

Title: A comparison of the anticipated benefits and received outcomes of paediatric cochlear implantation: Parental perspectives

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A comparison of the anticipated benefits and received outcomes of pediatric cochlear  
implantation: Parental perspectives

This article presents the findings of a study that investigated parents' expectations and experiences of their children's outcomes with cochlear implants. A survey completed by 247 parents whose children had been implanted in eastern Australia compared parents' reports of their pre-implant expectations with their experiences of post-implant outcomes on a large number of items related to communication, academic and psychosocial domains. The quantitative findings from the survey data were extended and elaborated by qualitative findings from interviews with 27 of the parents. The findings indicated that parents' relatively high expectations of their children's outcomes largely had been met, although a tenth of survey respondents reported that their expectations had not been met. It appeared that professionals generally provided parents with realistic expectations. The qualitative findings revealed a complex interaction between parents' expectations, hopes, and determination that their children would do well with the implant. Implications for professionals are discussed.

## Pediatric cochlear implants: Parental perspectives

### A comparison of the anticipated benefits and received outcomes of pediatric cochlear implantation: Parental perspectives

With the growing incidence of pediatric cochlear implantation in most developed countries in the last two decades, and the increasing trend for cochlear implants to be considered the best response to profound and, increasingly, severe levels of hearing loss in infants and children, parental expectations of cochlear implantation for their deaf children are likely to be high. It is important for cochlear implant programs and others informing or advising parents to have as full an understanding as possible of parents' expectations of the outcomes of implantation for their children and of the ongoing demands associated with implantation on families. In addition, knowledge of implanted children's outcomes across a range of functional settings as perceived by parents is important. Of the myriad studies investigating children's outcomes reported in the literature, a large proportion have focused on speech perception and spoken language development. Broader measures including educational, employment, and psychosocial outcomes, as well as family expectations and experiences, have received less attention in research studies (Spencer & Marschark, 2003; Swanwick & Tsverik, 2007; Thoutenhoofd, et al., 2005). Thoutenhoofd et al. pointed out that "very few studies attempt to assess the child's ability to perceive and produce spoken language in their day-to-day lives, after implantation, rather than in clinical tests" (p. 243). They also asserted that parents' perspectives, which may more closely reflect the functional outcomes of children in everyday life situations than assessments made in clinical settings, were underrepresented in the literature. Others also have suggested the necessity of including broader outcome measures, particularly parental report, in the assessment of the outcomes of implantation in young children (Lin, et al., 2008).

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The relative invasiveness of cochlear implantation compared to hearing aids, the high level of parents' emotional and resource investment in their children's cochlear implantation, and parents' expectations of success from the implant mean that it is vital to examine a full range of outcomes. The current study explored the broader areas of functional communication, educational, and psychosocial outcomes, as well as family expectations and experiences and the concordance between anticipated and experienced outcomes.

Research has indicated that many parents have high expectations of the outcomes of cochlear implantation for their children (Christiansen & Leigh, 2002; Weisel, Most, & Michael, 2007; Zaidman-Zait & Most, 2005). The importance of realistic parental expectations is recognised by researchers and cochlear implant programs; as Weisel et al. maintained, "if expectations from and attitudes toward the CI are so high, perhaps unrealistically high, then the effects of CI, good as they are, will likely fail to meet them" (p. 62), and higher levels of parental stress can result from this failure. Given the high levels of families' personal and emotional investment in the decision to implant and in supporting their children's progress with the cochlear implant, along with the often unrealistic media portrayals of cochlear implants for children (Komesaroff, 2007; Power, 2005), it may be unsurprising if parents' expectations are very high.

A small number of studies focusing on parents' expectations of cochlear implantation are reported in the literature. Zaidman-Zait and Most (2005) conducted a study in Israel examining mothers' expectations regarding their children's cochlear implantation. They developed a survey instrument focusing on five areas: speech-related communication abilities, academic achievement, social skills, change in future life, and the rehabilitation process. The findings indicated that the 35 mothers

surveyed held high expectations in relation to their children's communication, social, and academic abilities following cochlear implantation; they expected, for instance, that their children would be able to use the telephone, follow group conversations, and understand speech without needing to lip-read. It is interesting that these mothers held almost uniformly high expectations for their children's outcomes despite the variability in outcomes reported in the literature. Mothers' current satisfaction with their children's progress was also assessed with three questions about satisfaction with their children's communication abilities, social skills, and academic abilities. The researchers reported that the mothers' level of current satisfaction correlated positively with their expectations on the communication and social subscales.

A survey study of 64 mothers' stress and expectations of cochlear implantation found that stress did not decrease as time passed and mothers whose children had been implanted for at least three years indicated some disappointment in the areas of their children's communication and academic outcomes (Weisel, et al., 2007). They held lower expectations for these outcomes than mothers whose children had been more recently implanted or whose children were candidates for implantation. The authors concluded that the initial period of parents' high hopes and expectations associated with the decision and process of having the implant can give way, over some years, to a realisation that their child is still deaf and that intensive rehabilitation efforts remain necessary.

In a prospective longitudinal study conducted by a paediatric cochlear implant centre in the UK, 43 parents completed questionnaires before their child's implant surgery and at 1, 2, and 3 years post-implantation (Nikolopoulos, Lloyd, Archbold, & O'Donoghue, 2001). The questionnaires were brief, with three questions: parents were asked to what extent they expected that the implant would help their child in

communication with others, in listening to speech without lipreading, and in speech and language development. Parents' expectations were high in the areas of general communication and speech and language development, and lower in relation to listening to speech without lipreading. In the post-implant questionnaire, parents were asked "have you noticed positive changes" in the same three areas. Parents' responses indicated that they had noticed positive changes in all areas, particularly at the 3 year follow-up.

A study of parents of 101 children implanted at one cochlear implant centre in England assessed parents' perceptions of their children's outcomes in areas including communication, general functioning, social relations, and education. Three years after their children's implantation, the parents were largely satisfied with their children's outcomes and considered their children to be happy and talkative. The majority agreed that their expectations of implantation for their children had been exceeded, although 20% disagreed (Archbold, Sach, O'Neill, Lutman, & Gregory, 2008).

Sach and Whynes (2005) reported findings about parents' expectations from a study involving interviews with over 200 parents of children implanted at one cochlear implant centre in the UK. They found that most parents felt that their expectations had been met, and a small minority of 5% reported that their expectations had not been realised. Some parents spoke of progress being slower than they had expected. The authors also reported that some parents revised their expectations over time, usually expecting more as initial expectations were met. In Germany, Spahn et al. (2003) found that expectations of parents rose in the time period after their children's implant operation whereas expectations of parents of children fitted with hearing aids remained constant or fell slightly.

