

1. This document was created to support maximum accessibility for all learners. If you would like to print a hard copy of this document, please follow the general instructions below to print multiple slides on a single page or in black and white.
2. This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
3. Copyright: Images used in this course are used in compliance with copyright laws and where required, permission has been secured to use the images in this course. All use of these images outside of this course may be in violation of copyright laws and is strictly prohibited.
4. Social Workers: For additional information regarding standards and indicators for cultural competence, please review the NASW resource: [Standards and Indicators for Cultural Competence in Social Work Practice](#)
5. Need Help? Select the “Help” option in the member dashboard to access FAQs or contact us.

How to print Handouts

On a Mac

- Open PDF in Preview
- Click File
- Click Print
- Click dropdown menu on the right “preview”
- Click layout
- Choose # of pages per sheet from dropdown menu
- Checkmark Black & White if wanted.

On a PC

- Open PDF
- Click Print
- Choose # of pages per sheet from dropdown menu
- Choose Black and White from “Color” dropdown

No part of the materials available through the continued.com site may be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of continued.com, LLC. Any other reproduction in any form without such written permission is prohibited. All materials contained on this site are protected by United States copyright law and may not be reproduced, distributed, transmitted, displayed, published or broadcast without the prior written permission of continued.com, LLC. Users must not access or use for any commercial purposes any part of the site or any services or materials available through the site.

A solid red square is located in the bottom left corner of the page.



Pediatric Connectivity: Access to Video Games

Kat Tribulski, AuD, CCC-A, PASC

Kat Tribulski, AuD, CCC-A, PASC

Dr. Kat Tribulski is a pediatric audiologist at Nemours Children's Hospital Delaware Valley. She received her doctorate in Audiology from Salus University in 2016. Prior to working at Nemours Delaware Valley, Dr. Tribulski worked at Tufts Medical Center in Boston, MA and Nemours Children's Hospital, Orlando in Orlando, FL. Dr. Tribulski is a member of the American Cochlear Implant Alliance (ACIA) and an ACIA Pennsylvania State Champion. She is a member of The American Speech-Language Hearing association (ASHA) and has her certificate of clinical competency in audiology. In 2024 Dr. Tribulski obtained her Pediatric Audiology Specialty Certification. Throughout her career she has focused on pediatric care and cochlear implant technology/programming.



Disclosures

- **Presenter Disclosure:** Financial: Kat Tribulski is employed by Nemours Children's Hospital Delaware Valley. She received an honorarium for this presentation. Non-financial: Kat Tribulski has no relevant non-financial relationships to disclose.
- **Content Disclosure:** This learning event focuses on connectivity for Phonak, Oticon, Cochlear, Med-El and Advanced Bionics Devices along with Microsoft X-Box, Nintendo Switch and Sony Playstation
- **Sponsor Disclosure:** There is no external sponsor for this course.

Limitations/Risks

- The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.
- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

After this course, participants will be able to:

- Describe how to pair pediatric hearing aids and cochlear implant processors to different game systems.
- Identify what type of Bluetooth signal a device uses.
- Articulate why direct streaming is beneficial to those with hearing loss.

Agenda

- Matching Signals
- Microsoft X-Box
- Nintendo Switch
- Sony Playstation
- Future with Auracast
- Summary
- Q & A

The Why? Direct Connection

- Pediatric patients need a better SNR (signal to noise ratio) to score like adults in speech recognition testing
- Pediatric patients are often in noisier environments than their adult counterparts
- We often clinically examine SNR loss in patients.
 - BKB-SIN; QUICK-SIN; WIN

SNR Loss	Degree of SNR Loss	Expected Improvement with Directional Microphones
0-3 dB	Normal/near normal	May hear better than normal hearing in noise
3-7 dB	Mild SNR loss	May hear almost as well as normal hear in noise
7-15 dB	Moderate SNR loss	Directional microphones will help
>15 dB	Severe SNR loss	Maximum SNR improvement is needed. Directional microphone may be ineffective. Consider FM system or streaming remote mic.

