

EARLY CHILDHOOD INTERVENTION 2014 OUTCOME RESULTS



Hearing loss is one of the most common disabilities in newborns, affecting approximately

2 in 1,000

babies each year.

National Framework for Neonatal Hearing Screening August 2013 #

ABOUT THE CORA BARCLAY CENTRE

The Cora Barclay Centre is the oldest and most comprehensive dedicated Listening & Spoken Language (LSL) program in Australia providing intensive, evidence-based intervention through Auditory-Verbal Therapy (AVT).

The aim of the Cora Barclay Centre is to help children who are deaf or hearing impaired achieve life-long social and emotional well-being and economic independence.

The Centre provides evidence-based, multi-disciplinary services for children who are deaf or hearing impaired, the majority of whom are fitted with hearing aids, cochlear implants or other listening devices. Programs include early childhood intervention, student support services, social participation programs, and ongoing monitoring and assessment to children from birth to 18 years and their families.

The objectives of our Early Childhood Intervention program are to assist children with hearing loss to develop

listening and spoken language as their primary mode of communication and to facilitate their inclusion in mainstream education from the earliest age possible. Parents and caregivers actively participate in therapy and are guided and coached to facilitate their child's spoken language development through listening.

Thanks to early diagnosis and continuing advances in hearing technologies, the vast majority of children attending the Cora Barclay Centre (and other First Voice centres*), who have no additional disabilities, achieve speech, language and comprehension that is comparable to children of the same age with normal hearing by the time they go to school.

#1 per 1,000 live births is the estimated rate of permanent childhood hearing loss that is identified at, or very close to, birth. By the time each 'birth cohort' has reached 5 years of age, this rate has risen to approximately 3 per 1,000 children. National Framework for Neonatal Hearing Screening August 2013, Page 4 <http://health.gov.au/internet/main/publishing.nsf/Content/neonatal-hearing-screening>

* First Voice is the national voice for six centres providing listening and spoken language early intervention for children with hearing loss in Australia and New Zealand. Members are the Cora Barclay Centre (SA), Hear and Say (QLD), The Shepherd Centre (NSW/ACT), Taralye (VIC), Telethon Speech and Hearing (WA) and the Hearing House (NZ). First Voice champions the right of all deaf people to listen and speak.



CORA BARCLAY CENTRE ASSESSMENT PROTOCOLS

In February 2010, the Cora Barclay Centre introduced a new standardised assessment protocol as part of the First Voice early childhood intervention outcome measures. This protocol assesses the speech, language and vocabulary development of children aged 9 months to 5 years enrolled in the Early Childhood Intervention AVT Program.

The purpose of assessment is:

1. to obtain objective measurements of each child's speech and language development to form their individual therapy plan.

2. to enable objective comparisons between children who are deaf or hearing impaired undertaking the Cora Barclay Centre AVT Program and children with normal hearing of the same age in order to determine if their spoken language skills are equivalent to their hearing peers.

3. to monitor and evaluate the effectiveness of Cora Barclay Centre therapy programs.

Children attending the Cora Barclay Centre AVT Program receive a range of standardised assessments annually. The tests are designed to measure the children's understanding of language, expressive use of language and their clarity of speech.

The assessment tools are:

- 1. Pre-School Language Scale Edition 4 & 5 (PLS-4/PLS-5)**
- 2. Peabody Picture Vocabulary Test Edition 4 (PPVT-4)**
- 3. Goldman Fristoe Test of Articulation (GFTA-2)**

Cora Barclay Centre programs are constantly reviewed in the light of national and international research and its own program evaluations. As part of its evidence-based approach, the Cora Barclay Centre contributes its data to the First Voice national clinical database, which consolidates data for over 700 children across Australia and New Zealand in early childhood intervention programs provided by First Voice centres.

92%

of children with permanent hearing loss are born to hearing parents.

Mitchell & Karchmer, 2004

CORA BARCLAY CENTRE ASSESSMENT METHOD

Fifty-five (55) children aged between 9 months and 5 years who were enrolled in AVT early intervention at Cora Barclay Centre were assessed from January 2014 to the end of December 2014.

All children (n55) were assessed using the Pre-school Language Scale Edition (PLS-4/PLS-5).

