Amplification Decisions for Children with Mild Bilateral and Unilateral Hearing Loss

Les décisions prises à propos de l'amplification pour les enfants ayant une perte auditive bilatérale et unilatérale légère

KEY WORDS

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Elizabeth M. Fitzpatrick
Candace Roberts
JoAnne Whittingham
Carmen Barreira-Nielsen

Abstract

Universal newborn hearing screening has resulted in early identification of hearing loss including a substantial number of children with mild bilateral or unilateral hearing loss. Research suggests there is considerable uncertainty about the benefits of amplification for these children. The purpose of this study was to explore audiologists' amplification decisions for children with minimal hearing loss.

We conducted a cross-sectional survey of Canadian audiologists. Participants completed a questionnaire that included 6 typical clinical scenarios (4 mild bilateral, 2 unilateral), drawn from a pediatric audiology clinic. The survey elicited audiologists' decisions about amplification. We also examined the relationship between amplification decisions and audiologists' experience, percentage of children serviced, and work setting.

Questionnaires were received from 64 audiologists. For 3 scenarios, the majority of respondents (> 93%) indicated they would provide amplification. However, responses varied for the 3 other scenarios with 15.6% to 64.5% recommending no amplification. Decisions were not related to experience (< 10 versus > 10 years). However, audiologists servicing a larger pediatric clientele (< 50% versus >50%) were less likely to recommend amplification for two scenarios, (mild unilateral, $p = .032$; bilateral high frequency, $p = .013$). Audiologists in hospitals/public agencies were less likely than those in private settings to provide amplification in two scenarios (mild bilateral high frequency, $p = .047$; mild bilateral, $p = .009$). There was also considerable variation in types of amplification (e.g., hearing aids, hearing aids and FM systems, FM systems only) recommended.

In conclusion, most audiologists preferred to recommend amplification for children with mild bilateral or unilateral hearing loss. However, there were considerable differences when bilateral or unilateral thresholds were very mild. Further research is required to understand practice variations and to develop evidence-based guidance for managing these children.

Elizabeth M. Fitzpatrick,
University of Ottawa,
Ottawa, ON
CANADA
Children's Hospital of Eastern Ontario Research Institute,
Ottawa, ON
CANADA

Candace Roberts,
University of Ottawa,
Ottawa, ON
CANADA

JoAnne Whittingham,
Children's Hospital of Eastern Ontario Research Institute,
Ottawa, ON
CANADA

Carmen Barreira-Nielsen,
Federal University of Espírito Santo,
BRASIL

Abrégé

Le dépistage universel de la surdité chez les nouveau-nés a conduit à l'identification précoce de la perte auditive, notamment auprès d'un nombre important d'enfants ayant une perte auditive unilatérale ou bilatérale légère. Les données de la littérature suggèrent que les bénéfices de l'amplification pour ces enfants sont incertains. L'objectif de cette étude était d'explorer les décisions d'amplification prises par les audiologistes pour les enfants ayant une perte auditive légère.

Nous avons effectué une enquête transversale auprès d'audiologistes canadiens. Les participants ont complété un questionnaire composé de six scénarios cliniques typiques (quatre portant sur une perte auditive bilatérale légère et deux portant sur une perte auditive unilatérale légère). Ces scénarios provenaient d'une clinique d'audiologie pédiatrique. L'enquête a permis de recueillir les décisions prises par des audiologistes à propos de l'amplification. Nous avons également étudié la relation entre les décisions prises à propos de l'amplification et l'expérience de l'audiologiste, le pourcentage d'enfants dans la charge de travail et le milieu de travail.

Soixante-quatre audiologistes ont retourné le questionnaire. Dans trois des scénarios, la majorité des répondants (> 93%) ont indiqué qu'ils recommanderaient l'amplification. Néanmoins, les réponses obtenues pour les trois autres scénarios variaient. De 15,6 % à 64,5 % des répondants ne recommanderaient pas l'amplification. Les décisions n'étaient pas reliées à l'expérience (< 10 versus > 10 ans). Toutefois, les audiologistes ayant un plus grand pourcentage d'enfants dans leur clientèle (< 50% versus > 50%) étaient moins susceptibles de recommander une amplification dans deux des scénarios (perte auditive unilatérale légère, p = 0,032 ; perte auditive bilatérale dans les hautes fréquences, p = 0,013). Les audiologistes travaillant dans un centre hospitalier ou dans des agences publiques étaient moins susceptibles de fournir une amplification dans deux des scénarios (perte auditive bilatérale légère dans les hautes fréquences, p = 0,047 ; perte auditive bilatérale légère, p = 0,009), lorsque comparé aux audiologistes travaillant dans le secteur privé. Une variation considérable dans le type d'amplification recommandé (p. ex., prothèses auditives, prothèses auditives et systèmes MF, systèmes MF seulement) était également notée.

En conclusion, la plupart des audiologistes ont préféré recommander une amplification pour les enfants ayant une perte auditive bilatérale ou unilatérale légère. Toutefois, des différences considérables ont été notées lorsque les seuils unilatéraux ou bilatéraux étaient très légers. Des études supplémentaires sont nécessaires pour comprendre les variations dans la pratique des audiologistes, ainsi que pour élaborer des guides basés sur les données probantes sur la façon de prendre en charge ces enfants.

Universal newborn hearing screening has become a standard public health intervention in many countries to reduce or even prevent the impact of hearing loss on auditory and communication development. It is well documented that early identification of hearing loss can lead to early intervention including the fitting of appropriate hearing technology (Ching et al., 2013; Fitzpatrick, Durieux-Smith, Eriks-Brophy, Olds, & Gaines, 2007; Sininger, Grimes, & Christensen, 2010). It has become increasingly clear that a substantial number (40-50%) of children with permanent hearing disorders first present with mild bilateral or unilateral hearing loss (Barreira-Nielsen et al., 2016; Fitzpatrick, Whittingham, & Durieux-Smith, 2014). Children with unilateral loss are now frequently identified early through screening and when mild loss is included in the target disorder for screening programs, these children are also identified at a young age. Recent research showed that age of diagnosis for this population of children was reduced from 5 to .8 years in a screening program (Fitzpatrick et al., 2014). Some children with mild bilateral or mild unilateral loss continue to be identified later because hearing loss is not present at birth or because these milder degrees are not targeted, are missed, or take longer to confirm (Gravel et al., 2005; Porter, Bess, & Tharpe, 2016).