The Why? Video Games

- >90 % of kids over 2 play video games
- $\frac{3}{4}$ of American Households have a gaming console
- After the age of 8 many kids are reporting 1.5-2 hours of video games a day
- Research is emerging on listening levels causing hearing loss

Verification Mismatch in Hearing Aids

Threshold	RECD	Verification	Error
Insert	Insert	INSITU	None
Earmold	Earmold	Simulated	None
Headphone	Earmold	Simulated	Some
Headphone	None	INSITU	Some
Insert	Earmold	Testbox	Some
Insert	Insert	Testbox	Some

Matching Bluetooth Signals

Device Signal (Patient Wearing)	System Signal (Trying to connect to)	Error
Bluetooth Classic (4.2)	Bluetooth Classic (4.2)	None
Bluetooth LE (≥ 5.2)	Bluetooth LE (≥ 5.2)	None
Bluetooth LE (≥ 5.2)	Auracast	None
Bluetooth Classic (4.2)	Bluetooth LE (≥ 5.2)	Yes
Bluetooth LE (≥ 5.2)	Bluetooth Classic (4.2)	Yes
Bluetooth Classic (4.2)	Auracast	Yes

Pediatric Device Streaming Signals

Company	Device	Streaming Signal
Advanced Bionics	Sky CI-M	Bluetooth Classic and LE
Cochlear	Nucleus 8	Bluetooth LE
Med-El	Sonnet 2+AudioStream	Bluetooth LE
Oticon	Play Px	Bluetooth LE
	Exceed	Bluetooth LE
Phonak	Sky Marvel	Bluetooth LE
	Sky Lumity	Bluetooth LE

- Monitor and set the streaming ratio
 - Make sure outside communication and safety can still occur

Microsoft X-Box Signal

- Currently does not have Bluetooth access to outside devices due to “X-Box wireless”
- The console itself no longer has driver to allow for Bluetooth adaptors
- BUT! The controllers do! They run on Bluetooth 5.2



Microsoft X-Box Signal Cont.

- Using a Bluetooth adaptor that matches the signal for the hearing device plugged into the controller will allow for direct streaming.



Microsoft X-Box Signal with Accessories

- Connect the accessory to the hearing device
 - Make sure the accessory has a 3.5 mm jack port



What's next for X-Box?

- Moving from hardware to software/subscription basis
- Allow for mobile access with phone usage
- Accessibility and convenience for 2025

Nintendo Switch Signal

- Uses Bluetooth 4.1 or classic
- Device can be paired to television or independently used as a handheld
- Has audio 3.5 mm jack in the system



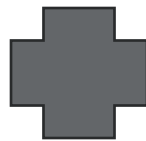
Nintendo Switch Signal Cont.

- Using a Bluetooth adaptor that matches the signal for the hearing device plugged into the controller will allow for direct streaming.
- Direct connect through settings; however, due to Bluetooth classic may be limited in terms of older device



Nintendo Switch Signal With Accessories

- Connect the accessory to the hearing device
 - Make sure the accessory has a 3.5 mm jack port



Nintendo Switch Signal With Accessories cont.

- Use Bluetooth classic connection wirelessly



What's next for Nintendo?

- Switch 2 in 2025
- Backwards compatible
- Connectivity options still unknown

Sony Playstation Signal

- Currently does not have access to outside devices.
- The console DOES have the driver though so you can insert an external dongle to allow access
- You can also access with an adaptor into the controller



Sony Playstation Signal Cont.

- A USB-C or A Bluetooth dongle that matches the signal for the hearing device plugged into the machine.



- Using a Bluetooth adaptor that matches the signal for the hearing device plugged into the controller will allow for direct streaming.