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A qualitative study in South Africa investigated mothers' expectations of, and satisfaction with, the outcomes from cochlear implantation for their children (Perold, 2001). Eight mothers of children under 6 years of age who had used a cochlear implant for between 3 months and 2 years were interviewed. Perold found that the mothers' expectations changed over time, and described their expectations as either hope-based or knowledge-based, with hope-based, unrealistic expectations appearing to be stronger when mothers' anxiety increased. In addition, some mothers had experienced disappointment in the period following the switch-on of their children's implants because they had had unrealistic expectations of seeing immediate improvement in their children's communication abilities.

Apart from Sach and Whynes' (2005) study, these studies involved relatively small samples, and in many cases the samples were drawn from one cochlear implant program. In addition, the majority involved an interval of around three years post-implant. It is useful to include, where possible, children with longer use of implants in order to assess long-term outcomes. As paediatric cochlear implantation has been proceeding for over 20 years in many countries, it is becoming more possible as time passes to report on long-term outcomes, and a small number of such studies have recently been reported in the literature. For instance, Beadle et al. (2005) investigated 30 children with between 10 and 14 years of implant use in the UK, Uziel et al. (2007) reported on 82 children with 10 or more years of implant use in France, and in a longitudinal U.S. study, Geers, Tobey, Moog, & Brenner (2008) assessed 85 children at ages 8 to 9 years and again at age 15 to 18 years. Overall, these studies found continuing advances in language and educational outcomes for many of the children. There seems to be value in examining parents' experiences of implantation over a range of time periods.

Research that directly compares parents' pre-implant expectations with their later perceptions of their children's outcomes on a range of communication, psychosocial, and academic items with a large sample is lacking. The current study investigated expectations with a relatively large sample of parents of children implanted at several implant clinics and attending a variety of early intervention and educational settings across a range of locations in eastern Australia. The study compared parents' reports of their pre-implant expectations with their experiences of post-implant outcomes on a large number of items related to several outcome domains; further, it utilised a mixed methods approach that allowed quantitative survey findings to be extended and elaborated by qualitative findings from in-depth interviews and open-ended written responses. It included children with varying lengths of time since implantation and thus gained the perspectives of parents, teachers, and young cochlear implant recipients themselves about the lived experience and functional outcomes for implanted children and their families over time.

The study investigated three major aspects of childhood cochlear implantation: 1) the expected outcomes of implantation; 2) the decision-making process; and 3) the personal, social, and educational outcomes of cochlear implantation for deaf children and their families. The decision-making process and further aspects of parents', teachers' and children's perspectives are reported elsewhere (authors, in preparation). The current article reports on parents' expectations and experiences of their children's implantation, addressing the following research questions:

- What are parents' expectations of the outcomes of cochlear implantation for their children?

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- What are the parents' perceptions of the outcomes of cochlear implantation for their children in language and communication development, educational achievement, social participation and psychological well-being?
- Is there a concordance between parents' expectations and experiences of their children's outcomes?

### Method

A mixed methods approach to data collection and analysis was used to enable the research questions to be addressed more fully and accurately than the adoption of only a quantitative or qualitative approach would permit. A combination of quantitative and qualitative approaches was adopted in a sequential strategy in which one method is used to further explore and expand the findings of another (Creswell, 2003). Thus, parental expectations and experiences of outcomes were measured by a detailed quantitative survey instrument. Subsequently, a subsample of parents participated in in-depth interviews designed to explain, extend and elaborate on the data generated from the survey.

### *Participants*

Parents of children who had received cochlear implants before the age of 18 in the Australian states of Queensland, New South Wales and Victoria participated in the study.

### *Measures*

We constructed a survey that collected responses in three areas: background information, parental expectations, and parents' experiences of their children's outcomes.

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*Background information.* The first section of the questionnaire sought background information and contained 30 questions covering family demographics, including household structure, postcode, and language used in the home, as well as information related to the child's hearing, including age of hearing loss occurrence and identification, age of cochlear implantation, occurrence of bilateral implantation, use of hearing aids before the implant (and since, if used in the non-implanted ear), communication modes before and since the implant, educational setting and communication approach in the educational setting.

*Parental expectations.* The questionnaire for the expectations section of the current study was adapted from Zaidman-Zait and Most's (2005) questionnaire that was used with mothers of children with cochlear implants. Zaidman-Zait and Most's questionnaire contained 33 items divided into five sub-scales measuring mothers' expectations in the areas of Communication Abilities, Social Skills, Academic Achievements, Change in Future Life, and Rehabilitation Demands. In addition, the questionnaire included 3 questions to rate the mothers' overall satisfaction with their children's social, academic, and communication abilities. Zaidman-Zait and Most reported Cronbach alpha coefficients for internal consistency for the subscales as follows: .86 for Communication abilities, .76 for Social skills, .63 for Academic achievements, .72 for Future life, and .65 for Rehabilitation demands.

For the present study, modification was made to some of the items to more closely reflect the Australian context, and further items were included. Parents were asked to rate their level of agreement or disagreement with items with the stem "I expected that...." These sub-scales followed the major domains of Zaidman-Zait and Most's (2005) survey instrument, with the addition of another outcome domain, Well-being and Happiness. (Here we report findings of parents' expectations and

experiences of their children's outcomes; results of the rehabilitation demands will be reported in the context of the impact of implantation on families in a forthcoming paper.)

The items on the Communication Abilities subscale reflected abilities in spoken language in functional, everyday situations. The Social Skills and Participation items were concerned with children's experiences making friends with and being accepted by hearing peers, as well as initiating and actively participating in play with children in general, and having improved social skills. The Wellbeing and Happiness subscale included items about children's happiness, frustration, and safety with the implant. The Academic Achievements subscale included children's ability to participate in a regular class, as well as items concerning levels of achievement in maths, reading and writing, and general age-related levels. The Future Life subscale was concerned with perceptions of children's general functioning and independence as well as their identity as deaf or hearing persons. Items on the subscales can be seen in Tables 3 to 7.

Respondents were asked to rate their level of agreement with each item on a 5-point scale with responses *strongly disagree*, *disagree*, *neither agree nor disagree*, *agree* and *strongly agree*.

