiliary cable or the male to male headphone cable to the bottom of the device. One thing I didn't mention previously is you can also get these cables in a variety of sizes. The auxiliary cables, the one that comes with the accessory, may be on the longer side for a patient who's actively playing a game, they might sit on it or anything like that.

So you can any big box retailer or electronic store get a very, very short auxiliary cable so that you're not having this huge cable as well when you're doing direct connectivity. One of the nice things is for the Nintendo Switch since it allows for outside connections. You can use things like the Oticon Connect clip as well. The Oticon Connect clip can be used as a great intermediary tool to connect to Bluetooth of different versions. So even though you may have Oticon hearing aids that are using low energy, the Oticon ConnectClip can cycle through Bluetooth Classic and Bluetooth LE as needed.

All you would do is pair your devices through the programming to this. You would then hold the large button on the side of the ConnectClip and the plus which puts that into Bluetooth search mode. It kind of flashes blue on your Nintendo Switch. You would go to the home screen, system settings, Bluetooth audio and they will actually direct connect. This is really helpful for a lot of our younger patients if they are wearing that sort of hearing aid.

Just because there's less stuff hanging off anything and there's also less that parents have to monitor. The actual Kinect clip can stay close to the console or on a table and not end up on the couch and in the cushions or things like that. In terms of what's next for Nintendo in general, about a week before these slides were due, Nintendo made a huge announcement that in 2025 the Switch 2 is coming. So a brand new console system for us to stress about. They are saying that the Switch 2 is going to most likely be available on the market in Q3 or Q4, but a set date has not been given in terms of what functionality the Switch 2 is going to have is a lot of people's guess.

They announced that in April of 2025 is when a lot of the specifics about the system will be. They did announce though in their big release that it will be backwards compatible. What that means is anyone's guess, it could mean that the games are backwards compatible. So games available on the original switch can work in this one. It could mean that connectivity is backwards compatible using older controllers, things like that.

So in terms of will it have Bluetooth LE capability, will it have auracast? We don't know yet. But there should be updates coming in April of this year. My hope is we may be able, because it is the older of the three systems, we might have some updates on Bluetooth capability and kind of being able to move forward, maybe use less of these intermediaries. The third console I want to talk to you about today is the Sony PlayStation 5.

The PlayStation 5 was released in November of 2020, about a week apart from the Xbox. And so that is a console that is a tower system that you would plug into the tv, very similar to the Xbox. And just like the Xbox, it currently does not allow for access to outside devices. So you would have to purchase a PlayStation headphones or PlayStation controller in order to pair. Unlike the Xbox though, the actual console does still have the driver to allow you access to use Bluetooth.

This gives you the capability of using an external dongle or using the controller in order to gain access to it. For those of you who may not be familiar with Bluetooth dongles, it's a very similar idea of if you were using a wireless map mouse, there's a USB that you would plug in. And once it's plugged in, once it's paired to a device, you won't have all of these extra wires and things like that. One thing that's a little bit different is for the Bluetooth dongle, for the PlayStation 5, it's actually a USB C or a USB, a Bluetooth dongle. And you need to make sure that the dongle that you would get again from any big box retailer, online electronics retailer, it needs to match the signal of the device you're pairing it to.

The one thing that's a little bit different with a dongle versus an adapter is the dongle does not have its own power supply. So for this you would get your Bluetooth dongle, you would plug it in to the front of the device and then you would hold the button and pair it to your hearing devices. The other option, as you've seen, I think you get the gist by now, is using the Bluetooth adapter that matches the signal to that hearing device and then would plug into the controller. One thing I do want to mention Specifically with the PlayStation 5, there are a lot of controllers out there that were specialized special releases. And this special model that only came out with this game or is extra decorative or has a special rechargeable battery.

Anytime that it is one of those limited editions or specialty controllers, sometimes that 3.5 millimeter jack on the bottom of the controller is now obscured. So that's just something to counsel families and parents about is if they do have something really fancy or special that they got to make sure that they

still can access that 3.5 millimeter jack port at the bottom of the controller. And then similar to the other things that I've shown you, you can use any of our accessories. With the 3.5 millimeter jack port you can use the Oticon Edumic, The Cochlear Mini Mic 2 and the Metal audio streamer fine tuner here.

