



Speech and language in children with unilateral hearing loss: Investigating factors predicting intervention needs

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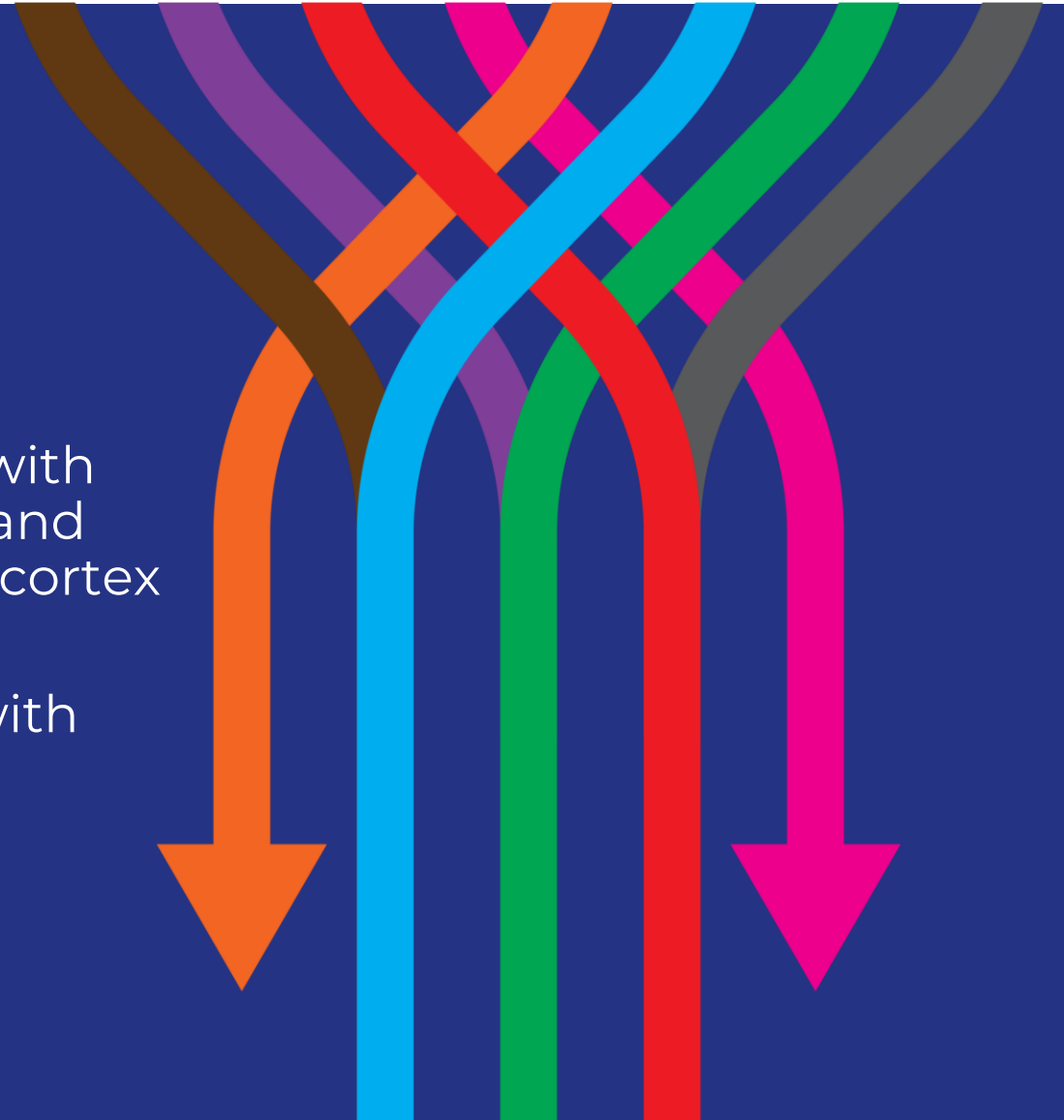


