



RM Systems for Children who are Hard of Hearing: Access, Utilization, and Impact on Language Acquisition

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Acknowledgements



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 U of North Carolina, Chapel Hill: Melody Harrison, Tom Page



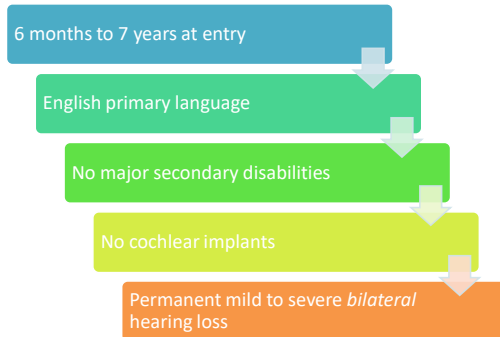
- Introduction to study
 - Auditory access
 - Aided audibility and language outcomes
 - Remote microphones and language outcomes

The OCHL study is a multicenter, longitudinal study focusing on outcomes of children with mild-severe hearing loss

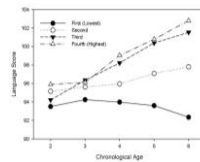
SUBJECTS	TOTAL
HH	317
NH	117



Study participants: Inclusion criteria



- Children need good audibility (high SNR) to develop language.
- **Background noise, reverberation and distance** decrease audibility.

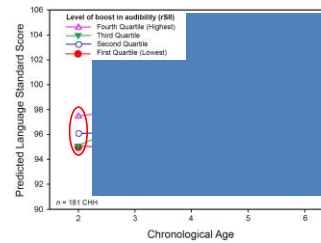


How does noise interfere with hearing?

- Reduces incidental learning
- Increases fatigue



Aided Audibility Contributes to Language GROWTH



• **Quartiles of Aided Benefit**, after controlling for degree of loss

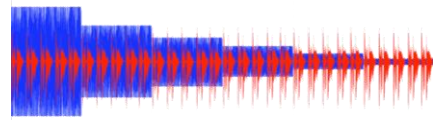
• **Benefit holds for mild to severe degrees of hearing loss**

Conclusion: Children who receive the most benefit from hearing aids show steeper growth in language skills

Tomblin, Harrison, Ambrose, Walker, Oleson, & Moeller, *E&H* (2015); McCreery et al., *E&H* (2015)

How does noise interfere with hearing?

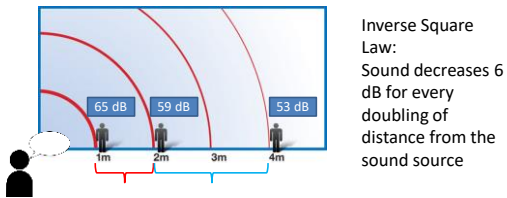
- Noise can “cover up” speech sounds
- Noise can interfere with concentration/attention
- **Everyone** has more difficulty hearing in noise



How does distance interfere with hearing?

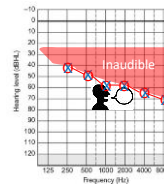
How does distance interfere with hearing?

- As distance from sound increases, intensity decreases

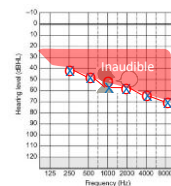


How does distance interfere with hearing?

1 meter (70 dB)



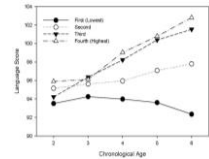
8 meters (52 dB)



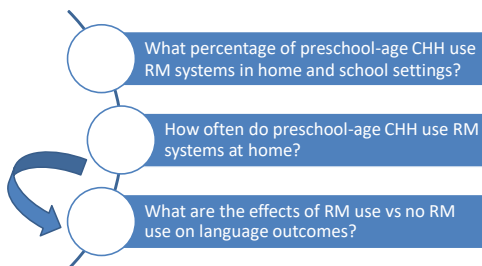
What can remote microphones do?



- Children need good audibility (high SNR) to develop language.
- Background noise, reverberation and distance** decrease audibility.
- Use of RM increases SNR for better audibility
- Does use of RM facilitate language development?



Research questions



Current study: Participants

217 children between 6 months to 4 years of age

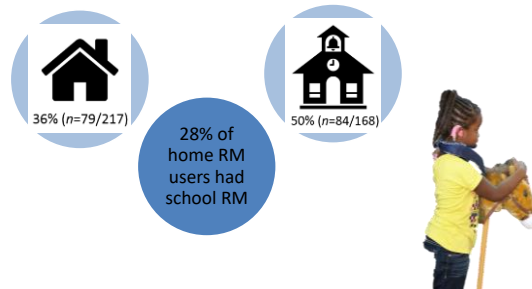
- 173 identified at NHS
- 43 later-identified

<i>n</i> = 217	<i>M</i>	<i>SD</i>
Demographic Characteristics		
Age in months at visit 1	30.4	15.1
Better-ear PTA (dB HL)	48.0	12.9
Age at confirmation	9.1	11.8
Age at HA fit	11.4	11.9

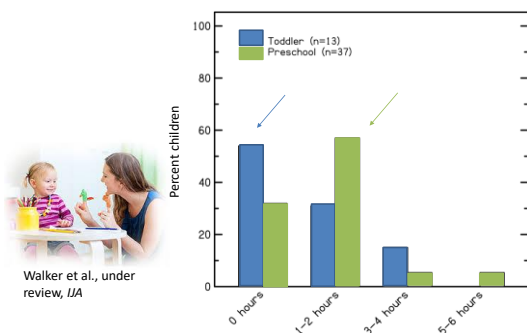
Methods: RM checklist

- Completed at each OCHL visit
- Using RM at home or school—Y/N
- Device use in hours & consistency ratings
- Type of device used
- Funding source
- Available online at www.ochlstudy.org