Excuse me. And you would pair that through the manufacturer specifications to your hearing device, use an auxiliary cable and then plug into the controller. No, excuse me. You can also wirelessly pair the dongle to some of these accessories as well, including the Kinect clip. In a similar way that you did with pairing the connect clip.

You would put it with the large button from it's the Oticon Connect clip, excuse me, the large button and the plus to put it in pairing mode. And then you can pair to the dongle you can pair to an Edu mic and a micro Cochlear Mini mic two plus as well. In terms of what is next for Sony, they specifically said that they are going to be moving into cloud gaming and so maybe your saved file would live on a cloud somewhere and you would access it that way. They've also published some information that they're interested in looking at a handheld system in the future. The one that's the most important to me in terms of connectivity and hearing access is they are looking into more third party games right now.

A third party game is usually created by a video game company and then it will be released on multiple consoles. When it's a third party game and not a game that's only made for a specific system, there's been a large push in the industry to move towards disability access. A lot of our newer games that are coming on the market that are available for multi use consoles and different things like that, they actually are requiring disability coordinators and actual testing for disability access access. There's been a bunch of games released recently that actually are requiring a disability coordinator and making sure that motility access, vision access and hearing access are all kind of looped into the game specifically which is really beneficial for the future. So the fact that Sony wants to look more at those means in the future we may have more access and accessibility with them moving towards cloud

gaming.

This could also mean in the future there may be more apps for games where we can use the phone as an intermediary for many of you at home, and a bunch of my colleagues have already asked, yeah, that's great. This is a lot of information, it's really in depth. But why we can just connect to the TV directly? Why are we going to go through all this song and dance, dance of extra things and this that the other we can just connect to the tv? You can, you absolutely can.

There are many televisions that do have Bluetooth capability where individuals directly connect their hearing devices to the television. And there's also a lot of manufacturer accessories out there that are made for specifically streaming to televisions. There's TV streamers, anything you can imagine. This allows often for a one way signal signal. So if one person is enjoying tv, it'll go directly to their hearing aids.

But not every television allows for it also to be heard through the speakers as well. The reason I came up with all of these different ways of connecting and the direct connectivity is because a lot of my older patients actually shared with me that the timing sounds off when they are directly connecting to the television via Bluetooth. Bluetooth or when they are connecting through a TV streamer. My best guess from the science of it is once it actually goes to the television, there is some breakdown that causes a timing delay. They have expressed that the timing delay is not significant enough, that if they're watching a movie, live action, anything like that, the mouth moving doesn't match the auditory signal.

But in a video game the timing is off enough. A lot of auditory alerts in some games for you've completed this level or now you have to do this special task or here's where the secret item is that they're missing it and their overall enjoyment of the game is hindered by that or even their progress in the game. And that's what had me focus a lot more on this direct connectivity instead of the TV as the intermediary is. As soon as we were connecting to the controller itself or the actual system, that lag of

timing delay in the audio signal was better. I don't know if that's just because you're actually connecting to where the audio and visual signal is coming from, but that's been the report so far.

The other thing is video games in general are a social thing. You may have siblings with hearing devices, you may have friends with hearing devices, you can have children in a household who use different company hearing devices, one who uses a CI, one who uses a hearing aid. And in order to allow for the connectivity, it's hard to have multiple TV streamers hooked up versus if we're using controller access or another intermediary. That is a way that you can actually get to more individual. Another thing that some patients have reported is specifically some of our newer technology that has Bluetooth le it's actually allowing for two way signals.

So not only can they get the auditory, but similar to how they are using these devices to answer phone calls, they don't need an external microphone or an additional part. A lot of these devices they actually can communicate to others playing the game by just speaking and their device microphones being used as that intermediary in the phone mode. The other problem with this connectivity is if you're using a television specifically for the Nintendo Switch, you can't use that console in a handheld mode. I will say of all of the patients who are finding direct connectivity, whether it be through an adapter or an accessory, basically they find one thing and stick to it. So if they're going to be using a Bluetooth adapter, they use it for multiple types of consoles.

