

Then and Now: The Evolving Landscape of Childhood Hearing Loss

Elizabeth Fitzpatrick, Ph.D. LSLS Cert AVT®
Résonance, Montréal, November 13, 2025





Dr. Daniel Ling
1926 –2003

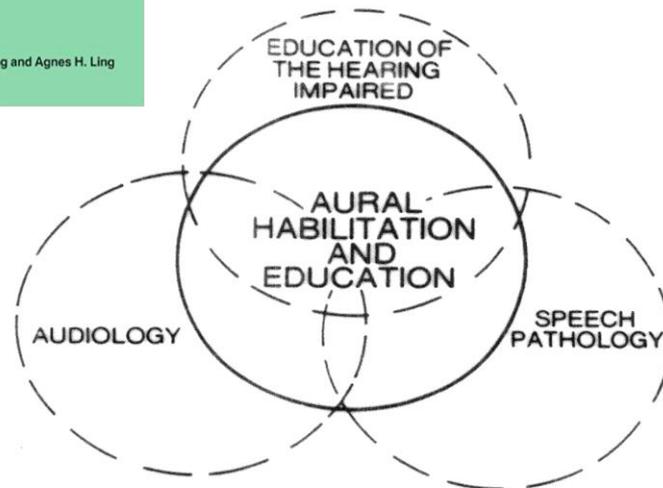
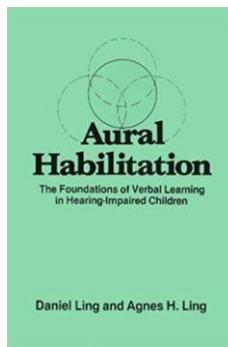
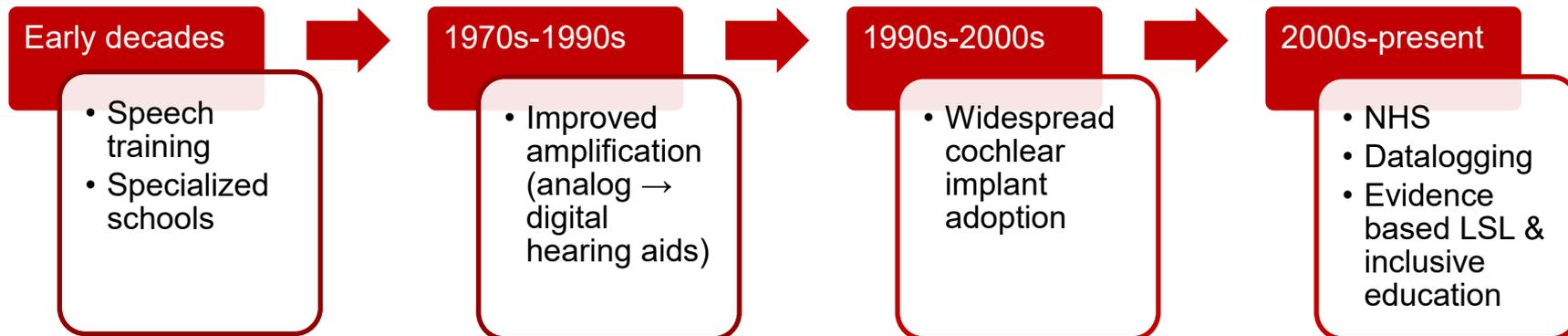


Figure 14.1

RÉSONANCE MONTRÉAL

The new name and look of MOSD

Milestones across 75 years



NHS: newborn hearing screening; EI: early intervention

- *The last 35 years have seen significant advances in the field of aural habilitation and education of hearing impaired children. These have come through the growth of knowledge and technology permitting optimal use of residual hearing from the first months of life.*
- *Depuis 35 années, on a pu constater des progrès importants dans les domaines de l'habilitation auditive et de l'éducation des enfants déficients auditifs. Ces développements sont apparus suite à l'amélioration des connaissances et de la technologie permettant l'utilisation optimale des restes auditifs dès les premiers mois de la naissance.*

Thirty-Five Years in Aural Habilitation: A Personal Viewpoint

Trente-cinq années en habilitation auditive: un point de vue personnel

Agnes Ling Phillips

Montreal Oral School for the Deaf

Abstract

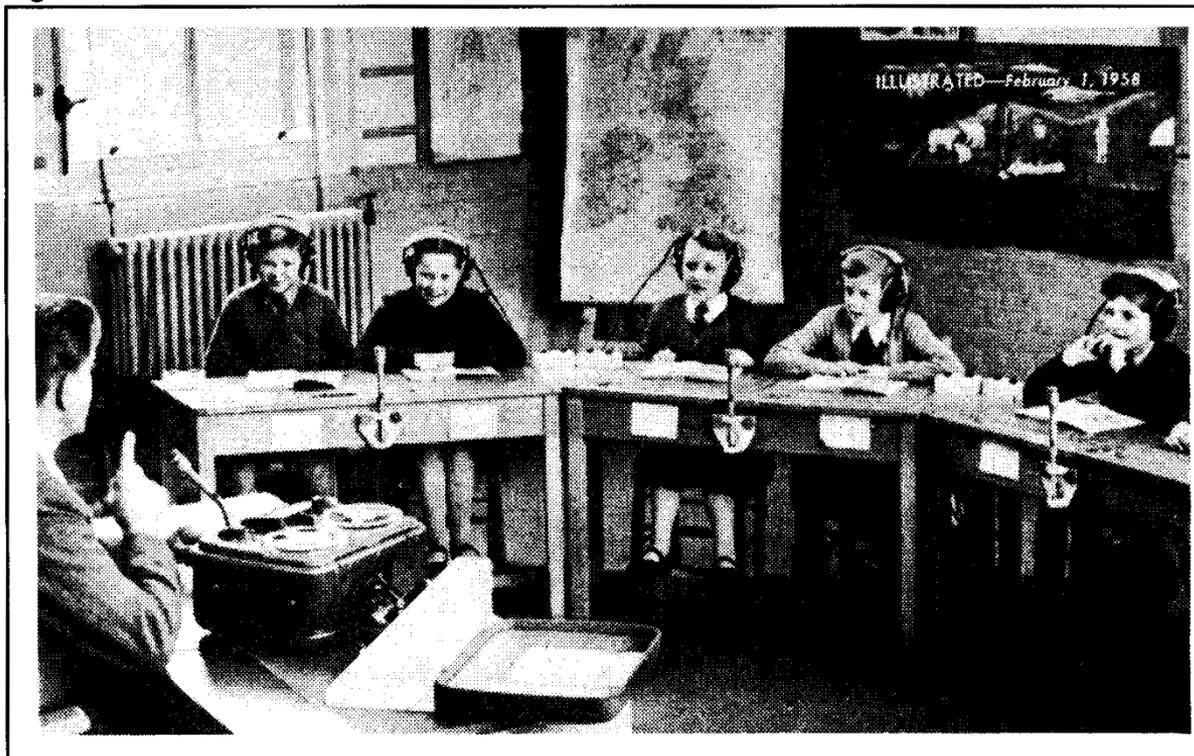
The last 35 years have seen significant advances in the field of aural habilitation and education of hearing impaired children. These have come through the growth of knowledge and technology permitting optimal use of residual hearing from the first months of life. Many children with severe and profound losses have been able to develop good speech and language, receive most of their education in regular schools, and proceed to college and university, taking up careers which were formerly closed to hearing impaired people. The pioneering efforts of speech and hearing professionals, together with the support of committed parents have made these attainments possible. Paradoxically, while all these advances were underway, the oral method was largely supplanted by total communication in schools and classes for hearing impaired children.

was assigned its use for “auditory training” once or twice per week. This approach was not very successful, and I eventually became discouraged. I knew from my training as a teacher of the deaf at Manchester University that in order to develop oral communication, it was important to use residual hearing continually as a supplement to lipreading and to ensure that children were in an environment where speech was commonly used (Ewing & Ewing, 1950).

I became enthralled about the possibilities offered by emphasizing the use of residual hearing when I visited Daniel Ling’s class for deaf children in the town of Reading, England and heard the profoundly deaf children in his class talking. They had natural sounding voices and were in the

Phillips Ling, A. 1990. Thirty-five years in aural habilitation: personal viewpoint. *JSLPA/ROA*, 14(2), 2, 5-11.

Figure 1.

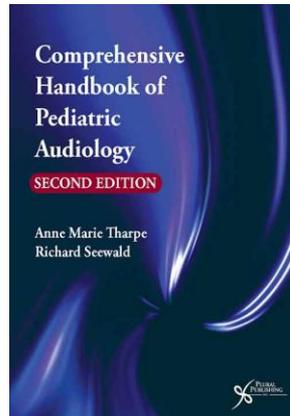


Phillips Ling, A. 1990. Thirty-five years in aural habilitation: personal viewpoint. *JSLPA/ROA*, 14(2), 2, 5-11.

Major hearing aid developments 70s – 90s

- 1970s - Body worn analog hearing aids common for children
 - Behind-the-ear aids began to improve
- 1980s - Miniaturization of BTE aids (became the standard)
 - Better pediatric fitting/verification strategies
 - Programmable analog hearing aids
- 1990s – Digital revolution
 - Clearer sound, more precise amplification
 - More child-friendly hearing aids
 - Growing use of remote microphone (FM) systems







- *The professionals primarily responsible for amplification programs, the audiologists, need to expand their observational skills and activities to other situations.*
- *It is most useful when they leave the sound-treated environments that have become their reality and become more involved in observing the children's performance in their **reality of the home or classroom**—both of which are **extensions of our traditional "clinic"**.*

Seewald & Ross, 1988. Amplification for the hearing-impaired child. P. 217-271



Two impactful developments

Cochlear implants



Newborn hearing screening



Los Angeles Times

WORLD & NATION

Breaking Sound Barriers : Health: The cochlear implant, now approved for children, helps the deaf function in hearing world. But the device is costly and difficult to use.