*Parents' experiences of their children's outcomes.* While Zaidman-Zait and Most (2005) surveyed mothers' *expectations* for each of their items, we sought to investigate parents' *experiences of outcomes* for each item, as well as their expectations. The items on each subscale in the expectations section of our questionnaire asked parents to rate their level of agreement about their *expectations before* their child had received the cochlear implant. A following section provided the same items, but asked parents to report on their perception of *outcomes experienced*

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*since* their child's implantation. Parents were asked "now that your child has the cochlear implant, to what extent do your observations of your child lead you to believe that each expectation has been met?" In each sub-scale, the stem was "now I find that...." and the items were worded in the present tense, for example, "with the cochlear implant, my child is able to use the telephone." The response scale included the same five response options as the expectations items, but with the addition of a *not applicable* (NA) option. This was because some children may have been too young for parents to respond to some items, such as to use the telephone or to achieve in maths. Where an NA response was given, it was coded as a missing response

Following exploratory and confirmatory analyses of parents' responses, some items in each subscale were excluded from the subsequent analyses if they did not cluster meaningfully and thus decreased the reliability of the subscale. Cronbach alpha coefficients for internal reliability for the reduced subscales was .89 for Communication Abilities, .90 for Social Skills and Participation, .82 for Wellbeing and Happiness, .86 for Academic Achievements, and .74 for Future life.

In addition, six items rated parents' overall satisfaction with their children's social, academic, and communication abilities; for example, "overall the expectations I had before my child was implanted are now being met;" and "currently, I am satisfied with my child's communication abilities." Parents were also invited to write open-ended comments with the question "If there is one central message that you would like to convey to us about the experiences you have had with your deaf child and his/her cochlear implantation, what would that be?"

### *Interviews*

We aimed to conduct follow-up interviews with approximately ten per cent of parents who completed surveys. Almost 80% of the survey respondents agreed to be contacted for an interview. Thus, we needed to make a selection of parents to contact and invite to be interviewed. In keeping with the aims and qualitative approach of this phase of the study, sampling was purposeful. Purposeful sampling is designed to select information-rich cases likely to best illuminate the questions being investigated and yield insights and in-depth understanding, rather than empirical generalizations (Patton, 2002). We sought to include a range of parents in terms of location (metropolitan, regional, rural), current age of child, age of child at implantation, and the type of educational setting the child attended, so that there would be structured representation across the range of situations of families. In keeping with the study's aim of investigating the experiences of families whose children do not benefit optimally from their cochlear implant, parents who had indicated on the survey that their child no longer used their cochlear implant were included in the interviews.

We interviewed 27 parents. Five of these parents had 2 children with cochlear implants, and so the number of children discussed in the interviews was 32 (16 girls and 16 boys). Of these children, 2 attended early intervention centres, 19 were in primary school, 10 were in high school, and 1 had completed tertiary education and was in the workforce. The children's ages ranged from 1 year 8 months to 25 years. The large majority of these had been implanted before 3 years of age: Five of the children had been implanted before the age of 1 year, 18 between the ages of 1 and 3, 5 between the ages of 3 and 12, and 4 between the ages of 12 and 17. Three of the children no longer used their cochlear implant.

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Although we attempted to arrange interviews with several fathers, only one interview with a father eventuated; the other interviewees were all mothers. One interviewee was Deaf; the others were hearing.

The interviews incorporated an initial list of questions serving as a guideline only, allowing unanticipated information to emerge. The use of a semi-structured interview schedule does not pre-empt the open-ended nature of the qualitative interview, as within each question the opportunity for unstructured responses remains. Rather, the schedule ensures that previously identified areas of interest will be explored even if they do not emerge spontaneously during the course of the interview (McCracken, 1988). Thus, the format and sequence of each interview was determined as the session proceeded. In addition, further questions were asked as necessary to probe or clarify particular answers in relation to the study aims.

The questions included in the interview guide covered the parents' decision-making process, their expectations before their child's implantation, and their experiences and perceptions of their child's communication, personal, social, and educational outcomes since implantation. Only data relating to parents' expectations and experiences are reported here.

Interviews were conducted over the telephone and ranged in length from 35 minutes to one hour 45 minutes, with most taking around one hour. All interviews were audio-taped, with the parents' prior consent, and transcribed in full for analysis. The interview data were analysed according to the constant comparative method (Glaser & Strauss, 1967; Lincoln & Guba, 1985). Analysis involved the coding of data in order to generate categories, with the constant comparison of units of data in order to discover similarities, differences, patterns and consistencies of meaning that identified themes. As a validity check, a selection of interview transcripts was

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reviewed and coded by an informed person external to the research team (Creswell & Plano Clark, 2007). The interview data analysis was facilitated by the use of the NVivo 8 computer program.

### *Procedure*

Approval for the project was gained from the Human Research Ethics Committees of the universities, state government departments of education, early intervention centres, and hospitals with cochlear implant clinics involved in the study. Cochlear implant clinics, early intervention centres and the departments of education facilitated distribution of copies of the survey to families of all children on their data-bases who had been implanted under the age of 18 years. In addition, organisations for parents of deaf children disseminated information about the project to their members. All parents were informed of the option of completing and submitting the survey online at the project's web-site.

### Quantitative results

The number of surveys received from parents was 250. Three of these were excluded from the analysis due to missing data; thus the sample consisted of 247 parents.

### *Family characteristics*

Mothers made up the large majority (88.3%) of the survey respondents, while 10.1% were fathers, and 1.6% were "others," reported as the child's grandmother, foster parent or step-father. The large majority of parents were hearing (96.7%); 2.8% were hard of hearing, and 1 parent (0.4%) was Deaf. Although 9.7% of parents indicated that English was not their first language, only 4.0% reported that English was not the language they used most each day.

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The large majority of the children (92.7%) had a profound hearing loss pre-implantation and 6.9% had a severe loss (0.4% unknown). For the majority of the children (69.2%), parents reported that hearing loss was congenital or had occurred before the age of 2 years (11.1%), while 7.8% had lost their hearing over the age of 2, and 12.6% of parents reported that they did not know when their children's hearing loss had occurred. Fifty-five parents (22.3%) indicated that their children's hearing loss had been identified at birth. Of the remaining 191 parents who answered this question, their children's deafness was identified between the ages of 1 month and 8 years.

Almost all (97.9%) of children whose parents responded to the survey used their cochlear implants for all or most of the time during their waking hours. Five parents (2.1%) reported that their children had stopped using their implants. Sixty-five of the children (26.3%) had a sequential bilateral implant.

One quarter of the parents (25.3%) indicated that their children had additional difficulties or disabilities. Parents specified a range of medical conditions and developmental disabilities, including cerebral palsy, autism, and intellectual disability, as well as conditions likely to be relatively mild in their impact.

Table 1 about here

Table 1 displays further demographic details of the children. As the table indicates, there was a wide range of ages, ages at implantation, and duration of implant use in the group. The majority of children attended mainstream educational settings in which they spent most or all of their time in the regular classroom, usually with itinerant teacher of the deaf or co-teacher support. A further third of children attended special education settings including early intervention centres for deaf

children and special education settings in regular schools or special schools. Parents who reported that their children were in “other” settings usually described these as being some kind of combination, for instance of day-care and early intervention, or were attending higher education or in the workforce.

