

Sound Outcomes: Demographics of hearing loss and spoken language data

Overview of findings from the 2020 dataset

1. Executive Summary

Members of First Voice are recognised as world leaders in providing early intervention listening and spoken language therapy programs for children with hearing loss. The First Voice Sound Outcomes data set contains the outcomes of children with hearing loss enrolled in its members' early intervention services. This is the largest data set for children with hearing loss receiving listening and spoken language early intervention globally.

Member organisations collect standardised data on the children's language skills. These internationally standardised assessments compare the children's total language, auditory comprehension, expressive communication and vocabulary to peers of the same age with typically developed hearing.

In 2020, 1,868 children were enrolled in a First Voice early intervention program. The 1,650 children supported by the Australian centres represents 39% of the children under 6 supported by Hearing Australia.

Demographic findings:

The demographics of the children the member centres supported in 2020 include:

- 77% of children were diagnosed via Universal Newborn Hearing Screening.
- 75% of children had bilateral hearing loss, with 25% having single-sided loss.
- 17% of children had been diagnosed as having additional needs complicating their hearing loss.
- 33% of children were exposed to a language other than English, with 29% from a CALD background.
- 2.5% were from an Aboriginal and Torres Strait Islander background within Australian based centres.
- 27% of children wore cochlear implants, 47% wore hearing aids, 12% wore a hearing device that was not hearing aids or cochlear implants, and 14% were not fitted with a hearing device.

Graduate outcomes findings:

- 269 children (14% of the enrolled children) graduated from the First Voice centres at the end of the calendar year.
- 89% of graduate children who had hearing loss only (so their results can be compared to typically-hearing children) demonstrated language skills that were in the normal range or above, only 11% of the children had delayed language compared to 16% of children with typical hearing.
- 67% of all graduates (including those with additional needs, late diagnosis or mainly being expose to a language other than English) who were able to complete standardised language assessments demonstrated language skills that were equivalent to or above those for typically hearing children.

These outstanding results, with graduating children who had hearing loss alone demonstrating language skills that matched those of their typically hearing peers, continued the results seen in 2018 and 2019.

These outstanding outcomes were achieved despite the COVID-19 pandemic severely affecting the final year of early intervention for the 2020 graduates.

2. Background

2.1 About First Voice

First Voice is the representative body for centres providing listening and spoken language early intervention for children with hearing loss, with members in Australia, New Zealand, South Africa and the UK.

Member centres are:

- Can:Do4Kids (South Australia);
- Hear & Say (Queensland);
- The Hearing House (New Zealand);
- The Shepherd Centre (New South Wales, Tasmania and the Australian Capital Territory);
- NextSense (previously The Royal Institute for Deaf and Blind Centre, Australia-wide);
- Telethon Speech & Hearing (Western Australia);
- Auditory-Verbal UK (AVUK, United Kingdom);
- Carel du Toit¹ (South Africa).

One of the key strategic objectives of First Voice is to collect, analyse and release annual outcomes data for children enrolled in their listening and spoken language early intervention programs. The purpose of this work is to develop a dataset which can be used to inform service development and improvement.

The key features of the early intervention programs used by First Voice members include:

- A focus on early diagnosis, early amplification and immediate enrolment into early intervention programs.
- Family-centred listening and spoken language programs with a focus on empowerment of parents/caregivers to create environments promoting listening and spoken language development.
- Ongoing assessment and review of children's outcomes to further inform the future direction of therapy interventions.

3. Findings from the 2020 Data

3.1 Demographics

3.1.1 Criteria for Inclusion

Children included in this report met the following criteria:

- having permanent hearing loss (20dB or more in 2 adjacent frequencies, in one or both ears)
- aged less than or equal to 5 years 11 months as at 31 December 2020;
- were enrolled in an early intervention program to support the development of spoken language, for any period during the year;
- all Graduates were aged 5 to 5 years 11 months as at 31 December 2020 after receiving at least 24 months of early intervention from the reporting service (except for Telethon Speech & Hearing where the data is from children's final assessment prior to exiting EI program); and
- Graduates had completed one or more assessments during the 2020 calendar year.

¹ Data from Carel du Toit is not included in the report.

3.1.2 Characteristics of children in First Voice

Figure 1 presents the number of children in First Voice centres from 2017 to 2020. There has been a steady increase in the number of children supported by First Voice centres. In total 1,868 children were enrolled in a First Voice early intervention program in 2020, which is a 22% increase in enrolments compared to 2019.

