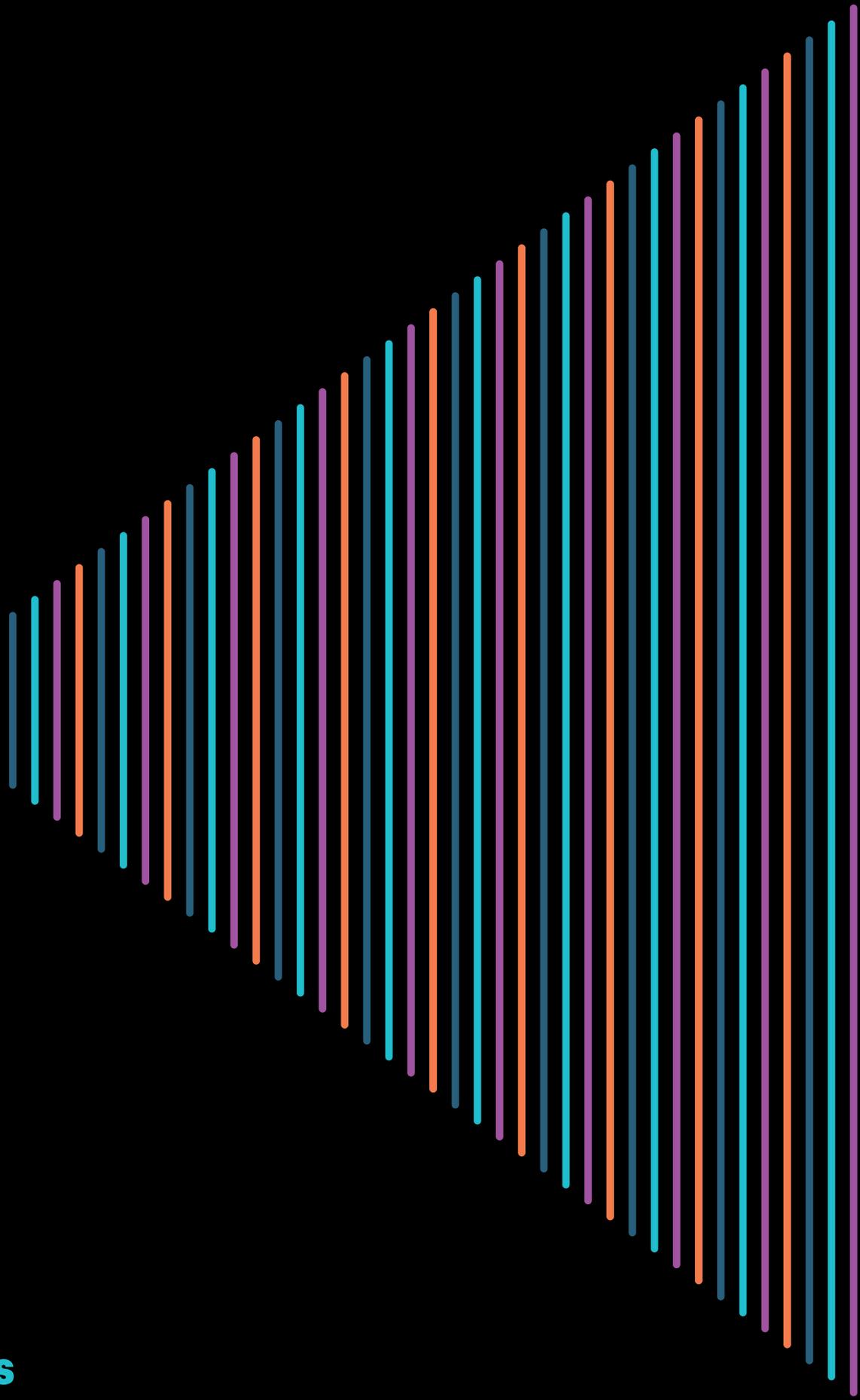


HH



**2015-  
2016  
Annual  
Outcomes  
Report**



Introduction	02
Executive summary	04
Research review	06
Our services	08
The right choice for Josh	14
New referrals	16
Children receiving services	18
Outcomes	22
Research and training	28
Appendix: assessments	29



We hope to provide useful information to stakeholders about our families, services and outcomes through this report.  
Should you have any feedback, please direct this to Scott Johnston, the CEO of The Hearing House: [scott@hearinghouse.co.nz](mailto:scott@hearinghouse.co.nz); or to the report's primary author: Janet Digby, [janet@levare.co.nz](mailto:janet@levare.co.nz).  
Thanks to everyone in the team who contributed to this report, particularly Gurdeep Singh (Contractor) and Alexandra Crosbie (Habilitation Manager).

**The Hearing House is a charity established in 1998 to teach deaf and hearing impaired children to listen and speak. Since its inception, it has provided services to more than 400 children.**

As children with hearing aids or cochlear implants require an abundance of listening and language stimulation<sup>1</sup> to catch up with their hearing peers, the organisation focuses on the provision of intensive therapy and building parents' skills to carry out therapy at home, as part of normal life.

The majority of families who receive services from The Hearing House have children with one or two cochlear implants, meaning most have hearing losses that are described as severe or profound from an audiological perspective.

The Hearing House is based in Greenlane, Auckland. It employs habilitationists, audiologists and administrators, as well as staff for its preschool. Team members strive to provide the best possible services for children, young people and their families.

The Hearing House (THH) partners with Kelston Deaf Education Centre (KDEC) and staff from this organisation provide cochlear implant habilitation services in the northern region (north of Turangi) for children over the age of five years.

In addition to providing services for families whose children have been, or are being, assessed for cochlear implants, The Hearing House also provides habilitation services for a number of children under the age of five, who have hearing aids.

The Hearing House receives about half of all its funding from the Northern Cochlear Implant Trust to provide services to children and young people with cochlear implants, including those who are at school. The remaining funding is raised from the charitable sector.

Habilitation services provided by The Hearing House for families of children with hearing aids are not Government funded. Therefore, these services are provided on a case-by-case basis, depending on clinical capacity and the availability of private funding. All services are provided free-of-charge to deaf and hearing impaired children and their families.

The Hearing House fundraising team is continuing to make solid progress towards a fundraising target of \$7.9M for a purpose-built, 1000m<sup>2</sup> facility that will better serve the needs of deaf and hearing impaired children and their families, and other adults for years to come.

By the end of June 2016, just over 70% of the target amount has been raised, and the Joyce Fisher Preschool has been operating at its new facility for one year. The remainder of the new development is currently on-track to be completed in the third quarter of 2017.

<sup>1</sup> Lim SYC & Simser J. (2005) Auditory-Verbal Therapy for Children with Hearing Impairment. *Annals Academy of Medicine*. May 2005, Vol 34, No 4.

# Executive summary

The Hearing House has provided services to more than 400 deaf and hearing impaired children since it was established in 1998, including through its joint venture partnership with Kelston Deaf Education Centre, as paediatric provider to the Northern Cochlear Implant Trust.

Services provided by The Hearing House include habilitation, audiology and a preschool. Outreach services are provided to families who live outside the Auckland region.

The Hearing House provides intensive habilitation services for children under the age of five, while Kelston Deaf Education Centre provides habilitation for children and young people between the ages of five and 19. At the age of 19, recipients transition to the adult cochlear implant programme.

Approximately half of The Hearing House's funding each year is raised from private and charitable sources and this is spent on staff, systems, facilities and equipment to support more than 200 children currently on the cochlear implant programme, plus an additional 15 children with hearing aids.

This report includes data for the period 1 July 2015 to 30 June 2016.

## Services

In addition to the habilitation, audiology and preschool services, The Hearing House and Kelston Deaf Education Centre, also provide children and their families with programmes which aim to meet their specific needs. These programmes are described later in this report.

### Children and young people with cochlear implants

- The number of children and young people supported by the paediatric cochlear implant programme in the northern region has grown considerably, from 117 in March 2009 to 223 children and young people by 30 June 2016.
- 46 children and young people were referred to the paediatric cochlear implant programme during the 2015-16 year:
  - 27 children/young people went on to receive one or two publicly funded cochlear implants during the period;
  - an additional four children/young people received implants through ACC or private funding; and
  - the average time between acceptance of candidacy and surgery was less than one month.

→ Of the children currently receiving cochlear implant services:

- 31% have one or more additional disabilities in addition to their hearing loss;
- 49% are recorded as being of European ethnicity, with 24% Māori, 10% Pacific, 22% Asian and 6% Middle Eastern, Latin American and African (MELAA) ethnicity<sup>2</sup>;
- families come from a mix of socio-economic backgrounds, with more families from medium and slightly more from high deprivation areas than those in the general population; and
- 40% are not 'verified' for additional educational funding (ORS), meaning the child does not receive additional direct education funding (see page 20); 40% are verified 'high needs', and 20% are verified as 'very high' needs.

→ The majority (71%) of children and young people with cochlear implants who are five years of age and over attend mainstream schools while 19% are in KDEC 'School Provision' in mainstream schools (these were previously called 'Deaf Units'); 10% attend Special Schools; 1% attend a Special Unit in a Special School.

### Children with hearing aids

- There has been an increase in the number of children with hearing aids who are being supported by THH habilitation staff, due to funding from the Freemasons Foundation.
- Fifteen children with hearing aids have received habilitation support during the period, and these children range in age from one to four years.
- Habilitation is generally provided for these children for around two years, depending on their progress and needs.

## Assessments and outcomes

Children receiving services have their progress assessed regularly by programme staff using a variety of tools.

### Audiology

This includes speech perception testing which is conducted with children and young people who have sufficient oral language to participate. Different tests are used depending on the child's ability. This testing provides a useful measure of how well the child or young person can hear.

→ Results are described for children whose speech perception had been tested, both at the time of their assessment and after they received their implant(s), using a commonly used test, and who had a language age of eight or higher.

→ The results showed that average speech perception word scores rose from 17% to 55% after the child received their cochlear implant.

### Habilitation

Children receiving habilitation services are assessed using standardised and/or criterion referenced assessments to measure outcomes.

→ Overall average scores are used to describe language achievement for 43 children, who were assessed:

- during the last four years;
- using at least one of three specific standardised language assessments; and
- were between the age of four and five and a half years (broadly termed as graduates going to school) at the time of these assessments.

→ These children all have bilateral hearing losses, the majority of which are categorised as 'severe' or 'profound' in both ears.

→ These children are also split into 'standard' and 'non-standard' groups.

→ Those in the standard category are those children with hearing loss, who have no significant delays in starting early intervention services, and who have no additional disabilities which affect their learning and who are predominantly exposed to English at home (at least 50% of the time). All others are categorised in the non-standard group.