Families’ geographical locations were categorised by postcode and compared to Australian Bureau of Statistics information which classifies postcodes into an accessibility to services/remoteness index of regions termed Major Cities, Inner Regional, Outer Regional, Remote, and Very Remote (Australian Bureau of Statistics, 2006). The proportion of survey respondents living in each locality category reflected quite closely the 1996 Census population figures reporting percentages of people living in regions ranked on accessibility/remoteness (Australian Bureau of Statistics, 2001). For the purposes of our analysis, the Outer Regional, Remote, and Very Remote participants were grouped into one category, termed OR/Remote.

Families’ postal codes were also used to ascertain socioeconomic status (SES). Each postcode was assigned to one of ten decile positions according to the Index of Relative Socio-economic Advantage and Disadvantage which ranks postcode areas on a continuum of social and economic advantage to disadvantage (Australian Bureau of Statistics, 2008). A large majority of parents (75.1%) lived in areas ranked in the top five deciles.

### *Expected and experienced outcomes*

To examine levels of expected and experienced outcomes, scores were averaged for each of the five subscales (Communication Abilities, Social Skills and Participation, Wellbeing and Happiness, Academic Achievements, and Future Life), with higher scores indicating higher expectations and experiences (after reversing the relevant

items), and the means and standard deviations for each subscale were calculated. As shown in Table 2, means for the subscales were at the higher end of the range (1-5). Thus, parents indicated relatively high expectations of outcomes for their children. Similarly, they indicated relatively high experiences of outcomes for their children.

Table 2 about here

Paired sample t-tests were conducted to compare the mean scores of the subscales for expected vs. experienced outcomes. The only subscale scores to vary significantly in terms of expected vs. experienced responses was Social skills and Participation ( $t = -4.98$  ( $df = 246$ ),  $p < 0.001$ ) where scale scores increased significantly. Thus, the child's observed social skills and participation were significantly greater than expected.

Tables 3 to 7 show how parents responded to items about expectations and experiences in the five domains. All items that were on the survey, including those excluded from the subscales following confirmatory analysis, are included in this descriptive reporting. The *agree* and *strongly agree* responses have been summed to indicate agreement, and *disagree* and *strongly disagree* responses summed to indicate disagreement. We also report the other response option on the five-point scale, *neither agree nor disagree*, as these were in most cases far larger for parents' expectations than for their experiences, revealing just how unsure many parents were about what they could expect from the implant. For example, nearly a quarter of parents chose the *neither agree nor disagree* option in response to their expectation about whether their child would be able to use the telephone with the cochlear implant, whereas only a tenth chose the same response in regard to their experiences of their children's outcome of using the telephone. Similarly, it is clear that many parents just did not know, before the implant, if their child would be able to participate easily in a regular

class. In general, experiences would seem to have informed expectations and typically led to the reduction of uncertainty, most frequently in a positive direction.

Tables 3-7 about here

On the Communication Abilities subscale, most responses indicated a move in a positive direction, such that more parents reported, for example, that their child was able to use the telephone than had expected this ability. However, in the item about following a spoken conversation with a group of people, parents' experiences fell short of their expectations; 11% of parents reported that they had expected that their child would not be able to do this, but 20% reported that their child could not currently do this with the cochlear implant. For some items there would seem to have been a strong predisposition underlying parents' initial expectations, such as the item about the child's potential use of a sign language and being able to speak with family and friends. The gap for these items between expectation and experience was small and response scaling remained stable, indicating the strength of the original expectation. Other items highlight the reduction of the level of initial uncertainty, based on experience. For example, the item about socialising with deaf peers showed almost 37% uncertainty in expectation and only 15% after experience (with 68% agreeing that their child also socialized with deaf peers). This trend is also observed in relation to classroom socialisation where uncertainty was reduced and more positive outcomes were experienced.

High levels of uncertainty were maintained in the domain of wellbeing and happiness, where a quarter of the respondents remained unsure about whether their child was happier than without the implant and 40% remain unsure about the level of trust that their child had towards others. Relatively high levels of uncertainty were indicated in the expectations of academic achievement but most were reduced by

experience – the two exceptions seem to be in the important areas of reading/writing and mathematics where uncertainty is often maintained or more negative experiences are reported.

The future life domain showed almost unequivocally positive responses for the overall question (93% expected that the implant would significantly improve, and experienced that it had improved, their child's life), but high levels of uncertainty expressed and retained for some items about the components of a future life. For example, this is seen in relation to the use of sign language, identity as a deaf or hearing person and whether their child would develop normal hearing. For the latter item, almost a quarter of the respondents surprisingly suggested that their child had acquired normal hearing.

### *Parental Satisfaction*

The parents were asked to report their current levels of satisfaction with their children's overall outcomes and, in particular, their communication, social and academic outcomes. Their responses indicated that parents were, on the whole, satisfied with their children's outcomes. As shown in Table 8, approximately four fifths of parents agreed that, overall, the expectations they had before their children were implanted were being met, while a tenth were disappointed that their expectations had not been met. Again, four fifths agreed that they were optimistic that their expectations would be met in the future, and were satisfied with their children's current communication abilities and social skills and participation, and almost three quarters were satisfied with their children's academic abilities. However, close to 10% of parents were not optimistic that their expectations would be met in the future, and were not currently satisfied with their children's communication abilities, social skills, and academic abilities.

Table 8 about here

### Qualitative results

The findings from the interview data provided clarification, illustration and elaboration of the quantitative findings; parents' explanations of their expectations and experiences of their children's outcomes added detail and depth to the survey findings. The results reported here include parents' written open-ended responses to the "central message" question on the survey, as well as interview data.

#### *Expectations or hopes?*

In the interviews, parents were asked "what were your expectations of a cochlear implant for your child?" and "to what extent have your expectations been met?" Analysis of responses from the 27 interviewed parents, as well as the open-ended responses on the parent surveys, revealed that parents' expectations were often difficult to disentangle from their hopes, and sometimes from a faith or belief that "this had to work" or that they would ensure that it would work for their child.

From many parents' stories it was apparent that cochlear implant professionals had tried to ensure that they did not hold unrealistic expectations of their children's implant. Some parents reported that they had been told that there is a range of outcomes from cochlear implants, or that factors associated with their child (such as age or presence of disabilities or medical conditions) were likely to limit outcomes for their child. Nevertheless, it was apparent that often parents' hopes and determination, as well as meeting children who successfully used cochlear implants, led them to believe that their child would achieve good outcomes. This parent of a 16 year old girl who had been implanted at 2 years of age explained:

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Well, the professionals played it down a lot. They told us not to expect for her to be able to hear speech very clearly, that she would probably get a lot of environmental sounds from it, and that she would not be able to talk on the telephone, just, they basically told us not to have any expectations. And that was another reason why I thought, well why would I get it done, why would I do this, but after meeting the little boy, I just thought, I have got expectations, and I never told them! I just thought, [our child] is going to do well from this because I'll make sure she does, and I was just very determined that she was going to have quite a lot of success from it.