Has adequate hearing in one ear to develop typical speech and language



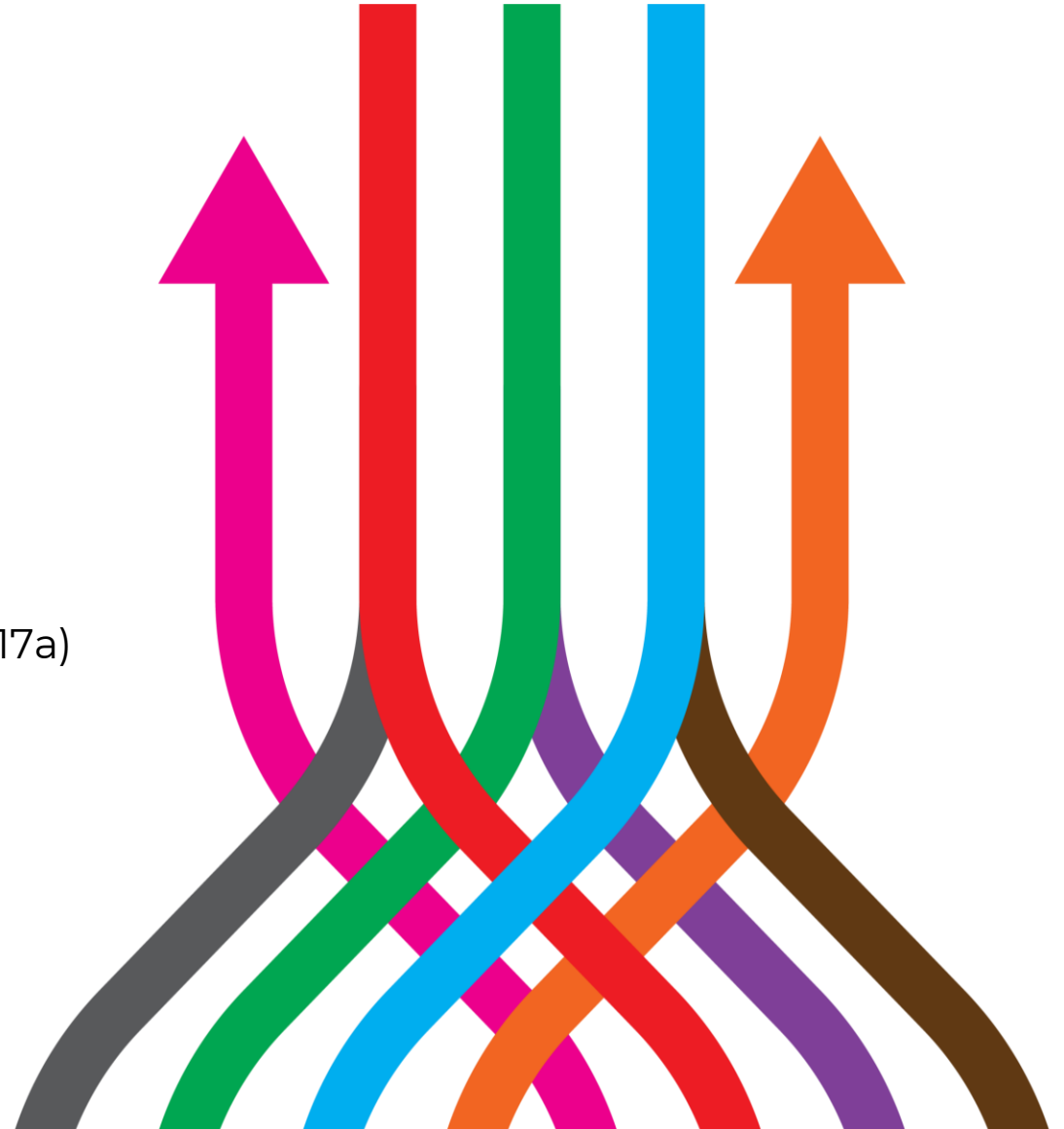
Auditory Pathway Development

- Limited auditory stimulation in children with unaided UHL result in cortical structural and functional reorganisation of the auditory cortex and other areas of the brain.
- Critical time frame with best outcomes with intervention before 3 years of age.
(Propst et al, 2010; Jung et al, 2017; Kral et al, 2016)