→ In using standardised assessments, we are able to compare scores for our hearing impaired children with those of children in the general population:

- the average language score for standard graduates is 91. The average for children in the general population is 100; and
- 12 of the 19 standard graduates are going to school with age-appropriate language or better, compared to 16 of 19 for their counterparts in the general population.

→ Understandably, a smaller proportion of children with additional disabilities or challenges, such as those learning mostly a language other than English, six of 23, had age-appropriate language.

→ Devices worn by the 43 children whose results were described are: two cochlear implants (n=28), a cochlear implant and a hearing aid (n=6), two hearing aids (n=7) and a cochlear implant and no device (n=2).

### School Leavers

Young people who graduated from our early intervention programme between 1993 and 2002 were surveyed to gain some understanding of their social, educational and employment outcomes for this group.

Of the 21 young people in this category, surveys were sent to 19 for whom contact information was available, and we received 15 responses before the deadline for this report.

The majority of those who responded (93%) had attended a mainstream school during some or all of their time at high school.

Currently, of the 15 respondents to the survey – three are in paid employment, four are studying and in paid employment, three are studying and not in paid employment, one is seeking work, one is unable to work, one is travelling and two are stay-at-home parents.

Of the seven who are currently studying – qualifications underway include one apprenticeship, five Bachelor's degrees (Social Science, Business, Creative Technologies, Electrical Engineering and one with no subject of study listed), and one Master's degree (Science).

## Research and professional development

The Hearing House has been involved in a number of research projects this year, including its review of the effect of communication modes on outcomes (see page 06), its ongoing work with First Voice and the Koala project.

Each year, staff from across the organisation engage in professional development activities, including attending/presenting at conferences and upskilling. This year, this included visits from Jane Madell, Christine Yoshinago-Itano, and attendance at the Alexander Graham Bell Conference in the United States.

<sup>2</sup> Please note that as families can specify multiple ethnicities for their child the total of these figures is greater than 100%.

# Research review

Families of hearing impaired children often report receiving conflicting or confusing advice from professionals about the communication mode or modes that will be of most benefit to their child.

Following requests for information from families, The Hearing House commissioned a review of the evidence on communication modes in late 2015, with a view to creating a plain English summary of the review's conclusions, and making this and the review available to families and professionals.

Dr Julia Sarant was asked to conduct this review owing to her significant and relevant experience as a Senior Research Fellow in the Department of Audiology and Speech at The University of Melbourne. She has been conducting research and working clinically with hearing impaired children and adults for more than 25 years.

Dr Sarant has led a number of multicentre research projects, including one into outcomes of bilateral versus unilateral cochlear implants for children, and she is currently exploring the relationship between hearing loss and cognitive decline in older adults.

Dr Sarant has authored more than 30 academic papers, multiple book chapters and many conference presentations. She sits on the Advisory Council for Children with Impaired Hearing and is a member of the Deafness Foundation. She holds an appointment at the Royal Victorian Eye and Ear Hospital as an Honorary Clinical Researcher.

The full review can be found at The Hearing House website: [www.hearinghouse.co.nz/research](http://www.hearinghouse.co.nz/research)

## Review conclusions

The following conclusions are based on the available evidence in the literature. Overall, there are a greater proportion of studies showing evidence of superior results across a range of developmental outcomes for children using an oral method of communication. However, because of limitations in the design of most studies, (usually small numbers of participants and failure to control for other possible confounding factors) there are not one or two easy and definitive conclusions to be drawn.

### Language learning

→ The brain is wired to learn language through both visual and auditory modes. The phonological processing of signs and words is identical.

→ When access to either spoken or sign language is delayed, there is a subsequent negative impact on language/literacy development.

→ Hearing parents find learning sign language very difficult as adults, and the majority do not provide fluent sign language for their children.

→ In most cases, children who initially signed but went on to develop spoken language dropped the use of sign gradually over time.

### Evidence re oral and signed communication

→ There is little evidence to suggest that use of sign language causes negative effects in terms of developing spoken language, as long as the use of audition and spoken language is emphasised.

→ There is limited evidence that early use of sign language may assist with the development of spoken language.

→ There is no evidence to show that bilingual education improves educational outcomes over oral education.

### Use of early sign

→ It is often difficult to predict which children will successfully develop spoken language through audition and which will not, unless they have additional disabilities (these are often difficult to diagnose at a young age). Learning sign language could provide a means of communication prior to cochlear implantation, and 'insurance' in cases where spoken language does not develop quickly or at all. This is a complex issue, however:

- this group of children is very small relative to the wider population of children with hearing loss;
- some children cannot sign due to motor difficulties (e.g. cerebral palsy);
- some children who perceive spoken language well cannot speak due to motor difficulties. In order to be a part of the larger hearing world they need to use assistive devices for expressive communication rather than sign.

### Oral communication

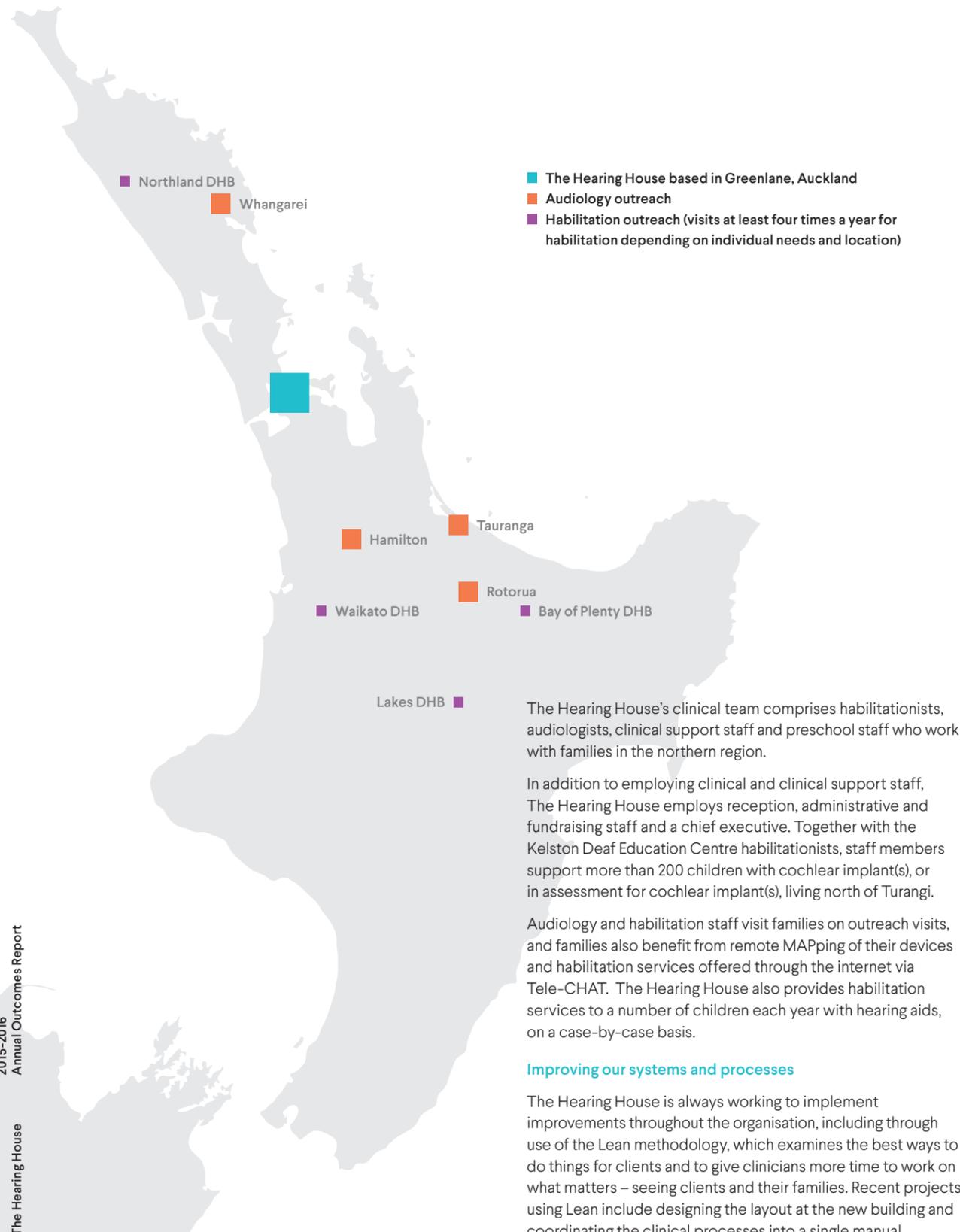
→ There is evidence to suggest that children in oral communication education settings (vs oral plus sign settings) develop significantly better spoken language.

→ There is evidence that children using oral communication achieve significantly better speech perception and speech production outcomes than do children using oral plus sign communication.

→ There is evidence that children with early cochlear implants who use oral communication can achieve language, social and academic outcomes comparable with those of their peers with normal hearing.



# Our services



In addition, a new cloud-based Clinical Appointment Booking System has been implemented to replace older technology. The new booking system provides more transparency, tracking and reporting abilities, information about clinical capacity and client appointment notifications. This allows The Hearing House to use real time data to look for ways to provide a more efficient, effective service to clients. A good example is that client appointment reminders are now sent automatically to the family advising them of their up-coming appointment. Feedback from clients has been overwhelmingly positive; one recent reply was “The Hearing House rocks!”.