The mother of a child implanted more recently expressed similar determination:

And then of course all the literature you read had a lot of 'fingers crossed' or 'cochlear implants don't work' and I think, oh no, I've seen them working, I've seen them – I've got to believe that it does. I just wanted to have it be easier for him to hear, and I knew that so long as the operation went well, I knew that we were going to get him using it, because of our drive and his ability to listen with his hearing aid.

It was evident from responses such as these that parents had faith that their expectations, along with their hard work with their children, would lead to optimal outcomes for their children. This was reflected in parents' written responses; for example:

I have always had high expectations, and often pushed him to achieve, and as a result his outcome is amazing at this point.

Parents spoke, and wrote in their survey responses, a great deal about their hopes for their children. One parent wrote "we had no expectations, only hopes," and in the

interviews remarks such as this expressed this hopefulness in the face of uncertainty about outcomes:

Well, we were always hopeful he would be able to listen. We know it's not as we do but we were always hopeful of the best. We were aware that depending on the number of electrodes implanted the outcome was variable but we were just hopeful, and as it turned out it's proven to be excellent.

*Parents feeling their expectations were met or exceeded*

The qualitative data contains many reports of parents' expectations being met or exceeded, as these two parents reported:

I think she's actually gone past my expectations. The things that she says to me now, it's sort of like - I go 'wow'! I can't believe you said that! So it's passed my expectations now.

Our expectations have been surpassed actually. [Our child] is actually bilingual so he's a wonderful signer – Auslan - and doesn't shut up, and speaks quite clearly. The only issues he really has with his speech is 'th' sounds like in 'thirty' and 'three' he replaces it with an 'f', but in class with his school work he's pretty much on par with other kids in the class. Our expectations were surpassed. We're very happy in that respect.

Some parents, particularly in the open-ended comments they wrote on the surveys, were fulsome in their praise, seeing the implant as a blessing and expressing gratitude, as these two written comments indicate:

Can't recommend an implant enough - dread to think where we'd be without it.  
She's a happy, confident child. A great blessing.

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Thank God for the cochlear implant - our child still faces challenges but has a world more of opportunity as a result of cochlear implantation.

Another parent described how her thorough investigations led her to limit her expectations:

I had low expectations. And also by that time, I made sure I went to [early intervention centres and deaf organisation], I really started to speak to mothers, observe children who had cochlear implants and realised that, despite what some organisations would lead you to believe, it's actually not a miracle cure, it's a lot of hard work, years of hard work often, years of speech therapy, with mixed outcomes. So I was quite realistic.

Parents often emphasized that their children's positive outcomes had been achieved after a long period of time and hard work and efforts on the part of the family, as this written response illustrates:

The hearing with a cochlear implant will never be normal, it's not a magic fix-it straight away but it takes years of hard work, commitment etc. It has paid off as he is finally doing really well 10 years down the track.

*Parents feeling their expectations were not met*

Other parents, however, experienced disappointment with outcomes that fell short of their expectations, as these written responses indicate:

Before the cochlear implant I wanted our son to be like a 'hearing person' and not have to sign because it was scary and in a totally unknown territory (deafness) to us. With our experience seven years since implantation our expectations have come down dramatically and reality set in.

We were told that to be implanted as young as she was, by school age our daughter would have caught up to her hearing peers and be on par with them academically and socially, this has not been the case.

And for a parent of a child now aged 7 years:

I was expecting the implant to 'fix' his hearing as I had seen children with implants talking and hearing beautifully. As [our child] has Auditory Neuropathy he has scrambled hearing and only a vocab of about 6 words.

In some instances, mothers and fathers were reported to have had different expectations and disagreed about the path they should follow for their deaf children, as in this case:

With the implant my husband thought he would be like any other regular hearing child. ....I wasn't sure what to expect....I expected something good out of it but I always knew that [our child] is deaf and he'll always be deaf and he's got a device that can help him to hear sometimes....So I wanted to do both signing and get the implant and my husband said no, he should have one or the other.... he wanted to go through [the early intervention centre], where they definitely didn't do signing, and he was thinking that if [our child] got the implant then he'd be just like this normal everyday child.

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Although this child had the implant at 18 months of age and followed the early intervention centre's auditory-verbal program, it became apparent that he had other difficulties that limited the benefits to oral communication that the parents hoped he would gain from the implant, and that signing was needed. The child's father experienced disappointment that his son's progress with the implant had not met his expectations; the child's mother felt "disappointed that I hadn't followed up on my instincts at the beginning, that I went my husband's way."

One mother described her 16 year old son's desire to have an implant and his high expectations of it, even though family and professionals emphasised that benefits may be limited. One year after receiving the implant, his high expectations were not realised:

He's had a good dose of reality. His experience – how could I say it – he has perhaps experienced firsthand that no matter how hard you want something you can't get it. So, although he wanted this to be the perfect solution, it hasn't been.

The three interviewees whose children no longer used their implants described their feelings about the failure of the development of hearing and speech in their children. One mother said:

Well, of course [my expectations] were the same as, you know, the other children I had met, and, I don't know, you just get your hopes up and, because I didn't really know about much that it wouldn't work. I just thought, you know, it will work, that that was it.... I never really met any families or anybody who was deaf or who had a deaf child or anything, no. I met all the implanted ones who were hearing really well.

A teenager implanted at age 3 but whose implant “did not work” was comfortable with her Deaf identity and enjoyed a full social life with her Deaf friends. Her mother, although accepting the situation, expressed her disappointment at the failure of the implant:

I guess we’re just used to it now. I would still like, I would *love* for her to use the cochlear implant and to be able to learn speech properly and hearing and so forth, I would love it, do you know what I mean, but it’s now her decision.

After struggling for several years to have her son who has severe autism accept the implant, a mother and the professionals involved eventually decided “no more.” The boy’s mother did not regret the decision to implant her son:

We wanted [our child] to have all the answers – you know make sure we did everything and if he didn’t take to it, well so be it. You know, we tried.... So we’ve given him the implant, we’ve tried, it’s there for him if he does want it later. So there’s always hope later on maybe.