By SHARI ROAN

Sept. 4, 1990 12 AM PT



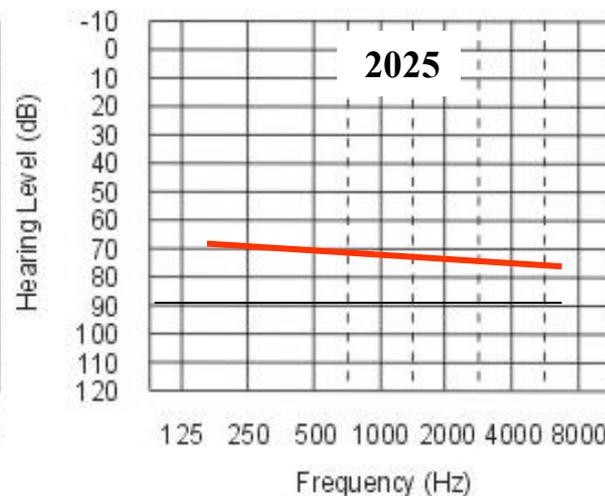
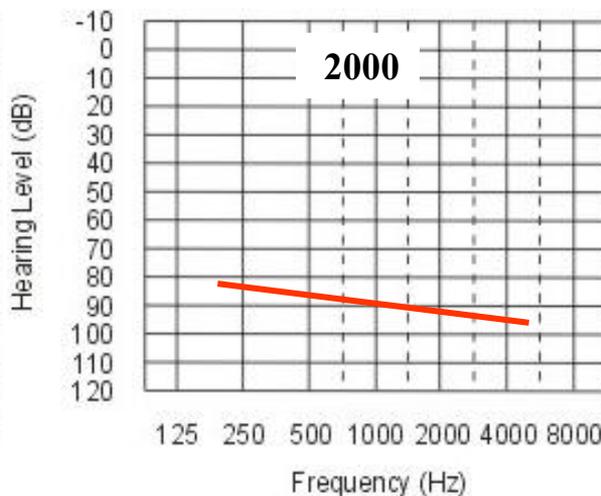
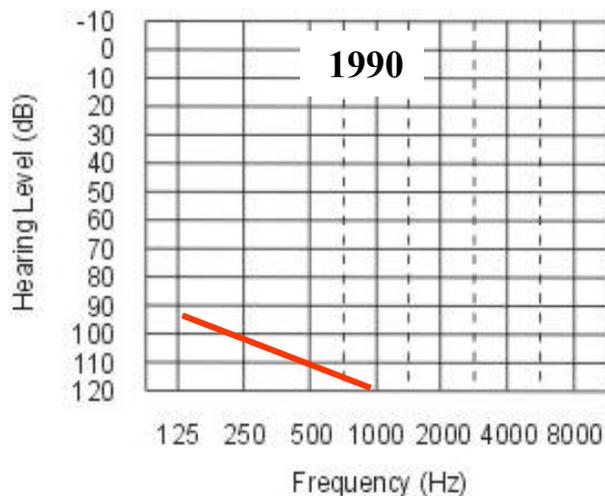
TIMES HEALTH WRITER

Casey Correia was 5 when he lost his hearing as a complication of meningitis, an inflammation of the membranes surrounding the spinal cord or brain. Hearing aids were of no use to the Yorba Linda boy. Within weeks of becoming deaf, his speech deteriorated.

Frankie and Jack Correia seized upon the only remaining alternative for their son: a cochlear implant. The device includes a small component surgically implanted in the inner ear and an external component resembling a conventional hearing aid, along with a small battery pack.



35 years....



Age

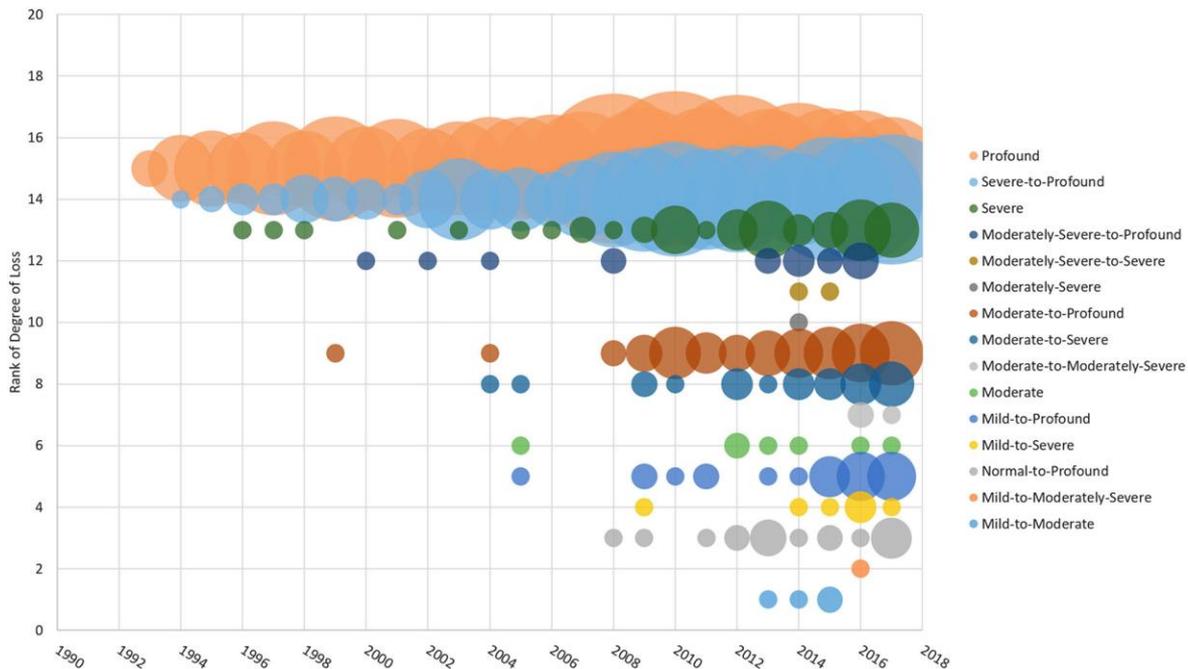
≥ 24 m

18 m

9 m

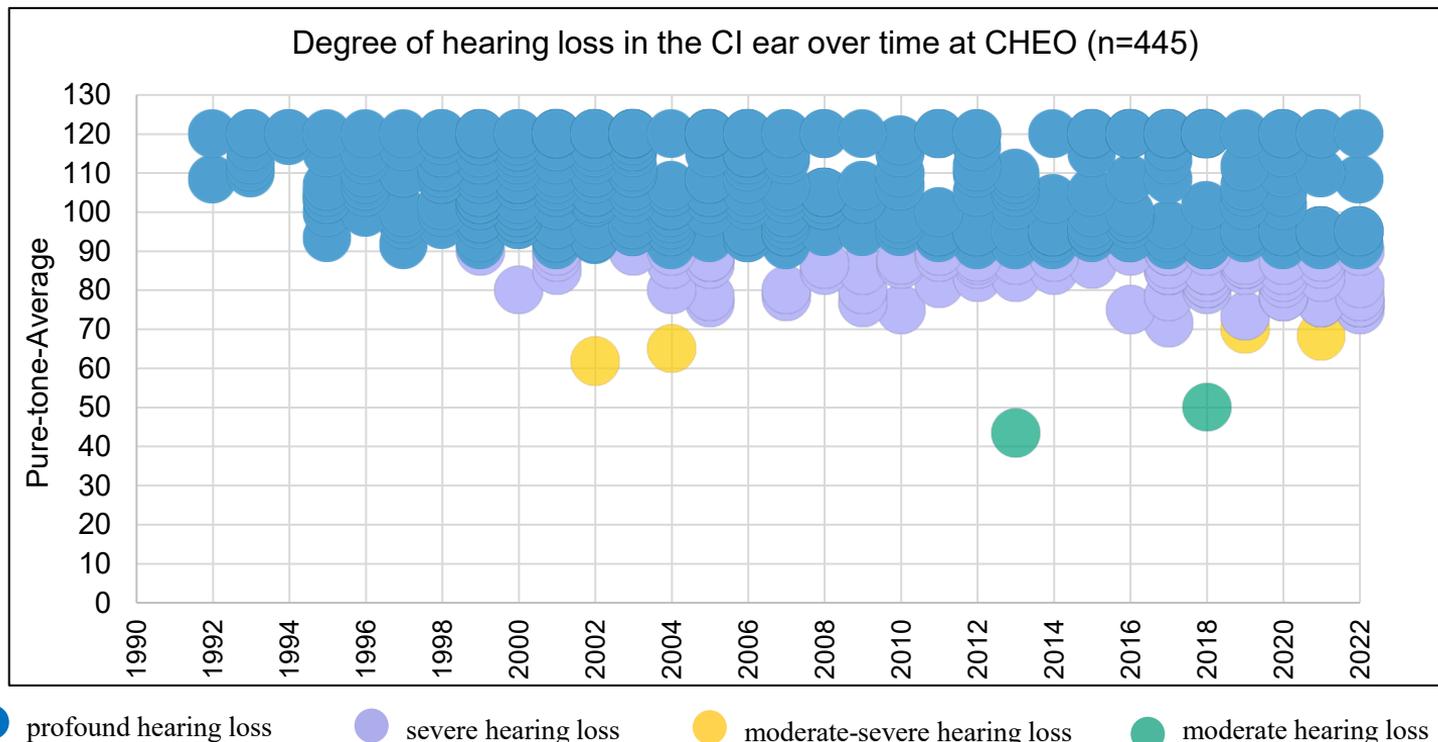
Candidacy criteria have expanded – in practice

- Increase in CI with **residual hearing** since 2008 (Teagle et al., 2019)
- 78% of surgeons (63/81) implanted 'off-label' (Carlson et al., 2018)
 - **31% implanted outside audiometric criteria**



Source: Teagle et al., 2019., Pediatric cochlear implantation: A quarter century in review. *Cochlear Implants Int'l*, 20, p. 293

Candidacy criteria have expanded – in practice



Outcomes in non-traditional candidates: Does delay to CI matter?

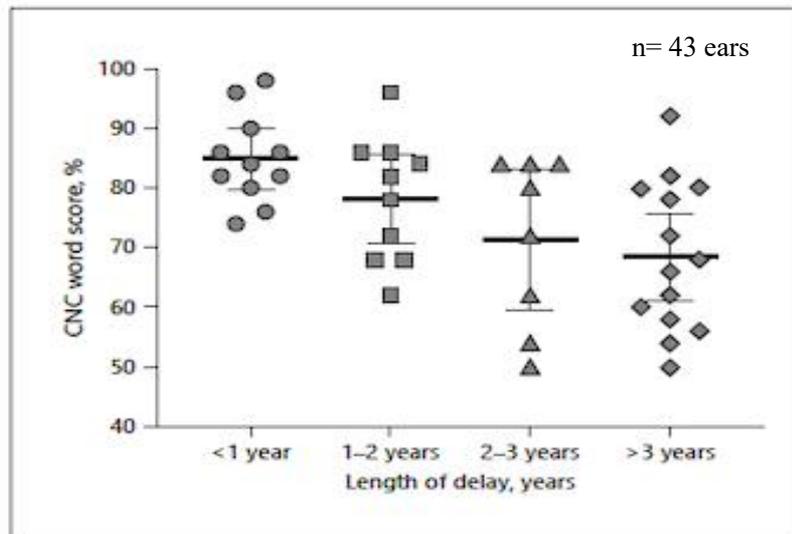


Fig. 2. Prolonged delay demonstrates a trend toward worse speech perception performance. There was a significant difference in outcomes between the 0–1 and >3-year delay groups ($p = 0.003$). Error bars represent 95% confidence intervals, and the middle bands are means. CNC, Consonant-Nucleus-Consonant.

