

# **Sound Outcomes: Demographics of hearing loss and spoken language data**

*Overview of findings from the 2021 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 spoken language skills. These standardised assessments compare the children's total language, auditory comprehension, expressive communication, and vocabulary to peers of the same age with typical hearing.

In 2021, 1,894 children were enrolled in seven participating First Voice early intervention programs. Enrolment numbers in AVUK was not obtained. The 1,699 children supported by the Australian centres represent 44% of all children with hearing aids or cochlear implants under the age of 6 years that are supported by Hearing Australia.

## **Demographic findings:**

Of the 1,894 children enrolled in the seven member centres in 2021:

- 77% had their hearing loss identified through Universal Newborn Hearing Screening.
- 75% had bilateral hearing loss, and 25% had unilateral hearing loss.
- 14% were identified as having other developmental needs in addition to their hearing loss which impacted their rate of spoken language development.
- 28% were exposed to a language other than English at home, with 16% coming from a Culturally and Linguistically Diverse background.
- 4% of those in the Australian-based centres were from an Aboriginal or Torres Strait Islander background.
- 24% wore cochlear implants, 47% wore hearing aids, 12% used another type of hearing device, and 16% were not fitted with any device.

## **Graduate outcomes findings at 5 years of age:**

- 217 children (14%) were 5 years old in 2021 and in the final year of early intervention before transitioning to school education. They are defined in this report as 'graduates'.
- 83% of graduates who had hearing loss only demonstrated language skills that were in the normal range or above.
- 69% of all graduates (including those with additional needs, late diagnosis or mainly being exposed 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 children with typical hearing.

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

These outstanding outcomes were achieved despite the COVID-19 pandemic in 2021 severely affecting the final year of early intervention before school entry for these 5-year-old children.

## 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 (Australia-wide);
- Telethon Speech & Hearing (Western Australia);
- Auditory-Verbal UK<sup>1</sup> (AVUK, United Kingdom);
- Carel du Toit Centre (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 working in partnership with parents/caregivers and building parent/caregiver capacity to create rich learning environments for their child 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 2021 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 2021.
- were enrolled in an early intervention program to support the development of spoken language, for any period during the year.

For the purposes for this report 'graduates' of the programs were defined as children who:

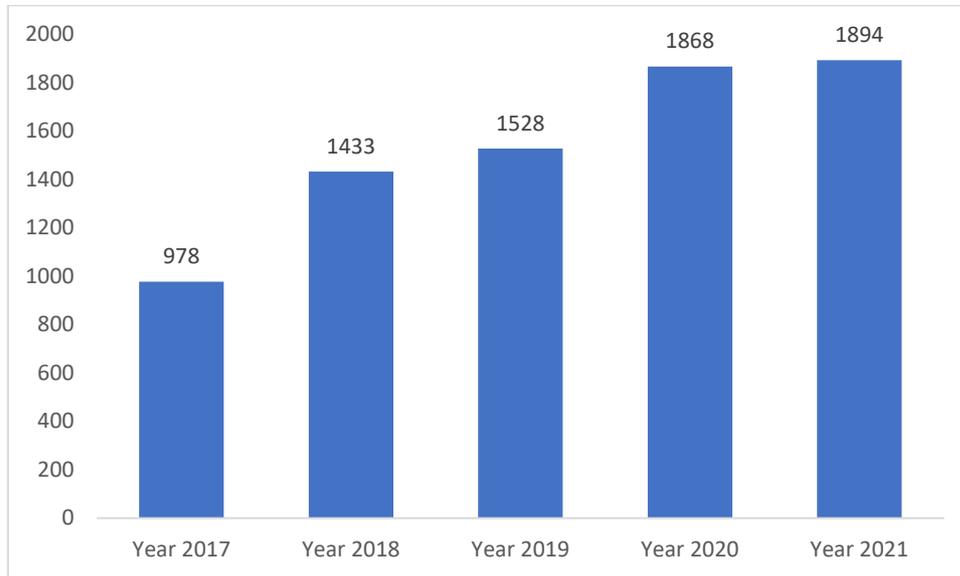
- were aged 5 to 5 years 11 months at 31 December 2021 and had received at least 24 months of early intervention from the reporting service (except for Telethon Speech & Hearing where the data is for children's final assessment prior to exiting that early intervention program); and
- had completed one or more standardised language assessments during the 2021 calendar year.

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<sup>1</sup> Data from AVUK is not included in the report.