#### *Disappointment in the short term*

Some parents had expected to see positive results for their child immediately after switch-on, or at least a lot sooner than they did, and this added to their levels of stress at a difficult and emotional time, as this parent explained:

I know they tell you not to expect miracles, but I must say when it was first switched on and nothing happened, I did come home from [the city] and I was very, very disappointed because I had to resign from my job to do this because they wouldn’t give me time off work and I’m a single mum, and so .... [I expected] something on the day, on that day, and it’s just that there was nothing. It was like someone had punched me in the heart and I thought “oh

my God, what have I done?".... It took like the first six months before we started seeing there was something there.

In an open-ended response on the survey, another parent wrote of the long period of time before benefits were realised from her son's implant:

I was extremely surprised to realise that once we 'switched on' the implant my son absolutely *hated* it and it took a good 12 months to get him to wear it. *That* was extremely stressful. He also developed an infection in his implant site 2 weeks after the operation which delayed switch on for about a month, and then nearly a year to the day developed a second infection which required 3 months of antibiotics, 2 weeks hospitalisation and no use of his implant for 1 month, until the swelling settled. It is not all that you expect but 6 years down the track it has definitely been worth it. It has helped his progress immensely, *eventually*. (Emphasis in original)

#### Discussion and integration of qualitative and quantitative results

The quantitative findings indicate that this group of parents as a whole had held relatively high expectations of their children's communicative, social, academic, wellbeing and future life outcomes from cochlear implantation. These findings are consistent with reports in the literature of high parental expectations (Christiansen & Leigh, 2002; Weisel, et al., 2007; Zaidman-Zait & Most, 2005). However, our findings did not reflect the almost uniformly high expectations of the mothers in Zaidman-Zait and Most's study; rather, more variability in expectations was found among our larger sample.

The findings also indicate that the parents' experiences of their children's outcomes with their cochlear implants were relatively high; in most domains, there was no statistically significant difference between parents' expectations and

subsequent experiences of their children's outcomes with the cochlear implant. In one domain, Social Skills and Participation, parents' experiences of their children's social outcomes were significantly more positive than they had expected pre-implant. It is encouraging that parents reported positive outcomes for their children in this domain. However, the qualitative findings revealed that the area of social participation remained a concern for many parents, who were aware of their children's difficulties in groups and how those difficulties affected their social participation. Those findings are reported in a separate paper specifically concerned with social outcomes (authors, in preparation). Overall, the comparison of the average scores for the subscales suggests that this group of parents' expectations of their children's cochlear implantation had largely been met. In addition, responses to the questions about overall satisfaction indicated that the expectations of four fifths of the parents had been met. These findings suggest that the majority of parents viewed their children's cochlear implantation as a positive step in the children's lives, and had high levels of satisfaction with their children's outcomes. Nevertheless, a proportion of the parent group did not indicate such satisfaction. For example, the percentage of parents disagreeing that their overall expectations had been met was 10.6%, and the same percentage agreed that they were disappointed that their expectations had not been met. Further, a tenth of parents were not optimistic that their expectations would be met in the future, and were not satisfied with their children's communication abilities, social skills, and academic abilities.

These findings show consistency with those of other studies. In the Archbold et al. (2008) study, although the majority of parents agreed that their expectations of implantation for their children had been exceeded, 20% disagreed. The quantitative nature of that study precluded the reasons for those parents' dissatisfaction being

known. Five percent of the parents in Sach and Whynes (2005) study indicated that their initial expectations had been high and had not been met.

Our study's qualitative findings, through both the interview data and survey open-ended responses, indicated that the parents who were disappointed were often parents whose children's additional disabilities or conditions precluded them from gaining much benefit from their implants. Particularly when the child was implanted at a young age and the additional problems were unknown until some time after implantation, parents' expectations of good spoken language development were not realised. Studies reported in the literature indicate that the development of spoken language after implantation is not always achieved for children with disabilities, for example, those with significant global developmental delay (Edwards, Frost, & Whitham, 2006), autism spectrum disorder (Donaldson, Heavner, & Zwolan, 2004) and a range of cognitive, behavioural, and language disorders (Nikolopoulos, Archbold, Wever, & Lloyd, 2008). Nevertheless, it has been found that cochlear implants for children with significant disabilities provide important benefits that may lie outside the speech and language parameters generally considered the major goal of implantation, benefits that are more in the areas of quality of life and psychosocial wellbeing (Bacciu, et al., 2009; Donaldson, et al., 2004; Edwards, 2007; Edwards, et al., 2006). The increasingly young age at which infants are being implanted, commonly between 6 and 12 months of age (Dettman, Pinder, Briggs, Dowell, & Leigh, 2007; Holt & Svirsky, 2008; Valencia, Rimell, Friedman, Oblander, & Helmbrecht, 2008) and even younger in some centres (Birman, 2009; Lesinski-Schiedat, Illg, Heermann, Bertram, & Lenarz, 2009), suggests that more children will be implanted before the age at which identification of many disabilities is possible. For instance, the growing incidence of children being diagnosed with disorders on the

autism spectrum means that there is an increase in children who are both deaf and autistic, and typically these children's autism is diagnosed later than in hearing children (Vernon & Rhodes, 2009). It is likely that parents of such children will have expectations of implantation that will not be met.

It is apparent from the interview findings that some families endured considerable stress and sadness when their expectations or hopes for their children were unrealised. It is important for families and their children who do not appear to benefit optimally from the cochlear implant to be followed up and supported. It is clearly important to focus on the communicative and educational needs of children who are receiving less than expected benefits from their implants, not only so that they can develop and progress optimally, but also to provide sufficient support to their parents who may have to deal with the disappointment that their expectations of implantation for their children have not been met.

Some of the parents we interviewed described their disappointment at switch-on or in the months following; they had expected to see something initially wonderful or at least some rapid progress. This is consistent with other studies' findings. The majority of parents in Archbold et al.'s study (2008) indicated that they found progress during the first few months post-implant very slow. In her qualitative study, Perold (2001) found a 'honeymoon' period of initial excitement with signs of the child's responses to sound, followed by a 'despondency' phase as the slowness of speech development became apparent. In our study, it was many years before some of the families saw the kind of progress they hoped for in their children. Some of the parents interviewed said that they had not expected the large amount of ongoing time and effort needed for their children's communication development with their cochlear implants. While the parents whole-heartedly devoted the time and effort needed to do

this for their children, this was usually at some cost to the families in several ways. This aspect of impact on families is explored in more detail in a forthcoming report but suggests that parents need levels of support that may not always be available to them, particularly for those families living a considerable distance from providers of implant and rehabilitation services.