Source: Park, L.R. et al., 2021. Delaying cochlear implantation impacts postoperative speech perception of non-traditional pediatric candidates. *Audiology & Neurotology*, 26, p. 186

Universal newborn hearing screening (UNHS)

- UNHS → EHDI - early hearing detection and intervention programs
- Canada slower to implement newborn screening programs
- Risk factor screening was the pre-cursor
- Average age of detection: 2.8 years for referred children
(Durieux-Smith & Whittingham, 2000)
- UNHS – 1st mandated in 2000 in Ontario - implemented in 2002





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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Language of Early- and Later-identified Children With Hearing Loss
Christine Yoshinaga-Itano, Allison L. Sedey, Diane K. Coulter and Albert L. Mehl
Pediatrics 1998;102:1161-1171
DOI: 10.1542/peds.102.5.1161

This information is current as of June 22, 2006

The online version of this article, along with updated information and services, is located on the World Wide Web at:
<http://www.pediatrics.org/cgi/content/full/102/5/1161>

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American Academy of Pediatrics



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Downloaded from www.pediatrics.org at Swets Blackwell 68959729 on June 22, 2006





2024 Report Card: Early Hearing Detection & Intervention

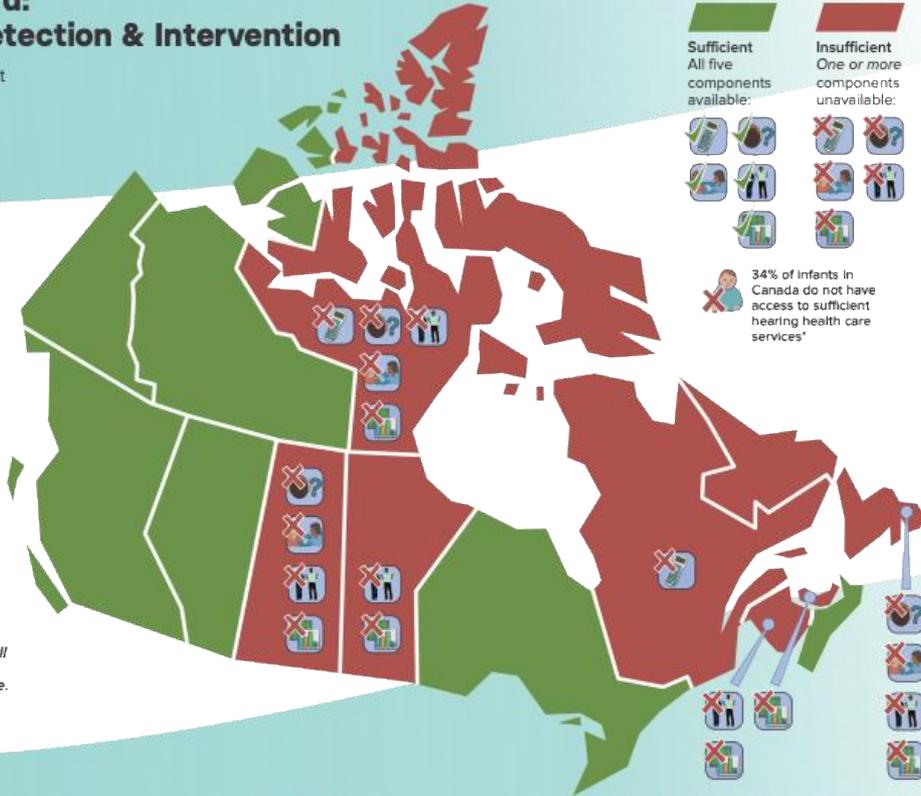
Developed by the Canadian Infant Hearing Task Force (CIHTF)
(www.infanthearingcanada.ca)

©Bagatto 2024

Early Hearing Detection and Intervention (EHDI) programs aim to proactively address infant hearing health and include:

-  universal hearing screening of all newborns
-  identification of babies with permanent hearing loss
-  support services for technology & language development
-  family support
-  monitoring and evaluation of the program

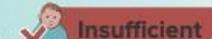
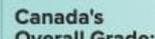
Grades were assigned based on all five of the components being available province or territory-wide.



Developed by:



Endorsed by:



*Based on 2022/23 Statistics Canada live birth rates for insufficient provinces and territories.

Canada's Overall Grade: 

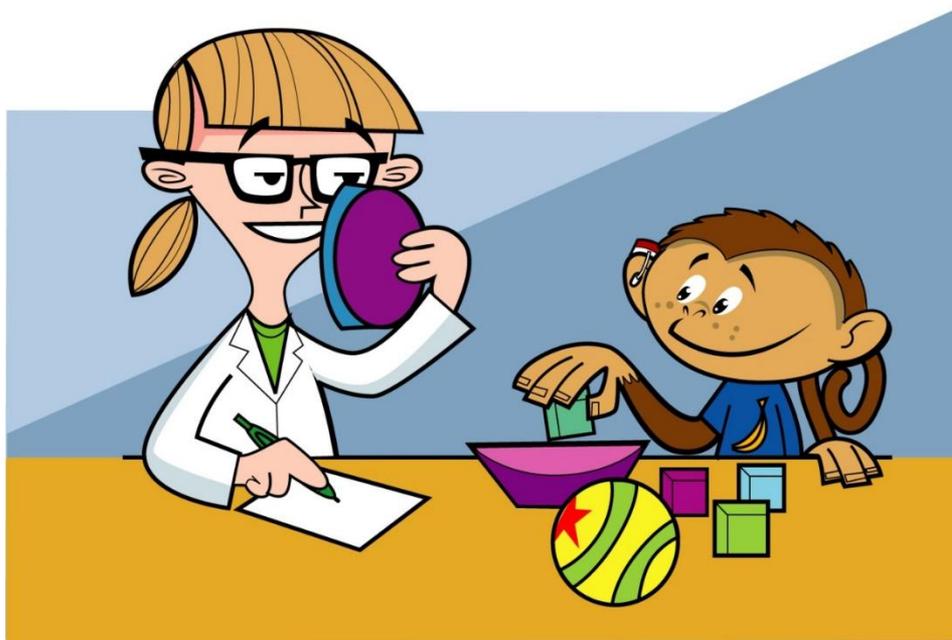
We still have work to do...

- 34% of infants in Canada do not have access to sufficient hearing health care services*

*Based on 2022/23 Statistics Canada live birth rates for 'insufficient' provinces and territories

<https://canadianaudiology.ca/canadian-infant-hearing-task-force-releases-2024-chdi-report-card/>

The way we were....



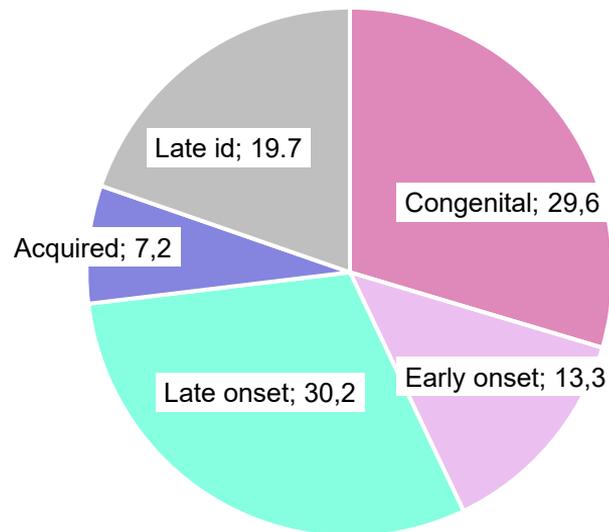
Source: Advanced Bionics, Tools for Schools

Newborn Hearing Screening: New knowledge and challenges

Assumptions pre-UNHS:

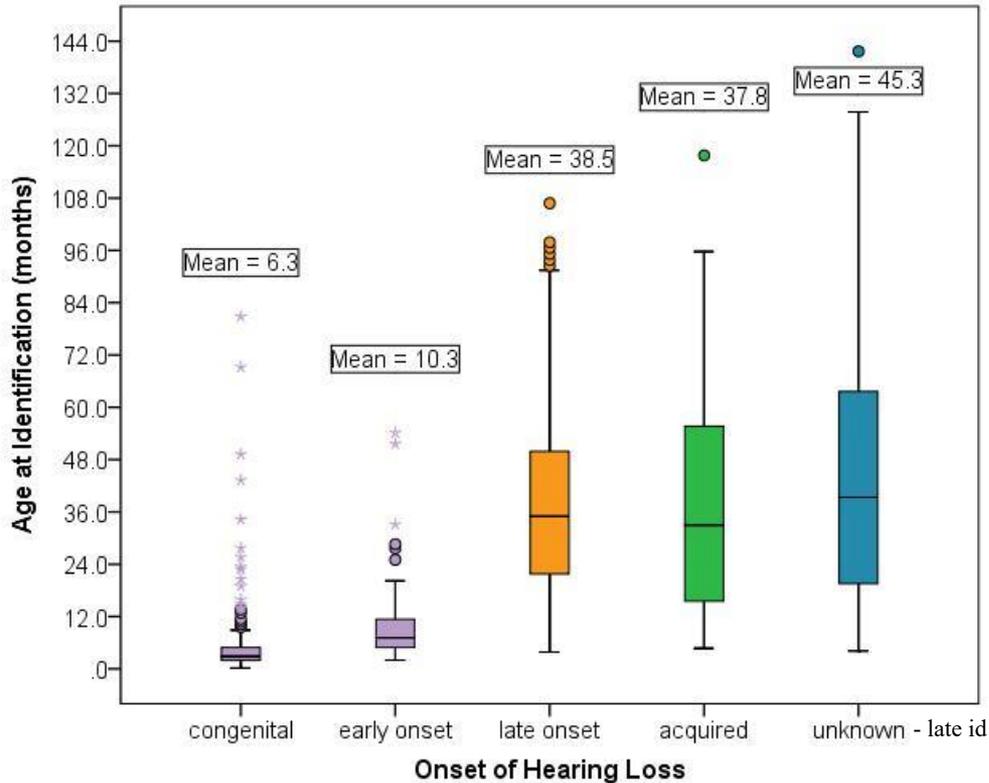
- Most late-identified babies were born with hearing loss / parents just didn't notice it
- Universal newborn hearing screening would identify almost all children
- A 'large' proportion had severe/profound loss
- Most had fairly stable hearing?