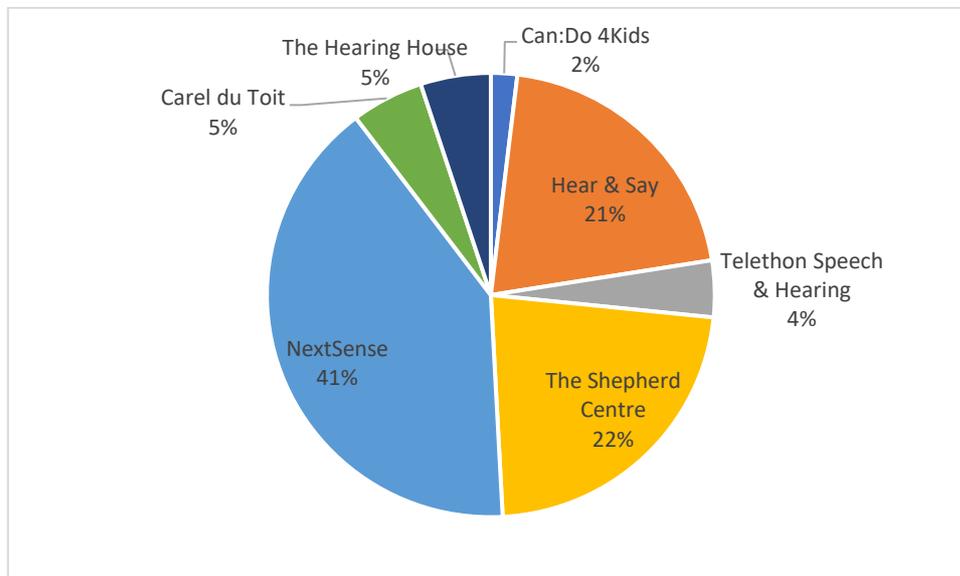
### 3.1.2 Characteristics of children in First Voice

Figure 1 presents the number of children in First Voice centres from 2017 to 2021. There has been an increase in the number of children supported by First Voice centres. In total 1,894 children were enrolled in a First Voice early intervention program in 2021, which is a 1.4% increase in enrolments compared to 2020.



**Figure 1. Number of children enrolled with First Voice centres from 2017-2021**

Figure 2 shows the percentage of children who received early intervention in 2021 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 identification and diagnosis of hearing loss and therefore earlier access to speech and spoken language for children. Table 1 shows that 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 mostly presented with late onset hearing loss or were born overseas in countries without universal newborn hearing screening programs. Notably, South Africa does not have a universal newborn hearing screening program

and 79% of the children enrolled at the Carel du Toit Centre were not diagnosed through newborn hearing screening.

Table 1. Percentage of children identified through UNHS

Centre	Number of children in EI	Number of EI children identified through UNHS (%)
Can:Do 4Kids	36	33 (91.7%)
Carel du Toit	99	21 (21.2%)
Hear & Say	390	347 (89.0%)
NextSense	768	490 (63.8%)
Telethon Speech & Hearing	78	75 (96.2%)
The Hearing House	96	76 (79.2%)
The Shepherd Centre	427	362 (84.8%)
<b>Total</b>	<b>1894</b>	<b>1404 (74.1%)</b>

### 3.1.4 Level of Hearing Loss

Hearing losses are commonly categorised by left and right average pure tone hearing thresholds 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 documented for 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).