Despite the recognition that children with milder losses are at risk for difficulties, there is considerable uncertainty and lack of evidence about the benefits of intervention and the advantages of amplification. For example, speech and language outcomes reported for children with mostly mild to moderate hearing loss at age 3 years from a population-based Australian study suggested there may be limited advantage of early compared to later detection and fitting of amplification (Ching et al., 2013). In contrast, Walker et al. (2015) reported that hearing aid use predicted better language outcomes (vocabulary and grammar) in children with mild hearing loss assessed at age 5 or 7 years. However, there was no significant difference in articulation and speech perception scores between hearing aid users and nonusers. The lack of consensus about the benefits of amplification and overall management of these children has resulted in some countries setting the target disorder for universal newborn screening at > 40 dB HL (National Workshop on Mild and Unilateral Hearing Loss: Workshop Proceedings, 2005; Wood, Sutton, & Davis, 2015). Other screening programs include mild hearing loss in the target disorder on the basis of the risk of progressive hearing loss (Hyde, Friedberg, Price, & Weber, 2004). Recent amplification guidelines and recommendations tend to conclude that amplification should be considered and that decisions should be made on a case-by-case basis for these children (American Academy of Audiology, 2013; Bagatto et al., 2016; Bagatto & Tharpe, 2014; Lieu, 2015; MacKay, Gravel, & Tharpe, 2008). Essentially, what constitutes 'treatable' hearing loss varies because relatively little is known about whether intervention and the early use of amplification minimizes adverse developmental effects in these children.

When left undetected, several studies have documented that mild or unilateral hearing loss can adversely affect a child's academic, psychosocial, and language development (Porter et al., 2016; Tharpe, Sladen, Dodd-Murphy, & Boney, 2009; Vila & Lieu, 2015). Recent investigations reported in a series of studies on children with unilateral hearing loss, have concluded that they are at risk for delays in speech-language development and educational achievement (Lieu, Tye-Murray, & Fu, 2012; Lieu, Tye-Murray, Karzon, & Piccirillo, 2010). When compared to their siblings with normal hearing, delays in speech-language development persisted even into adolescence (Fischer & Lieu, 2014). However, in a recent study, preliminary results of developmental outcomes for 55 early-identified children with mild bilateral or unilateral loss showed auditory and communication development to be similar to hearing peers up to 4 years of age. One exception in this study was a parent-reported auditory functioning measure where children with normal hearing obtained higher scores (Fitzpatrick, Durieux-Smith, Gaboury, Coyle, & Whittingham, 2015). In contrast to other studies, this was an early-identified group with a median age of identification of 4.2 months (interquartile range [IQR]: 2.7, 5.9) and data were collected in the preschool years.

In the literature, there are various definitions of mild hearing loss and a range of descriptive terms including slight, minimal, or mild, sometimes making comparison of research findings difficult. For this study, consistent with our previous work, we have adopted the definition of mild and unilateral hearing loss from the National Workshop on Mild Bilateral and Unilateral Hearing loss (2005), which adapted the definition proposed by Bess, Dodd-Murphy, and Parker (1998): mild bilateral hearing loss refers to average pure-tone air conduction thresholds at .5, 1, and 2 kHz between 20 and 40 dB HL or thresholds > 25 dB HL at two or more frequencies above 2 kHz; unilateral loss refers to hearing loss in one ear only with a pure-tone average ≥ 20 dB HL or > 25 dB HL at two or more frequencies above 2 kHz.

Given the limited evidence, one of the greatest challenges in the management of children with milder hearing loss is undoubtedly whether or not to recommend amplification (Porter et al., 2016). Furthermore, studies have shown that when amplification is recommended, children with milder degrees of hearing loss tend to show

less consistent use than those with greater hearing loss (Fitzpatrick, Durieux-Smith, & Whittingham, 2010; Walker et al., 2013). As noted, several researchers have drawn attention to the challenges and uncertainty around amplification and have recommended decision-making on a case-by-case basis (Bagatto & Tharpe, 2014; Porter et al., 2016). Our previous research that examined a large cohort of 331 children with mild bilateral or unilateral loss diagnosed over a 20-year period showed that 87.2% eventually received recommendations for amplification. However, there was considerable lag time between the initial diagnosis of hearing loss and amplification recommendations with more than 50% receiving a recommendation more than 3 months after first being diagnosed (Fitzpatrick et al., 2014), suggesting considerable indecision and variations in clinical practice. For children with mild bilateral hearing loss, those with poorer hearing in the better ear and later age at diagnosis were more likely to receive amplification recommendations (Fitzpatrick et al., 2010; Fitzpatrick et al., 2014). A recent study involving interviews with parents of children with mild bilateral or unilateral hearing loss suggested that parents need considerable support during the early period, particularly around amplification. Parents indicated that they experienced some confusion about the need for and importance of using hearing aids even when audiologists recommended them. In some cases, parents reported encountering mixed opinions from different health professionals, which led to some confusion about the potential benefits of hearing technology for their children (Fitzpatrick et al., 2016).

While there is clear consensus that audiologists should monitor hearing development closely, there is little evidence to help audiologists determine the level of hearing loss or difficulty that will likely result in a child benefitting from amplification. Little is known about audiologists' decision-making for this population of children. In light of the limited evidence and uncertainty related to amplification for children with mild bilateral or unilateral hearing loss, this study was undertaken as a parallel study to a larger project examining longitudinal communication development outcomes for this population of children. The research was motivated by that work as it became apparent that many families encountered difficulties and inconsistent perspectives around amplification (Fitzpatrick et al., 2016). The purpose of this inquiry was to extend our previous investigations into variations in clinical practice by exploring audiologists' perspectives on amplification for children with mild bilateral and unilateral hearing loss. Using clinical scenarios, we sought to broaden our understanding by investigating clinical recommendations across a larger number of audiologists practicing in Canada. We also sought to determine whether variations in recommendations were related to characteristics of clinical providers such as experience, pediatric caseload, and work setting.

Methods

Design.

We conducted a cross-sectional survey with audiologists working in Canada related to their decisions on the management of children with mild bilateral and unilateral hearing loss.

Sample and procedures.

The sample was drawn from audiologists working in Canada. Audiologists were invited to complete the survey through two different methods: 1) an email was sent via two professional associations, the Canadian Association of Speech-Language Pathologists and Audiologists (now Speech-Language and Audiology Canada) and the Canadian Academy of Audiology; the invitation, which was sent twice by each organization, explained the purpose of the survey and invited participants to fill out a questionnaire online or to request a paper copy by mail; and 2) subsequently, to recruit a larger number of respondents, audiologists attending a national conference in Ottawa, Ontario, were invited to complete the questionnaire at the conference site; these audiologists were provided with a $5.00 (Cdn) thank you card and their name was entered into a draw for a small prize.

The Children's Hospital of Eastern Ontario Research Institute Ethics Board approved the study (Ethics reference #09/64X).

Questionnaire development.

The survey involved six clinical scenarios drawn from health records in a Canadian pediatric audiology clinic. These scenarios were selected to represent a spectrum of hearing disorders within the category of mild bilateral and unilateral loss and a range of decisions encountered in a pediatric program. Six audiograms and case histories were extracted from clinical files and each was presented as an individual scenario that included an audiogram and brief description. Table 1 presents a brief summary of each scenario according to the order they were presented to the audiologists and the full questionnaire is provided in Appendix 1. As shown, the scenarios included two unilateral (one mild, one moderate) and four mild bilateral cases, one of which was a bilateral high frequency loss.