Onset of hearing loss (%)

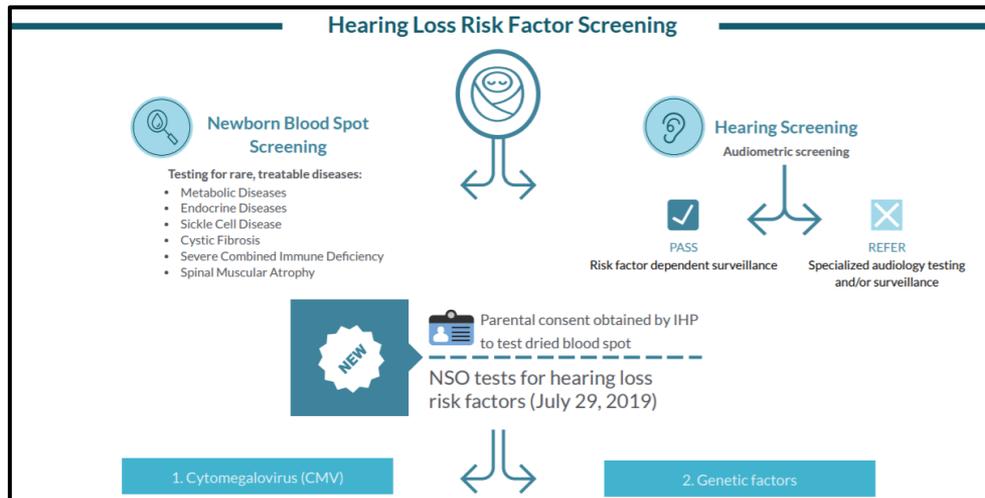


- Congenital
- Early onset
- Late onset
- Acquired
- Late identified

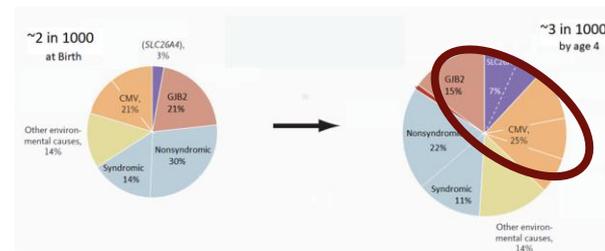
Age of confirmation by onset



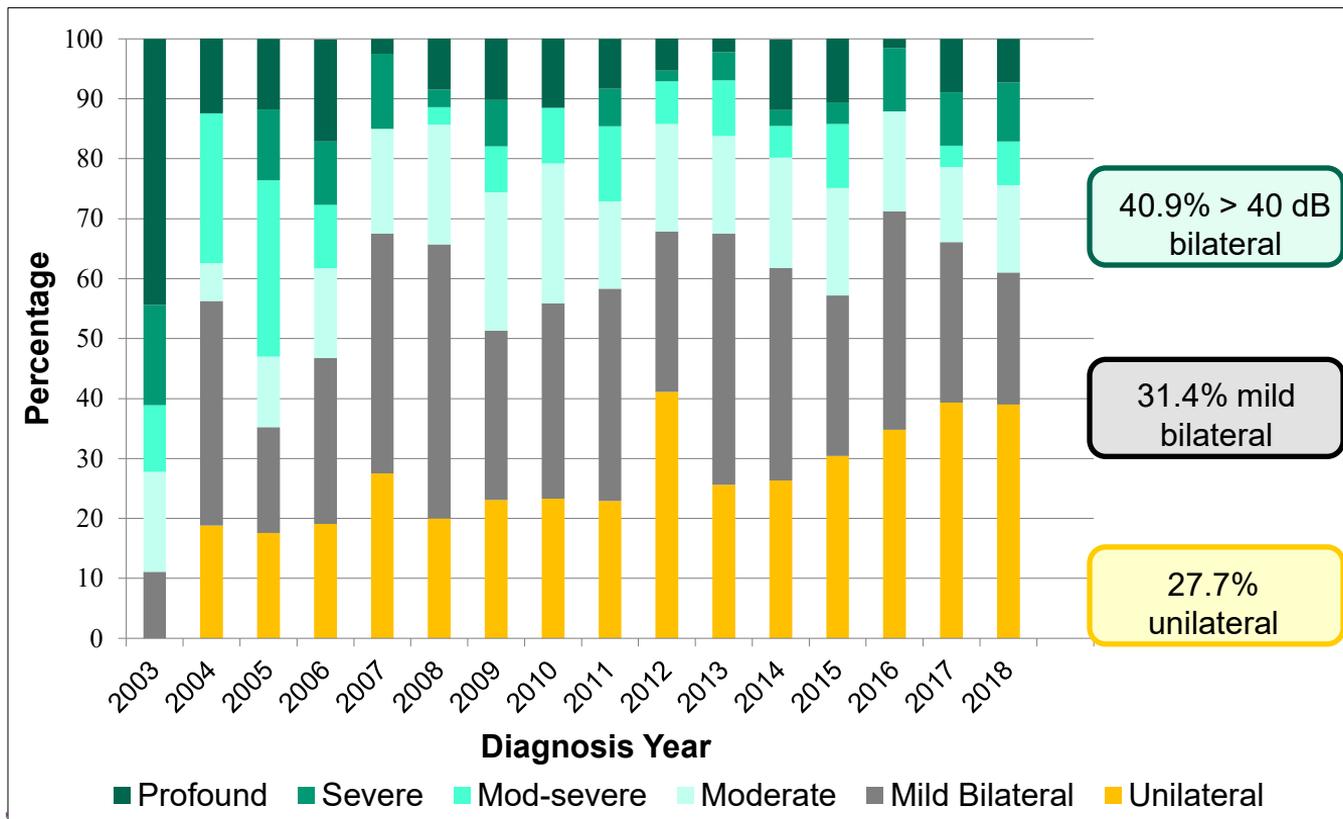
Ontario implemented risk factor screening 2019



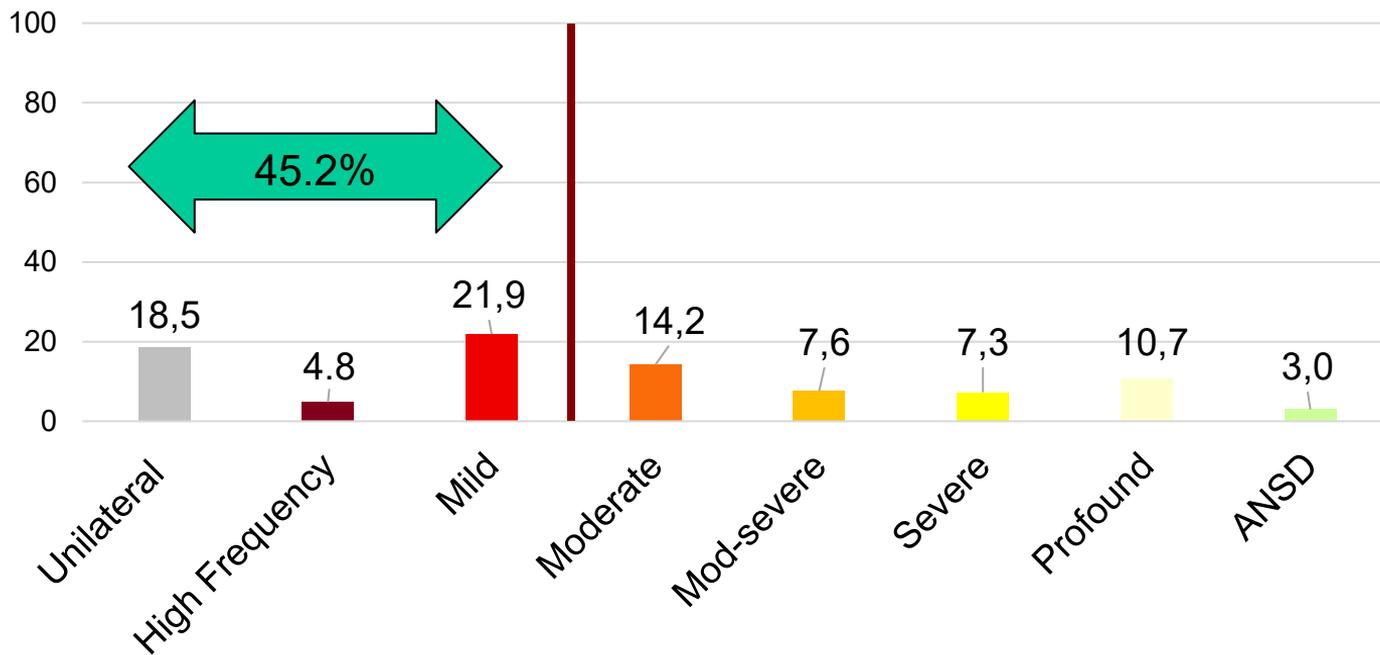
Permanent Childhood Hearing Loss (PHL) (Morton and Nance 2006)



Severity of hearing loss for children 2003-2018 (n=727)



Severity of HL – most recent audiogram (n=727)



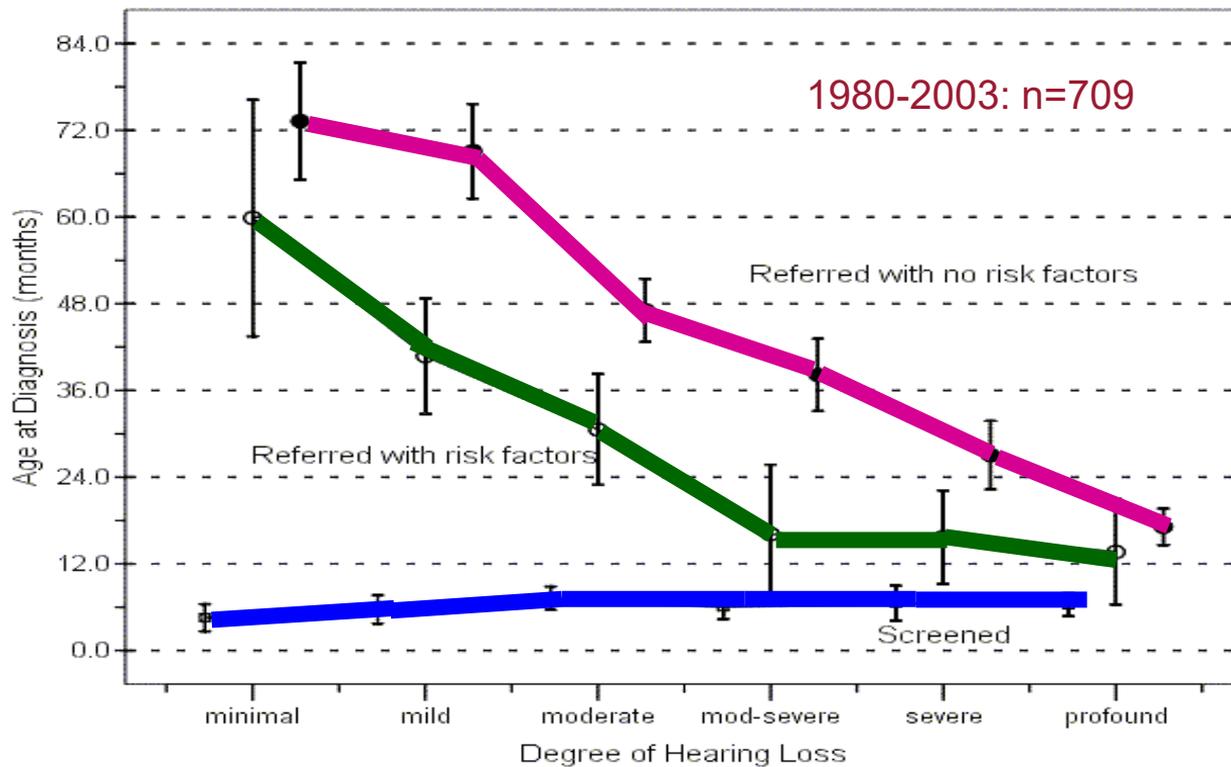
*”Hearing Australia ... reports the highest proportion of children first fitted with amplification under 12 months of age have an average hearing loss in the better hearing ear in the range of **0–40 decibels** (i.e., unilateral or mild bilateral loss)”*