And if they're going to their cousin's house or their aunts or uncles, grandma, grandpas, wherever they're going, they usually kind of hone in on this is my way to connect and I'm going to use it no matter what. So they usually kind of have one system that they follow and that's what they use for everything. I think I'd be remiss to come and talk to you about connectivity and not touch on AuraCast a little bit. I know this is all the rage and probably all you've been hearing about from different hearing aid representatives, but AuraCast is here. It is a Bluetooth low energy technology that's going to allow for

broadcasting to multiple multiple devices.

The most exciting part about AuraCast and Bluetooth Low Energy is a universally agreed upon system. It's not proprietary to this company or that company. It's going to allow access to multiple connections and connection regardless of what company you're using. The idea of oracast is a little bit similar to a telecoil system in the fact that you can connect to large area and large scale events. Events.

So if you were in the airport and you were wearing an AuraCast capable piece of technology, you would connect to that airport's AuraCast system, if they made a public announcement, you know, of you having to be at a terminal, you would be able to hear it through your hearing devices. Another way that it's going to be really helpful is in large entertainment venues. There's many large entertainment venues that are already fit with telecoil systems. But as we're moving towards rechargeable hearing aids and smaller the better, a lot of these telecoil functionalities are being left out of newer devices. But the Bluetooth is there.

And so what this would allow for in a large entertainment venue is for you to connect to that venue's ORACAST system. And regardless of what hearing aid manufacturer you're using or what device manufacturer, you'd be able to enjoy that large entertainment, whatever program they're promoting or having and you would hear it directly in your ears. My hope is that with ORACAST being a new signal, it's another piece that we are going to have to keep in mind that we're going to have to match our devices to, to our, excuse me, our devices to game systems. And so it's yet another signal. But one of the good things is Bluetooth low energy is supposed to be compatible with AuraCast, so maybe it's one less thing to remember.

And with auracast hopefully we'll need less stuff, less third party things, less intermediary devices to connect. The other thing about ORACAST that is happening is there's already some phones available on the market, cell phones that have ORACAST transmitters and receivers in them already. So if there

is a phone that has an ORACAST transmitter and receiver, if we're moving towards more game systems that have apps with them or if we're having accessibility through the phone, this is going to allow ORACAST technology to be used for that direct connection to video games, be it other things as well. There's so much information out there on how to connect to a certain phone and this new version and that new version and because that seems to be much more popular and marketable in terms of the information for connectivity out there, it's going to be really helpful. My hope is it's also going to create mismatches being a thing of the past because it's a universally accepted signal, the interoperability of, you know, connecting an OTICON device with a Phonak signal.

But through Auracast it is universally accepted and is universally something where we can connect to it. So hopefully there will be less pairing in the future. I know that was a crazy amount of information and I apologize for that. So I kind of just want to touch on some important highlights and kind of really, what are the key takeaways, Ways. The reason we're talking about direct connectivity.

Excuse me. The reason we're talking about it is to increase that signal to noise ratio. We as pediatric audiologists often counsel families like, well, yeah, the child's wearing hearing devices and they're doing better, but a hearing device is not a cure for hearing loss. We still need to make sure that, that we're overcoming signal to noise ratios, still making sure we're getting the best signal possible. How are we doing that?

And that's by using accessories, FM systems, remote microphone systems, all of that. And in order to overcome that signal to noise ratio, to make them score or be able to do as well as their adult counterparts. So that's why direct connectivity is so important. There's even patients and families who use remote microphones for sports, for outside activities. So there's no reason that from their day to day enjoying video games, we're not doing that as well.

It's also extremely important to monitor what your streaming ratio is the primary goal of a family and the reason they chose amplification. And what type of amplification, what's their primary goal? We often in pediatrics may not use the AFAB or the cozy as much as our adult audiology counterparts because it changes so much so quickly. You can have a preschool patient who is interested in dancing T ball one day and then a week later they're in karate. And so thinking about their communication and what situations they're going to be in.