Table 1. Clinical Data Presented for Case Scenarios in Questionnaire

Scenario	Hearing Loss	PTA RE (dB HL)	PTA LE (dB HL)	Age HL Confirmation (months)	Etiology	Other
1	Bilateral high freq	30.0	28.8	12	> 5 days in NICU	Typical development
2	Unilateral mild	10.0	27.5	36	Unknown	Speech delay
3	Unilateral moderate	23.8	62.5	32	Syndromic	Typical development
4	Bilateral mild	37.5	36.3	40	Unknown	Typical development
5	Bilateral mild	35.0	55.0	6	GJB2 gene mutation	Typical development
6	Bilateral mild	25.9	25.0	24	Unknown	Fine and gross motor delay

PTA: four frequency pure tone average (0.5, 1, 2, and 4 kHz); RE: Right ear; LE: Left ear; HL: Hearing loss; high freq: High frequency - thresholds > 25 dB at two or more frequencies above 2 kHz; NICU: Neonatal intensive care unit.

As shown in Appendix 1, the first page of the questionnaire collected basic information about numbers of years of experience, percentage of pediatric caseload serviced, and workplace environment. The respondents were instructed to read each clinical scenario and to assume that there were no medical contra-indications (i.e., permanent hearing loss and no medical reasons to not fit amplification), no financial constraints, and no parental objections to amplification. They were asked to indicate their recommendation for amplification based on the clinical data at the time the hearing loss was confirmed, from the following closed-set choices: monitor (no amplification), hearing aid(s) only, FM system only, hearing aids and FM system.

Data analysis.

Responses for each clinical scenario were first entered into Excel and then sorted and categorized according to the questions about amplification included in the questionnaire (e.g., yes/no for decision to amplify, type of amplification) to obtain an overall summary of responses and to qualitatively inspect responses for any apparent trends according to degree or laterality of hearing loss. All questionnaires were included in the analyses even if all scenarios were not completed (n = 3 with 1 scenario not completed). Descriptive statistics were carried out using SPSS 22.0. Potential factors influencing audiologists' recommendation regarding amplification available from the questionnaire (number of years of experience, pediatric caseload, and work setting) were examined through chi-square analysis applying Fisher's exact test as appropriate. Significance was accepted at the $p < .05$ level.

Results

Characteristics of respondents.

A total of 64 audiologists completed the questionnaire. Table 2 provides details on study participation and audiologists' characteristics. Audiologists from all regions provided responses with 56.3% (n = 36) from Quebec and Ontario, Canada's two largest provinces, representing approximately half of the country's population. The number of years experience varied from less than 5 years to more than 20 years); 60.9% (n = 39) had more than 10 years of experience. At the time of the survey, 65.7% (n = 42) of audiologists reported their caseload to be more than 25% pediatric with 45.3% (n = 29) of them more than 75% pediatric. The majority of respondents (92.2%) worked in a public (64.1 %, n = 41) or private (28.1%, n = 18) clinical setting. Seven of the audiologists indicated that they currently did

Table 2. Characteristics of Respondents (n = 64)

Characteristic		n (%)
Region		
	Eastern Canada *	4 (6.3)
	Quebec	11 (17.2)
	Ontario	25 (39.1)
	Western Canada *	21 (32.8)
	Other	3 (4.7)
Years of Experience		
	0-5 years	19 (29.7)
	6-10 years	6 (9.4)
	11-20 years	21 (32.8)
	> 20 years	18 (28.1)
Percent Pediatric Caseload		
	Up to 25%	15 (23.4)
	25 to 50%	9 (14.1)
	51 to 75%	4 (6.3)
	76 to 100%	29 (45.3)
	None	7 (10.9)
Current Workplace		
	Hospital/Public Agency	41 (64.1)
	Private Clinic	18 (28.1)
	Other	5 (7.8)

* Participants from the Eastern Provinces included New Brunswick and Newfoundland; Participants from the Western Provinces included British Columbia, Alberta, Manitoba, and Saskatchewan, as well as the North West Territories and the Yukon

not work directly with pediatric patients. After conducting a sensitivity analysis, in which we found no significant difference in results when the seven were removed from the analysis (with one exception noted below), we report all analyses below based on the full number of respondents. Our overall interest was in examining the perspectives of clinical audiologists and at the outset, our study criteria did not exclude individuals who were not working with children at the time of the survey.

Amplification recommendations.

Table 3 presents the range of responses for each clinical scenario related to audiologists' amplification decisions and type of amplification they would prescribe. As shown, the majority of audiologists (range 77.8 to 98.4%) indicated that they would recommend amplification of some type (personal hearing aids and/or remote microphone [FM]) for five of the six scenarios. The notable exception was scenario #6, where 35.5% (n = 22) preferred to fit amplification. The remaining audiologists preferred to monitor the status for this child who had mild bilateral hearing loss (4-frequency PTA of 25.0 and 25.9 dB HL as well as fine and gross motor delay). As shown, while the overwhelming majority of audiologists (> 93%) indicated they would amplify for three scenarios (scenario #3, #4, #5), three other scenarios showed more variability in responses. In addition to scenario # 6 noted above, where 35.5% preferred amplification, these included scenario #1 (bilateral high-frequency) and scenario #2 (mild unilateral) where 84.4% and 77.8%, respectively, indicated a preference for amplification.

Table 3. Amplification Recommendations for Case Scenarios in Questionnaire (Percentage of Respondents who would Recommend Amplification)

			Recommendation to Amplify (%)		Type of Amplification		
Scenario	Hearing Loss	Number of Responses	No Amplification	Amplification	Hearing Aid(s) Only	Hearing Aid(s) + FM	FM System Only
1	Bilateral High frequency	64	15.6	84.4	60.9	21.9	1.6
2	Unilateral mild	63	22.2	77.8	52.4	20.6	4.8
3	Unilateral moderate	61	6.6	93.4	50.8	42.6	0
4	Bilateral mild	63	1.6	98.4	45.3	50.0	3.1
5	Bilateral mild	64	3.1	96.9	68.8	28.1	0
6	Bilateral mild	62	64.5	35.5	14.5	4.8	16.1

Type of amplification.

Table 3 also shows the range of audiologists' responses regarding the type of amplification recommended for each scenario. Personal hearing aids with or without FM were the preferred option in all scenarios although only a slight difference was noted in scenario #6 (very mild bilateral) where 19.3% recommended personal aids with or without FM and 16.1% FM only. For scenarios #3, #4, and #5, where more than 93% indicated a preference for amplification, the number recommending both hearing aids plus FM varied from 28.1% for scenario #5, 42.6% for scenario #3, and 50.0% for scenario #4. Except for scenario #6, very few (< 4.8%) recommended FM only for any of the other five scenarios.

Factors influencing decisions.

An exploration of factors affecting the decision to amplify (with any type of technology) was carried out for scenarios #1, #2, and #6 (bilateral high frequency; unilateral mild, and 'very' mild bilateral [25 dB PTA in each ear]), as these three scenarios showed more variability in decision-making. Table 4 details all recommendations according to respondent characteristics. There was no relationship between the number of years of experience (< 10 versus > 10), and the decision to amplify for these three scenarios (p = 1.00; .135; 1.00 for scenario #1, #2, and #6, respectively). However, audiologists whose caseload comprised a larger pediatric clientele (> 50% versus ≤ 50%) were less likely to recommend amplification for two scenarios, the bilateral high-frequency loss (scenario #1; p = .013) and the mild unilateral (scenario #2; p = .032). An analysis excluding the seven audiologists who reported no current pediatric service, revealed a slight difference in findings only for scenario #2. For this scenario, audiologists who serviced a larger pediatric clientele were less likely to recommend amplification, (34.4% vs. 12.5%), however, the difference did not reach statistical significance (p = .072).