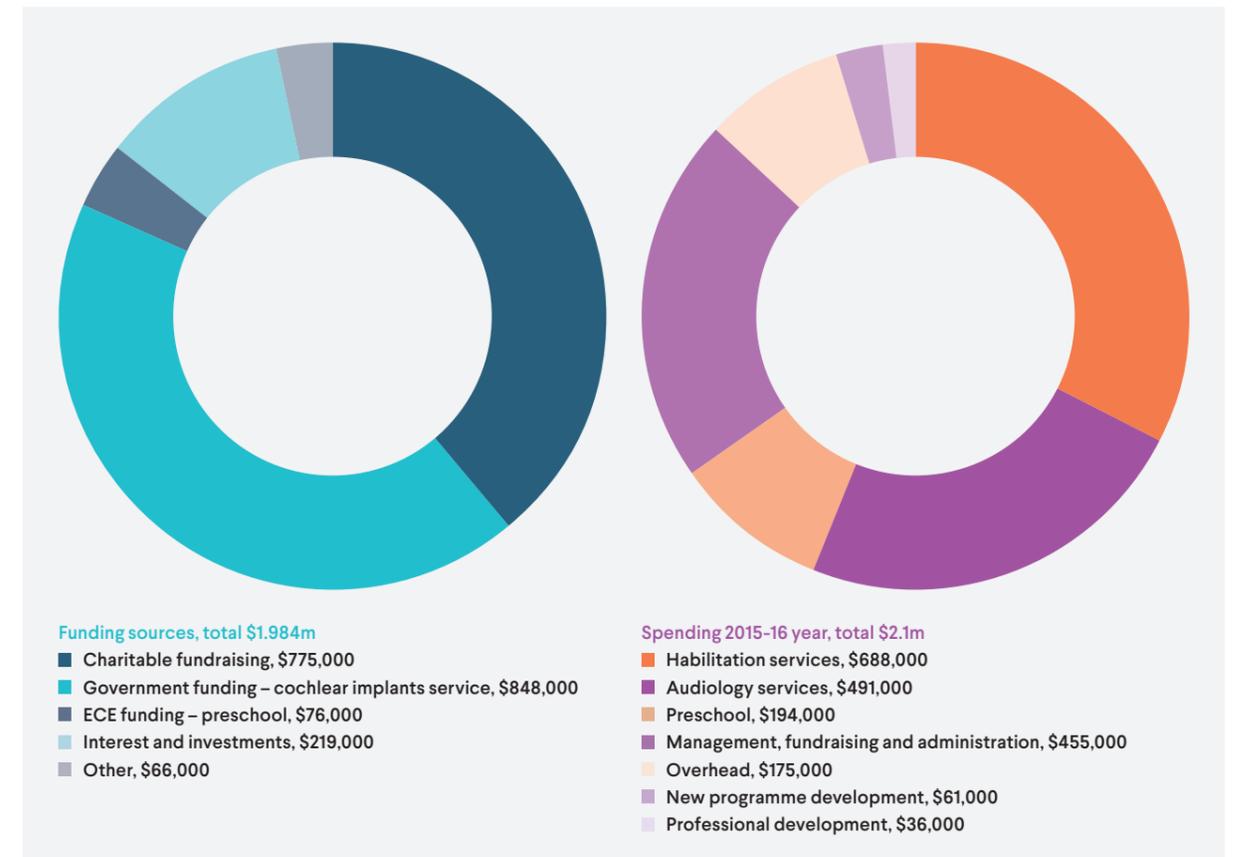
For the first time, we can now accurately count client appointments for audiology (all cochlear implant clients under 19 years old) and for habilitation (under five years old) and using the data we estimate we are now doing about 930 audiology appointments a year and 1350 habilitation appointments a year for children under five years old.

## Funding

Funding from Government covers a little under half the costs incurred by The Hearing House in providing services to children with hearing loss, the vast majority of whom have cochlear implants. (These revenue and spending costs exclude those associated with Kelston Deaf Education Centre habilitation staff.)

To make up the deficit and provide sufficient breadth and quality of services, The Hearing House relies on fundraising from the charitable sector.

Figure 1: Funding and expenditure (2015-2016)



## Habilitation

### Auditory verbal therapy

Technology alone is not sufficient to assist children with hearing loss to develop speech and language skills. An intensive auditory-based programme is needed to provide parents with the skills they need to cultivate their child's spoken language potential.

The Hearing House was the first centre to provide such early intervention services – based on an Auditory Verbal approach – to children in New Zealand.

A number of individuals played important roles in the development of Auditory Verbal practice, including Helen Hulick Beebe<sup>3</sup> and Doreen Pollack<sup>4</sup> and their contemporaries. Even with the very limited technology available during the earlier days, considerably improved spoken outcomes for hearing impaired children were achieved through a focus on the use of residual listening.

This type of therapy accelerates the natural way language develops to enable children with a cochlear implant(s) or hearing aids to catch up with the listening skills and language of their peers.

Families of children with cochlear implants generally receive weekly one-on-one therapy for several years, in which the therapist works with the child and the parent(s) or caregiver(s). The parent, as the natural teacher of language, is the main focus for the habilitation. They are taught skills and strategies to teach their child how to listen and speak, and these skills are applied during daily interactions with the child in the home and wider community. They may also be offered other programmes specific to their needs such as 4+ Extension Group, tele-intervention or participating in a residential programme.

As children with a hearing loss often receive a number of specialised services, The Hearing House habilitation staff work collaboratively with many other professionals, including Ear, Nose and Throat (ENT) surgeons; Ministry of Education staff; private speech language therapists; child development staff; Resource Teachers of the Deaf (RTDs); Advisors on Deaf Children (AoDCs) and others.

The Hearing House provides five habilitationists to work with children under the age of five, while its partner, Kelston Deaf Education Centre, provides three habilitationists to work with children over the age of five years.

<sup>3</sup> Beebe H (1933) A guide to help the severely-hard-of-hearing child. New York. Basel.

<sup>4</sup> A. G. Bell Academy for Listening and Spoken Language. Principles of LSLA Auditory Verbal Therapy, <http://nc.agbell.org/page.aspx?pid=359>, accessed March 2012.

Older children with progressive hearing loss, who already had language before their hearing deteriorated, may require less intensive habilitation support. Habilitationists working with children over the age of five liaise directly with these students and their teachers.

This year habilitation has been offered fortnightly in Hamilton, with two therapists travelling to see families from the Waikato, Bay of Plenty and Lakes areas.

Habilitation and administration staff moved to temporary premises at Ascot Office Park in September 2015 and are excited to be moving back to the new redeveloped facility in the third quarter of 2017.

### Auditory language enrichment

Some children benefit most from an Auditory Language Enrichment programme (ALE) which continues to follow the principles of Auditory Verbal Therapy, but where these principles are adapted as needed to meet the additional needs of the child.

These children use listening to develop understanding and, where possible, communicate using spoken language. They may also be assisted by additional means, such as lip patterns, key sign, gestures, pecs (picture exchange communication system) and augmentative alternative communication.

## Audiology

Qualified audiologists carry out testing to establish cochlear implant candidacy as well as providing post-operative audiology services for children under the age of 19 who live north of Turangi.

The audiologists ensure cochlear implants are optimally programmed for the specific needs of each child and young person. In the first year following surgery, each cochlear implant recipient is seen at least 10 times by the programme's audiology staff. After the first year, children over five are seen annually and children under five are usually seen bi-annually, unless issues arise.

Audiologists are responsible for monitoring each child's audiological progress and they utilise various measures to establish progress and benefit. Audiologists from the service also provide training sessions to professional groups such as Resource Teachers of the Deaf.

As children with a hearing loss often receive a number of specialised services, The Hearing House audiology staff work with many other professionals, including Ear, Nose and Throat surgeons; other audiologists; RTDs; and AoDCs.

Children with hearing aids receive audiology services from their local district health board, rather than from The Hearing House's audiology team.

In August 2014, The Hearing House audiology team moved to temporary premises at Greenlane Clinical Centre, and they will move back to newly redeveloped facilities on Campbell Road, Greenlane when these are completed.

## Clinical support

In addition, there are staff employed to manage repairs and inventory, scheduling, clinical administration and assessment and referrals.

## Joyce Fisher Preschool

After a great deal of work, The Hearing House has its own new purpose-built preschool, named after Lady Joyce Fisher, whose charitable trust provided significant funding for this development. This new building opened in July 2015.

Staff are particularly proud of the playground, which is nature-based and features a mud-kitchen, sandpit, bridge and vegetable garden. This focus aligns with the preschool's regular visits to Cornwall Park, which encourage learning and exploration.

The preschool operates using a reverse integrated approach for hearing impaired children. This means that these children are part of a classroom environment that includes their hearing peers from the local community. The rich language environment that hearing peers provide, and the utilisation of auditory verbal therapy principles within the programme, encourages the development of listening skills and spoken language.

Teachers provide both quality language input and also reinforce language modelled by children in the preschool setting.

The preschool also provides a space for hearing impaired children to engage in social interaction in order to promote dynamic relationships and foster confidence and creativity. In addition, a core part of the preschool philosophy is to provide regular exploration of the natural environment, which exposes the children to a variety of experiences and provides a catalyst for spoken language.

The preschool was offering five-and-a-half-hour sessions each weekday during the 2015-16 year (this will be increasing over the coming months) with children generally attending a minimum of three days a week.

During the year ending 30 June 2016, 23 children – eight of whom are hearing impaired – attended the preschool. This is slightly fewer children than in previous years.

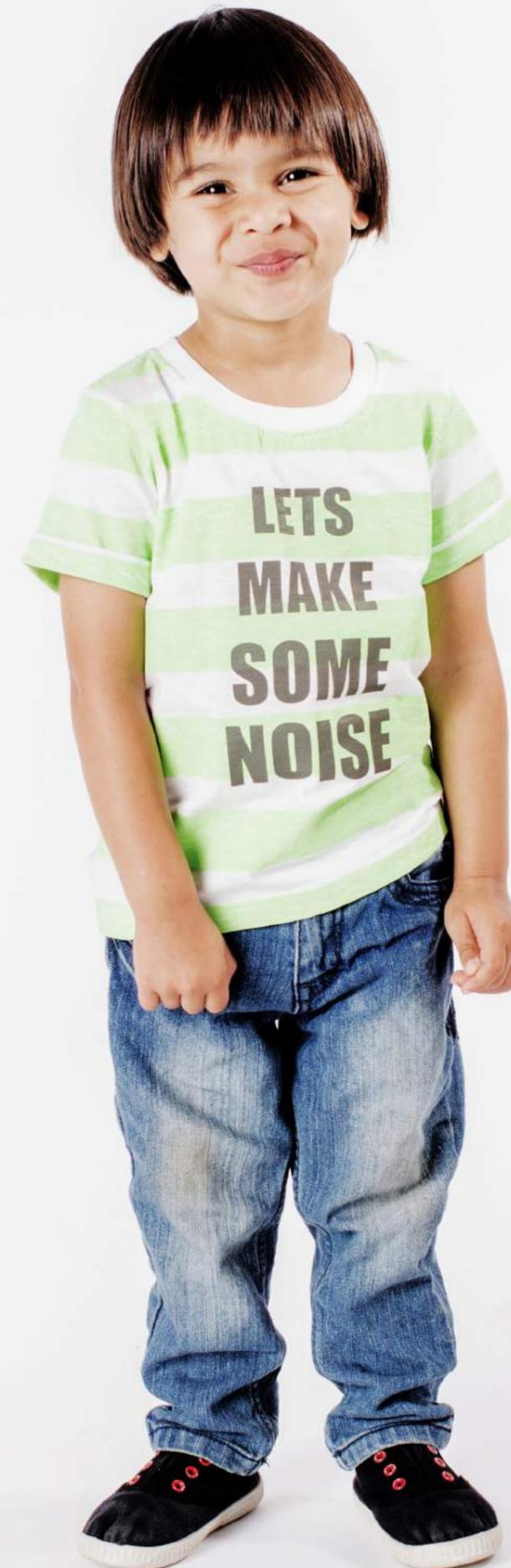


## Programmes

In addition to programmes included in the table below, we offer families a range of events and get-togethers during the year. These include a regular playgroup, 'meet the teenagers' evening, graduation, picnics, parent evenings and family workshops.