In addition, children aged between 3 and 5 years (n27) were assessed with the Peabody Picture Vocabulary Test Edition 4 (PPVT-4) and the Goldman Fristoe Test of Articulation (GFTA-2).

The stages and ages of assessment were:

6 months post hearing aid (HA) or Cochlear Implant (CI) fitting

12 months post HA or CI fitting

24 months post HA or CI fitting

Within 3 months post 3rd birthday*

Within 3 months post 4th birthday

Within 3 months post 5th birthday

The amount of time the children had been receiving AVT at the Cora Barclay Centre ranged between 5 and 61 months with the mean being 30 months.

* Where the 3rd birthday occurs within 6 months of the 24 month post-fitting criterion the 3rd birthday is taken as the priority assessment time.

Figure 1: Clients assessed by assessment age

Number of children assessed by assessment age in 2014 (N=55).



Figure 2: Severity of hearing impairment

Degree of hearing loss of children on service at the Cora Barclay Centre.

The children in the AVT Program had varying degrees of hearing impairment which ranged from unilateral hearing impairment to profound deafness.

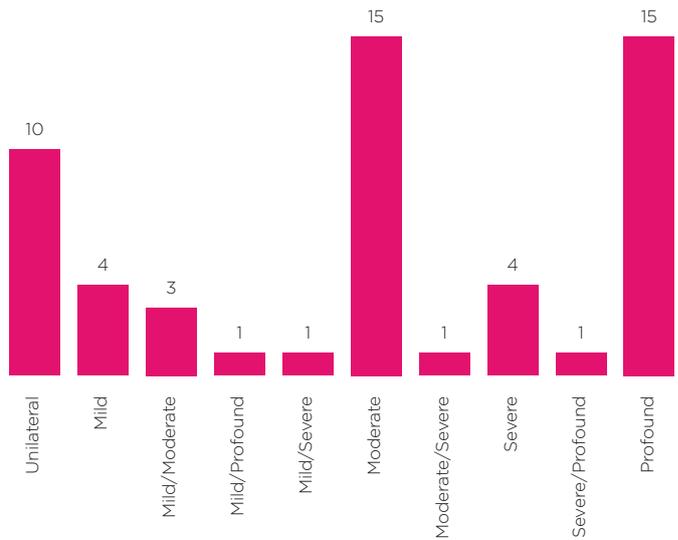
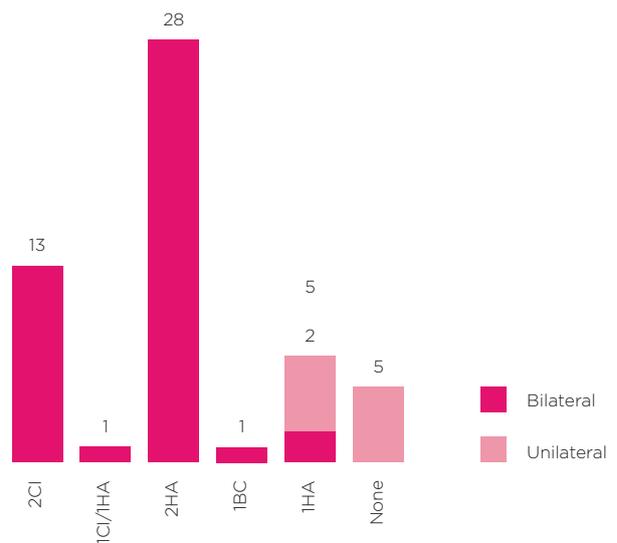


Figure 3: Hearing devices

Number of children using each type of Amplification Device.

This graph shows that 28 children participating in AVT at the Cora Barclay Centre were wearing two hearing aids and 13 had bilateral cochlear implants. The five (5) children not currently fitted with an amplification device all had a unilateral hearing loss.

CI - Cochlear Implant
 HA - Hearing Aid
 BC - Bone Conduction Hearing Aid



THE THREE KEY ASSESSMENT TOOLS USED BY THE CORA BARCLAY CENTRE ARE:

1

PRE-SCHOOL LANGUAGE SCALE EDITION (PLS-4/PLS-5)

The PLS-4/PLS-5 is divided into 2 parts: (1) **Auditory Comprehension** which assesses the understanding of spoken language; and (2) **Expressive Communication** which assesses the child's verbal language. Both parts of the assessments are used to calculate the total language score.