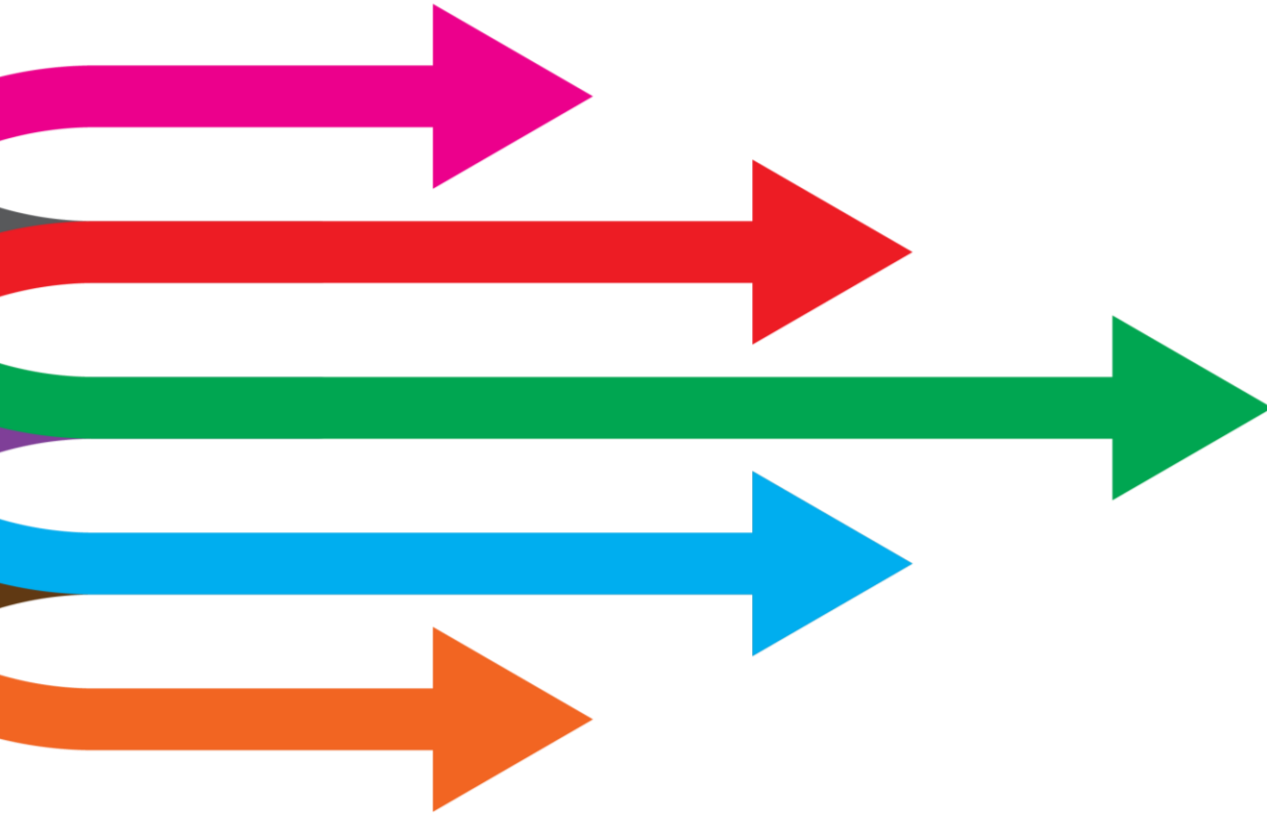
Audiology

- To fit or not too fit and beyond
- 20-30% of UHL may deteriorate over time (Barreira-Nielsen et al., 2016; Fitzpatrick et al., 2017a)



Speech Pathology

- UHL influences language acquisition, academic performance and social integration.
- Fitzpatrick et al. (2018) children with unilateral hearing loss exhibited gaps in receptive and expressive language skills by 48 mnths
- Delays in vocabulary, reading, and phonological processing, up to one-third of children with ULHL have academic impacts (Bess et al., 1998; Wake & Poulakis, 2004; Winiger et al., 2016).