Table 1: Programmes offered by The Hearing House

Programme (cohort)	Details	Number of children in 2015-16 year
Transition to school (all four year olds)	The Hearing House provides a Transition to School process to support the parent, child and new school through the child's transition into their school setting. AoDCs are a key part of this process and they work alongside the child's parent(s), therapist, school staff, existing preschool staff and KDEC's cochlear implant habilitationists. This programme serves to support the parents during this important change and ensures that the school can offer the child appropriate support to enable continued language development.	9
Tele-CHAT and Tele-Audiology (remote MAPping) (selected children living outside Auckland)	The Hearing House has been offering therapy via Skype to some families who live outside Auckland for a number of years. Sometimes families receive a combination of face-to-face sessions in Auckland, visits from staff to their home or local area and Tele-CHAT. This programme reduces inequalities of access for these families and has demonstrated its ability to provide significant numbers of additional sessions for families. It often reduces travel for families in the process, when compared with traditional delivery methods.  Recipients of cochlear implants need to attend regular mapping sessions to adjust their speech processors. For some children who live outside of Auckland, the cochlear implant is programmed remotely via 'Remote MAPping' either utilising habilitation staff or by staff kindly provided by Bay Audiology. This can save the family time and costs associated with travel to Auckland.	19 (Tele-CHAT)  16 (Tele-Audiology)
Music therapy (selected AVT and ALE children under the age of five)	These sessions are usually held twice a year and the therapy is provided by Raukauri Music Therapy Centre, whose staff members are highly experienced in facilitating such sessions. The overall aim of this programme is to allow parents to explore music with their child and to add a dimension of creativity and fun to their listening experiences. Children develop responses to pulse, rhythm and pitch, and self-confidence and creativity is encouraged.	9
Parent to parent and play groups (all children under 5)	This is a morning coffee group open to all parents whose children are aged under five and receiving services. These groups are facilitated by the habilitation staff.	8
Residentials and workshops (selected children under the age of five with cochlear implants and/or hearing aids)	Residential workshops are offered based on parent need and funding availability. These programmes are focused on supporting and empowering families. Included are hands-on sessions for families focused on troubleshooting devices, learning about stages of language development, play and attachment, and time for families to share their experiences with other families.  Additional (non-residential) workshops are also offered for families of young children who have recently begun receiving services.	No residential workshop held during this period  2 babies in the May 2016 Workshop
Focus (some children)	This programme, established through funding in 2010 from the JR McKenzie Trust, focuses on how The Hearing House can work more effectively with families who are not optimally engaged with the programme and those where the child's progress is not as the clinical team had hoped, or who are at risk of poorer outcomes. In practice this means examining changes to policy and practice within the organisation to better support these families.	36





## The right choice for Josh

Josh Foreman has more reasons than most to be grateful to his parents. He was born profoundly deaf in both ears, but no one realised until his parents, who adopted him when he was two months old, began to wonder.

“They had their suspicions. I wasn’t responding to sounds that other babies would respond to – a dog barking, the doorbell ringing.”

Josh was two years old when it was confirmed.

“My parents were given a choice – I could learn sign language or get a cochlear implant.”

Josh, now 25, says he is very grateful that his parents chose the latter, making him the youngest person in New Zealand at that time to have a cochlear implant. He was two and-a-half years old.

He completed eight years of intense therapy, six of them with The Hearing House, which his parents Bill and Diane Foreman were instrumental in helping to establish. With the help of teacher aides Josh attended mainstream schools and he says this integration helped him develop his language skills.

“Being exposed to normal hearing peers helped me. They talked to me and I thought ‘I have to get used to this’. I was modelling myself on them.”

Josh says he is “really thankful” that his parents decided to get him cochlear implants.

“I’m really happy that they made that choice. A lot more opportunities have opened up to me. I’m enjoying hearing – music, birds, the waves. I find it hard to think I would have gotten this far without CIs.”

Josh certainly has come a long way – and he hasn’t stopped. He went to the University of Auckland and gained a Bachelor of Physical Education and is now doing a Masters in Exercise Science specialising in cardiac rehabilitation.

He started university life with assistance from a reader and writer, but “I felt that was being lazy”. Instead, Josh sat up the front of classes and lectures and paid more attention. He says he wouldn’t be able to do his masters without CIs.

“The majority of communication these days is verbal. And I need to listen to my patients.”

He uses a digital stethoscope to help him do so.

Josh is also grateful that technology has developed. The first processor he wore was carried in a little bag on his back. Not only are modern devices so much smaller, but they can also drown out background noise. Josh says this means he is able to relax more when he is in social settings.

“I used to have to concentrate a bit more and I had to lip read.”

But now a conversation in a noisy café is comfortable and manageable.

Once Josh, who has worked as a swim instructor and a waiter, has finished his studies he hopes to get a full time job working in a hospital or cardiac rehabilitation centre. He dreams of opening up his own clinic that will not only provide cardiac rehabilitation, but also sports rehabilitation for athletes who have sustained injuries. He also wants to save up to go travelling and then work overseas.

As a young man, Josh has been keen to give back to The Hearing House and encourage teenagers with cochlear implants. He volunteers as a mentor on the Hear For You programme. The mentoring weekend away aims to give advice to teenagers and give them a confidence boost.

“These teenagers will have questions that only a deaf person will know the answer to. It’s so important that they can open up to someone. These kids talk, and really open up. They realise they are not alone.”

---

### The power of speech

In August 2015 two Hearing House children travelled with their families to Canberra for the annual First Voice Power of Speech Conference. Jaydeep (12) from Auckland, and Ryder (9) from Hamilton, spoke at Australia’s Parliament House about being deaf, their spoken language journey with their cochlear implants, and how they are now thriving in the hearing world.

The purpose of the conference is to promote the use of cochlear implants and hearing aids in deaf children and to challenge the common perceptions that society has about deaf children and what they are able to achieve.

First Voice reported at the time “Divided into two age categories, parents, family, therapists, politicians and supporters all watched with awe as each child confidently battled their nerves to address the crowd.”

Speeches at the conference were made by children between the ages of six and 12 years and each of the speakers talked in front of a full theatre for three minutes.

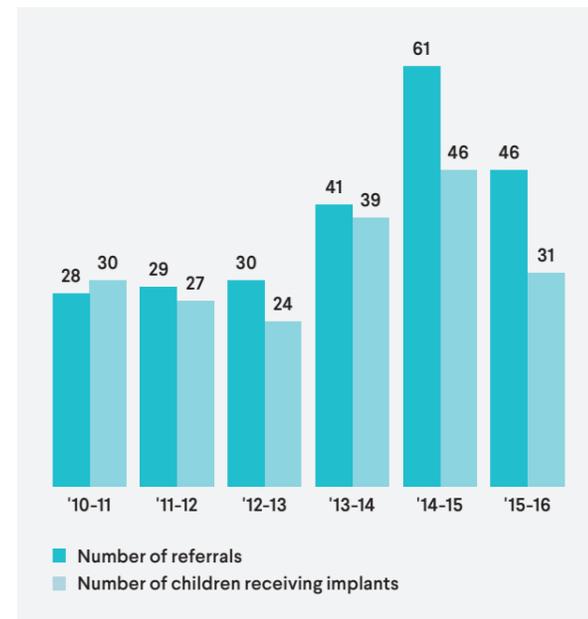
Seven-year-old Cale Gravagna from Queensland won the category for six to eight year old children, while 12-year-old Jacob Jay from Western Australia took out the category for those aged nine to 12 years.

“Both Jaydeep and Ryder spoke incredibly well and we are very proud of them”, says Scott Johnston, CEO of The Hearing House.

---

# New referrals

Figure 2: Number of children referred and number of children receiving new implants, by year



## Cochlear implant – referral and assessment

The Hearing House is a provider to the cochlear implant programme in the northern region, which includes children and young people living north of Turangi who are under the age of 19.

Children under the age of five referred to the programme waited an average of 25 days to begin assessment during the period, while those over five waited an average of 28 days. This difference is because triage and the initial cochlear implant referral and assessment meeting take longer for the older group. Often older children need further audiological information and they sometimes require further testing from their local district health board.

Once the assessment is completed (on average this took three months), the young person or child's family is then told of the outcome of the assessment.

In cases where a child or young person is assessed as a cochlear implant candidate (the vast majority of the time), and where parents/guardians choose to proceed, surgery is scheduled within one month unless a family requests a later surgery date or unless an approval is needed from ACC. The average time between acceptance of candidacy and surgery was less than one month during the 2015-16 year.

### Referral criteria

Referrals for cochlear implants are accepted from ENT specialists, audiologists and AoDCs and Resource Teachers Deaf Assist. Referrals are made based on a set of criteria (see below) and are assessed by a multidisciplinary team (including ENT surgeons, habilitationists and audiologists).

Guidance on cochlear implants for children and young people under the age of 19 include:

- children who have a bilateral severe hearing loss or worse, from 1 kHz to 8 kHz on ABR testing, or on an unaided test;
- children with a severe reverse sloping hearing loss or worse, or those whose speech and language is not progressing adequately;
- children with auditory neuropathy spectrum disorder who are not progressing in their speech and language development;
- children older than three who are referred should have documented evidence of developing oral language;
- children over the age of four with no oral language will be considered and discussed only on a case-by-case basis; and
- a child older than five with no language is unlikely to benefit from a CI.

## Children receiving cochlear implants

Of the 31 children who received cochlear implants during the period, as described in Figure 2:

- 27 of these children and young people (aged from birth to 19 years of age) received publicly funded cochlear implants in the northern region during the 2015-16 year. Of these, 22 were children receiving their first cochlear implant during this period;
- two children received cochlear implants funded by ACC; and
- two children received cochlear implants paid for privately.

While children are being triaged for CI assessment they receive a habilitation service as a hearing aid child to ensure progress is ongoing and to get a baseline measure of their language skills.

Please note that the huge rise in referrals and implants in the previous year (2014-2015) was related to the change in policy by the Ministry of Health that allowed retrospective second ear implants for children under the age of six years. Only one child, the last to receive one of these second devices, had their surgery during this year (2015-16).

Three children received re-implants during this period.

Of the referrals this year, 10 came to the programme as a direct result of newborn hearing screening

## Children with hearing aids

Each year a number of hearing-aided children under the age of five are referred to The Hearing House and are provided with habilitation services to support their spoken language development. This year the number has grown due to funding from the Freemasons Foundation.

The decision on the number of children to support is made on a case-by-case basis and considers the capacity of clinical staff in the organisation and the availability of private funding, as this service is not Government funded.

At the end of the assessment process the young person/family is then told whether they will be accepted onto the habilitation programme. Children with age-appropriate speech and language are referred back to their local provider:

- 15 referrals for hearing aid habilitation were received during the 2015-2016 calendar year; and
- of these, 10 children were accepted for services during this period, although only nine of these began receiving service before 30 June 2015. A further six children were accepted previously and continued to receive services during the 2015-16 year.