Finally, there was also a difference in decision-making between different workplace environments in that audiologists working in public programs (identified as hospitals or public clinics/health units on the survey) were less likely to fit the bilateral high frequency loss in scenario #1 (p = .047) and the "very" mild bilateral loss in scenario #6 (p = .009). However, for Scenario #2 (mild unilateral), there

Table 4. Amplification Recommendations for Case Scenarios in Questionnaire (Percentage of Respondents who would Recommend Amplification by Respondent Characteristics)

	Years of Experience			Percent Pediatric Caseload			Current Workplace			
Hearing Loss	≤ 10 years of experience	> 10 years of experience	p value	Caseload ≤ 50%	Caseload > 50%	p value	Hospital / Public	Private Clinic	Other	p value
Bilateral High frequency	84.0	84.6	1.000	96.8	72.7	.013	75.6	100.0	100.0	.047
Unilateral mild	88.0	71.1	.135	90.3	65.6	.032	70.0	88.9	100.0	.193
Unilateral moderate	100.0	88.9	.137	90.0	96.8	.354	92.3	94.1	100.0	1.000
Bilateral mild	100.0	97.4	1.000	100.0	97.0	1.000	97.6	100.0	100.0	1.000
Bilateral mild	100.0	94.9	.516	96.8	97.0	1.000	95.1	100.0	100.0	1.000
Bilateral mild	36.0	35.1	1.000	46.7	25.0	.111	22.5	61.1	50.0	.009

was no statistically significant difference in decision-making based on workplace setting (p = .193). It is important to note that 75.6% of the 41 audiologists working in public agencies reported more than 50% pediatric caseloads, whereas only 1 audiologist (5.6%) of the 18 respondents in private clinics had a caseload consisting of more than 50% pediatrics.

Discussion

Using realistic scenarios from a pediatric audiology setting, this study examined Canadian audiologists' recommendations for six different clinical scenarios, that fall within the traditional description of 'minimal' hearing loss (four with mild bilateral hearing and two with unilateral loss). Most audiologists indicated that they would recommend amplification, suggesting overall good agreement about the expected benefits for most children with mild bilateral and unilateral loss. However, audiologists differed in their views for certain cases, as illustrated by three scenarios presenting children with bilateral high frequency, mild unilateral, and 'very' mild bilateral loss. These differences point to some uncertainty, suggesting that these cases are more borderline and evoke different concerns and management options from audiologists. The largest discrepancy in decision-making was for one scenario of a child with 'very' mild (25 dB PTA) bilateral hearing loss.

Our exploration of potential contributors to these different perspectives suggests that audiologists who provide services to more children than adults and those who work in public settings are less likely to fit amplification for these more borderline cases. One potential explanation might be that audiologists in primarily pediatric settings, who generally have contact with language interventionists, view amplification as part of the full spectrum of intervention and therefore an ongoing process. It may be that they are in a position to monitor the child's hearing and speech-language development with the option to provide amplification if difficulties arise. Consequently, they may decide to monitor borderline cases and make amplification decisions as the child matures and as developmental concerns arise.

These findings are consistent with our previous research (Fitzpatrick, 2010; Fitzpatrick et al., 2014), which indicated that hearing aids were prescribed for an overwhelming majority of children with these milder losses. These studies also showed considerable lapse in time from hearing loss identification to amplification recommendations, suggesting indecision about the need for amplification and considerable variation in practice. Furthermore, for children with mild bilateral loss, they also showed that the decision to amplify was related to age at diagnosis with older children more likely to receive amplification recommendations at initial diagnosis. Children with more severe loss in the better ear were also more likely to be fitted with hearing aids. This may be indicative of the importance audiologists attribute to information about the impact of hearing loss on the child's development in making decisions and guiding families. However, these previous findings were related to clinical practices in only one Canadian pediatric center. The current study extends knowledge by directly asking audiologists working in various settings across Canada to present their recommendations on specific clinical cases.

Previous reviews, program descriptions, and clinical guidelines have recommended a case-by-case decision-making approach for these children, pointing to the lack of evidence to guide decisions about which children will benefit from amplification (Bagatto, Scollie, Hyde, & Seewald, 2010; MacKay et al., 2008; Ontario Ministry of Children and Youth Services, 2014). Recently, Bagatto and Tharpe (2014) provided a decision support guide which recommended case-by-case decision-making, taking into consideration a range of audiological, developmental, child, and family factors (e.g., configuration and severity of hearing, child's developmental status) for these children.

The Cincinnati Children's Hospital developed guidelines (Cincinnati Children's Hospital Medical Center, 2009) for amplification for school-age children with unilateral hearing loss, which the Ontario Infant Hearing Program has recently adopted for infants and children identified with unilateral loss (Bagatto et al., 2016). Bagatto et al. (2016) reported that of 155 children identified with unilateral loss through the Ontario Infant Hearing Program, a hearing aid was recommended for 44% of them at the time data were collected. Our results for the current study did not seem to support this finding in that, with the exception of one 'very' mild bilateral case, the overwhelming majority of audiologists preferred to recommend amplification for children with mild bilateral or unilateral hearing loss. Specifically for the two unilateral scenarios, 77.8% and 93.4% indicated they would recommend amplification of some type. Time since identification was not reported in the Bagatto et al. study and difference in findings may be partly accounted for by the age of the children when audiologists were asked to make amplification decisions. In the two scenarios in our study, the children with unilateral loss had hearing loss confirmed at age 32 and 36 months and audiologists were provided with descriptive information (e.g., speech delay for the child with mild unilateral loss). Another important difference is that our questionnaire informed audiologists to assume no medical or parental contraindications to amplification. Our focus

group interviews with audiologists (unpublished data) suggest that the presence of complex medical and developmental issues as well as parental reluctance to proceed with hearing aids influences the priority and timing accorded to amplification.

Our recent work involving interviews with parents of children with mild bilateral or unilateral hearing loss also showed that hearing aid decisions and use were challenging areas for them in caring for their child (Fitzpatrick et al., 2016). Our findings suggested that these parents are confused about the benefits of amplification and the need to use hearing aids consistently even when they were prescribed. It is possible that this is related to the uncertainty of messages from audiologists and other professionals especially in the presence of more borderline hearing loss, as shown in the current study.