Carew et al. 2023. Language and health-related quality of life outcomes of children early-detected with unilateral and mild bilateral hearing loss. *Frontiers in Pediatrics*

Newborn hearing screening

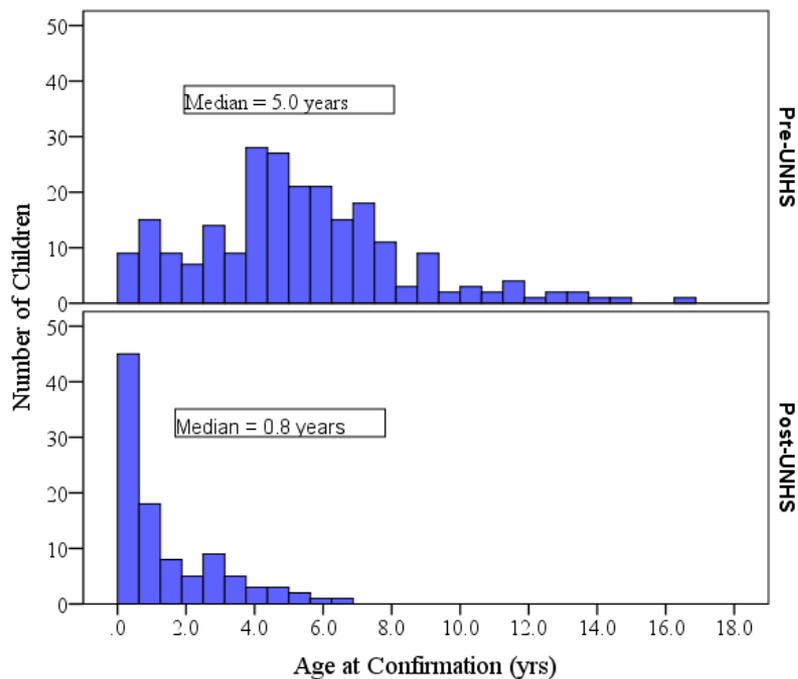


- Goal is to provide children with a “head start” to reduce or eliminate the impact of hearing loss
- What constitutes “treatable” hearing loss has become a subject of discussion
- Screening programs have adopted different case definitions and management approaches
 - Some countries screen for $>$ moderate hearing loss
 - Ontario: ≥ 30 dB HL from 500-4K Hz in either ear
- In Canada – a new population of children



Durieux-Smith, Fitzpatrick & Whittingham, 2008

Age of confirmation pre and post-UNHS



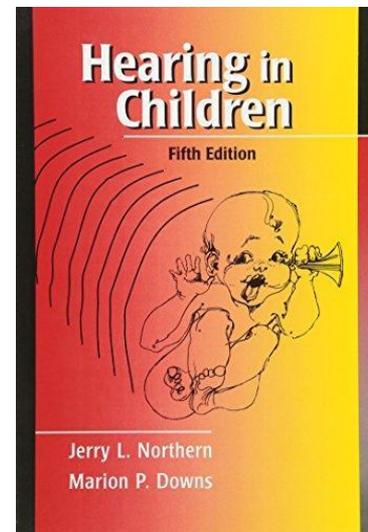
Fitzpatrick, E., Whittingham, J., & Durieux-Smith, A. (2014). Mild Bilateral and Unilateral Hearing Loss in Childhood: A 20-Year View of Hearing Characteristics, and Audiologic Practices Before and After Newborn Hearing Screening. *Ear and Hearing, 35*, 10-18.

Unilateral hearing loss - the olden days...

- In the 1970s/early 1980s, audiologists learned there were no effects of UHL:

“...audiologists and otolaryngologists are not usually concerned over such deafness, other than to identify its etiology and assure the parents that there will be no handicap.”

(Northern & Downs, 1978 textbook)



Towards understanding the consequences of mild bilateral and unilateral hearing loss (M_bUHL)



Thank you to Collaborating Centers

Children's Hospital of Eastern Ontario, Ottawa
Pinecrest-Queensway Health Centre, Ottawa, Ontario
Western University Clinic, London, Ontario
Erin Oaks Centre, Toronto, Ontario
Preschool Services Branch, Ministry of Education, Ontario
Voice for Hearing-Impaired Children, Hamilton, Ontario



Key characteristics

- **69 children** HL; 38 unilateral, 31 mild bilateral
 - 63/69 (91.3%) congenital/< 6 months onset
 - Age diagnosis = **3.5 m** (IQR 2.0, 5.5)
 - Age assessment = **47.8 m** (IQR 38.88, 48.5)
 - Maternal education = 17.2 years (SD 3.4)
-
- **51 children** with **normal hearing** – comparable characteristics



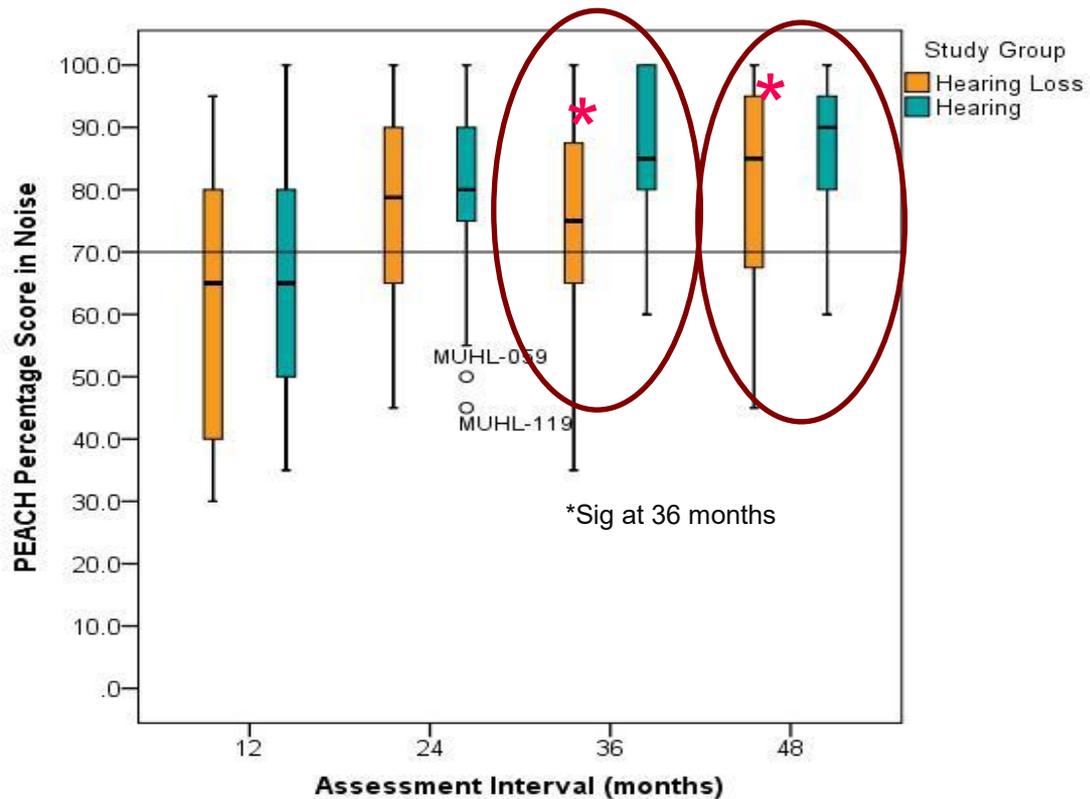
Parents' Evaluation of Aural/Oral
Performance of Children
(P.E.A.C.H.)