Social/Family

- Making sense of new normal
- Iterative decision-making, however, commonly guided by professional advise without consideration for every-day impact (Fitzpatrick, Jacques, & Neuss, 2011; Hardonk et al., 2010; Hyde, Punch, & Komesaroff, 2010; Li, Bain, & Steinberg, 2004; Ramsden et al., 2009).
- Value perspectives beyond amplification (Fitzpatrick et al., 2018)

Sound Direction Plus

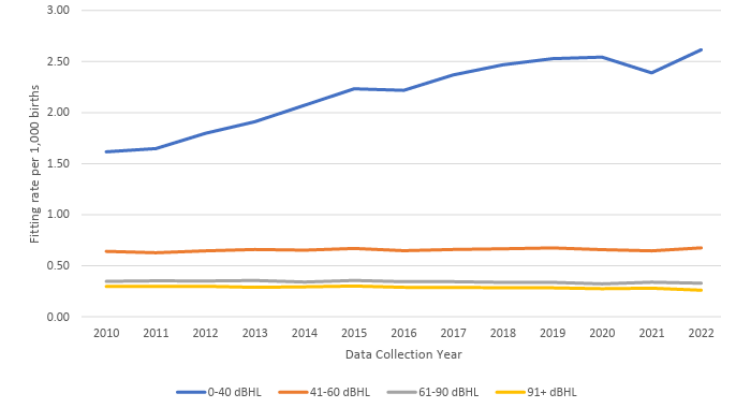
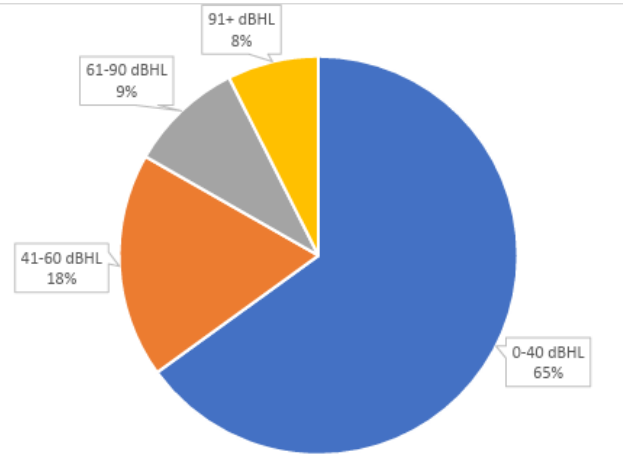


This study aims to **explore key factors** influencing speech and language outcomes in children with unilateral hearing loss (UHL) attending an early intervention service, with a particular focus on **identifying factors predicting** intervention needs.

- What are the key demographics that influence speech, language, or listening outcomes in children with UHL receiving early intervention services?
- What are the factors leading to a need of more than a monitoring program?

Cohort

Cohort of children (aided and unaided) with UHL (**n=351**) attending a transdisciplinary early intervention service (2013-2024).



Distribution of hearing loss amongst total aided clients aged under 26 years @ 31 December 2022 (3-Frequency Average Hearing Loss in the better ear)
[https://www.hearing.com.au/HearingAustralia/media/Resources/\(4\)%20Children%20and%20Young%20Adults/Aided-Child-Demographics-2022-Hearing-Australia.pdf](https://www.hearing.com.au/HearingAustralia/media/Resources/(4)%20Children%20and%20Young%20Adults/Aided-Child-Demographics-2022-Hearing-Australia.pdf)

- A retrospective review of clinical data
 - Cohort of children with UHL (n=351) attending a transdisciplinary early intervention service (2013-2024).

Inclusion criteria:

- Engagement with early intervention service beyond our introductory parent program.
- Permanent sensorineural and/or conductive hearing loss (hearing thresholds >25dBHL inclusive), in **one ear only**.

Clinical data were collected during routine clinical services (demographics, audiological, and graduate speech and language assessment data, including FLI-P).

The graduation outcomes data includes language scores from standardised language assessment of the **Clinical Evaluation of Language Fundamentals – Preschool (CELF-P2)** (Wiig et al., 2004). This assessment was conducted within 6 months of the children starting Kindergarten.

Results

Category	Early EI	Late EI
Total number of children (n=351)	218	133
Gender		
Female	89	47
Male	129	86
Additional needs		
Diagnosed Additional need	13	36
None diagnosed	205	97
Language Exposure		
English only	117	69
Majority English	47	31
Primary language other than English	37	22
Unknown	17	11
SEIFA ranking		
1st decile	10	12
2-9th decile	154	90
10th decile	54	31

Diagnosis, device and intervention pathway relative to EHDI		
Category	Early EI	Late EI
Age at diagnosis		
≤1mnths	185	82
2-6mnths	32	22
≥7mnths	1	29
Age at 1st device fitting		
≤1mnths	34	4
2-6mnths	65	14
≥7mnths	35	72
No device	84	43
Age at intervention		
≤1mnths	77	
2-6mnths	141	
≥7mnths		133

Table 1. Demographics and diagnosis, device and intervention pathway.