# Children receiving services

This section describes characteristics of children receiving services. The majority of children receiving services during the 2015-16 year were those with one or two cochlear implants – and so our primary focus is on this group, although we do have some information on children with hearing aids who have received habilitation during this period.

## Children and young people with cochlear implants

Figure 3 shows the significant growth in the number of children and young people in the northern region receiving cochlear implant services during the last eight years<sup>5</sup>.

A greater intensity of habilitation service is generally provided to children under the age of five whose hearing losses were present before they developed language. Children who receive cochlear implants at older ages generally have language and so they often require less intensive habilitation.

### Deprivation status

'NZDep2013' provides the deprivation status of every area in New Zealand. Deprivation scores are calculated by the University of Otago (Wellington) by combining census data relating to income, home ownership, employment, qualifications, family structure, housing, access to transport and communications.

Each small area in New Zealand is allocated a score and each score relates to 10% of the population. For example, those with the highest score (10) relate to the most deprived 10% (decile) of areas in New Zealand.

The Hearing House records deprivation data for families receiving services to help staff understand whether there are particular groups that may not be accessing services and to identify children who may be at risk of reduced outcomes.

Figure 4 shows children and young people receiving services span the full range of deprivation 'scores', with those in deciles three, five and the top two deciles (the most deprived) over-represented and those in the lowest and upper middle deciles under-represented.

Figure 4 shows children and young people receiving services span the full range of deprivation 'scores', with those in deciles three, five and the top two deciles (the most deprived) over-represented and those in the lowest and upper middle deciles under-represented.

Figure 3: Children with cochlear implants receiving services by year and age group

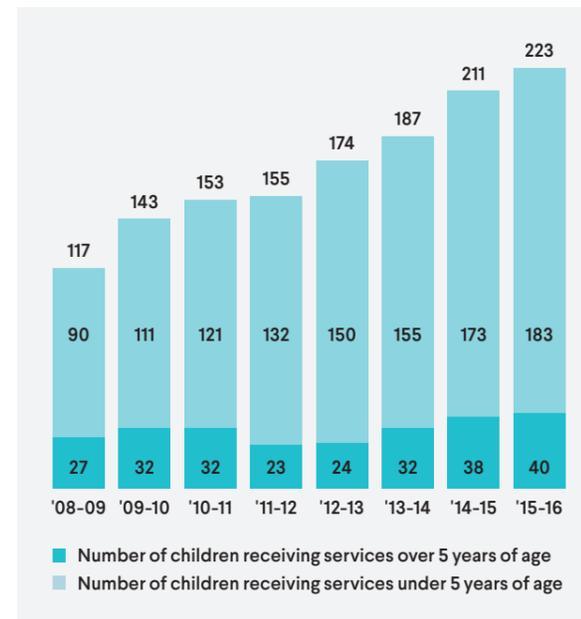
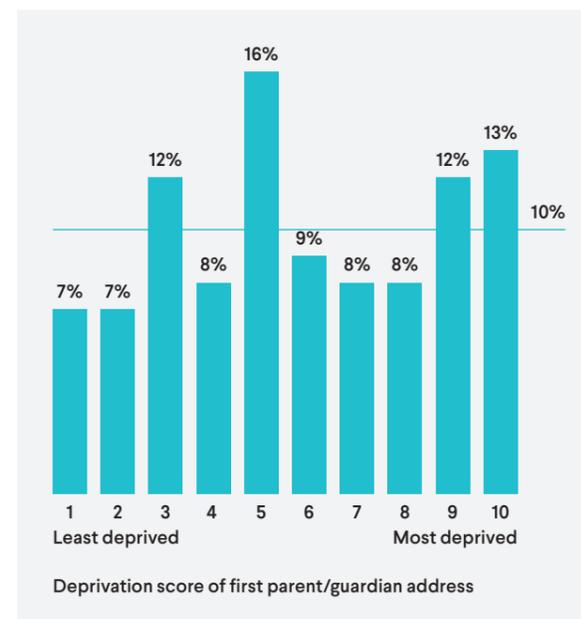


Figure 4: Deprivation of families receiving cochlear implant services



<sup>5</sup> Please note that some data in Figure 3 are different to those described in last year's report due to changes in the way these were calculated. For future reports we will continue with this revised methodology.

### Devices

Almost half of children and teenagers with cochlear implants receiving services now have two cochlear implants (48%). Where clinically appropriate, bilateral implants have been routinely provided to newly referred children and young people since 1 July 2014.

A third of children and teenagers (33%) with cochlear implants have a hearing aid in their other ear, while the remainder (18%) have no device in their other ear.

### Ethnicity

Figure 5 shows the ethnic breakdown of children and young people currently on the cochlear implant programme. Families can select one or more ethnic groups when they complete the enrolment form, and so these figures have been presented using the total response method, which means the summed percentage is greater than 100%.

While these data suggest that European, Asian and Pacific children and young people may be over-represented compared with their size in the population<sup>6</sup>, as prevalence information for ethnic groups is not well understood in New Zealand we are unable to determine whether this is actually the case.

Māori are thought to have fewer severe and profound hearing losses than their New Zealand European peers, but are well represented among those children receiving services, which are mostly those with severe and profound losses<sup>7</sup>.

We have seen an increase in the number of children receiving implants who are recorded as having one or more Asian ethnicities (sometimes with other ethnic groups also listed). This increase echoes the increasing proportion of Asian New Zealanders, particularly in the Auckland region.

### Other key points

Type of hearing loss – almost all children and young people with cochlear implants (99%) have sensorineural hearing loss in both ears, with the remaining 1% having mixed losses in both ears.

Severity – as with last year's results, the vast majority of children and young people with cochlear implants who are receiving services have a severe or profound hearing loss.

Age profile – the age profile of current cochlear implant clients is shown in figure 6. The majority of cochlear implant recipients are currently aged between six and 15 years.

<sup>6</sup> When compared with multi-coded 2013 Census data (Statistics New Zealand) for children and young people under 20 years of age.

<sup>7</sup> Digby JE, Purdy SC, Kelly A, Welch D, Thorne PR (2014) Are hearing losses among young Māori different to those found in the young NZ European population? NZMJ 18 July 2014, Vol 127, No 1398; ISSN 1175 8716.

Figure 5: Ethnicity of children receiving cochlear implant services

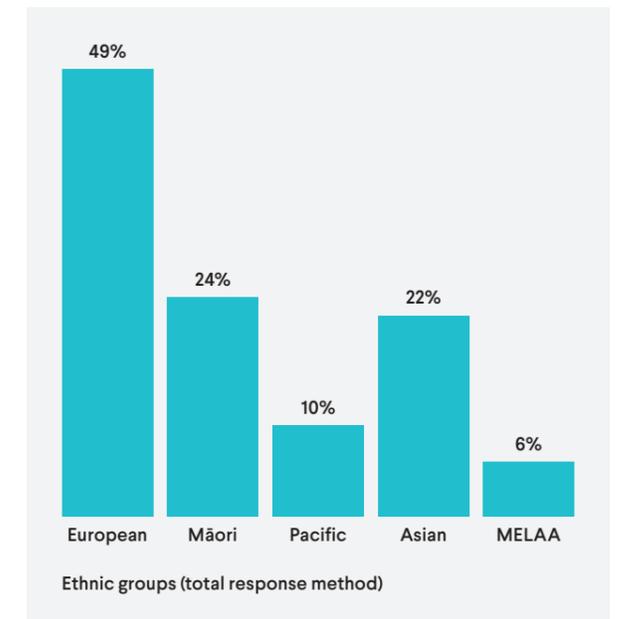
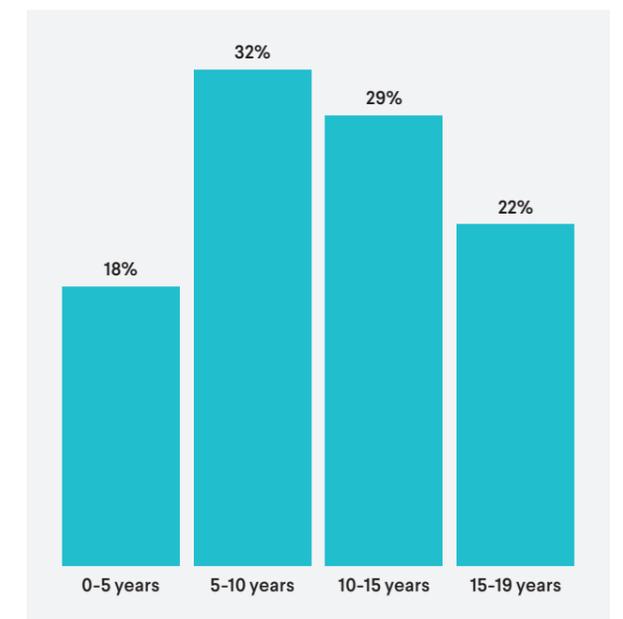


Figure 6: Age profile of children and young people receiving cochlear implant services



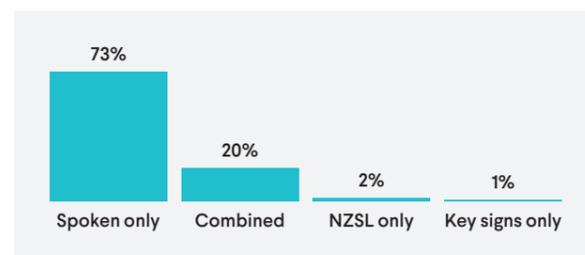
### Languages spoken or being learned

There are 19 languages which are spoken or being learned by children/young people with one or two cochlear implants who are currently receiving services. Seventy-seven percent of children are learning one spoken language, 22% are learning two spoken languages, and 1% are learning three spoken languages. Ninety-four percent of children/young people are learning one or more spoken languages.

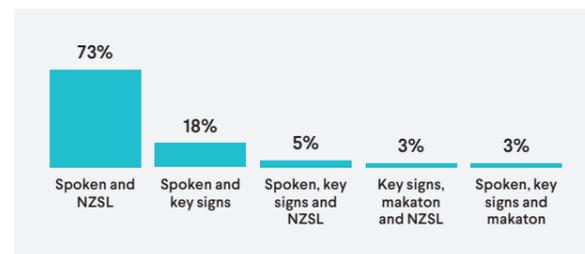
Children/young people on the programme can be categorised into one of four groups: those who are learning or using one or more spoken languages only, those learning only sign language, those learning only key signs<sup>8</sup>, and those learning or using a combination of one or more of these. The size of each of these groups can be seen in the Figure 7 below.

The 'combined' category includes children and young people learning or speaking some combination of spoken language, New Zealand Sign Language (NZSL), Key Signs and Makaton<sup>9</sup>. Figure 8 shows the breakdown for this category. The majority of children in this category are using or learning spoken language along with NZSL.