One limitation of this study is that, in the interest of producing a very short questionnaire, we did not ask audiologists to provide any rationale for their decisions about amplification, therefore, we were unable to further explain variability in decisions from their perspectives. In Canada, audiologists' scope of practice and responsibilities vary in some provinces such that not all are directly involved in prescribing amplification. This may account for some of the variation in responses but could not be examined further with the information collected. We did not collect sufficient details about professionals' work settings to separate out these differences. Another limitation is that we did not include questions related to funding. In a study of hearing aid fitting practices for all degrees of hearing loss in the United States, McCreery, Bentler, and Rousch (2013) noted that hearing aid funding might contribute to differences in practices amongst clinical sites. In Canada, although all provinces provide some funding to assist with hearing aid purchase, this can range considerably throughout the country from partial to full coverage. Audiologists in some centers may take costs to parents in consideration, and this factor could influence their decision to not recommend amplification when hearing loss is very mild, particularly in young children. In particular, funding availability may affect the recommendation for remote microphone systems to be used in conjunction with personal hearing aids.

Another important limitation is that the audiograms in the questionnaire included only auditory brainstem results or air conduction thresholds, although information about middle ear function and other conditions was provided. Furthermore, our study was limited to only six clinical profiles, which included realistic clinical scenarios, however, these differed in clinical characteristics such as laterality, degree of hearing loss, and age at identification and time of decision-making about amplification. It is therefore not possible to isolate factors and attribute decisions solely to the degree and configuration of the hearing loss. Therefore, results need to be interpreted with caution for any specific case. Finally, the information we collected about pediatric experience was limited to audiologists current pediatric caseloads, not their overall career experience, and a small number of audiologists (n = 7) reported no current pediatric caseload. It is important to note that this survey was not intended to produce an expert consensus but rather professionals' perspectives on clinical scenarios encountered in managing children with minimal hearing loss. These types of surveys are also susceptible to social response bias, that is, respondents may have provided more positive decisions about amplification, which they viewed to be the more socially desirable response.

This study provides a first glimpse at decision-making for various cases of pediatric mild bilateral and unilateral hearing loss. Consistent with many other reports in the literature (Porter et al., 2016), we opted to probe audiologists' perspectives related to both mild bilateral and unilateral hearing loss. Although the difficulties reported for children may stem from different perceptual abilities for mild bilateral and unilateral hearing loss, similar outcomes and challenges have been reported for these children. Furthermore, our own focus group interviews (unpublished data) in preparation for this work and our examination of clinical practices (Fitzpatrick et al., 2010; Fitzpatrick et al., 2014) suggested that audiologists face similar challenging decisions for both groups of children. Our findings showed that the majority of audiologists in Canada recommended amplification for these children. It also points out that there is considerable variability in choosing to proceed with amplification versus monitoring the child's hearing and development status when either bilateral or unilateral hearing loss is 'very' mild. There is also a range of differences in the choice of type of amplification (personal hearing aids only, remote microphone system only, or both). As pointed out recently by Bagatto et al. (2016), there is a need to continually review and update guidelines for these more challenging clinical decisions. Controlled studies that examine the advantages of amplification for these populations of children would be a useful addition to this field of enquiry. In the absence of evidence-based guidance regarding the benefits of amplification, a continued look at the reality of clinical practice decisions may help shed light on optimal practices. It seems reasonable to assume that when evidence-based information is lacking, decisions are likely made based on professional experience, observations

of outcomes, and communication with parents and intervention specialists about their concerns and the difficulties they observe in the child's development. With increasing numbers of young children who have milder losses identified through newborn screening practices, it is anticipated that the issue will become one of increasing importance for clinicians, parents, and decision-makers.

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Declaration of Conflicting Interests

This authors declare that there is no conflict of interest.

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Research Ethics

This study was approved by the Research Ethics Board at the Children's Hospital of Eastern Ontario Research Institute, Ethics committee reference #09/64X.

Patient Consent

Patient consent was not required for this project as no patients participated directly in the project. Participants in the project were audiologists who voluntarily completed a questionnaire. Consistent with ethics requirements, consent was assumed based on a returned questionnaire. No identifying details about patients were presented in the clinical scenarios.

Authors' Note

Correspondence concerning this article should be addressed to Elizabeth Fitzpatrick, Ph.D., Faculty of Health Sciences, University of Ottawa, 451 Smyth Road, Ottawa, ON, K1H 8MG Canada. Email: elizabeth.fitzpatrick@uottawa.ca.

Appendix A:
Mild & Unilateral Hearing Loss in Early Childhood

Mild Bilateral Hearing Loss and Unilateral Hearing Loss Amplification Recommendation Questionnaire

Les pertes légères bilatérales et unilatérales
Questionnaire des recommandations d'amplification

Province: _____

How many years have you worked as an audiologist?

Combien d'années avez-vous à titre d'audiologiste?

☐	0-5 Years 0-5 Années	☐	6-10 Years 6-10 Années	☐	11-20 Years 11-20 Années	☐	> 20 Years > 20 Années

What percentage of your current caseload is paediatric (0-18 years)?

Quel est le pourcentage de vos dossiers en cours avec la population pédiatrique (0-18 ans)?

☐	0-25 %	☐	26-50 %	☐	51-75 %	☐	76-100 %

What is your current workplace environment?

Quel est votre lieu de travail?

☐	Hospital Hôpital	☐	Private Clinic Clinique Privée	☐	Academic Académique	☐	Other Autre

---

On the following pages are 6 clinical examples. For each example, please review the clinical data and indicate your preferred audiologic recommendation.

Six exemples cliniques sont présentés aux pages suivantes. Pour chacun de ces exemples veuillez identifier vos recommandations préférées.

For the following examples, please assume that:

Pour les exemples suivants S.V.P. supposez que:

- There are no medical contradictions to amplification
  Il n'y a aucune contre-indication médicale pour l'amplification
- There are no financial constraints
  Il n'y a aucune contrainte financière
- There are no parental objections to amplification
  Il n'y a aucune objection des parents

Your completed questionnaire can be returned to the Research Coordinator at jwhittingham@cheo.on.ca.

Votre questionnaire rempli peut être retourné à la coordonnatrice de la recherche, à jwhittingham@cheo.on.ca.

Thank you / Merci beaucoup

EXAMPLE 1: CLINICAL DATA / *EXEMPLE 1: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	12 months / 12 mois

☒ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☐ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Referral from the UNHS program at 2 months; first assessment at 5 months; regular monitoring; hearing loss confirmation at 12 months
Référé par le programme de dépistage universel des nouveau-nés à 2 mois; première évaluation à 5 mois; suivi régulier; confirmation de la perte auditive à 12 mois

RISK STATUS ***STATUS DU RISQUE***	AT RISK *À RISQUE*	Neonatal intensive-care unit (NICU) graduate *Gradué des soins intensifs néonatals*
ETIOLOGY ***ÉTIOLOGIE***	KNOWN *CONNU*	Prolonged intubation and ototoxic antibiotics *Intubation prolongée et antibiotiques ototoxiques*
OTHER ***AUTRES***	Typical development / *Développement typique*	