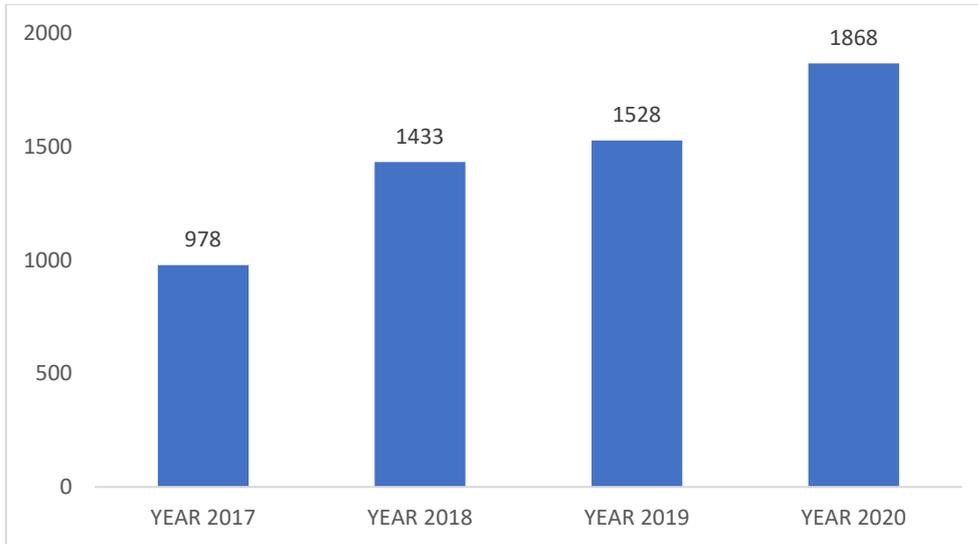


Figure 1. Number of children enrolled with First Voice centres from 2017-2020

Figure 2 shows the percentage of children who received early intervention in 2020 by First Voice centre.

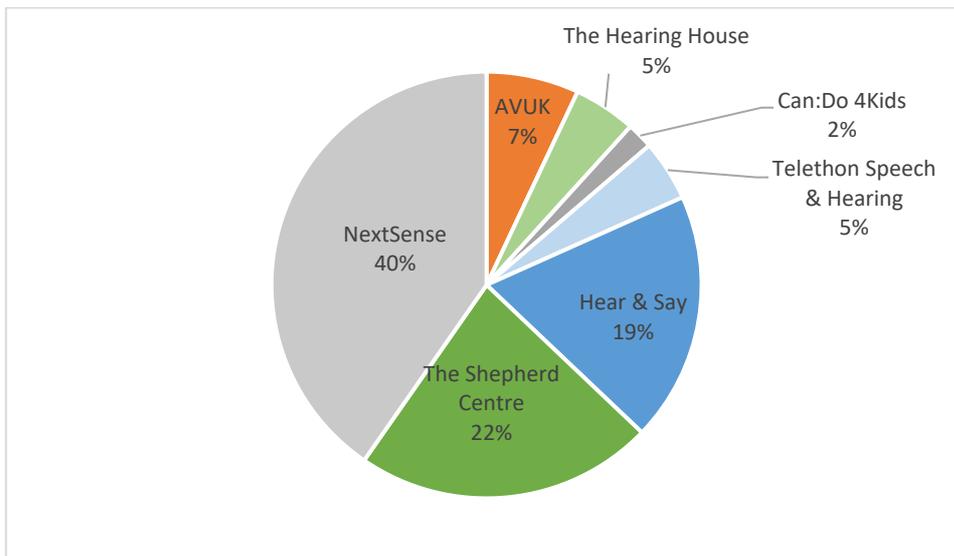


Figure 2. Percentage of children in early intervention per centre

3.1.3 Children Identified Through Universal Newborn Hearing Screening

Advances in technology and the introduction of newborn hearing screening have allowed earlier diagnosis of hearing loss and therefore earlier access to speech sounds for children. Table 1 presents the percentage of children identified their hearing loss through universal newborn hearing screening (UNHS). Overall, 77% of children enrolled in the Early Intervention Programs at First Voice Centres had their hearing loss identified through UNHS. Children who were not identified through universal newborn hearing screening presented with late onset hearing loss.