Developed by Teresa Ching & Mandy Hill

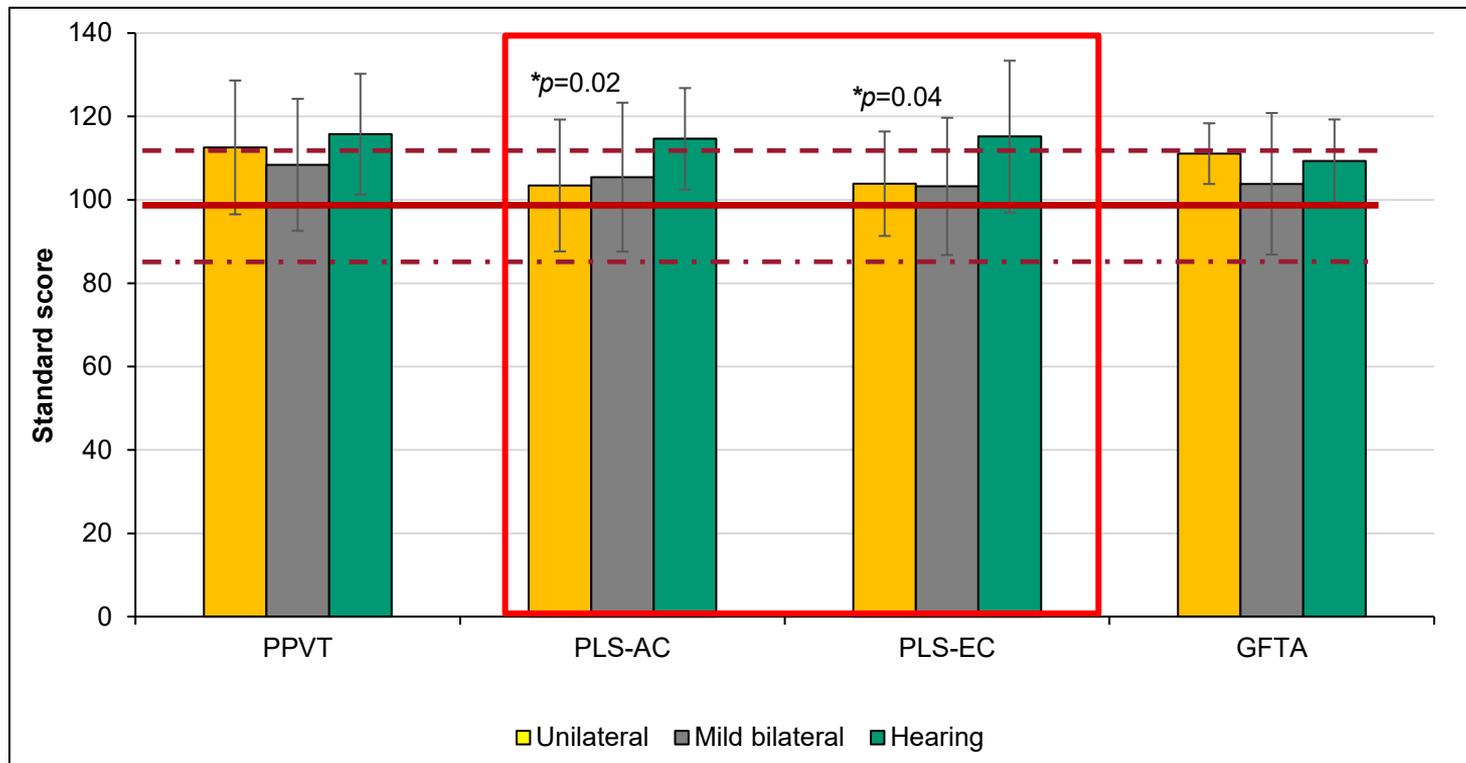


	Question	Never 0%	Seldom 1 - 25%	Sometimes 26 - 50%	Often 51 - 75%	Always 75-100%
1.	How often has your child worn his/her hearing aids and/or cochlear implant?	0	1	2	3	4
2.	How often has your child complained or been upset by loud sounds?	4	3	2	1	0
3.	When you call, does your child respond to his/her name in a quiet situation?	0	1	2	3	4
4.	When asked, does your child follow simple instructions or do a simple task in a quiet situation?	0	1	2	3	4
5.	When you call does your child respond to his/her name in a noisy situation when he/she can't see your face? (examples of responses include looks up, turns, answers verbally)	0	1	2	3	4

PEACH - Noise



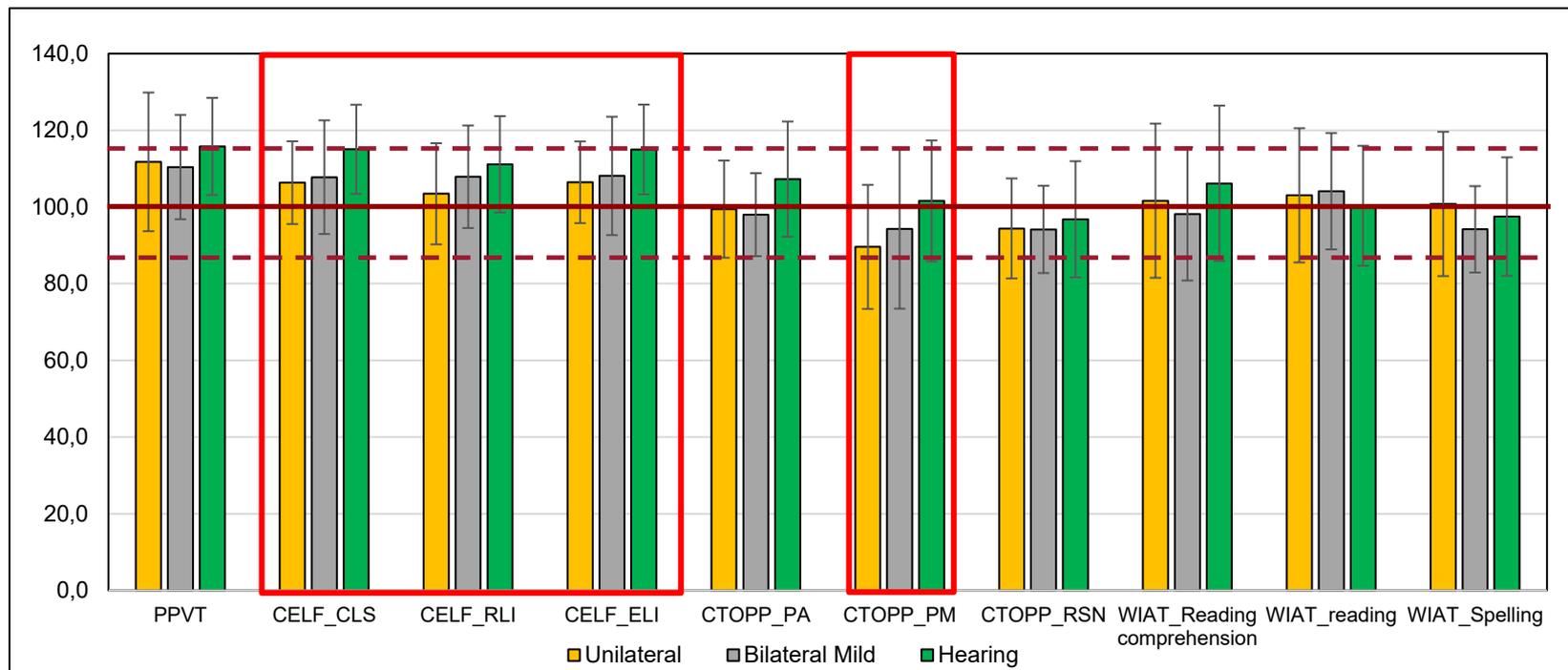
Speech-Language Scores unilateral, mild bilateral, normal hearing at age 4



Long-term impact of mild bilateral and unilateral HL in children



Language scores



1/2 to 2/3 SD below peers



Early ages

*“...children at age 2 years with unilateral or mild bilateral loss demonstrated, on average, caregiver-reported **expressive vocabulary** approximately **two thirds of a standard deviation** below population normative scores (n = 197, mean 90.5, 95% CI: 88.22, 92.74)*



Later ages

*“... children with early-identified unilateral or mild bilateral hearing loss have average **language and HRQoL outcomes poorer than population normative expectations from an early age**. These outcomes are observed at **later ages** across childhood”.*

Carew P, et al. 2023. Language and health-related quality of life outcomes of children early-detected with unilateral and mild bilateral hearing loss. *Frontiers in Pediatrics*. 11:1210282 . doi: 10.3389/fped.2023.121028.

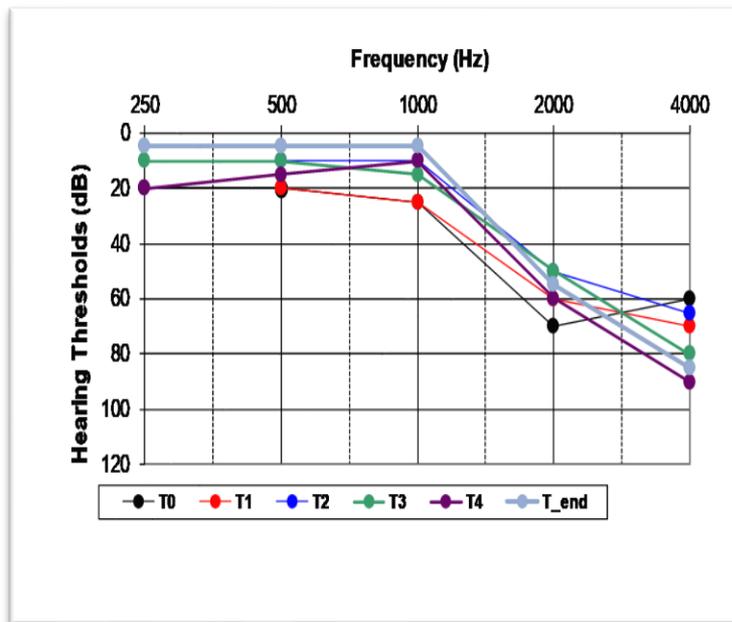
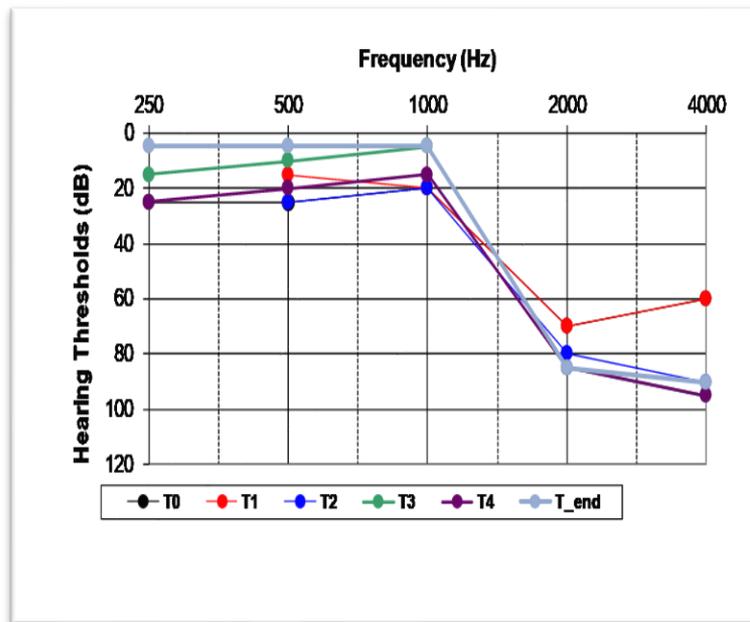
Clinical Practices/Challenges



Speech-Language and Audiology Canada (SAC) Position Statement 2020

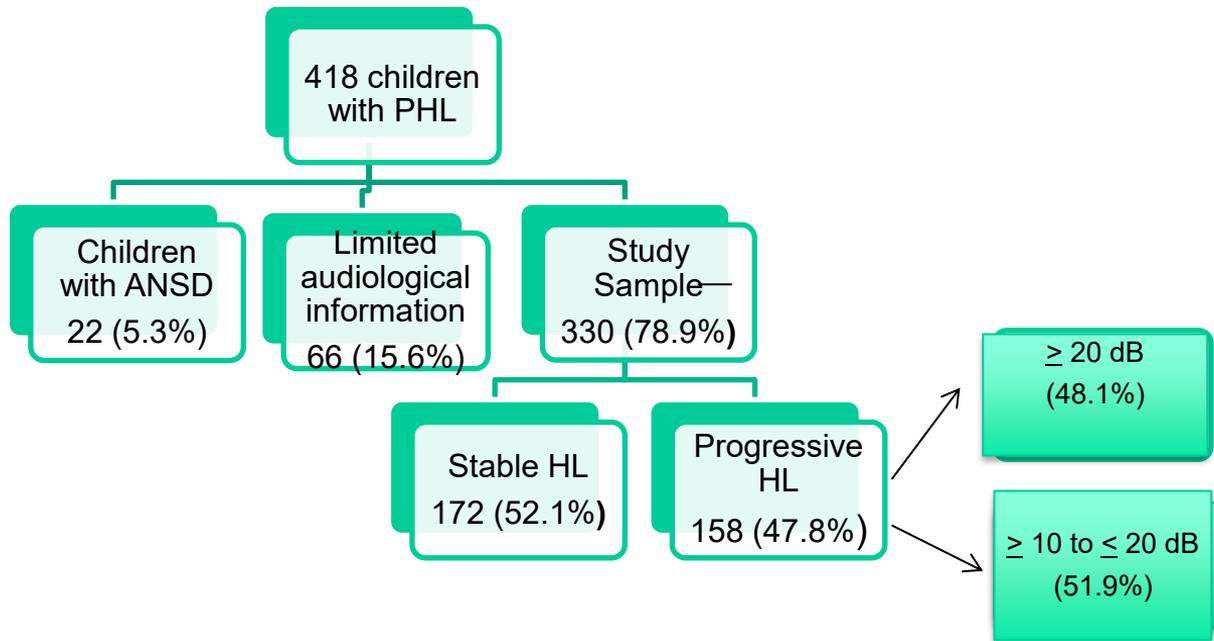
- Appropriate **intervention** includes caregiver support and coaching, consideration of hearing technology options, monitoring and direct therapy services when required... provided within the context of an Early Hearing Detection and Intervention (EHDI) program.