OTOSCOPY
OTOSCOPIE

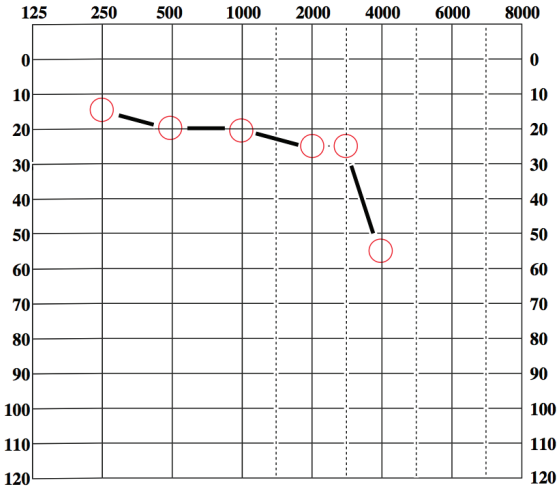
RIGHT EAR *OREILLE DROITE* **Normal** — LEFT EAR *OREILLE GAUCHE* **Normal**

TYMPANOMETRY
TYMPANOMÉTRIE

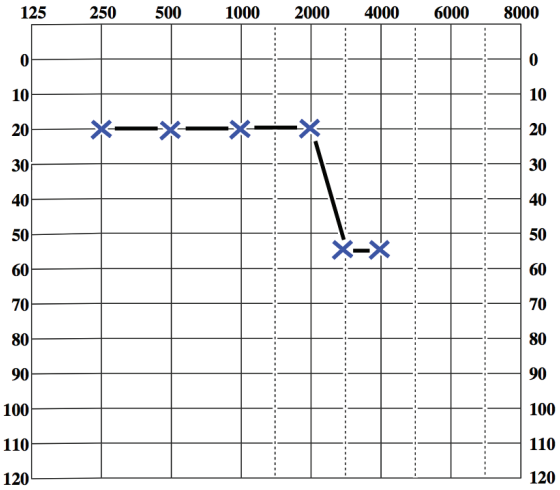
LEFT EAR *OREILLE GAUCHE* **Type A** — LEFT EAR *OREILLE GAUCHE* **Type A**

AUDIOGRAM
AUDIOGRAMME

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: High-frequency sensorineural hearing loss
RÉSULTATS: perte neurosensorielle sur les hautes fréquences

Thank you / Merci beaucoup

EXAMPLE 1: Clinical recommendations / *EXEMPLE 1: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)

IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup

EXAMPLE 2: CLINICAL DATA / *EXEMPLE 2: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	36 months / 36 mois

☐ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☒ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Passed newborn hearing screening, referred by the family doctor at 28 months secondary to persistent middle ear dysfunction. First assessment at 28 months, hearing loss confirmed at 36 months (see audiogram).
Résultats du programme de dépistage universel des nouveau-nés: RÉUSSITE. Référé par le médecin de famille ou le pédiatre à 28 mois (problème d'oreille moyenne). Diagnostique de la perte; première évaluation à 28 mois, confirmation de la perte auditive à 36 mois (voir audiogramme).

RISK STATUS *STATUS DU RISQUE*	AT RISK *À RISQUE*	Persistent OM for more than 3 months *Otites moyennes répétées pour plus de 3 mois*
ETIOLOGY *ÉTIOLOGIE*	KNOWN *CONNU*	no etiology for hearing loss determined *étiologie indéterminés de la perte auditive*
OTHER *AUTRES*	Speech delay / *Retard du langage*	

OTOSCOPY *OTOSCOPIE*

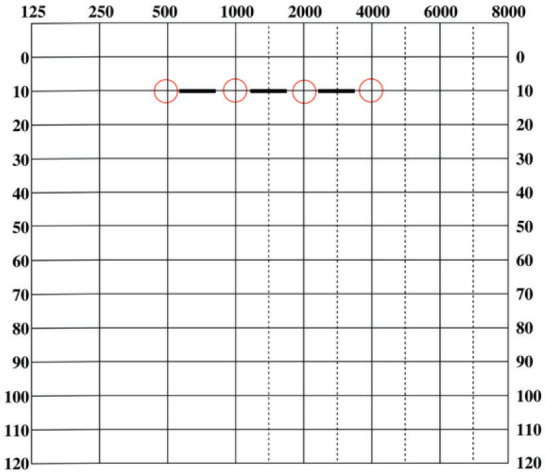
RIGHT EAR *OREILLE DROITE*	**Normal**	LEFT EAR *OREILLE GAUCHE*	**Normal**

TYMPANOMETRY *TYMPANOMÉTRIE*

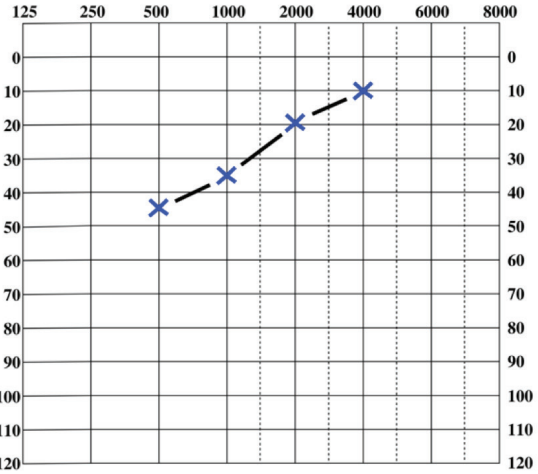
LEFT EAR *OREILLE GAUCHE*	**Type A**	LEFT EAR *OREILLE GAUCHE*	**Type A**

AUDIOGRAM *AUDIOGRAMME*

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: Unilateral sensorineural hearing loss
RÉSULTATS: perte neurosensorielle unilatérale

Thank you / Merci beaucoup

EXAMPLE 2: Clinical recommendations / *EXEMPLE 2: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)

IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

For each: ☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup

EXAMPLE 3: CLINICAL DATA / *EXEMPLE 3: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	32 months / 32 mois

☐ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☒ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Referred by a Genetics clinic at 29 months following diagnosis of a mucopolysaccharidoses syndrome, hearing loss was confirmed at 32 months following medical treatment for middle ear disease.
Renvoyé par une clinique de génétique à 29 mois après le diagnostic d'un syndrome mucopolysaccharidoses, la perte auditive a été confirmée à 32 mois après le traitement médical de la maladie de l'oreille moyenne

RISK STATUS *STATUS DU RISQUE*	AT RISK *À RISQUE*	Syndrome known to include hearing loss *Syndrome connus pour inclure la perte d'audition*
ETIOLOGY *ÉTIOLOGIE*	KNOWN *CONNU*	syndromic / *syndromique*
OTHER *AUTRES*	No developmental or cognitive delay *Aucun retard développemental ou cognitif*	

