



Background

- Deaf/HoH children often experience delays in spoken language
- Factors might be child-specific or parent/clinician decisions^{1,2}
- Cochlear implants (CI) and hearing aids (HA) are often used by families prioritizing spoken language acquisition

Factor	Reported Language Out
Gender	Mixed results ^{3, 4}
Developmental delay	No delay > delay ⁵
Degree hearing loss	Less > more severe ⁶
Amplification	CI or HA > none ^{8, 9}
Communication	Mixed results ^{10, 11}
Diagnosis & Intervention	Earlier > later ^{6, 12, 13, 14}

- National Early Hearing Detection and Intervention (EHDI) guidelines recommend that Deaf/HoH children meet 1-3-6:
 - screening by **1** month
 - diagnosis by **3** months
 - services by 6 months

Research Questions

- 1. How do child-specific factors vs. parent and clinician decisions influencing vocabulary apply to the heterogenous **range** of Deaf/HoH children receiving state services?
- 2. How are national guidelines for early diagnosis and intervention (1-3-6) met in a sample of children receiving early intervention services through the state?

Data/Methods

- Clinician reports for 90 Deaf/HoH children receiving state services (N.C. Early Learning Sensory Support Program)
 - Audiological history, demographics, CDI scores
- Used CDI productive vocabulary to compute delay in months relative to 50th percentile norms from Wordbank¹⁵
 - CDI has been validated in children with CIs for older chronological ages when vocab < median for instrument^{16,17}

	Words & Gestures (WG)	Words & Sent
	(typically 8 – 18 months)	(typically 16 -
Sample size	67	41
M age in mo. (SD)	21 (8.5)	35 (
M vocab/total (SD)	27/396 (6)	153/680

Early vocabulary and hearing loss: Who's getting state services? Erin Campbell & Elika Bergelson



parent/clinician decision factors, and their interaction with age, account for >65% of the variance in early vocabulary.

·	dev. delay

WS	
	none
	hearing aid
	cochlear imp
20 30	

V3	
· · ·	total comm

VS				
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	•••			do
	20	 	30	 -

Early Diagnosis and Intervention Goals

Met 1-3-6 Diagnosed by 3 mo. Services by 6 mo.

- likely to meet 1-3-6 guidelines

Limitations/Future Directions

- Highly correlated variables
- - Though largely in line with recommendations
 - from previous validation study¹⁵
- Relatively small sample size with wide variability
- Up next: models of vocabulary growth, longitudinal data, and add other language assessments

Conclusions

- sample

Broader Recommendations

- - but much later services

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References ¹Ching et al., 2013; ²Pisoni et al., 2018; ³Yoshinaga-Itano et al, 1993; ⁴Yoshinaga-Itano et al, 2003; ⁵Cupples et al., 2018; ⁶Vohr et al., 2008; ⁷Yoshinaga-Itano et al., 2004; ⁸Stika et al., 2015; ⁹Meyers et al., 1998; ¹⁰Geers et al, 2017; ¹¹Fitzpatrick et al., 2016; ¹²Kennedy et al., 2006; ¹³Diego-Lazaro et al., 2019; ¹⁴Vohr et al., 2011; ¹⁵Frank et al 2016; ¹⁶Thal et al., 2007; ¹⁷Fenson et al 2007

Full sample (n=84)	Children with comorbidities (n=35)
36%	20%
70%	49%
38%	26%

• Most of our sample **did not meet 1-3-6** guidelines • Children in the sample with **comorbidities** (prematurity, developmental delay, other health issues) were even less

Choice of WG/WS based on clinician judgement

1. Many known child-specific and parent/clinician

decision factors influenced vocabulary in the full heterogeneous sample receiving state services Words & Gestures may be more sensitive in this

2. Most children receiving state early intervention services for hearing loss did not meet 1-3-6 guidelines, especially children with additional diagnoses

• Smoother pipeline from diagnosis \rightarrow services Many children receiving on-time *diagnosis*,

• Prioritized service coordination for families who are balancing multiple needs and multiple services