Sound Direction+ (n=160)

- Tracking on formal standardized Speech and Language Ax
- Tracking on FLI-P
- Tracking on progress tools (Vocal developmental check-list, play skills, early literacy)
- No concerns about informal observations in interactions with multi-disciplinary team

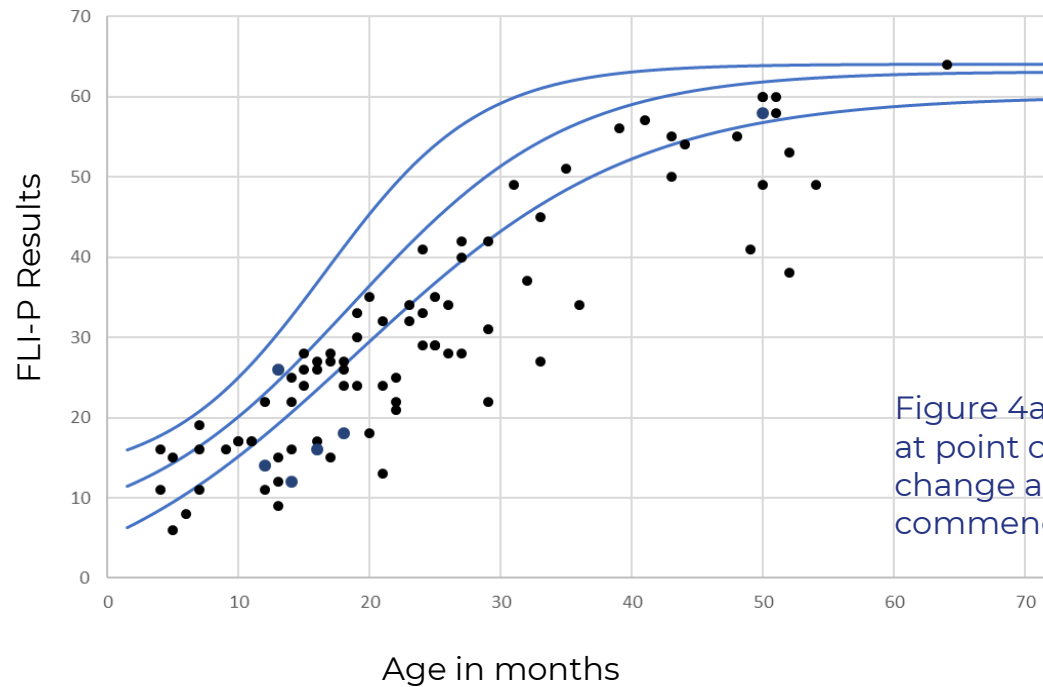
Change of Program (n=191)

- Informal observations (ongoing OME, Device compliance/No device, family support)
- Vocal Developmental Check List
- Functional Listening Index – Paediatric (FLI-P)
- Intelligibility check list
- PLS5 - CELF5 (Standardised Ax)