**Figure 7: Proportion of children learning a spoken language only, NZSL language only or a combination**

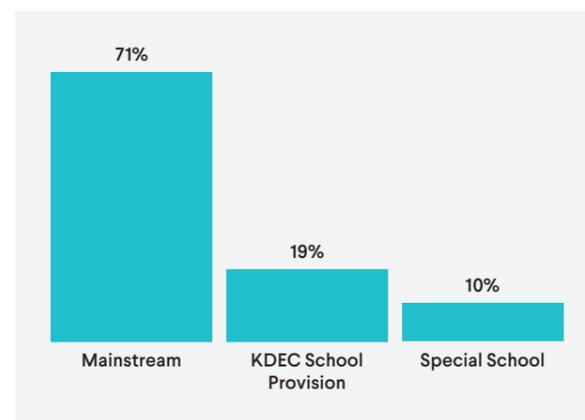


**Figure 8: Proportion of children learning a combination of languages and/or communication programmes**

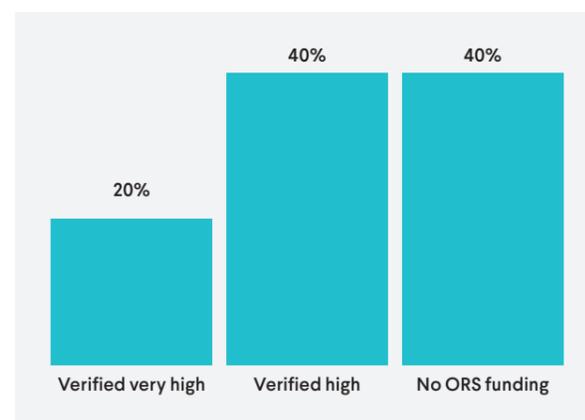


<sup>8</sup> Key sign is the use of manual signs to support communication, using signs for key concepts and words as they are spoken.  
<sup>9</sup> Makaton is a communication programme for people with communication and learning difficulties.

**Figure 9: School settings**



**Figure 10: Proportion of children over five years of age with and without Ongoing Resource Scheme (ORS) verification**



### School-aged children and funding for additional support

As at the end of June 2016, school-aged children and young people were in the range of school settings above, with most children in mainstream settings.

Please note that KDEC School Provision refers to satellite units in mainstream schools. These were previously known as 'Deaf Units'.

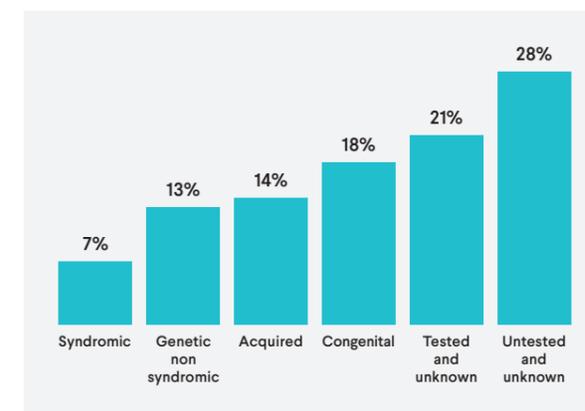
Children and young people may receive additional funding for their school through the Ongoing Resourcing Scheme (ORS) if they are verified as 'high' or 'very high needs'. Of the children and young people on the cochlear implant programme, the largest group (40%) are those who are verified under the ORS scheme as high needs. The other largest group (40%) is verified as having no ORS funding, and the remaining 20% are verified 'very high' needs.

### Aetiology

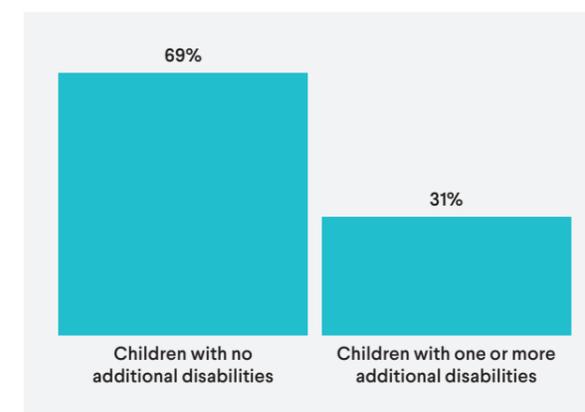
The aetiology (cause of hearing loss) can be either genetic (syndromic or non-syndromic) or non-genetic. Not all children with hearing loss have been tested for the cause of their hearing loss, and some tests may not be able to identify a cause.

Figure 11 shows the breakdown of the causes of hearing loss for each of the children receiving cochlear implant services. The largest group is those who have not had a cause established for their hearing loss (either untested and unknown or tested and unknown). Of those with a known cause for their hearing loss, the largest group have a congenital hearing loss that is not thought to be genetic or syndromic in nature, while the next largest group have an acquired hearing loss.

**Figure 11: Proportion of children receiving cochlear implant services grouped by cause of hearing loss**



**Figure 12: Proportion of children receiving cochlear implant services with additional disabilities**



### Children with one or more additional disabilities

Among all children and young people receiving cochlear implant services, 31% have one or more disabilities in addition to their hearing loss.

The presence of an additional disability may have a significant impact on outcomes and on the level of support the child or young person may require. Additional disabilities may include developmental delay(s), vision or physical impairments. Some children have a syndrome which includes a set of specific symptoms of varying severity.

This rate of confirmed additional disabilities (31%) is significantly higher than the rate reported in the New Zealand Deafness Notification Database<sup>10</sup> (19% with confirmed additional disabilities). Please keep in mind that cases included in the database range from mild to profound hearing loss in one or both ears, and only include additional disabilities confirmed at the time the hearing loss is diagnosed.

Overseas rates of children with additional disabilities are hugely variable as there are significant differences in the definition of what constitutes an additional disability between jurisdictions.

### Children with hearing aids

Previously, a small number of children under the age of five with hearing aids were provided with habilitation services to support their spoken language development. During the last 12 months, this number has risen significantly, thanks to funding from the Freemasons Foundation.

→ Children with hearing aids who are accepted onto the programme usually receive habilitation sessions with their parent(s) for a period of 24 months, although this is adapted based on the needs of the child;

→ A total of 15 children received hearing aid habilitation;

- These children ranged in age from one to four years old;
- Half of these children had their hearing loss diagnosed before they turned one-year-old;
- The majority of children were referred from within the Auckland region; and
- Audiologists made most of the referrals to the hearing aid habilitation service, followed by parents and then other professionals, such as speech language therapists, AoDC and ENT specialists.

<sup>10</sup> Digby JE, Purdy SC, Kelly AS (2016) Deafness Notification Report (2015) Hearing loss (not remediable by grommets) in New Zealanders under the age of 19. accessible. Auckland, New Zealand.

# Outcomes

Children and young people who are receiving services have their progress assessed in a number of ways. Such assessments assist staff to work in the best possible way with children and young people and their parents to achieve the best possible outcomes.

Families who bring their child to The Hearing House, including those who have chosen cochlear implants, are seeking a future for their child which focuses on listening and spoken language.

## Speech perception results

Speech perception testing is routinely carried out for all cochlear implant recipients who have acquired sufficient oral language to participate in this form of testing. There are different tests which are used depending on the child or young person's language ability.

The CNC word test, the results for which are described below, is suitable for children and young people who have a language age of eight years and greater, and all those within this group had their speech perceptions tested using this test<sup>11</sup>.

Speech perception testing requires the child or young person to listen to a word or sentence usually presented via an audio speaker (or occasionally presented by the tester) and repeat the word or sentence that was heard.

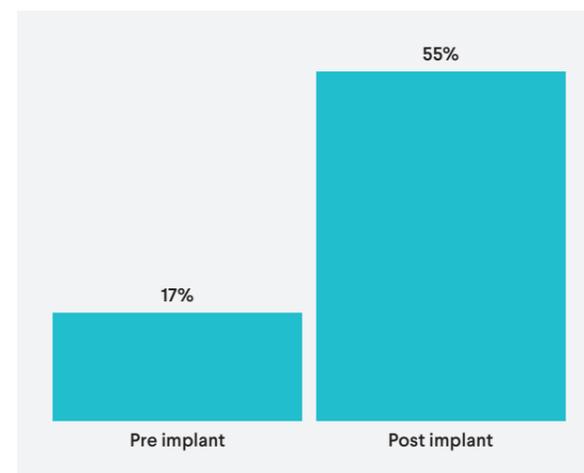
The results we have presented in this section are averages which are based on 'word scores' and 'phoneme scores'. As the words are presented through a speaker, the child or young person is not able to rely on lip reading. In this way, speech perception testing provides us with a reliable measure of how well the child or young person can hear. This is very useful as a tool for establishing if the child/young person's perception of speech improves after the cochlear implant (compared to before the cochlear implant) as well as measuring progress over time with the cochlear implant. In addition, research shows that there is a positive relationship between speech perception scores and perceived quality of life<sup>12</sup>.

The scoring for this test is based upon how many sounds in the repeated word are correct ('phoneme score') as well as whether the word itself was correct or incorrect. For example, if the word presented via the speaker was 'cat' and the individual hears and repeats 'cap', a phoneme score of 2/3 is obtained (as /c/& /a/ are correct) but the word score is 0, as the word is incorrect.

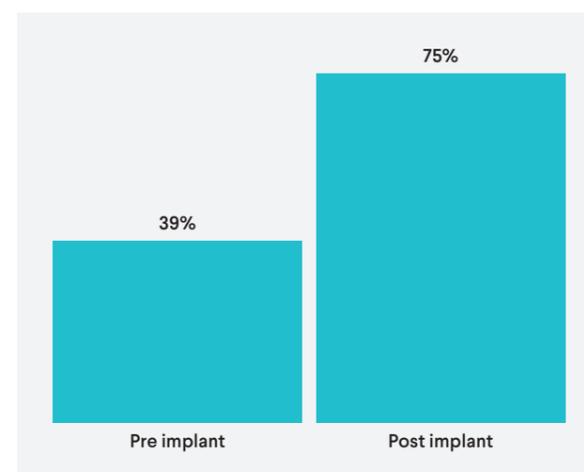
The results presented were obtained from the children and young people on our programme and show the speech perception results for the 'CNC word test', both before and after cochlear implantation.

As demonstrated in the graphs, The Hearing House results show an average word score of 55% and an average phoneme score of 75% (n=32). Our analysis found very strong evidence that after cochlear implantation children and young people in this group are better able to perceive both words and phonemes correctly.

**Figure 13: Pre and post implant word scores (CNC words) for all children tested (children n=32, ears n=42)**



**Figure 14: Pre and post implant phoneme scores (CNC words) for all children tested (children n=32, ears n=42)**



## Language assessments

The Hearing House's habilitation assessment protocol is continually reviewed to meet the needs of children and young people who receive services.