From the qualitative findings, it proved difficult to disentangle parental expectations from parental hopes. While cochlear implant clinics may try to ensure that parents have realistic expectations of the outcomes of cochlear implantation, it is surely an inherent part of the human condition to hope for the best for one's children. If told there are variable outcomes from cochlear implantation, and not all children do equally well, parents will certainly hope that their child will be one of the children to achieve the best possible outcomes from the procedure, and this hope may, in fact, construct a belief or expectation. Our findings suggest that parents' expectations, hopes, and beliefs about cochlear implantation may more accurately reflect the love they have for their child, the determination they have to do the best for their child, and their conviction that a cochlear implant is the "only way" for their child to most fully participate in a hearing world, rather than arise from professionals' explanations of the likely outcomes. Parents tended to interpret such explanations in the most positive context.

Without doubt it is necessary for professionals to ensure, as far as possible, that parents have realistic expectations of cochlear implantation, both before, when they are making the major decision about having an implant for their child, and after implantation, when the long process of rehabilitation, therapy and education is underway. At the same time, we need to be mindful that for parents to have hope and optimism is not a denial of reality. Indeed, as illustrated in the qualitative findings,

hope is an emotion that can drive the action, determination, and hard work that are necessary for children to benefit optimally from their cochlear implants. Investigating the experiences of parents whose children have developmental disabilities, Larson (1998) found that the “tension between their child’s current circumstances and their hope and desires for the future...became a driving force which energized the mothers to seek solutions, orchestrate daily routines, find programs and search for answers for their child’s sake” (p.871). Professionals in implant, therapy, and educational programs need to find the difficult balance between working with parents’ hopes in order to achieve the best possible outcomes and ensuring parents have realistic expectations of their children’s cochlear implantation.

### *Limitations of the study*

The retrospective nature of parents’ responses about their expectations prior to their children’s implantation may have the potential to be affected by recall bias. However, other researchers have found that most parents had detailed and accurate recall of significant events such as the diagnosis of their children’s deafness even many years later (Gregory, Bishop, & Sheldon, 1995; Watson & Gregory, 2005). Certainly we found in the interviews that the stories of discovering their children’s deafness and their subsequent thoughts, feelings, and actions were vivid in the minds of the parents, who showed remarkable recall of the period leading to their children’s implantation.

The breakdown of socioeconomic level by respondents’ postcodes indicated that three quarters of families lived in areas included in the five highest deciles ranking socio-economic advantage and disadvantage (Australian Bureau of Statistics, 2008). Thus, although we made attempts to include participation from families across a range of socioeconomic and geographic backgrounds, the views and experiences of families from low socioeconomic backgrounds may not be fully represented. It is

possible that parents in the lowest SES categories are hindered in responding to surveys of this nature, not having the time or resources to do so. Thus, the study's findings may be more generalizable to families who are better resourced financially, educationally, and personally than to the whole population of parents whose children have, or may be candidates for, cochlear implants. Despite the best attempts, this remains a challenge for future research.

### *Conclusion*

The current study investigated the experiences of families across a range of locations and educational approaches, and included families whose children no longer used their implant, families who are often lost to follow-up studies. The study brought together the features of a number of previous studies and elaborated on the categories used in these earlier studies to examine a range of outcomes, including communication, social, academic, and wellbeing, in a single study. The study generally confirmed the findings of previous studies in most respects. It found that the expectations of a relatively large sample of Australian families whose children had received implants were substantially high and that these expectations were largely reflected in their subsequent experiences with their children's development with the cochlear implant. It also found that a small proportion of these families were disappointed with the outcomes of implantation for their children. The findings suggest that there remain challenges for systems that support parents and children in several areas, including academic achievements, and particularly for families whose children do not do as well as expected with the implant. While the quantitative findings revealed a high level of consistency between parents' expectations and subsequent experiences, the qualitative findings reflected a greater level of diversity, most notably in the area of children's social development and participation. In

addition, the nature of parents' expectations and the interaction between expectations and hopes was elucidated in the qualitative findings. It is suggested that the mixed methods approach adopted by the study is particularly valuable in this context.

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## Pediatric cochlear implants: Parental perspectives

Table 1. Characteristics of Children in Parent Surveys (N = 247)

	M	Range	SD
Age (yrs)	9.42	.67-25.0	4.63
Time since implant (yrs)	6.21	.25-18.0	3.79
Age at implantation (yrs)	3.27	.38-16.42	3.16
Age at bilateral implantation (yrs; n = 65)	5.16	.63-18.42	4.09
Gender	Male	Female	
	49.8%	50.2%	
Educational setting	Main-stream	Special education	Other
	58.6%	34.4%	6.1%
State	Vic	NSW	Qld
	21.8%	47.3%	30.7%
Locality	MC	IR	OR/R
	61.0%	29.3%	9.8%

*Note.* Vic = Victoria; NSW = New South Wales; Qld = Queensland; MC = major city; IR – inner regional; OR/R = outer regional and remote

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Table 2. Means and Standard Deviations for Parents' Expectations and Experiences across the Subscale Domains ( $N = 247$ )

Subscale score (average)	Expected	Experienced
Communication abilities	3.68 (SD=0.69)	3.77 (SD=0.80)
Social skills and participation	3.83 (SD=0.64)	4.10 (SD=0.73)
Well-being and happiness	3.93 (SD 0.69)	4.01 (SD=0.77)
Academic achievement	3.50 (SD=0.78)	3.61 (SD=0.88)
Future life	3.70 (SD=0.67)	3.76 (SD=0.73)

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Table 3. Parents' Expectations and Experiences of Communication Abilities (by Percentage) ( $N = 247$ )

Sub-scale item		Disagree	Neither agree nor disagree	Agree
My child would be able/is able to use the telephone	Expected	15.5	23.3	61.2
	<i>Experienced</i>	<i>14.4</i>	<i>9.9</i>	<i>75.7</i>
My child would be able/is able to easily detect even very quiet sounds (e.g., a whisper)	Expected	31.0	33.1	35.9
	<i>Experienced</i>	<i>20.9</i>	<i>17.2</i>	<i>61.9</i>
My child would be able/is able to understand speech without needing to rely on lip-reading	Expected	29.7	18.0	64.5
	<i>Experienced</i>	<i>20.9</i>	<i>8.5</i>	<i>70.8</i>
My child's speech would be/is intelligible to family members and close friends	Expected	3.3	10.2	86.5
	<i>Experienced</i>	<i>11.3</i>	<i>5.6</i>	<i>82.1</i>
My child's speech would be/is intelligible even to people who are unfamiliar with him/her	Expected	5.7	16.8	77.5
	<i>Experienced</i>	<i>14.7</i>	<i>9.1</i>	<i>76.3</i>
My child would be/is able to follow a spoken conversation with a group of people	Expected	11.0	22.0	66.9
	<i>Experienced</i>	<i>19.9</i>	<i>18.6</i>	<i>61.5</i>
My child would/does not need to look at the speaker's face	Expected	30.7	28.7	40.5
	<i>Experienced</i>	<i>34.7</i>	<i>14.6</i>	<i>50.6</i>
My child would/does not need to use sign language at all	Expected	21.4	16.9	61.7
	<i>Experienced</i>	<i>28.4</i>	<i>9.5</i>	<i>62.1</i>
My child would/does communicate easily with his/her family	Expected	3.3	12.8	83.9
	<i>Experienced</i>	<i>7.8</i>	<i>3.5</i>	<i>88.8</i>
I would be/am able to communicate as easily with my deaf child as I do with a hearing child	Expected	31.8	19.2	49.0
	<i>Experienced</i>	<i>34.2</i>	<i>8.2</i>	<i>57.6</i>
My child's communication skills (language and speech) would improve/have improved significantly	Expected	1.2	9.0	89.8
	<i>Experienced</i>	<i>6.1</i>	<i>2.6</i>	<i>91.4</i>
My child would be/is able to express his/her wants, needs and feelings	Expected	2.0	7.8	90.1
	<i>Experienced</i>	<i>5.7</i>	<i>4.4</i>	<i>90.0</i>