54.5%

FLI-P Results

Early entry FLI-P point of program change



Late entry FLI-P point of program change

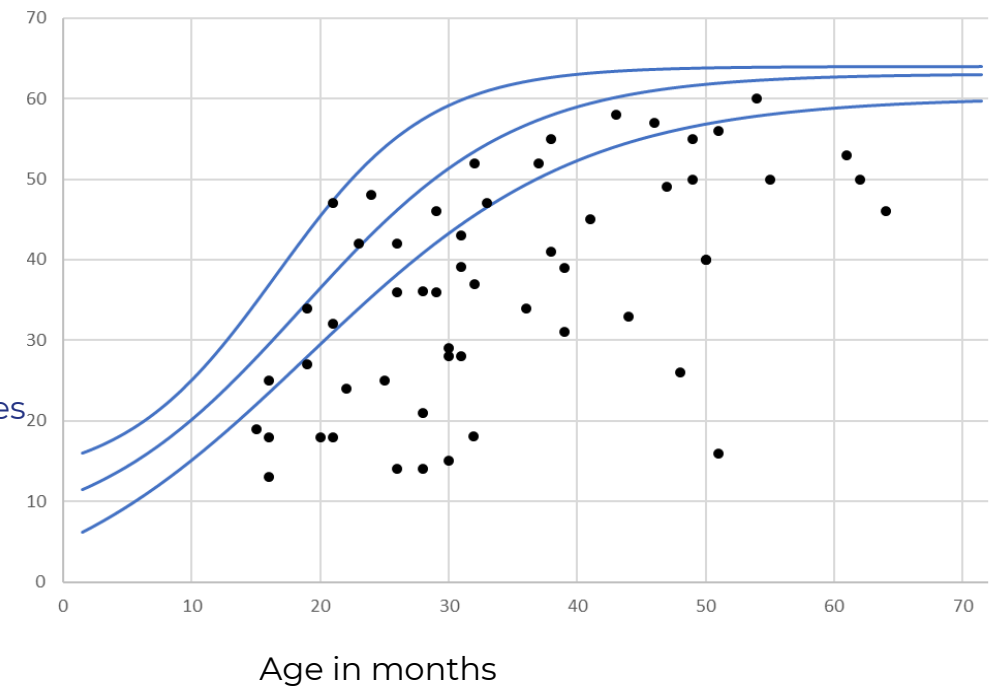
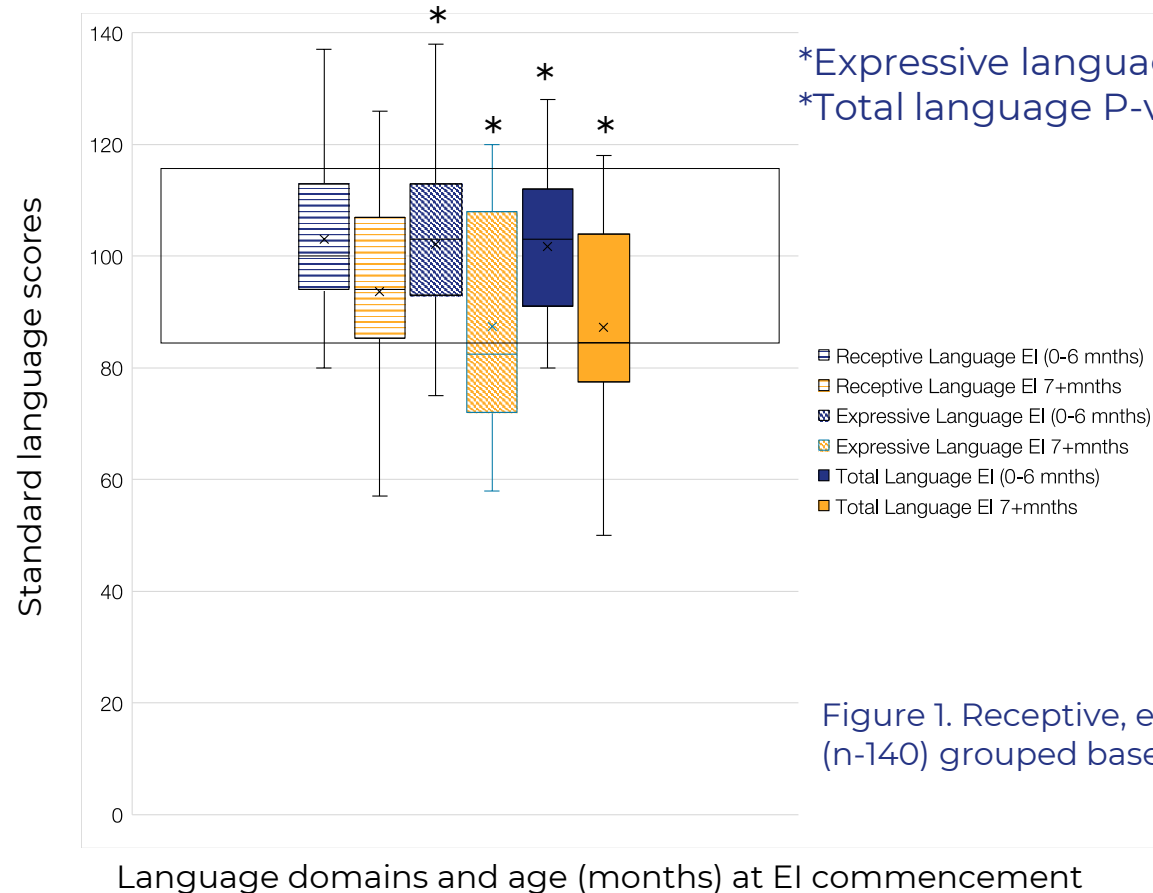


Figure 4a,b. FLI-P scores at point of program change and age of commencement in EI.