Table 1. Percentage of children identified through UNHS

Centre	Number of children in EI	Number of EI children diagnosed following UNHS (%)
AVUK	130	101 (77.7%)
Can:Do 4Kids	37	32 (86.5%)
Hear & Say	353	283 (80.2%)
NextSense	754	514 (68.2%)
Telethon Speech & Hearing	86	79 (91.9%)
The Hearing House	88	68 (77.3%)
The Shepherd Centre	420	370 (88.1%)
Total	1868	1447 (77.5%)

3.1.4 Level of Hearing Loss

Hearing losses are commonly categorised by left and right pure tone averages from the child's audiogram across four frequencies (0.5, 1.0, 2.0 and 4.0 kHz). Where a hearing loss is bilateral, the degree of loss is taken from the better ear.

As shown in Figure 3a, a quarter of children had a unilateral hearing loss while the rest had bilateral hearing losses. Approximately a quarter of children had bilateral moderate hearing loss while about one third had more severe hearing loss (i.e., severe, severe to profound, or profound loss; using the Hearing Australia hearing loss classifications as provided in the Glossary).

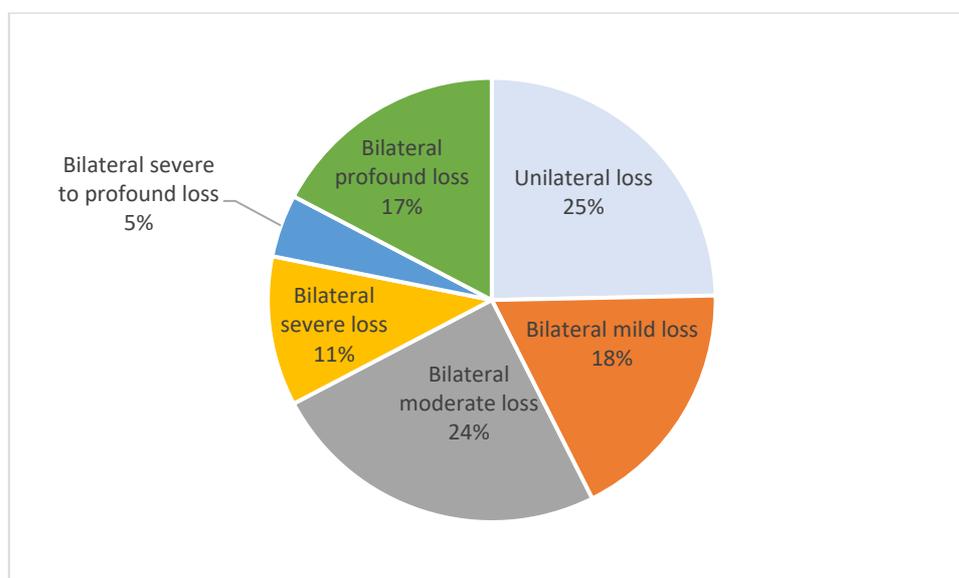


Figure 3a. Severity of hearing loss for Australian and NZ, UK -based First Voice Centre (n=1742)

3.1.5 Devices Used

Figure 4 illustrates the device used by First Voice children. In 2020, 27% of children wore cochlear implants, 47% wore hearing aids, 12% wore a hearing device that was not hearing aids or cochlear implants and 14% were not fitted with a hearing device.

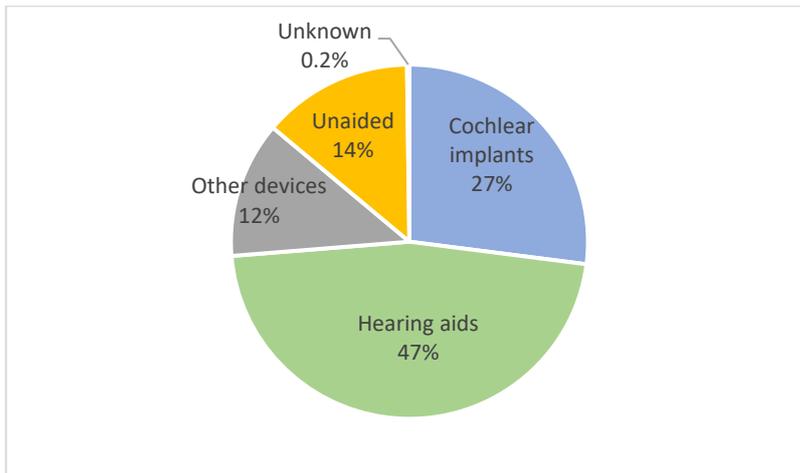


Figure 4. Device use in First Voice Children

3.2 Graduate Spoken Language Outcomes

3.2.1 Assessment Protocol

A standard assessment protocol is employed across all First Voice member centres. Assessments are selected from the protocol based on a child’s stage of development, the type of performance being measured and the test’s clinical relevance. Not all children are able to be assessed using standardised assessments (including some with additional disabilities, and those who use a language other than English). All language assessments are administered in English as per the test protocols – and therefore the tests measure a child’s performance in English. All assessments were completed face to face.