For more information on assessments used by The Hearing House and Kelston Deaf Education Centre habilitationists, please refer to Appendix A.

The assessment results described in this section refer to overall achievement on three specific types of language assessment: CELF-4, CELF-P2 and PLS-5.

### Rationale

The Hearing House's habilitationists have been conducting assessments on children receiving services since soon after the organisation's formation, in accordance with evidence-based practice.

Regular assessments are done for several reasons:

- to inform planning, habilitation and the setting of personalised goals for the child through the identification of strengths, difficulties and concerns;
- to monitor a child's progress over time;
- to make judgements about whether progress is sufficient for this stage taking into account other factors (such as age at identification, degree of hearing loss);
- to inform family decision-making and provide information to audiologists to assist them in optimal amplification;
- to identify areas that require further exploration by other professionals; and
- to better understand programme efficacy, inform programme development and resource allocation.

### Assessing 'language'

The three assessments (CELF-4, CELF-P2 and PLS-5) provide an overall score that describes a child's expressive and receptive language outcomes at the time of the test. This is called a standard score.

### What is receptive language?

Receptive language is what a child understands. This can range from single words to complex instructions, e.g. the child might be asked to point to a picture that shows "the big spotty dog is sitting under the tree".

### What is expressive language?

Expressive language is what a child says. This can include the ability to name items, put words together to make sentences and use different types of grammatical structures.

### Speech

Speech is different to language. Speech comprises articulation (how the child produces individual sounds and combines them to say words), voice (how the vocal-folds move), and fluency (the rhythm of speech). Please note that speech skills are not being reported in this document.

Adapted from the American Speech Language Hearing Association's "What is language? What is speech?" article on its website.

<sup>11</sup> Madell J (2011) Pediatric Amplification: Using Speech Perception to Achieve Best Outcomes. Accessed from <http://www.audiologyonline.com/articles/pediatric-amplification-using-speech-perception-841> on 04 August 2016.

<sup>12</sup> Schorr E, Roth R and Fox N (2009) Quality of life for children with cochlear implants. Perceived benefits and problems and the perception of single words and emotional sounds. *Journal of Speech, Language and Hearing Research*; Vol 52.

## Children assessed around the time they go to school

### Our graduates

The results in this section relate to children who have received habilitation services from The Hearing House. These children have hearing loss in both ears. The majority of these children have one or more cochlear implants and have severe or profound hearing loss.

Information in this section describes the range of language outcomes achieved by individual children<sup>13</sup> aged between four and five and a half years. These children were assessed using standardised language assessments<sup>14</sup> between 1 July 2012 and 30 June 2016<sup>15,16,17</sup>.

We have termed this group 'graduates' to make it easier to describe them – they are graduating or have recently graduated from the early intervention programme (i.e. they are about to, or have just started school).

There are 43 graduates who have been assessed using specific standardised assessments during this timeframe (CELF, CELF-P and PLS).

Devices worn by these children are: two cochlear implants (n=28), a single cochlear implant and a hearing aid (n=6), two hearing aids (n=7) and those with a single cochlear implant and a second ear with no device (n=2).

13 These are children who have received habilitation services from The Hearing House.

14 CELF, CELF-P and PLS – see the previous page for more information on these assessments. For children with more than one assessment result during this period these scores were averaged.

15 Standard score: Most standardised educational tests provide standard scores that are based on a scale that has a statistical mean (average) of 100. Most students achieve standard scores on tests that fall in the range of 85–115. This is the range in which 68% of the general population performs and, therefore, is considered the normal limits of functioning.

16 Please note that this section only includes information about children who are able to be tested using standardised assessments. For example, there are children who do not speak in English in the home and therefore they are not able to be tested with an assessment that is done in English. Another example might be a child who has a severe disability (such as cerebral palsy) and who therefore cannot participate in the assessment in a standardised way, such as being unable to point to pictures which would indicate their understanding during a test. A number of children within the age and date range to be included in the outcomes data above were not tested. Reasons for this included: child couldn't be tested as insufficient language to be tested (this is generally as they have multiple disabilities) n=16, child had significant attention problems and couldn't attend to the test n=1, the child moved away before testing could be done/completed n=6, child too unwell to be tested/child passed away n=2, SSD so not included n=1, family didn't attend multiple appointments n=1.

17 We have used this cohort (group) to ensure we can describe outcomes for a good-sized group of children.

### Results split by group

In further describing the language achievement of the 43 graduates, we have split children into distinct groups:

→ Standard graduates: This group includes children with hearing loss who did not have significant delays starting intervention, those who do not have additional needs which affect their learning; and those who are predominantly exposed to English at home (at least 50% of the time); and

→ Non-standard graduates: This group includes children with hearing loss who have additional disabilities that impact on their learning, and/or children whose primary spoken language at home is not English (more than 50% of the time), and/or children who had significant delays in identification of their hearing loss or in the start of intervention.

### Language results for children from the general population<sup>18</sup>

When children from the general population are tested using these assessments:

→ The average for children from the general population is a score of 100,

→ Scores between 85 and 115 are considered 'age appropriate',

→ 84 of every 100 children from the general population have language scores in the normal range or higher.

### Our graduates

The overall average language score (standard score) for all 43 graduates is 78<sup>19</sup>. Please note that this overall average includes 24 children with one of three significant challenges in addition to their hearing loss; 18 of these 43 graduates were assessed as having age-appropriate language or better.

The average language scores for standard graduates is 91 while the average for children from the general population is 100.

This means 12 of the 19 standard graduates are going to school with age-appropriate language, compared to almost 16 of 19 for their counterparts from the general population.

18 When we talk about the general population, the CELF and CELF-P tests used were standardised large samples of children from Australia and New Zealand. The PLS was standardised on a large sample of children from the United States, but this test has been 'language adapted' to fit our local setting.

19 Please note the lowest score on these tests is 40, while the highest is 160, hence the Y axis scale used here in Figure 15.

Figure 15: Average language scores for The Hearing House graduates compared with children from the general population

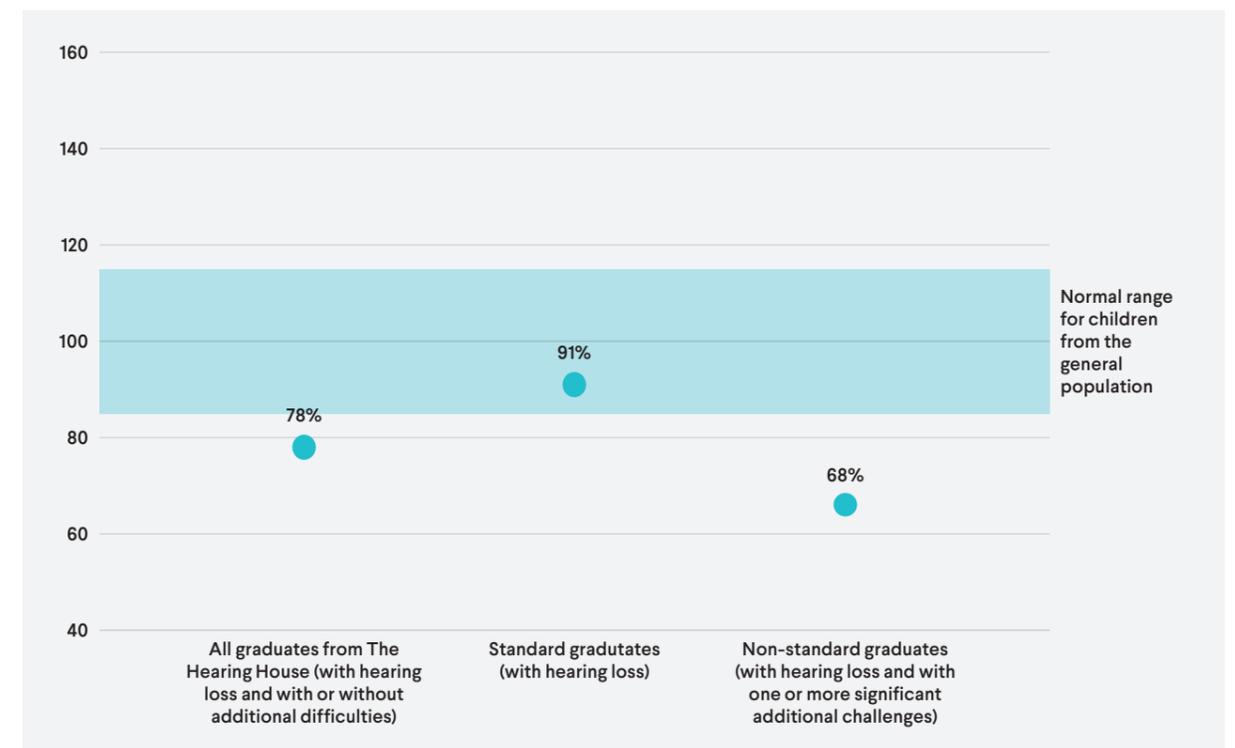


Table 2: Standard and non-standard graduates – groups of children, sample sizes and language scores

	Standard graduates	Non-standard graduates
Key groups of children	<ul style="list-style-type: none"> <li>→ With no significant delays in identifying their hearing loss, or in the onset of early intervention services.</li> <li>→ Without additional disabilities affecting their learning.</li> <li>→ Who are exposed to English most of the time at home.</li> </ul>	<ul style="list-style-type: none"> <li>→ With significant delays in identifying their hearing loss, or in the onset of early intervention services.</li> <li>→ With additional disabilities affecting their learning.</li> <li>→ Who are exposed to English less than 50% of the time at home.</li> </ul>
Number of children	n=19	n=24
Language scores	<ul style="list-style-type: none"> <li>→ 12 of 19 children had age-appropriate language or better.</li> <li>→ Three standard graduates achieved language scores above the normal range.</li> <li>→ The average language score (standard score) was 91, with a median of 89.</li> <li>→ These children had a range of scores from 64 to 122.</li> </ul>	<ul style="list-style-type: none"> <li>→ 6 of 24 children had age-appropriate language or better.</li> <li>→ The average language score (standard score) was 68, with a median of 66.</li> <li>→ These children had a range of scores from 50 to 108.</li> </ul>



### School leavers survey

Over the last few months, The Hearing House has been working on a School Leavers project with First Voice - a collaboration of similar centres in Australia and New Zealand.

There were 21 young people who graduated from our early intervention (EI) programme between 1993 and 2002. All but one had one or more cochlear implants, while another had hearing aids. Of these, we were able to get contact details for 19 individuals. These young people were born from 1988 to 1997, meaning they are now between 19 and 28 years of age. We invited them and/or their families to participate in a survey, and the surveys were completed by the young person who graduated, or their parent/caregiver.