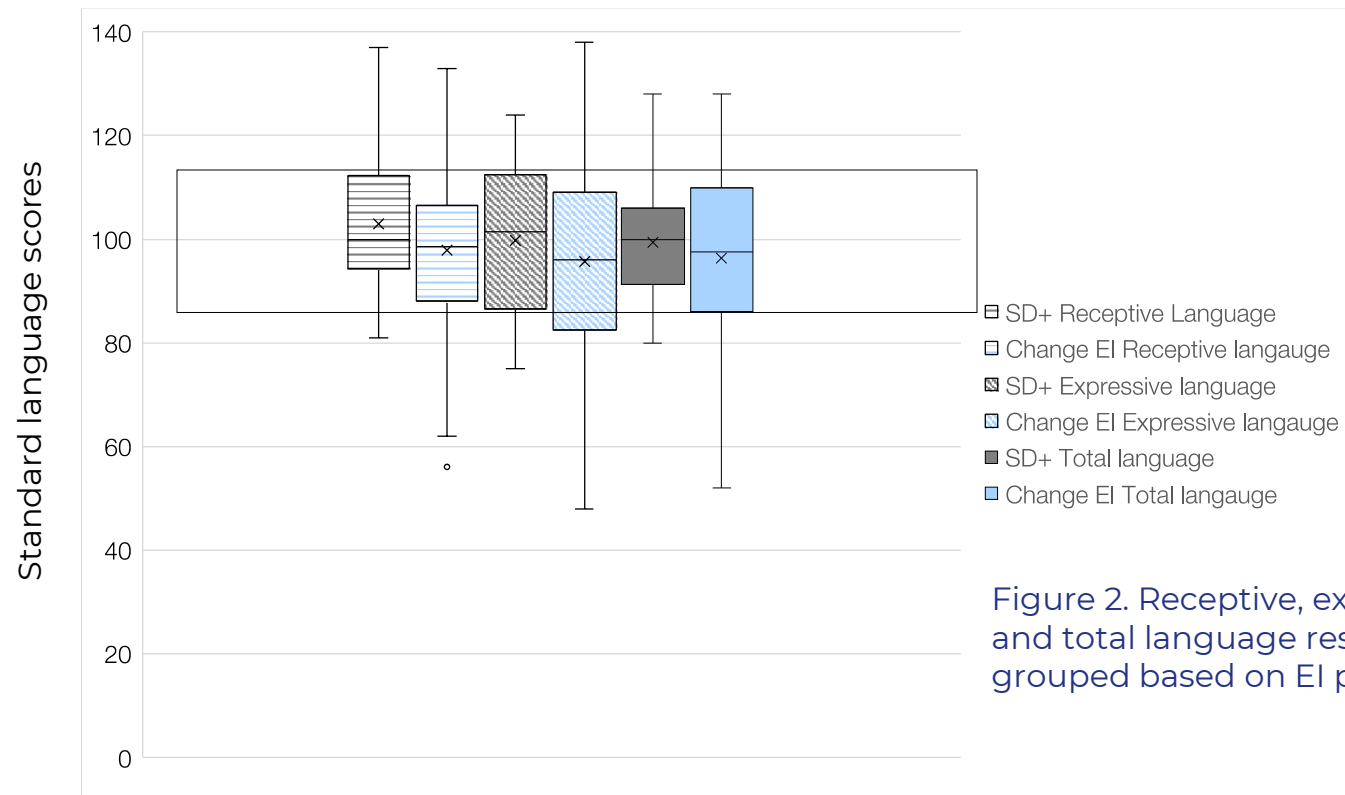
Results



Time of EI commencement has significant impact on outcomes

Figure 1. Receptive, expressive, and total language results (n=140) grouped based on age at commencement of EI.