The PLS-4/PLS-5 is a norm-referenced assessment which provides standard scores, percentiles, and age-equivalent scores for children from birth to six years. Standard scores have a mean or average of 100 and one standard deviation is a difference of 15. Therefore children who score between 85 and 115 fall within one standard deviation of the mean of 100, which is regarded as 'the normal range'. Sixty-eight percent (68%) of the overall population falls within this range (i.e., one standard deviation of the mean).

2

PEABODY PICTURE VOCABULARY TEST EDITION 4 (PPVT-4)

The PPVT-4 tests a child's understanding of words used to name objects and describe actions and attributes. It is a norm-referenced assessment of **vocabulary** which provides standard scores, percentiles, and age-equivalent scores from early childhood to adulthood. Standard scores have a mean or average of 100 and one standard deviation is a difference of 15. Therefore children who score between 85 and 115 fall within one standard deviation of the mean of 100 and are within the 'normal range'.

3

GOLDMAN FRISTOE TEST OF ARTICULATION (GFTA)

The GFTA is a norm-referenced assessment of **articulation** which provides standard scores and percentiles from early childhood to adulthood. The test provides information about a child's articulation ability by sampling both spontaneous and imitative sound production of consonants. The standard score system for the GFTA is similar to the PPVT, in that it has a mean or average of 100 and one standard deviation is a difference of 15. Therefore, children who score between 85 and 115 fall within one standard deviation of the mean of 100 and are within the 'normal range'.

ASSESSMENT TOOL RESULTS

1

Pre-School Language Scale Edition (PLS-4/PLS-5)

Figure 4A: Comparison of PLS standard scores - all assessed clients

Comparison of the PLS Mean Standard Scores gained by all children assessed in the Cora Barclay Centre AVT Program (n55) with the Mean Score gained by the general population.

This graph demonstrates that children enrolled at the Cora Barclay Centre are obtaining scores that are comparable to the general population.



Figure 4B: Comparison of PLS standard scores - diagnosed post 12 months

A comparison of the Mean Standard Scores gained by children assessed in the Cora Barclay Centre AVT Program diagnosed post 12 months with the Mean Score gained by the general population.

This graph demonstrates that children diagnosed after 12 months of age are achieving scores slightly below children who are diagnosed before 12 months of age. It also shows that these children are obtaining scores within one standard deviation of the norm (85-115) that are comparable to the general population.



For children affected by hearing loss, the future prospects are positive.

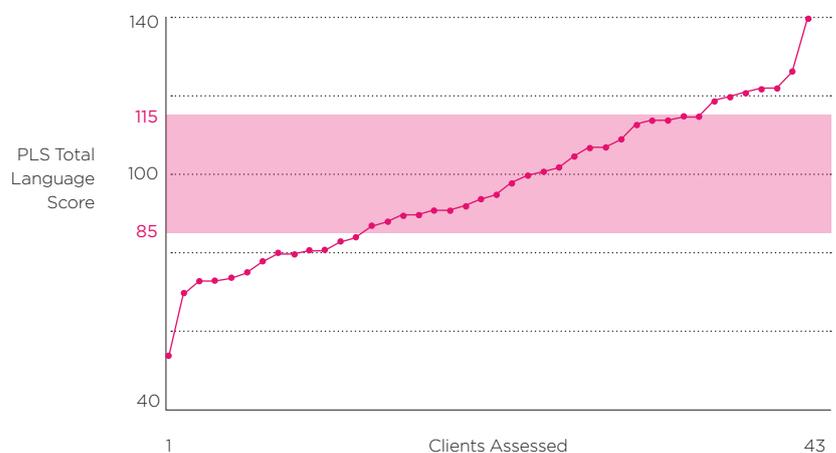
Thanks to early diagnosis, continuing advances in hearing technologies and access to listening and spoken language early childhood intervention at a very young age, children who are deaf or hearing impaired have the potential to learn to listen and speak.