Hearing can change! Progressive hearing loss



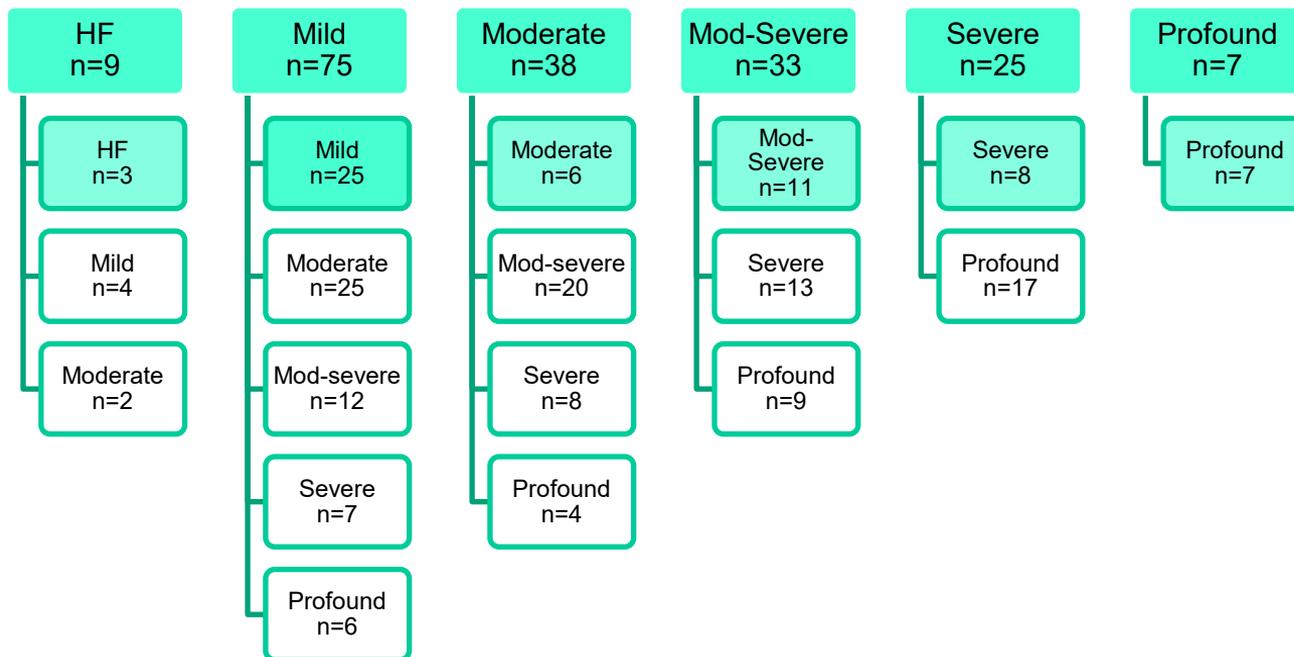
- Decrease of ≥ 10 dB at two or more adjacent frequencies between 500 and 4000 Hz or decrease in 15 dB at one octave frequency (Dahl et al, 2013)

