Children YOUNGER THAN 6 need +15dB SNR and FM ONLY technology that can currently PROVIDE this.

97% of all parents said FM for pre-school was beneficial

97%

BENEFICIAL

Based on the study, the average use of an FM in a given situation are:

- Car: 42 minutes
- Shopping: 1 hr 30 minutes
- Outdoors: 1 hr 31 minutes
- Home: 2 hr 06 minutes
- Nursery: 3 hr 18 minutes

Speech intelligibility scores are significantly related to signal-to-noise ratios and to the age of the child with +15 dB signal-to-noise ratio (SNR) not being adequate for the youngest children in the study (6 years of age). Bradley and Sato (2008).

Overall performance for a consonant recognition task was poorer for younger children (4-5 years of age) compared to adults or older children (6-7 and 8-9 years of age) in all SNR conditions. Nishi et al (2010).

Children required significantly higher SNR in speech recognition tasks (BKB speech in noise) as age decreased (12, 11, 10, 9, 8, 7 and 6). For 95% correct scores, 9 year olds required +15 dB SNR and 6 year olds required a signal-to-noise ratio exceeding +15dB. Neuman et al (2010).

The ‘Reading by 6: How the Best Schools Do It’ Ofsted report mentions: “Schools attributed weak listening skills not only to poor conversation in the home but, very often, also to continuous background noise, such as constant television, the noise of siblings and raised voices, which are bound to dull sensitivity to the nuances of sounds”.

The above findings are in relation to children with normal hearing. The data in the published studies suggest the younger the children are, the much greater the SNR they require in order for them to understand speech. The question that needs to be asked is:

What does this mean for really young children, more specifically really young children with a hearing loss?

What we do know is that the only technology currently available to young children with hearing loss that can achieve the recommended SNR’s (exceeding +15 dB) is FM technology. In the previous issue of Phonetic we included a brief summary of a recent study looking at the use of FM technology with pre-school children (Mulla, 2011). In this issue we include a little more detail on two aspects of the study: the quantitative results relating to actual FM use and the qualitative results exploring the views of parents and carers using the FM technology.

Data on FM use was collected using the datalogging feature on the Inspiro and daily diaries completed by parents. Five of the seven participants were able to establish regular use of FM technology in a variety of settings. For the two participants who did not establish regular use of the FM technology the variable age of child (11 months at the outset) was identified as a possible reason that may have affected FM technology use for these two participants. Further exploratory analysis of qualitative data revealed more specific reasons for non-use including ear infections, earmould troubles and the child not keeping hearing aids in. The other five participants who had established regular use of FM technology were aged between 15 to 32 months at the beginning of the study.

Overall the participants were involved in the study for a total of 1,198 days from which 837 days (71%) of FM technology use was recorded. The percentage of days FM was used increased to 80%
QUALITATIVE RESULTS

Another part of the study qualitatively explored the views and experiences of parents and carers on the use of FM technology with pre-school hearing aided children. The brief findings for this part of the study were:

- The improved access to speech FM technology provided was highly valued, especially in situations where the child was not facing parents, for example in the car or pram, in noisy situations, at a distance and when hearing aid microphones were covered.
- Improved listening behaviours in the child were noted when using the FM, including improved attending, locating of FM user, comprehension, improved concentration and reduced listening effort.
- The use of FM technology allowed access to intelligible speech over distances, in noise and more challenging listening situations. This provided more opportunities for over hearing which is important for children to acquire language and learn novel concepts.
- A theme of child control of own listening emerged. A clear sense of ownership and ability to establish preferred use of FM was found.
- Improvements in language as a result of FM use were reported, with more copying, more accurate intonation and increased clarity of speech being described.
- Improved well being was a strong theme where children were noted to be “loving” once data related to the two children who had not established FM use was removed. The total number of hours of recorded FM use was 2,874 hours and 15 minutes. From the total hours of recorded FM use parents reported 2,801 hours of FM use were with benefit, 2 hours and 30 minutes of FM use without benefit and 73 hours and 45 minutes of FM use were they were not sure of benefit. Parents reported benefit of using FM with their child 97% of the time they used the system.

FM use was categorised into seven environments and settings. Of these the home, nursery, car, shopping and outdoors were most popular. Mealtimes were not clearly recorded by all parents and TV use with direct input function was very limited. Although the largest percentage of hours used was recorded for the nursery setting, the highest number of days the FM was used in any setting was the home setting followed by the car then the nursery setting. FM use in the car, during shopping and outdoors was proportionate with the expected duration of time and number of days children would be expected to be in these situations. Fig. 1 describes the average duration of FM use in each category on the days FM was used.

Parents and carers on the use of FM technology resulting in positive emotions for the children such as “enjoyment”, “being happier”, “laughing” and “smiling more”. Children were also reported to have been calmer and more comfortable with FM technology. An increase in engagement and participation in activities at the child’s nursery and outdoors was also noted with children described to have an increased sense of social belonging. Parents reported children being more confident when parents used the FM device and of children using the technology as a a “safety blanket” when engaging in new activities.

- Parent’s of two children who had not established consistent use of their hearing aids found it difficult to introduce FM technology into their regular routines. These parents highlighted age of the child, ear infections, earmould troubles and the child not keeping hearing aids in as reasons for not establishing hearing aid use. However, in contrast two other participants reported how the introduction of FM technology overcome the difficulties associated with the child not keeping hearing aids in. This resulted in an increase in hearing aid use by the child to the extent that the children started requesting their hearing aids. This finding suggests the use of FM technology can help to increase the use of hearing aids in children.

- The technology was reported to have been “easy to use” and parents were able to establish daily FM management routines with ease. The FM transmitter was likened to a simplified “mobile phone” and the advanced features were accessed and used by parents.

- The challenges associated with FM use included younger children pulling at the microphone wire and remembering to mute the FM device. Overall parents were able to identify situations where they forgot to mute the FM system and were able to acknowledge the need to be more careful when using the technology.

To see our case studies and video footage of FM, please visit www.phonaknhs.co.uk.

References:

Sharon Leahy - Hale, England
“My daughter Madeleine (2 yrs, 8 months) has been using FM technology for eight months. When she is horse riding or we are outside it is really useful; I say her name and she responds instantly, whereas without FM I feel less confident. Also when we are shopping, the difference between using and not using FM is just massive. With FM it’s like she’s a normal hearing child, but without it - with all the hustle and bustle of a shopping centre - there would be little or no response.”