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## Commentary

# Knowledge and Education of Primary Care Physicians on Management of Children With Hearing Loss and Pediatric Cochlear Implantation

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In the United States, it is estimated that more than 4,000 infants are born each year with bilateral profound hearing loss, with an additional 8,000 born with unilateral or bilateral mild-to-moderate hearing loss. At the frontline of hearing loss screening is a large community of primary care physicians (PCPs) who provide long-term, continuous care for these children. More than 2 decades has passed since the introduction of universal neonatal hearing screening (1). Although 39 states (by 2011) mandate universal neonatal hearing screening, as many as 40% of infants are lost to audiologic follow-up in various geographic regions (2–5). This emphasizes the key role that PCPs play in the care and management of pediatric hearing loss.

Despite approximately 30,000 physicians in Southern California serving deaf and hard-of-hearing children, the level of awareness and the baseline knowledge of PCPs for audiologic resources has not been assessed. The beneficial impact of early audiologic intervention on speech and language development is strongly evident (6,7). For the last few decades, the introduction and advancement of cochlear implantation has revolutionized the otologic care for children with hearing loss. Restoration of hearing with cochlear implantation, especially before a “critical period,” (8,9) has been shown to have long-term benefits for children with respect to verbal communication, speech, and social and vocational skills (10,11). Such obvious

benefits of cochlear implantation have led many parents of congenitally deaf children with cochlear implants to elect early intervention for their children if presented with the option (12,13).

To evaluate PCPs’ knowledge of hearing loss, appropriate audiologic care and follow-up, and cochlear implantation, we surveyed Southern California PCPs who routinely cared for pediatric patients at various conferences, meetings, and practice sites in Orange and Los Angeles counties. The nonvalidated survey instrument was designed for convenient, random sampling as well as to attempt to educate PCPs quickly on an important topic and contained factual statements on the clinical impact of pediatric cochlear implantation. Although sample selection was limited to Orange and Los Angeles counties, these 2 regions combined accounts for nearly 60% of the population of Southern California, and the conferences from which survey responses were solicited represented a national sample (Pri-Med Access 2009 and 2010, Long Beach, CA). A total of 291 surveys were included in the analysis, of which, a subpopulation of 101 PCPs within this sample provided additional data on their board-certified specialty (61 family physicians and 40 pediatricians).

Our findings highlighted numerous knowledge deficiencies among PCPs, which underscores the need for continued effective communication between the PCP and the otologic communities, with the goal to strive toward appropriate and timely care for children with hearing loss. First and foremost, quite surprisingly among responders, only 91% were aware of cochlear implants. It is thus essential for the otologic community to continue to educate PCPs in these areas, as 9% of PCPs were not familiar with cochlear implantation as a management option for hearing restoration, which by now should be mainstream.

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We further found that PCPs' knowledge of appropriate care of pediatric patients with cochlear implants was extremely deficient. The results are summarized below:

- 15% of PCPs (15% of family physicians, 8% of pediatricians) did not know that cochlear implants give deaf children the ability to learn spoken language.
- 19% of PCPs (23% of family physicians, 23% of pediatricians) did not know that cochlear implantation is not an experimental procedure.
- 26% of PCPs (26% of family physicians, 20% of pediatricians) did not know that cochlear implants may restore hearing for the deaf.
- 32% of PCPs (33% of family physicians, 10% of pediatricians) did not know that children with congenital, profound hearing loss are candidates for cochlear implantation.
- 80% of PCPs (82% of family physicians, 75% of pediatricians) did not know that cochlear implantation is currently covered by all health plans.

We recognize a number of limitations in our brief study. First, although the study sought to assess the baseline knowledge level of PCPs, quantitative assessments of knowledge level would involve lengthy surveys that produce very low response rates because of significant time investment in completion. Given the large sample size and diverse backgrounds of the respondents, the current available data serves as a rough estimate of the knowledge profile within this population, with potential to expand the study to more quantitative assessments in specific areas of interest. Second, as with many survey studies, there is an element of selection bias. Specific to this study, PCPs had the right to decline filling out the survey at each venue, although this was rare. It is possible that those choosing to respond may have special interest in otologic topics and are thus generally more knowledgeable, thereby positively biasing the results. Third, the survey used in this study has not been statistically validated. We believe, however, that the cross-sectional data presented in this study captures the PCP knowledge gap in a sufficiently granular manner (i.e., highlights specific areas in which knowledge may be improved). Fourth, the study was exclusively regionalized to Southern California, potentially limiting its effectiveness in generalizing to other geographic regions with distinctly different demographic profiles. Future directions may include broadening the geographic region to reduce sampling error and bias.

In sum, although our objectives were achieved via a rough, nonvalidated survey instrument, they uniformly indicate the need for the otologic community to continue advancing the education of PCPs in otologic topics, as well as to reemphasize the potential clinical benefits of

early intervention and appropriate follow-up should a newborn fail universal hearing screening. There are significant knowledge gaps in the PCP community regarding hearing loss, pediatric otologic care, and pediatric cochlear implantation. It is crucial for PCPs, who are the first line of care for these children, to be familiar with the available resources and to refer them to appropriate specialist care when indicated. To achieve this, the otologic community must ensure that the proper guidelines for optimal care of deaf and hard-of-hearing children are clearly communicated. This is best done through meaningful outreach, that is, volunteering to give lectures for residency programs in primary care and for community hospitals.

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