And we often have to be really broad. So if we were to do a cozy, those specific areas could change so dramatically. We have to kind of think past that. And that's why it's important to think about what's the primary goal of this family and their communication. Is the child fit due to oral aural learning and input and output?

Are they just doing it for sound awareness and focusing on visual language? Are they just doing it for safety's sake? What's their primary communication goal? From there we can build secondary and tertiary communication goals. Does the child really like to play outside?

And we need to decrease the signal to noise ratio on the playground? Are they a video gamer? And we need to help them have access to that SNR while they're enjoying their game games? The other thing that we have to do is make sure that we are consciously matching the signal to the device that child is wearing to whatever game system you need, whether it be matching Bluetooth LE on an adapter to the Bluetooth LE on a hearing aid. Whether it be matching Bluetooth Classic to Bluetooth Classic, you need to make sure that you're matching the signal.

There is a variety of aftermarket devices out there. Adapters, dongles, manufacturer, accessories, you name it, it probably exists. And that's going to be what really helps you for direct connectivity with a lot of these cases. You may actually see, you know, based on this presentation, you may have a patient that's not really into video games, but maybe they use a toy or a tablet or something that does have that

3.5 millimeter headphone jack that we didn't cover today. But.

Oh, okay, I can use this exact same idea to give them access. One thing also to consider is pediatric patients in general are very different than our adult peers. They're in noisier situations. They are always learning. And because they're always learning, sometimes discipline is needed with a patient that may not be doing what they're told.

By using an aftermarket device device, whether it be an accessory, an adapter, a dongle, you can monitor screen time, limit what a child is doing without taking away their main communication aspect. So we can still focus on that primary communication goal that the family has set out for and take away this third party thing. So let's say, for example, little Susie is done with her screen time for the day and if they are direct connected through the Bluetooth on their devices, well, their screen time might be over. But that parent's in the kitchen and I can still do it, so I'm still getting access. We don't want to take their hearing devices away because then we're taking away their main communication tool.

But if we take away an intermediary device like an adapter or the connect clip or any anything, great, they still are getting that primary communication or primary goal of what that amplification is. And we're still monitoring them as a parent to a child or anything like that to make sure we're reaching our goals. And so I will say that's what families have shared with me is the most helpful. Yeah, there's all these extra parts and pieces, but they can still parent their child in a way that they're used to parenting, even though that child has a hearing loss and not punishing their child by taking away their hearing device. My other hope is that Oracast is going to make this so much easier.

But Oracast isn't going to happen tomorrow. Some devices already have it. What happens with Pediatric devices is typically anytime there's new technology, it starts with adult devices devices and then kind of trickles down to our pediatric patients. And that can happen over a couple years. So it may be as you have patients that you're counseling for upgrades on devices, we may want to look towards

more adult hearing aid technology and CI technology with that or CAST capability for our older patients as they may benefit from it a little bit sooner.

But also, so yeah, all of this information that I just shared, it's not going to disappear tomorrow. So even though auracast may make this a thing of the past eventually, it's not there quite yet. And so we may, in the next, you know, five years, eventually say, hey, we don't need all of these dongles, adapters, all of this stuff, we can just do it through AuraCast. But it's going to take some time. As with all technology, there's always a rollout and always, always things growing over time.

Thank you guys so much. That was a huge amount of information. So I do have luckily some time left over to go through some Q and A and I see that there's already some questions in the chat. If you do have a question, you can absolutely put it in the chat and I will get to it. And, and if we don't get to all of your questions, I have my contact information as well.

Before I answer some of these questions, though, I do want to reiterate if this is a topic of interest for you at all or if you want to seek more information, you can always feel free to contact me. But also, please, a lot of the references out there that I found, there's few and far between on the connectivity to video games specifically, but a lot of information on children and hearing loss and video games. So I'm going to start with our first question from Melanie and that one is, is there a difference in the audio signal quality when it's accessed via the console or the controller? So I think that's specifically for the PS5. Is there a difference in the audio signal with you using a dongle plugged into the actual device device or with the controller?