Figure 5A: PLS Range of Total Language Scores

The range of Standard Scores gained by each child enrolled in the Cora Barclay Centre AVT Program on the PLS-4/PLS-5 sub-tests.

13 individual children are below one standard deviation (85); 22 within the 'normal range' and 7 above one standard deviation with 1 achieving the remarkable score of 140!

NB Two of the children below the standard deviation had additional disabilities which impacted on their development and a further two had only recently established consistent hearing aid wear.



2

Peabody Picture Vocabulary Test Edition 4 (PPVT-4)

Figure 6: PPVT Standard Score

Comparison of the Mean Standard Scores gained in the PPVT-4 by children enrolled in the CBC AVT Program with the Mean Score gained by the general population.

This graph shows that children accessing the Early Intervention AVT Program have vocabulary knowledge that is higher than the Mean Score of the general population. These results suggest that individualised AVT from a young age improves listening skills and ultimately vocabulary development.

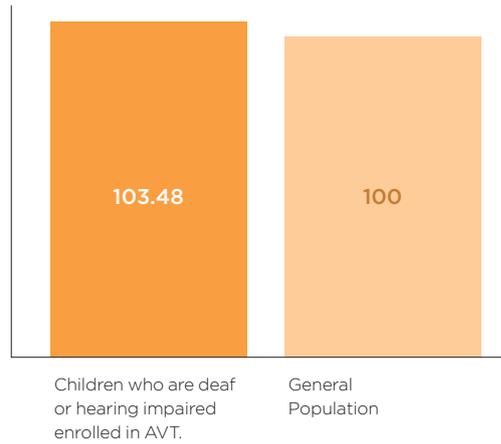


Figure 7A: Range of PPVT Scores by Assessment Age

The range of Standard Scores gained by the children enrolled in the Cora Barclay Centre AVT Program within each assessment group on the PPVT-4 (n27).

This graph shows the range of vocabulary knowledge scores for children aged 3, 4 and 5 years (n27). It demonstrates that children approaching school age have vocabulary knowledge equal to or better than their hearing peers.

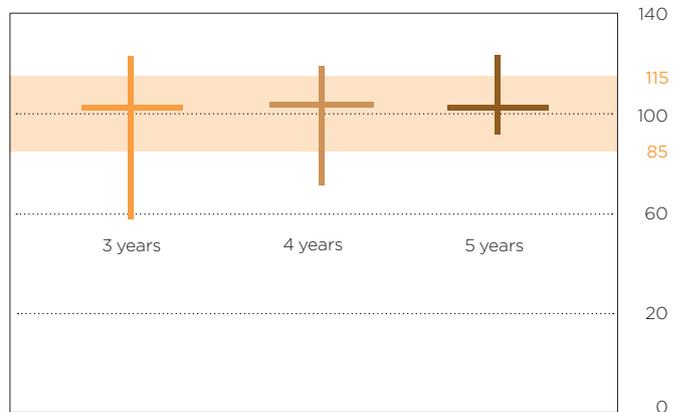
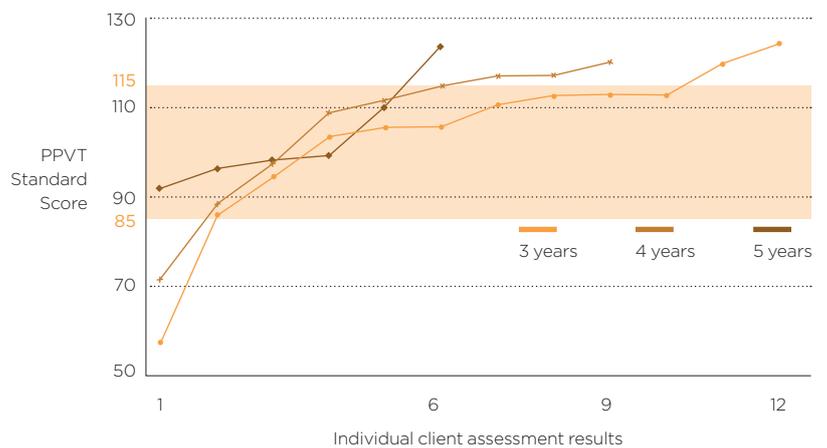


Figure 7B: PPVT Scores by Assessment Age

The range of Standard Scores gained by each child enrolled in the Cora Barclay Centre AVT Program within each assessment group on the PPVT-4.