Progressive hearing loss n=418



Barreira-Nielsen, Fitzpatrick et al. 2016, *Ear and Hearing*

Progressive hearing loss-bilateral – n=187 ears

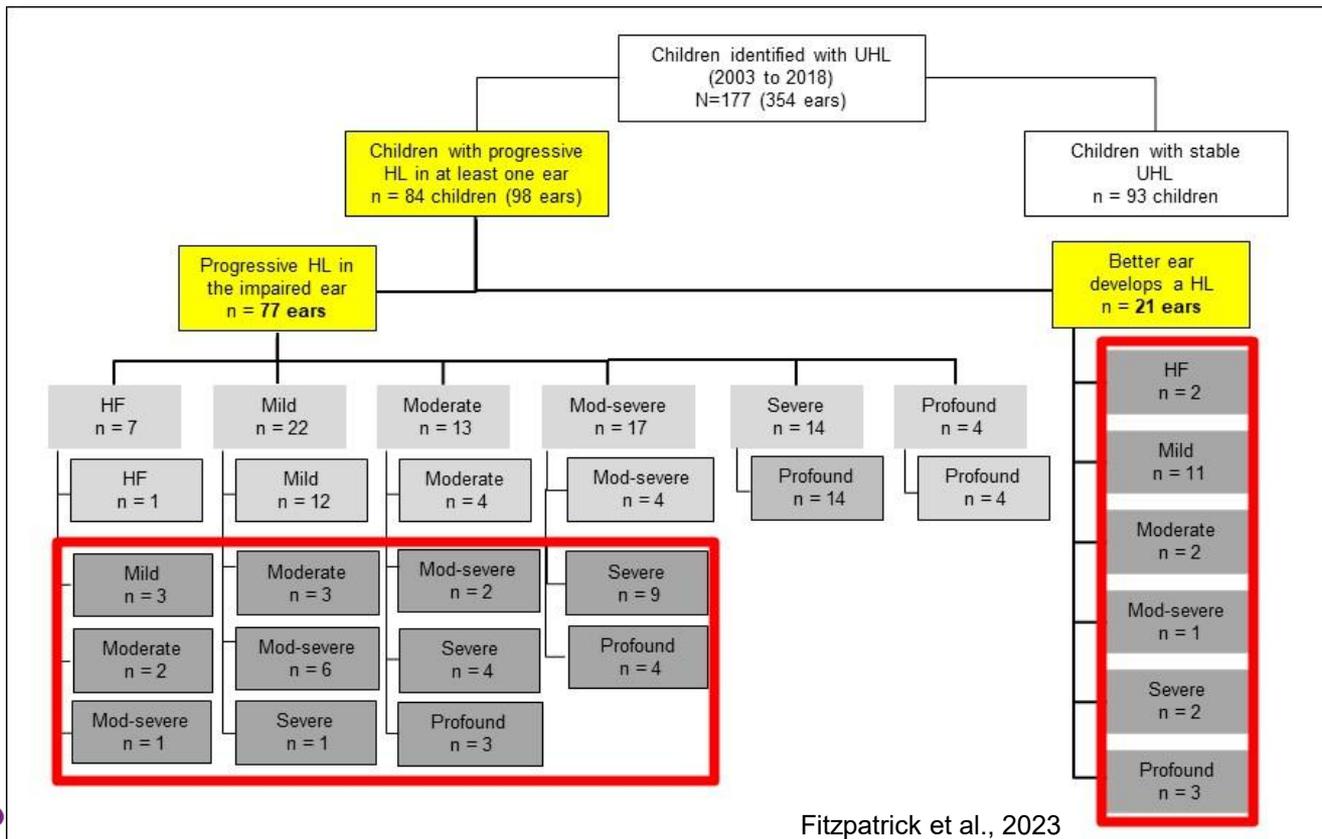


Barreira-Nielsen, Fitzpatrick et al. 2016, *Ear and Hearing*



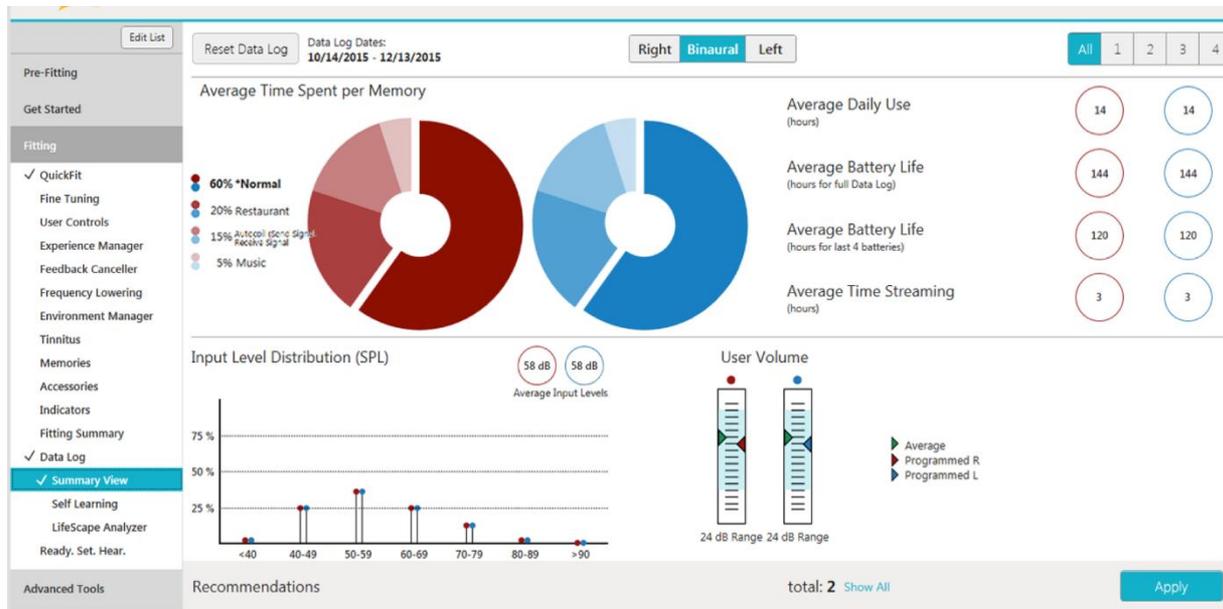
uOttawa

Changes in severity of hearing loss – Unilateral

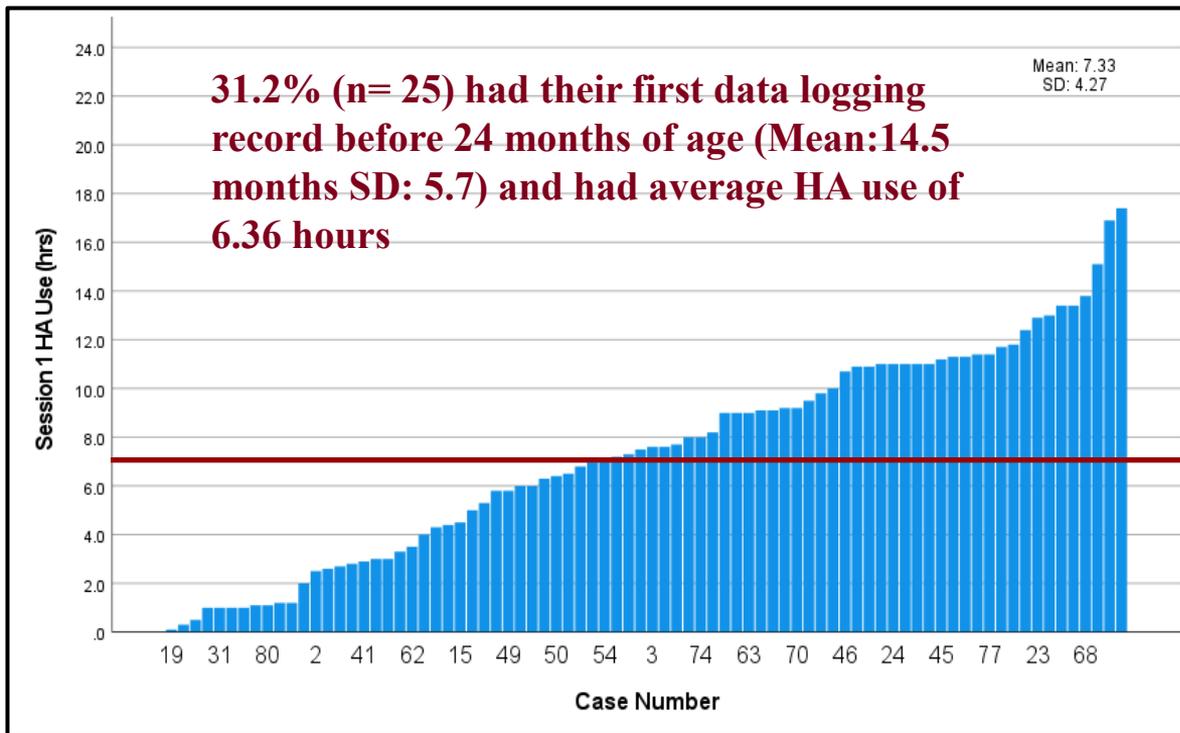




2000s Datalogging – a new tool



Datalogging: HA use time (n=80)



2000s - Evidence-base for spoken language

- Expectations of how children function and the factors that affect outcomes
- Outcome studies (spoken language outcomes)
- Systematic reviews of published literature



The Volta Review, Volume 104(1), 21–35

Outcomes of Auditory-Verbal Therapy: A Review of the Evidence and a Call for Action

Alice Eriks-Brophy, Ph.D.

While the Auditory-Verbal approach has been a popular intervention option for children with hearing loss since the 1940s, few empirical studies have evaluated the communication and academic outcomes of those children who have participated in this intervention approach. The focus of this article is to discuss the standards of evidence-based practice and to examine the existing evidence that supports Auditory-Verbal therapy (AVT) as an intervention approach. Various types of evidence are categorized in terms of the scientific strength they provide in favor of treatment approaches. The evidence that currently exists in support of AVT is presented through a review of seven studies examining various outcomes associated with this intervention approach. The article concludes with a discussion of the types of evidence that are still needed to support the outcomes of AVT and a call for collaboration in the generation of such evidence.

Auditory-verbal therapy for promoting spoken language development in children with permanent hearing impairments

Christopher G Brennan-Jones^{1, 2, 3}, Jo White³, Robert W Rush³, James Law⁴

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Contact address: Jo White, School of Health Sciences, Division of Speech and Hearing Sciences, Queen Margaret University, Queen Margaret University Drive, Edinburgh, EH21 6UU, UK. jwhite@qmu.ac.uk

Editorial group: Cochrane Developmental, Psychosocial and Learning Problems Group.

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Review content assessed as up-to-date: 30 January 2014.

Citation: Brennan-Jones CG, White J, Rush RW, Law J. Auditory-verbal therapy for promoting spoken language development in children with permanent hearing impairments. *Cochrane Database of Systematic Reviews* 2014, Issue 3. Art. No.: CD010100. DOI: 10.1002/14651858.CD010100.pub2.

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International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl



Review Article

Efficacy of auditory-verbal therapy in children with hearing impairment: A systematic review from 1993 to 2015



Ramesh Kaipa ^{*}, Michelle L. Danser ¹

Department of Communication Sciences and Disorders, Oklahoma State University, Stillwater, OK, USA



Cochlear Implants International

An Interdisciplinary Journal for Implantable Hearing Devices

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/yci20>

Efficacy of auditory verbal therapy in children with cochlear implantation based on auditory performance – A systematic review

Augustina Noel, Manju Manikandan & Prawin Kumar

To cite this article: Augustina Noel, Manju Manikandan & Prawin Kumar (2022): Efficacy of auditory verbal therapy in children with cochlear implantation based on auditory performance – A systematic review, *Cochlear Implants International*, DOI: 10.1080/14670100.2022.2141418

Communication



And now the typical kids are entering junior kindergarten with normal language....8-10 word sentences. We used to be so excited if they got to kindergarten with 2-3 word combinations.

*Fitzpatrick & Olds, 2015. Practitioners' perspectives on the functioning of school-age children with cochlear implants, *Cochlear Implants International*, 16:1, 9-23*

Social functioning



But their language is very clinical. What is missing is that these children come out like little adults and so the social aspect, understanding social awareness – they get it, but they don't get it. They get it in situation-specific contexts

*Fitzpatrick & Olds, 2015. Practitioners' perspectives on the functioning of school-age children with cochlear implants, *Cochlear Implants International*, 16:1, 9-23*

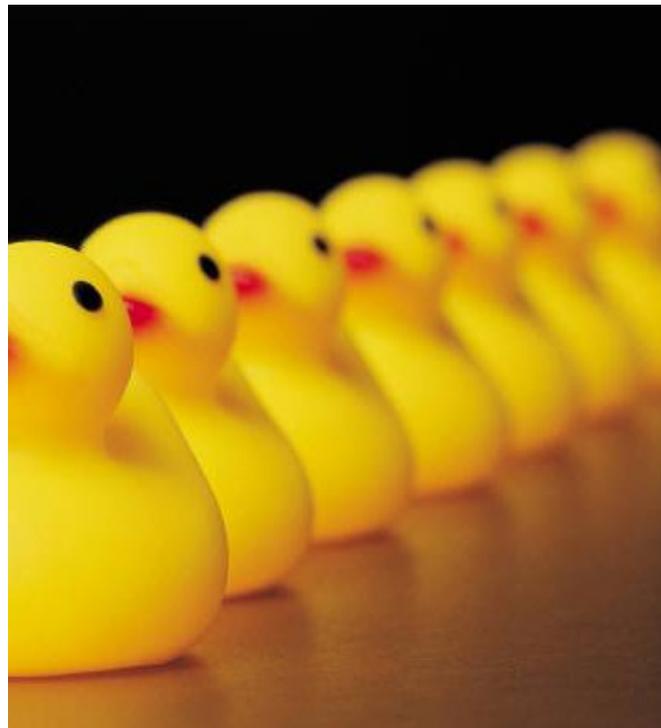
How are today's children doing?

- Tomblin et al. 2015. Language Outcomes in Young Children with Mild to Severe Hearing Loss (OCHL study) (n=290 children)
 - On average, children with hearing loss performed below matched hearing peers; the greater the hearing loss, the larger the gap. Early hearing aid fitting = better audibility = faster growth.
- Ching et al. (2013; 2017). Longitudinal Outcomes of Children with Hearing Impairment (LOCHI) outcomes (n = > 400 children) e.g.,
 - On average, children perform 1 SD to 1.5 SD below their peers with normal hearing.

Early detection and intervention are critical; Severity of hearing loss matters

The 'ducks' need to be lined up

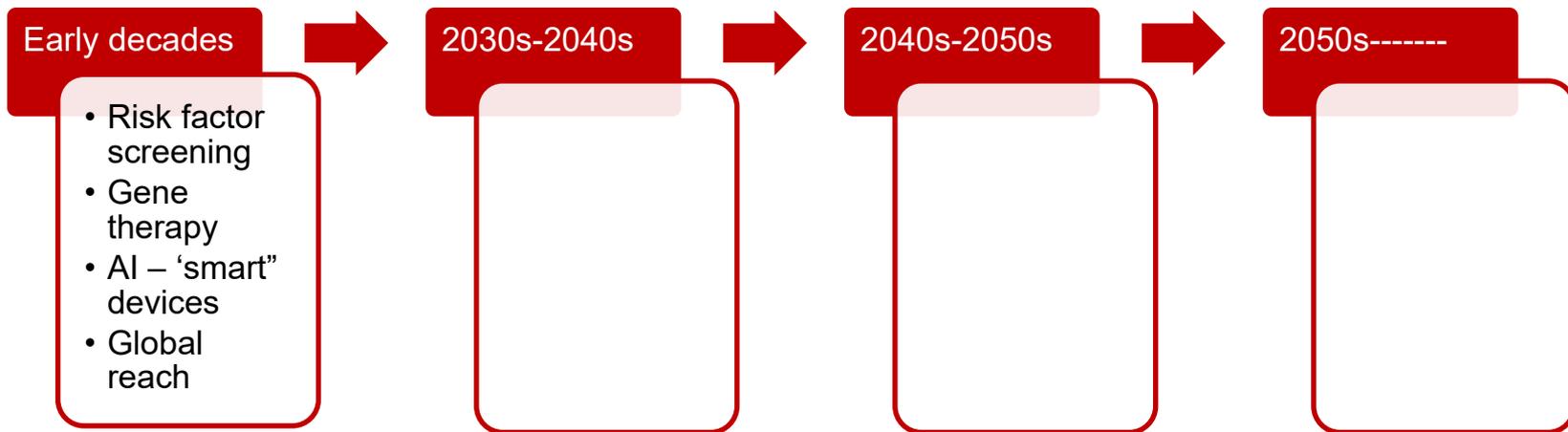
- Early detection/intervention
- Optimal hearing technology
- Consistent hearing technology use
- Child's learning environment
- High quality intervention
- *Typical development*



Where we've come

- *The last 35 years have seen significant advances in the field of aural habilitation and education of hearing impaired children. These have come through the growth of knowledge and technology permitting optimal use of residual hearing from the first months of life.*

Next 35 years



THANK YOU

