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Longitudinal Outcomes of Children with Hearing Impairment (LOCHI): 5 Year Data

Robert SC Cowan^{1,3,4} [Professor], Dr Brent Edwards^{1,2,5}, Dr Teresa YC Ching^{1,2}

¹The HEARing Cooperative Research Centre, Melbourne & Sydney, Australia

²National Acoustic Laboratories, Sydney, Australia

³The University of Melbourne, Australia

⁴Macquarie University, Sydney, Australia

⁵University of Nottingham, School of Medicine, Nottingham, United Kingdom

In 2013, The International Journal of Audiology published the first accounts of our Longitudinal Outcomes of Children with Hearing Impairment (LOCHI) study, a prospective population-based study following a cohort of children with hearing loss from birth through to young adulthood.

The LOCHI study was initiated in 2005 to provide an evidence-base on the effectiveness of universal newborn hearing screening (UNHS) and early intervention on improving outcomes at a population level. Although UNHS has been implemented in many countries, the World Health Organisation's (WHO) 2016 theme for World Hearing Day - "Childhood Hearing Loss – Act Now, Here's How", reflected on the fact that some 32 million children worldwide have hearing disability. The WHO campaign stressed the need for early intervention to enable children to reach their full potential through rehabilitation, education and empowerment. Early intervention relies on earlier identification, and the Joint Committee on Infant Hearing recommends that all children with hearing loss should receive intervention by six months of age, based on cross-sectional studies of the relationship between early identification and preschool language outcomes.

However, before LOCHI, there has been no prospective study that has systematically evaluated the impact of age at intervention on later language, literacy, psychosocial and educational outcomes of a population-based sample of children with different degrees of hearing loss. The long-term funding provided through the HEARing Cooperative Research Centre (HEARing CRC), established through the Australian Government's Cooperative Research Centres Programme, combined with the national audiological management of all hearing-impaired children through Australian Hearing, a statutory authority of the Australian Government, created an opportunity to conduct such a prospective study in Australia. Children were enrolled prospectively into the long-term study through the national service provision network during a narrow time window when different states in Australia were at various stages of implementing UNHS. This meant that participants had access to the same audiological management at no cost to families, but had differential access to UNHS depending on whether UNHS was implemented in their state of residence at the time when they were born. The sample is representative of the general population of hearing-impaired

children in Australia, including children with additional disabilities and those from different language backgrounds. The cohort of more than 450 children provided a sample with sufficient statistical power to investigate how the effect of age at fitting of hearing devices on outcomes varies with different degrees of hearing loss, for children using hearing aids or cochlear implants, after allowing for the effects of a range of demographic characteristics.

The IJA Special Supplement (2013) highlighted findings of the 3-year evaluations of the cohort. The age at first cochlear implantation, together with severity of hearing loss, presence of additional disabilities, maternal education, and use of speech in early intervention, were all found to be significant factors influencing language development at 3 years.

In this 2017 IJA Special Supplement, we report findings on outcomes of the LOCHI study cohort at 5 years of age. After describing the perspectives of parents on early intervention and support for their children by Scarinci et al and Erbas et al, the characteristics of hearing aids and/or cochlear implants worn by children in the cohort are reported by Ching et al and Incerti et al, respectively. Outcomes on measures of speech perception, language and functional performance, and psychosocial outcomes are reported in separate papers by Ching et al, Cupples et al, and Wong et al, respectively. The language and speech outcomes of children with hearing loss and additional disabilities are also described separately by Cupples et al. The key message emanating from the outcomes presented in these papers is clear - early fitting of hearing aids or cochlear implants is critical to achieving the best potential outcomes.

The Supplement is rounded off by a Summary of findings from the LOCHI Study Leader, Dr Teresa YC Ching. From the outset, Teresa has been tireless in pursuing academic excellence in the LOCHI study and the extremely high retention rate for the cohort is testimony to her diligence. The LOCHI study could not have been conducted without Teresa's leadership and the core team at the National Acoustic Laboratories, as well as the support and contributions of many audiologists, speech pathologists, educators, early intervention specialists, teachers of the deaf, and statisticians from The HEARing CRC and its Member organisations. We also would like to pay tribute to Adjunct Professor Harvey Dillon, the former director of the National Acoustic Laboratories, who has been an unwavering advocate of the LOCHI Study from its inception.

The generosity of the families participating in the LOCHI study in sharing their experiences and allowing the research team to follow the development of their children over an extended time frame has significantly increased our understanding of how the management of hearing loss in children can have enormous impact on their outcomes and future development.

We would like to acknowledge the many organisations that have provided funding and support to enable the LOCHI study to continue, including: The Australian Government Department of Health; Australian Hearing and its National Acoustic Laboratories; the Cooperative Research Centres Programme of the Australian Government Department of Industry and Science through establishment of The HEARing CRC; the U.S. National

Institutes of Health (NIDCD); the New South Wales Government Department of Health; and the Oticon Foundation.

We are committed to continuing LOCHI, as it is truly a world-unique population study that is providing a critical evidence-base on the importance and impact of early identification of hearing loss, early fitting of devices, and early intervention. We hope that readers will find the results presented in this IJA Special Supplement to be informative and of interest, and we look forward to sharing future findings from the LOCHI study.

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