This graph demonstrates that all of the children receiving AVT in 2014, except for 2, had vocabulary knowledge equal to or better than their hearing peers.



3

Goldman Fristoe Test Of Articulation (GFTA)

Figure 8: GFTA Standard Score

Comparison of the Mean Standard Scores of the GFTA gained by children aged 3-5 years (N27) enrolled in the AVT Program with the Mean Score gained by the general population.

This graph demonstrates that children enrolled in the Cora Barclay Centre AVT program are obtaining speech results within one standard deviation of the mean.

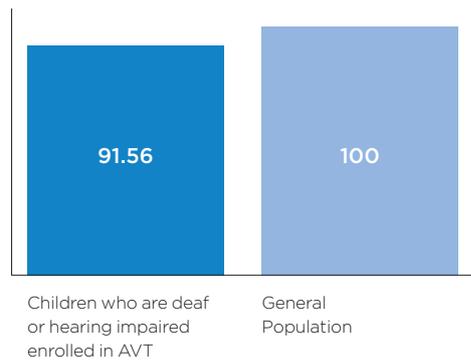
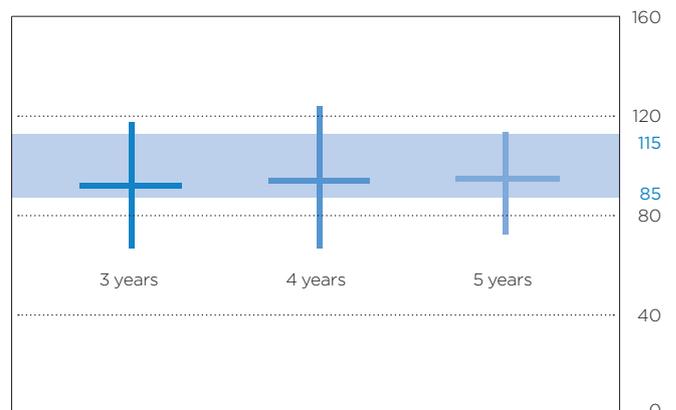


Figure 9: Range of standard scores gained from GFTA

The range of Standard Scores gained by children enrolled in the AVT Program within each assessment group in the GFTA-2.

This graph demonstrates variability in the speech skills of children with a hearing loss, ranging from below average to above. A number of factors can contribute to this variability e.g. age of diagnosis, consistent use of hearing equipment etc.



WHAT DO THESE ASSESSMENT RESULTS TELL US?

These assessments show that children who are deaf or hearing impaired in the Cora Barclay Centre Auditory-Verbal Therapy Program in 2014 have:

- 1.** An understanding of language comparable with children with normal hearing of the same age (Assessment: PLS – Auditory Comprehension)
- 2.** Verbal language comparable with children with normal hearing of the same age (Assessment: PLS – Expressive Communication)
- 3.** Vocabulary knowledge equal to or better than children with normal hearing of the same age (Assessment: PPVT)
- 4.** Speech skills comparable with children with normal hearing of the same age (Assessment: GFTA)

NATIONAL COMPARISON

At the national level, all five Australian First Voice centres follow the same standardised assessment protocols yielding a consolidated national outcomes database of over 1,000 children in our listening and spoken language programs. Analysis of the First Voice clinical database shows outcomes very similar to those reported above, providing further validation of the effectiveness of listening and spoken language early childhood intervention as practised in Australia.

The Cora Barclay Centre uses these objective assessments: (1) to review and modify each child's individual service plan in order to achieve the best possible outcomes for each child and (2) to evaluate our programs and compare them with those of comparable organisations.

OUTCOMES FOR EACH CHILD ATTENDING THE CORA BARCLAY CENTRE

These outcomes demonstrate that children who are deaf or hearing impaired who participate in listening and spoken language early childhood intervention programs have excellent prospects of learning to listen and speak fluently; attending mainstream schools; completing secondary education or other vocational pathways; and ultimately attaining high levels of social and emotional well-being and economic independence.



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