OTOSCOPY
OTOSCOPIE

RIGHT EAR *OREILLE DROITE* — **Patent** **Tubes**

LEFT EAR *OREILLE GAUCHE* — **Patent** **Tubes**

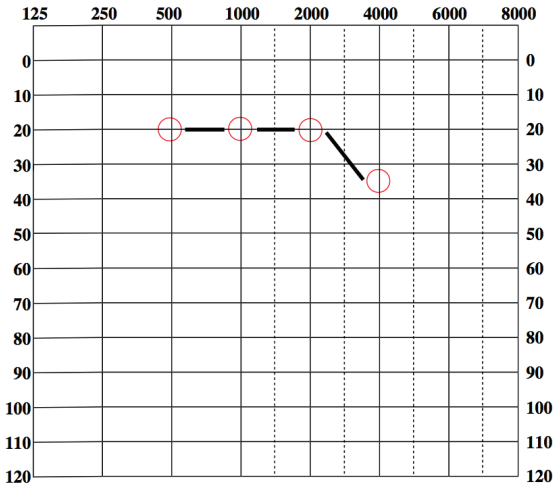
TYMPANOMETRY
TYMPANOMÉTRIE

LEFT EAR *OREILLE GAUCHE*

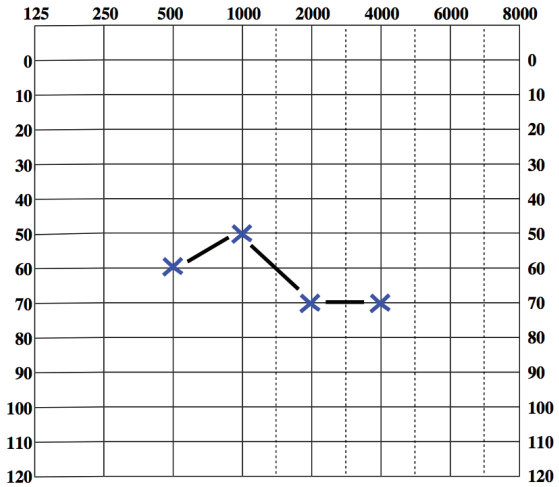
LEFT EAR *OREILLE GAUCHE*

AUDIOGRAM
AUDIOGRAMME

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: Unilateral sensorineural hearing loss
RÉSULTATS: perte neurosensorielle unilatérale

Thank you / Merci beaucoup

EXAMPLE 3: Clinical recommendations / *EXEMPLE 3: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)

IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup

EXAMPLE 4: CLINICAL DATA / *EXEMPLE 4: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	40 months / 40 mois

☐ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☒ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Referred by general practitioner at 40 months
Référé par le médecin de famille à 40 mois

RISK STATUS *STATUS DU RISQUE*	AT RISK *À RISQUE*	Parental concern *Inquiétudes parentales*
ETIOLOGY *ÉTIOLOGIE*	KNOWN *CONNU*	no etiology for hearing loss determined *étiologie indéterminés de la perte auditive*
OTHER *AUTRES*	Typical development / *Développement typique*	

OTOSCOPY *OTOSCOPIE*

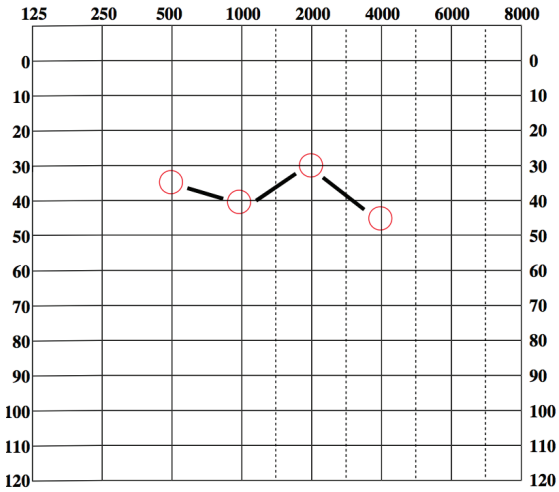
RIGHT EAR *OREILLE DROITE*	**Normal**	LEFT EAR *OREILLE GAUCHE*	**Normal**

TYMPANOMETRY *TYMPANOMÉTRIE*

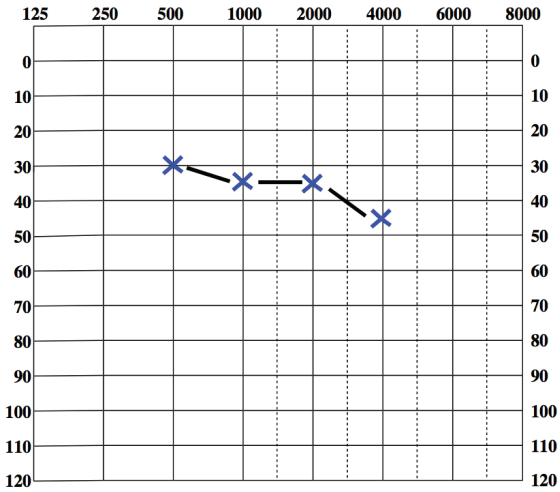
LEFT EAR *OREILLE GAUCHE*	**Type A**	LEFT EAR *OREILLE GAUCHE*	**Type A**

AUDIOGRAM *AUDIOGRAMME*

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: Mild bilateral sensorineural hearing loss
RÉSULTATS: perte neurosensorielle bilatérale de dégrée léger

Thank you / Merci beaucoup

EXAMPLE 4: Clinical recommendations / *EXEMPLE 4: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)

IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup

EXAMPLE 5: CLINICAL DATA / *EXEMPLE 5: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	6 months / 6 mois

☒ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☐ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Hearing loss diagnosis: first assessment at 4 months, hearing loss confirmation at 6 months (see audiogram, tone pipe-ABR)
Diagnostique de la perte: première évaluation à 4 mois, confirmation de la perte auditive à 6 mois (voir audiogramme, bouffées tonales-PÉATC)

RISK STATUS ***STATUS DU RISQUE***	NOT AT RISK *AUCUN RISQUE*	No risk factors *Aucun facteur de risque*
ETIOLOGY ***ÉTIOLOGIE***	UNKNOWN *INCONNU*	GJB2 gene mutation identified *mutation du gène GJB2 identifié*
OTHER ***AUTRES***	Typical development / *Développement typique*	

OTOSCOPY
OTOSCOPIE

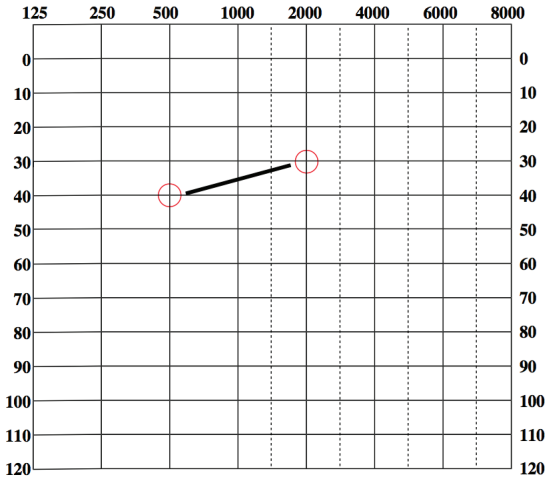
RIGHT EAR *OREILLE DROITE* **Normal** LEFT EAR *OREILLE GAUCHE* **Normal**