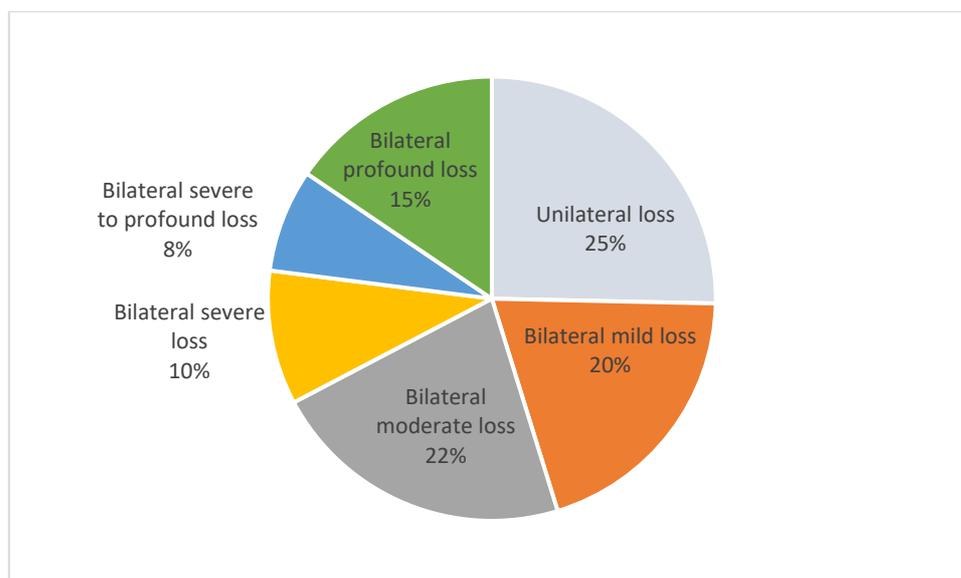
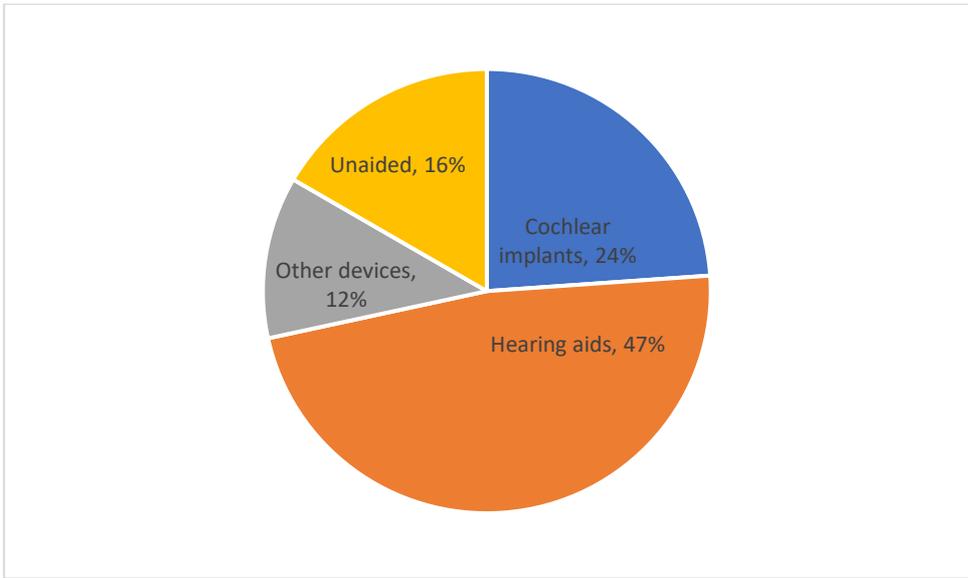


Figure 3a. Severity of hearing loss for Australian and NZ, South African-based First Voice Centres (n=1894)

### 3.1.5 Devices Used

Figure 4 illustrates the device used by First Voice children. In 2021, 24% of children wore cochlear implants, 47% wore hearing aids, 12% wore a hearing device that was not hearing aids or cochlear implants and 16% 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 children with additional disabilities, and those who use a language other than English). All language assessments are administered in English as per the test protocols. Therefore, the tests measure a child’s performance in English. All assessments were completed in person.

**3.2.2 Assessment Process**

The results included in this report were based on the assessment administered in the 2021 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 standardised assessments were used for the analysis. These assessments provide data on the child’s performance across a range of language measures.

<b>Assessment Type</b>	<b>Test used across age groups</b>	<b>Measure reported</b>
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 ‘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.

According to the norms (standards) for these assessments, 16% of children would be expected to 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 having 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. The language outcomes of the graduates with 'hearing loss alone' are reported in this report demonstrating the success of the early intervention programs provided by the First Voice centres.

### 3.2.5 Graduate Language Outcomes at age 5 years

217 children (11.5% of the children enrolled in a First Voice early intervention program) were 5 years old and in the final year of early intervention before transitioning to school education at the end of 2021. 163 children (75.1% of graduates) were able to complete a standardised language assessment. Of these:

- In the graduates classed as hearing loss alone (137, 63.1%), 115 children completed a standardised language assessment and 93 of these children (80.9%) achieved a standard score within or above the normal range compared to their same aged peers with typical hearing.
- Across all graduates, 110 children (67.5%) achieved a standard score within or above the average range compared to their same aged peers with typical hearing.

## 4. Discussion

The results reported in the 2021 Sound Outcomes data continue the outstanding results reported in previous years:

- 2018 – 86% of children with hearing loss alone in the normal range or above, with an average score of 100.5
- 2019 – 86% of children with hearing loss alone in the normal range or above, with an average score of 101.3
- 2020 – 89% of children with hearing loss alone in the normal range or above, with an average score of 100.6
- 2021 – 81% of children with hearing loss alone in the normal range or above, with an average score of 107.6

With the COVID-19 pandemic severely affecting the year before school entry for the 2021 graduates, it is wonderful that their results continue to match those expected for children with typical hearing. 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