The purpose of the survey was to gain some understanding of the social, educational and employment outcomes for this group of young people. While not intended as a formal study, it is hoped this exercise can build on the findings of the Outcome Surveys of Auditory-Verbal Graduates in 1993 and 2001, by Donald M. Goldberg & Carol Flexer. First Voice will be analysing the results from all First Voice centres, but in the meantime our team wanted to share with you some of the findings related to our graduates.

We are very grateful to the 15 young people (of a total of 19 who met our inclusion criteria and for whom we could get contact details) who took the time to respond before the deadline for this report. We expect to receive a further two responses to the survey in the coming weeks.

We have sought special permission from those responding to the survey, so we could share more specific information which may enable individuals to be identified.

A summary of the results is included below.

- All but one of the 15 young people surveyed had attended a mainstream school during some or all of their time at high school and 66% have been/were accepted into a tertiary or vocational course.
- Two of the respondents have children of their own and are stay at home parents.

→ Currently, of the 15 respondents to the survey – three are in paid employment, four are studying and in paid employment, three are studying and not in paid employment, one is seeking work, one is unable to work, one is travelling and two are stay at home parents.

→ Of those who have finished their studies – one has two Diplomas (in Fashion and also Hair and Make Up).

→ Of the seven who are still studying – qualifications underway include one apprenticeship, five Bachelor's degrees (Social Science, Business, Creative Technologies, Electrical Engineering and one with no subject of study listed), and one Master's degree (Science).

→ The majority of respondents (73%) mentioned they are or have been involved in volunteering or other community activities including: supporting people with disabilities, volunteering at Star Jam and performing mission work.

*"... AVT at THH has enabled ..... to achieve ... potential both academically, professionally and personally."*

**Parent of a 19-year-old ski instructor and indoor slalom champ**

*"... thanks to The Hearing House and my mum I am a 19-year-old that can walk around places and hear people and communicate with them. Without them I would not be who I am today."*

**19-year-old male**

*"The best possible service that is available to the hearing impaired. It absolutely without a doubt sets people up for life. It fills everyone with confidence. Keep up the fantastic work."*

**25-year-old male, Masters student, with a 1st Dan Black Belt**

*"I'm going to graduate soon (this year) and September is going to be a special month for me because I achieved what I have - gotten a degree, celebrating my birthday and making a new life."*

**22-year-old female, Bachelor of Business in Operations Management**

We look forward to bringing you more information in future reports about how young people are getting on as they become adults. Interestingly, if we were to do a similar study of 19-28 year olds who graduated the EI programme over the last 10 years the number in this group would be more than 120, much larger than the 21 graduates of the early intervention programme between 1993 and 2002 whose survey results are described above. This demonstrates just how much the number of children receiving services has grown in recent years.

# Research and training

## Research highlights

Each year The Hearing House, families and its staff are involved in various research projects. Highlights of some of these projects from the 2015-16 year are included below:

### First Voice: Sound Outcomes speech and language data (2016)

First Voice, local contributor Janet Digby. This study includes almost 800 children from Australia and New Zealand, including from The Hearing House.

### First Voice: School Leavers Project (2016)

The Hearing House is involved in The School Leaver Outcomes project, which aims to collect data on children who received Early Intervention (EI) therapy from First Voice (FV) centres and who have now finished school, in order to gain some understanding of their social, educational and employment outcomes.

### The effect of communication mode on outcomes for children with hearing loss: A review

The Hearing House commissioned a review of the evidence on communication modes in late 2015, with a view to creating a plain English summary of the review's conclusions, and making this and the review available to families and professionals.

### Koala project

THH is contributing to a research project which is being conducted in multiple countries (NZ, China, US and Germany) to gain a deeper understanding into the lives, needs and challenges of infants (those aged zero to five years) living with cochlear implants and their carers. The findings from this study will provide independent, evidence based results that will identify opportunities for Cochlear to improve the infant and carer CI experience through products and/or services.

### Master's research projects

We have two Master's students who are working within the programme. The first student is studying how children's ability to hear speech is affected by the acoustics in open-plan classrooms compared to enclosed classrooms, while the second is examining our Focus programme.

## Professional development

Each year staff from across the organisation engage in professional development activities including attending/presenting at conferences and upskilling.

During the year staff members:

- Attended the Alexander Graham Bell Association for the Deaf and Hard of Hearing conference which was held in Baltimore, Maryland (9 to 11 July, 2015);
- Attended Christine Yoshinaga-Itano's HOPE Tour – The Missing Link in Language Learning of Children who are Deaf or Hard of Hearing: Pragmatics (7 and 8 March, 2016); and
- Attended the Jane Madell HOPE Tour – Maximising Auditory Performance for Children with Hearing Loss and Other Auditory Function Disorders (28 and 29 October, 2015).

# Appendix: assessments

## Assessment protocols

The habilitation assessment schedule for children with cochlear implants is shown below in Table 3. Assessments are conducted 3, 6, 12 and 24 months after the device is fitted/child receives their cochlear implant(s), and at 3, 4, 5, 6, 8 and 12 years of age. Assessments which are standardised are shown in the table with an asterisk. Children are assessed at 10 and/or 14 years of age should parents request this or at the clinician's discretion.

Children with hearing aids are assessed using the tests below at the start of service and then annually based on their chronological age.

Tests have been chosen based on their topics of measurement (e.g. language, audition, speech), their reliability (consistent results for children of similar ability and internal reliability within a test) and validity (whether the test is measuring what it aims to measure).

**Table 3: Assessments which may be used, by age, March 2015 (standardised assessments are marked with an asterisk)**

Area to be assessed	CA: 0-211	CA: 3-35	CA: 36 – 40	CA: 40 - 411	CA: 50 onwards
Language	PLS-5*	PLS-5*	CELF-P2*/PLS-5*	CELF-P2*/PLS-4*	CELF-4*/PLS-5*/ CELF-P2*
		Rossetti, REEL, language sample, Bloom and Lahey, Brown's MLU, Grammatical Features checklist, Bracken Basic Concept Scale, Early Songs and Phrases List, Auditory Verbal Listening Skills Curriculum, ELTL Sounds List, St Gabriel's Curriculum, expressive language and receptive language checklist		Language sample, Bloom and Lahey, Brown's MLU, Grammatical Features checklist, Bracken Basic Concept Scale, Auditory Verbal Listening Skills Curriculum, St Gabriel's Curriculum, expressive language and receptive language checklist	
Vocabulary	– Vocabulary checklist	PPVT-4*, EVT-2*	PPVT-4*, EVT-2*	PPVT-4, EVT-2*	PPVT-4*, EVT-2*
Speech	– Articulation attainment chart	GFTA-2*	GFTA-2*	GFTA-2*	GFTA-2*
Audition	PEACH CAP Scales E-LAP	PEACH CAP Scales	PEACH CAP Scales	PEACH CAP Scales E-LAP	PEACH CAP Scales

No single test can accurately assess a child's language so The Hearing House and Kelston Deaf Education Centre habilitationists use a variety of assessments along with their experience working with each child to understand language performance and to set personalised goals and plans for work with each child.

## Types of assessments used

There are two main types of assessments used by the habilitationists, and each of these types has their uses. Assessments of each type are outlined in Table 4.

**Table 4: Standardised versus criterion referenced assessments, a comparison<sup>20</sup>**

	Criterion referenced assessments	Standardised norm-referenced assessments
Goal	<ul style="list-style-type: none"> <li>→ Determine whether a student has achieved specific skills or understands specific concepts (Salvia and Ysseldyke, 2004).</li> <li>→ Help us understand whether a child knows/ has specific skills before and after they receive services.</li> <li>→ Measures specific skills and incremental progress.</li> </ul>	<ul style="list-style-type: none"> <li>→ Measure student achievement and progress made compared with large numbers of hearing students (groups) of the same age (benchmarking).</li> <li>→ Allow comparison of various groups and their level of performance compared with hearing peers.</li> <li>→ Measure general performance and progress made in set areas, often over a longer period of time (eg. annually).</li> </ul>
Strengths	<ul style="list-style-type: none"> <li>→ These tests enable professionals to understand in more detail how a child is progressing and whether they meet particular pre-determined standards for achievement.</li> <li>→ Enable judgements to be made around behaviours or progress against identified targets, e.g. to find out whether the child has learnt the material or can carry out the behaviour being assessed.</li> <li>→ The child's level of functioning is measured on a regular basis, including through the use of criterion referenced assessments which help the therapist and parent understand the child's progress.</li> </ul>	<ul style="list-style-type: none"> <li>→ Using tests standardised on groups of hearing children allows us to compare deaf children with other peers, which is essential if we are to raise standards for deaf children, and close the attainment gap.<sup>21</sup></li> <li>→ These tests are carefully set so the results conform to a bell curve and have been found to be reliable and valid. This means it is possible to understand how a child is doing based on the normal distribution and also to understand how many children have performance within the normal range for children in the general population.</li> <li>→ Standardised tests also have a standard error of measurement – this is a calculation of the probability that a given speech testing score is a true reflection of the child's ability.</li> <li>→ Questions, conditions for testing, scoring and interpretations for standardised assessments are done in a consistent, prescribed way.</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>→ These tests should not be adapted for use with deaf and hearing impaired students as this may invalidate results.</li> <li>→ It is not possible with these tests to compare performance of children with other groups of children.</li> <li>→ It is not possible with these tests to understand how a child's performance ranks when compared to their counterparts.</li> </ul>	<ul style="list-style-type: none"> <li>→ Standardised tests don't tell you detailed information about nuances of performance that characterise a full range of student skill, ability and learning style.</li> <li>→ Children with additional needs and some children who are primarily learning spoken languages other than English may not be able to be tested using standardised assessments. Some of these children are able to be assessed using criterion referenced tests, while for others outcomes may be considered based on goals and progress.</li> <li>→ Only some standardised tests have been standardised with Australian/New Zealand children (CELF-4, CELF-P2) or are adapted for our local language usage PLS-5.</li> </ul>

<sup>20</sup> Adapted from Huitt W (1996) Measurement and evaluation: Criterion vs norm-referenced testing. Educational Psychology Interactive. Valdosta, GA.

<sup>21</sup> National Deaf Children's Society (2013) Assessing and monitoring the progress of deaf children and young people: Communication, Language and Listening. For Teachers of the Deaf and other professionals working with deaf children. Funded by Department for Education, NatsIP, NDCS.





ISSN 2463-2791

Citation: The Hearing House (2016): 2015-2016 Annual Outcomes Report. The Hearing House, Auckland, New Zealand. This report is available on The Hearing House website [www.hearinghouse.co.nz](http://www.hearinghouse.co.nz). Thank you to Moira Blincoe and others for the use of their photographs. This report can be freely quoted, copied and circulated with appropriate acknowledgement.

© 2016 The Hearing House