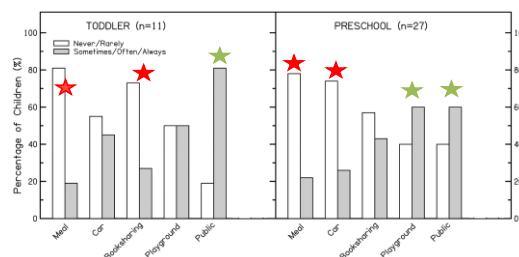
Results: What percentage of young CHH use RM systems in home and school settings?



How often do young CHH use RM systems at home?

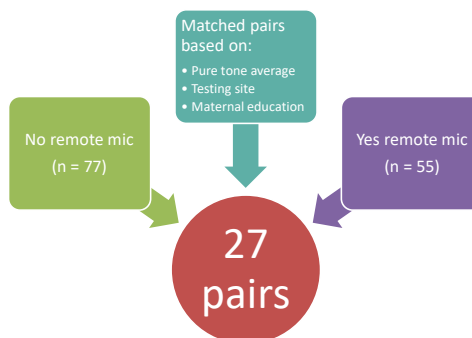


How often do young CHH use RM systems at home?

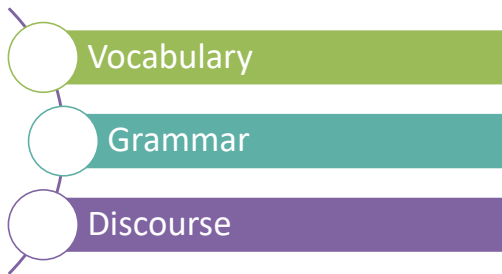


What are the effects of RM use vs no RM use on language outcomes?

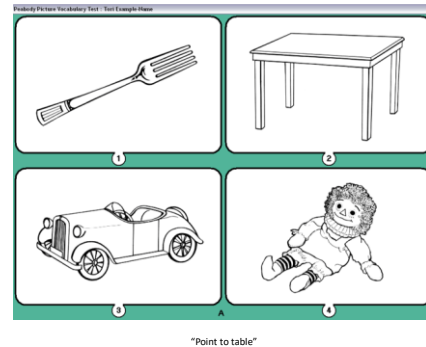
Curran, Walker, Roush, and Spratford, in press, *JSLHR*



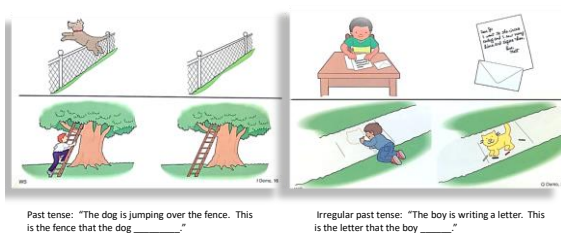
Language outcomes at age 5



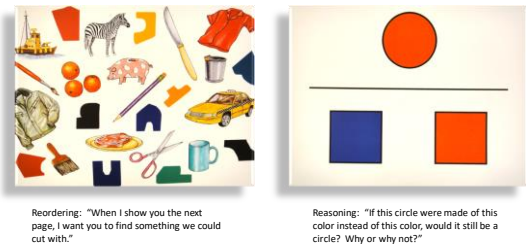
Vocabulary: PPVT example



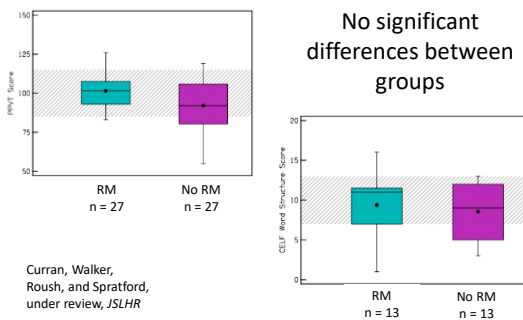
Grammar: CELF example



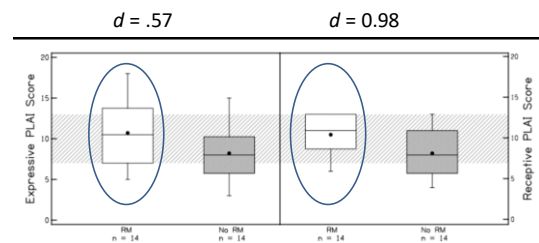
Discourse: PLAI example



Results: Vocabulary and Grammar



Results: Discourse



Curran, Walker, Roush, and Spratford, accepted. *JSLHR*

Clinical Implications of Remote Microphone study

- Improved auditory access via a personal remote microphone may support higher-level language skills
- Why? To speculate....
 - Caregivers talk more frequently at a distance when using remote mic system at home, compared to no remote mic (Benitez-Barrera et al., 2018)
 - Greater access to distant speech may enhance discourse skills due to increased frequency of exposure to conversation

Future directions

- Predicting language growth with RM
- Impact of RM use at preschool
- Improving methods of monitoring RM use
- Impact of parent/service provider training

OCHL Posters...now in Spanish, French, and Greek on www.ochlstudy.org!



Celebrating ten years of the Outcomes of Children with Hearing Loss study!



Special thanks to the families and children who have faithfully participated in these studies!

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Thank you!



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