TYMPANOMETRY
TYMPANOMÉTRIE

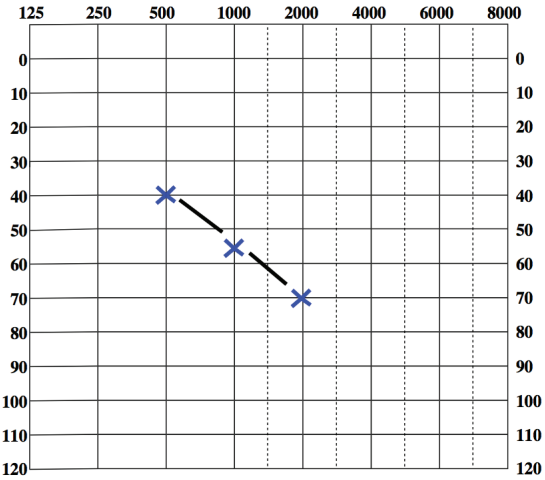
LEFT EAR *OREILLE GAUCHE* **Type A** LEFT EAR *OREILLE GAUCHE* **Type A**

AUDIOGRAM
AUDIOGRAMME

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: Mild bilateral sensorineural hearing loss (tone pip ABR results)
RÉSULTATS: perte neurosensorielle bilatérale de dégrée léger (bouffées tonales; résultats au PEATC)

Thank you / Merci beaucoup

EXAMPLE 5: Clinical recommendations / *EXEMPLE 5: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)

IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup

EXAMPLE 6: CLINICAL DATA / *EXEMPLE 6: DONNÉES CLINIQUES*

AGE OF HEARING LOSS CONFIRMATION *ÂGE CONFIRMANT LA PERTE AUDITIVE*	24 months / 24 mois

☒ UNIVERSAL NEWBORN HEARING SCREENING *DÉPSITAGE UNIVERSEL DES NOUVEAUX NÉS* OR ☐ DOCTOR REFERRAL *RÉFÉRÉ PAR LE DOCTEUR*

Referred from Universal Newborn Hearing Screening (UNHS) program at 1 month; first assessment at 1.4 months, hearing loss confirmation at 18 months (see audiogram, tone pips-ABR)
Référé par le programme de dépistage universel des nouveau-nés à 1 mois; Diagnostique de la perte; première évaluation à 1.4 mois, confirmation de la perte auditive à 18 mois (voir audiogramme, bouffées tonales-PÉATC)

RISK STATUS ***STATUS DU RISQUE***	NOT AT RISK *AUCUN RISQUE*	No risk factors *Aucun facteur de risque*
ETIOLOGY ***ÉTIOLOGIE***	UNKNOWN *INCONNU*	no etiology for hearing loss identified *étiologie indéterminés de la perte auditive*
OTHER ***AUTRES***	Global developmental delay (fine and gross motor) *Retard développemental global (motricité fine et grossière)*	

OTOSCOPY ***OTOSCOPIE***

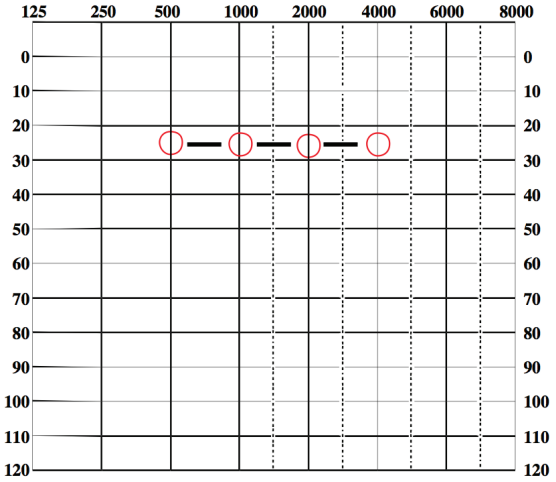
RIGHT EAR *OREILLE DROITE* **Normal** — LEFT EAR *OREILLE GAUCHE* **Normal**

TYMPANOMETRY ***TYMPANOMÉTRIE***

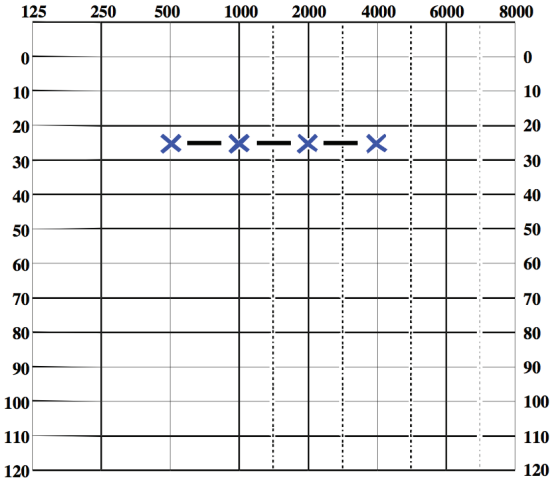
LEFT EAR *OREILLE GAUCHE* **Type A** — LEFT EAR *OREILLE GAUCHE* **Type A**

AUDIOGRAM ***AUDIOGRAMME***

RIGHT EAR *OREILLE DROITE*



LEFT EAR *OREILLE GAUCHE*



RESULTS: Very mild bilateral sensorineural hearing loss (tone pips; ABR results)
RÉSULTATS: perte neurosensorielle bilatérale de dégrée très légère (bouffées tonales; résultats au PEATC)

Thank you / Merci beaucoup

EXAMPLE 6: Clinical recommendations / *EXEMPLE 6: Recommandations cliniques*

From the clinical data at the time the hearing loss was confirmed, please indicate your **preferred** audiologic recommendation (**please choose one only**):

*À partir des données cliniques disponibles au moment de la confirmation de la perte auditive, veuillez s.v.p. indiquer votre recommandation **préférée** (s.v.p. cocher un seul choix):*

1 ☐ MONITOR (no amplification)
SURVEILLER (pas d'amplification)
IF YES, HOW FREQUENTLY?
SI OUI, À QUELLE FRÉQUENCE? _____

2 ☐ HEARING AID(S) ONLY
PROTHÈSES AUDITIVE(S) SUELEMENT

- ☐ BEHIND THE EAR
  BTE _____
- ☐ OTHER(s)
  AUTRE(s) _____

☐ LEFT *GAUCHE* ☐ RIGHT *DROITE* ☐ BINAURAL *BINAURAL*

3 ☐ FM SYSTEM ONLY
SYSTÈME MF SEULEMENT

☐ SOUND FIELD *CHAMPS LIBRE* ☐ PERSONAL *PERSONNEL*

4 ☐ HEARING AID(S) + FM SYSTEM
PROTHÈSES AUDITIVE(S) + SYSTÈME MF

☐ MONAURAL *MONAURAL* ☐ BINAURAL *BINAURAL*

COMMENTS / *COMMENTAIRES*

Recommendation based on (please check all that apply):
Recommandation basée sur (s.v.p. cocher tous les choix applicables):

☐ EVIDENCE / RESEARCH
RECHERCHE / ÉVIDENCE

☐ CLINICAL EXPERIENCE (PREVIOUS CASES)
EXPÉRIENCES CLINIQUES (CAS ANTERIEURS)

☐ OTHER
AUTRES _____

Thank you / Merci beaucoup