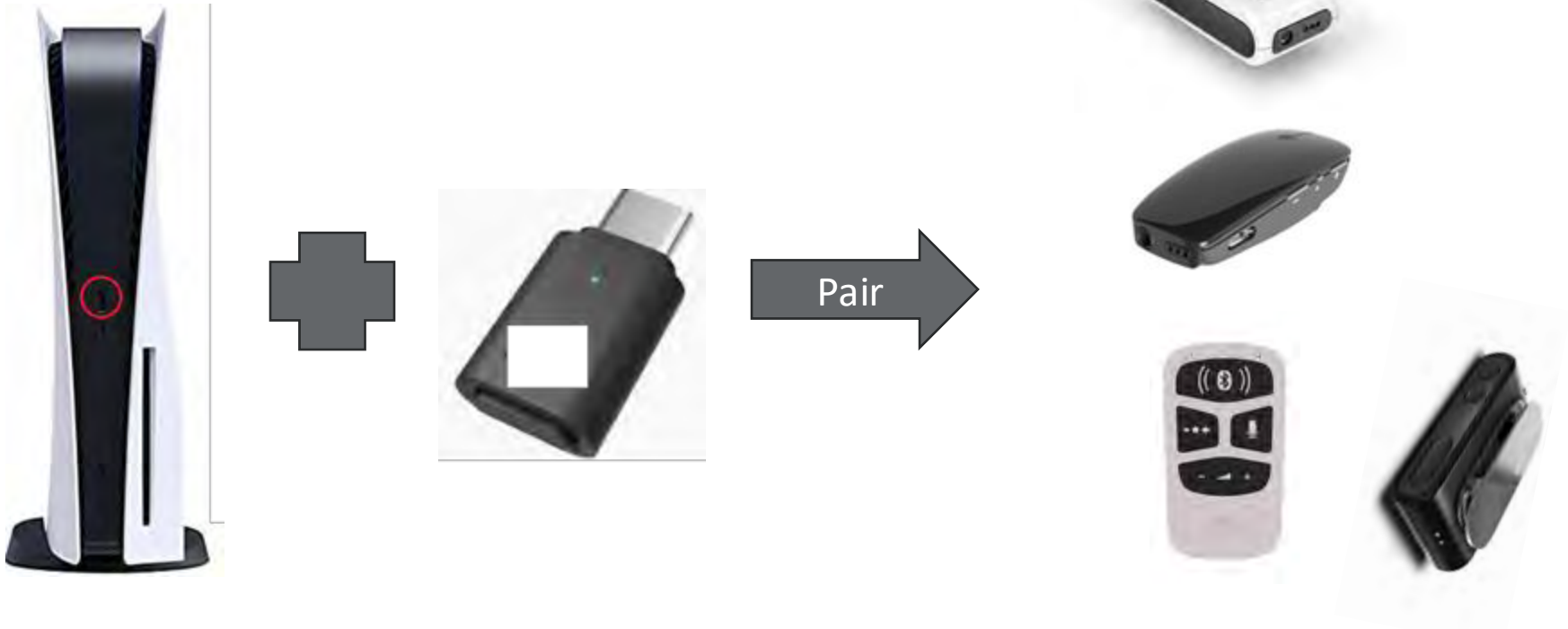
Sony Playstation Signal with Accessories Controller

- Connect the accessory to the hearing device
 - Make sure the accessory has a 3.5 mm jack port



Sony Playstation Signal with Accessories Dongle in System

- Connect the dongle first to provide power; than attach accessory



What's next for Sony?

- Cloud gaming
- Possible handheld system
- More 3rd party games which means possibly more disability access

Television Connection

- Connect to TV directly

Pro	Con
Less “stuff”	Timing of the sound can be “off”
Manufacturer made accessories for this	Multiple people in the household
Only allows 1 way signal	Can’t use “handheld”

Future with Auracast

- Bluetooth low energy technology that will allow broadcasting to multiple devices at once
- Public access audio- announcements
- Large entertainment venues
- New signal to match for devices and game systems
- Hopefully less gear needed for direct connectivity

Future with Auracast Cont.

- Some phones are being created with auracast transmitters and receivers
- Mismatch may become a thing of the past
 - Interoperability
- Less “pairing”

Summary

- Signal to noise ratio difficulties are one of the main reasons to direct connect
- Important to monitor the auxiliary streaming ratio
- Matching the device signal to the game system is needed
- There are a variety of after market devices (Adaptors and Dongles) as well as manufacturer accessories that assist with direct connectivity
- Auracast may make this all a thing of the past

Q & A



Thank you!!

Feel free to reach out if needed
Kathryn.Tribulski@nemours.org

Congratulations!

- You've completed the course and can move on to the exam!
- From your account:
 - Go to pending Courses
 - Choose take exam