I personally do not have hearing loss, Melanie, but so far my patients have shared no. I would imagine there is a slight delay because the signal for both that auditory and visual is coming from the console itself, but with it transmitting to the controller through that wireless Bluetooth network that's proprietary, the signal is, isn't delayed enough that they're noticing a difference. So so far the report to me is no,

both is sufficient with the only real difference being when you're using the television streamer or directly connecting to Bluetooth to the television rather than to the controllers or the system itself. Hope that answers it for you. The next question I have is from Chris.

Chris, and it says, might you know if Bluetooth adapters exist that can be compatible with both Bluetooth Classic and LE? Oh my goodness, Chris, let me tell you, I have looked and looked and looked and looked especially for this presentation because I was like, wouldn't that be so easy? You could just click a button. Unfortunately, no, I have not found it. I think there might be something out there that is much bigger than an adapter.

There are adapters that exist for televisions that are not Bluetooth compatible. So a Bluetooth television adapter that allows for the television signal to boost the signal. So far they have some functionality like that, but unfortunately I haven't quite yet. It's usually like to like and I think that's probably because they're starting to phase out more of the Bluetooth Classic and moving to the Bluetooth LE that a lot of that functionality is no longer available. But if you find one, let me know.

I'm on board.

Our next question is from Christine. I'm hoping that helping kiddos to connect their hearing aids or CIs will keep them from taking them off and using headphones instead. That's the goal. I do. She was asking if most clinical audiologists go over that.

I work in schools and I know most of the students are gaming regularly. That was my overall goal.

Christine, I cannot tell you how many patients would come in and be like, yeah, yeah, yeah, yeah, yeah, I do. I wear them a billion hours a day. But here's the thing.

I have to play this game every night with my friends who live, you know, so far away. And this is the only way to play. So I do take them off for that. And then my biggest concern is depending on the degree of hearing loss or the shape of the hearing loss, how high are they turning on their headphones to a point where they can accurately communicate with whomever playing a game. And then we're going to add a noise induced hearing loss because that volume limiting isn't there like it is on a hearing device.

So I personally go over safe listening volume headphone wear with all of my hearing aid patients, even when they're infants. Obviously an infant is not often wearing headphones. But to start to have those discussions with families and have them think outside of the box of oh, this is their ear, this is their communication tool. This is their safety awareness tool. And by having that and taking it away or taking it off now, I'm really limiting what they can do.

So. Yes, absolutely. I think it's really important that we have these other ways of connecting so that we're not taking off our devices. The last question I have in the chat right now is from Lisa and she says, what do you suggest for kids that are playing two person games that they need a microphone to talk? Lisa, so many things.

I think this one unfortunately is not console specific, it's game specific. There are a lot of two person games that are extremely popular right now that actually do have an app available for communication two ways, if that is one of the specific games that they're playing, actually using the phone as their intermediary instead of a Bluetooth adapter or anything like that. So the individual will be playing the game but connected to their phone and the app at the same time that's linked up to the game. They communicate back forth that way as if they're on a phone call. There are also some of the accessories you can use that will still have the hearing aid in phone mode.

Specifically, I know Phonak will allow you to accept calls on their Infinio and Marvel devices for pediatric patients. And that allows for two way communication motion. There is the possibility of also adding yet more technology, unfortunately of then having, okay, a splitter. So you would have a Bluetooth adapter plugged in and a Bluetooth splitter or another headphone jack for an external microphone. My hope is that with a lot more options through our cast and things like that, we can limit it.

But that is something, unfortunately, getting more stimulated stuff right now or using some of the telephone capabilities in some of our pediatric devices. Thank you guys so much for attending today and asking amazing questions. This topic is very near and dear to my heart, so you can always feel free to reach out to me. Here's my contact information. And just so that you know, we are going to.

You're going to have an exam after the event, um, in order to, to get credit. The exams usually available about 10 to 15 minutes after the conclusion of the course. And you have seven days to complete the exam. Thank you guys so much for allowing me to come back. I've had a great time.