Results

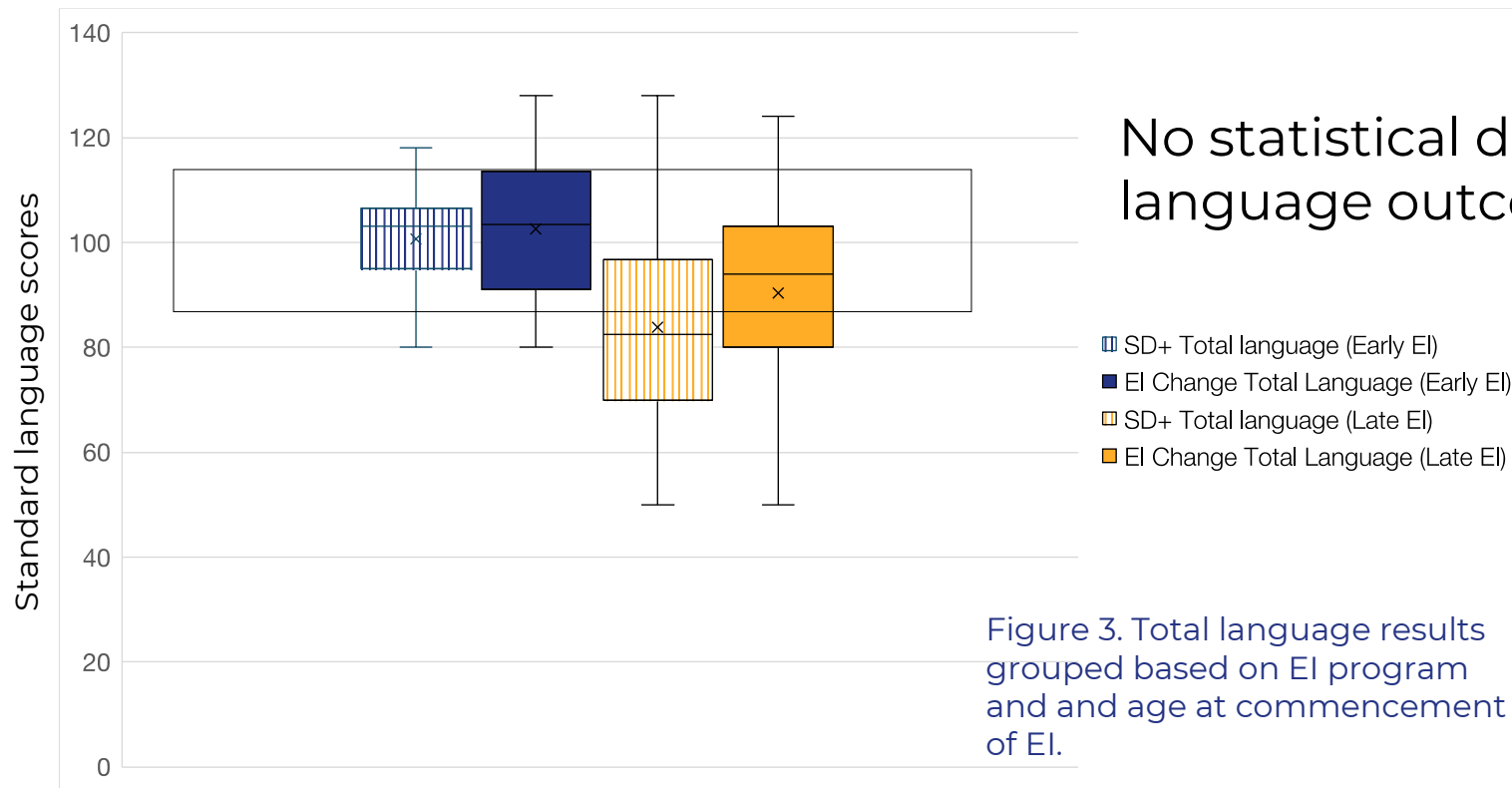


No statistical difference between language outcomes for the groups

Figure 2. Receptive, expressive and total language results grouped based on EI program.

Language domains and age (months) at EI commencement

Results



Total language, program and age at commencement of EI

Conclusion

- Early engagement with EI (<6 months of age) for children with UHL support great language outcomes
- 54.5% of children with UHL needed a higher level of support supporting individualised pathways to support
- Existing standardised measures are less reliable as predictors for this group, highlighting the need for more tailored approaches to assessment and intervention for UHL
- "More eyes of the child" through multi-disciplinary support



Thank you.

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