Table 4. Parents' Expectations and Experiences of Social Skills and Participation (by Percentage) ( $N = 247$ )

Sub-scale item		Disagree	Neither agree nor disagree	Agree
My child would /does easily make friends with hearing children	Expected	5.7	34.7	59.6
	<i>Experienced</i>	<i>11.2</i>	<i>18.0</i>	<i>70.8</i>
My child would/does actively participate in play and games with other children	Expected	3.7	20.4	75.9
	<i>Experienced</i>	<i>5.4</i>	<i>10.0</i>	<i>84.6</i>
My child would be/is accepted by his/her classroom hearing peers	Expected	7.8	29.4	62.9
	<i>Experienced</i>	<i>3.1</i>	<i>14.7</i>	<i>82.1</i>
My child would/does also socialize with deaf peers	Expected	7.8	36.7	55.5
	<i>Experienced</i>	<i>14.7</i>	<i>17.6</i>	<i>67.6</i>
My child's social skills would improve/have improved significantly	Expected	2.0	21.3	76.6
	<i>Experienced</i>	<i>4.3</i>	<i>15.3</i>	<i>80.4</i>
My child would be/is able to initiate social interaction and play	Expected	2.0	20.4	77.6
	<i>Experienced</i>	<i>3.8</i>	<i>10.9</i>	<i>85.3</i>
My child would be/is able to mix with many more people than without the implant	Expected	3.7	14.8	81.6
	<i>Experienced</i>	<i>6.0</i>	<i>16.2</i>	<i>77.9</i>

Table 5. Parents' Expectations and Experiences of Well-Being and Happiness (by Percentage) ( $N = 247$ )

Sub-scale item		Disagree	Neither agree nor disagree	Agree
My child would be/is happier than without the implant	Expected	6.5	23.5	70.0
	<i>Experienced</i>	5.8	21.7	72.6
My child's behavior would be/is appropriate for his/her age	Expected	10.4	28.6	61.0
	<i>Experienced</i>	11.3	12.1	76.6
My child would be/is less frustrated than without the implant	Expected	3.3	8.2	88.4
	<i>Experienced</i>	7.9	10.0	82.1
The level of trust my child has towards others would increase/has increased	Expected	8.7	47.9	43.4
	<i>Experienced</i>	8.8	39.2	51.9
My child would be/is safer than without the implant	Expected	4.5	16.9	78.6
	<i>Experienced</i>	5.0	12.8	81.7

Table 6. Parents' Expectations and Experiences of Academic Achievements (by Percentage) ( $N = 247$ )

Sub-scale item		Disagree	Neither agree nor disagree	Agree
My child would/does participate easily in a regular class	Expected	14.7	27.3	57.9
	<i>Experienced</i>	16.8	13.1	70.1
My child's learning abilities would improve/have improved significantly	Expected	2.5	13.9	83.6
	<i>Experienced</i>	5.2	8.6	86.2
My child's academic progress would improve/has improved significantly	Expected	2.9	20.4	76.7
	<i>Experienced</i>	7.3	16.1	76.6
My child would achieve/has achieved high standards in reading and writing	Expected	13.1	44.5	42.5
	<i>Experienced</i>	21.8	23.9	54.3
My child would achieve/has achieved high standards in maths	Expected	14.8	53.5	31.7
	<i>Experienced</i>	23.3	31.6	45.1
My child would achieve/has achieved at least the expected level for his/her age	Expected	11.1	23.4	65.6
	<i>Experienced</i>	18.3	11.8	69.9

Table 7. Parents' Expectations and Experiences of Future Life (by Percentage) ( $N = 247$ )

Sub-scale item		Disagree	Neither agree nor disagree	Agree
The cochlear implant would improve/has improved my child's future life significantly	Expected	1.2	5.3	93.5
	<i>Experienced</i>	2.5	4.6	92.9
My child would/does function like a child with normal hearing	Expected	22.6	24.3	53.1
	<i>Experienced</i>	23.2	18.6	58.2
My child would acquire/has acquired normal hearing	Expected	57.0	23.6	19.4
	<i>Experienced</i>	54.0	20.3	25.7
My child would be/is as independent as other children his/her age	Expected	12.3	21.0	66.7
	<i>Experienced</i>	17.3	13.9	68.8
My child would develop/has developed an identity as a hearing person	Expected	21.7	31.1	47.1
	<i>Experienced</i>	19.9	24.6	55.5
My child would develop/has developed an identity as a deaf person	Expected	40.5	40.5	19.0
	<i>Experienced</i>	37.2	35.9	26.9
My child would/does comfortably share both deaf and hearing identities	Expected	7.8	28.6	63.6
	<i>Experienced</i>	17.2	20.7	62.1
My child would have/has a positive attitude towards the use of the cochlear implant	Expected	2.0	9.0	88.7
	<i>Experienced</i>	2.6	2.1	95.3
My child would have/has a positive attitude towards the use of sign language	Expected	24.4	38.8	36.8
	<i>Experienced</i>	28.2	28.6	43.2

## Pediatric cochlear implants: Parental perspectives

Table 8. Percentage of Parents Reporting Satisfaction with Children's Outcomes ( $N = 247$ )

	Disagree	Agree
Expectations now met	10.6	80.9
Disappointed expectations not met	82.4	10.6
Optimistic expectations will be met in future	9.1	79.3
Satisfied with communication abilities	10.2	79.3
Satisfied with social skills	9.3	80.5
Satisfied with academic abilities	9.8	74.7