3.2.2 Assessment Process

The results included in this report were based on the assessment administered in the 2020 calendar year. Where a child had more than one assessment of a particular type during the calendar year, the most recent assessment result was used for analysis.

The following internationally standardised assessments were used for the analysis. These assessments provide data on the child’s performance across a range of language measures.

Assessment Type	Test used across age groups	Measure reported
Language	Preschool Language Scales (PLS-5), age 0:0 – 6:0	Total language score
	Clinical Evaluation of Language Fundamentals (CELF-P2), age 3:6 to 6:0	Core language score
	Clinical Evaluation of Language Fundamentals (CELF-4 & CELF-5), age 5+	Core language score

3.2.3 About the Assessments

The assessments above utilise a standardised scoring approach, so that the average score for children is 100 with a standard deviation (SD) of 15. The group of children used for the standardisation all came from an English-speaking background and had zero, or very few, children with hearing loss or additional needs. The ‘normal’ or ‘typical’ achievement range is within one standard deviation of the mean, that is between 85 and 115. Scores of less than 85 represent performance below the ‘normal’ range, with scores greater than 115 being above the normal range.

Due to this standardisation, in the typically-hearing population 16% of children will fall below the normal range and 84% will fall within or above the normal range.

3.2.4 Children in the Sample

The children in the sample all had a hearing loss in one or both ears. 61% of graduates were classed as hearing loss alone; with the others having one or more diagnosed disabilities, late diagnosis, and/or used a language other than English.

The First Voice members are dedicated to doing their best for all children they support, so the assessment results include children with additional complications beyond hearing loss that affect their language development (additional disabilities, late diagnosis or languages other than English), as well as children with hearing loss alone. However, as children with these additional complications were not included in how the assessments are standardised, only the 'hearing loss alone' children can be compared to the normal range in assessing the success of the early intervention programs provided by the First Voice centres.

3.2.5 Graduate Language Outcomes

269 children (14% of the children enrolled in a First Voice early intervention program) graduated at the end of 2020. 178 children (66% of graduates) were able to complete a standardised language assessment. Of these:

- In the graduates classed as hearing loss alone (164, 61%), 116 children completed a standardised language assessment and 103 of these (89%) achieved a standard score within or above the normal range for typically hearing children.
- Across all graduates, 120 (67%) achieved a standard score within or above the average range for typically hearing children.

4. Discussion

The results reported in the 2020 Sound Outcomes data continue the outstanding results reported in previous years:

- 2018 – 86% of hearing loss alone children in the normal range or above, with an average score of 100.5
- 2019 – 86% of hearing loss alone children in the normal range or above, with an average score of 101.3
- 2020 – 89% of hearing loss alone children in the normal range or above, with an average score of 100.6

With the COVID-19 pandemic severely affecting the final year of early intervention for the 2020 graduates, it is wonderful that their results continue to equal those expected for typically-hearing children. The graduates in 2021 will have been impacted by the COVID-19 pandemic over the final two years of intervention, which could be expected to affect their results.

5. References

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6. Glossary

Technical terms used within this report are contained below.

Bilateral hearing loss	Hearing loss affecting both ears.
Cochlear implant	A cochlear implant is an implanted electronic device which provides a sense of sound to the recipient by directly stimulating the auditory nerve with current pulses, rather than via amplified sound as occurs in hearing aids.
Unilateral hearing loss	Hearing loss affecting one ear.
CALD	Culturally and linguistically diverse population
ATSI	Aboriginal or Torres Strait Islander person

Hearing Australia - Hearing Level Classification (used by AVUK, Can:Do4Kids, Hear and Say, The Shepherd Centre, NextSense, Hearing House and Telethon Speech and Hearing).

Normal	Up to 20dB
Mild	21-40dB
Moderate	41-60dB
Severe	61-80dB
Severe to Profound	81-90dB
Profound	91+dB