

When ‘Mild’ Is Not Mild: Protective Bilingual Access in Down Syndrome with Dual-Sensory Barriers

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Multisensory: Beyond Vision and Hearing

**Multisensory:**
ASL utilizes shape, motion, touch/tactile, and proprioceptive feedback (muscle memory).

**Tactile Teaching Methods:**
Co-signing: gently guided hand shapes built spatial awareness; Hand-under-hand signing: child felt rhythm directly on signer's hands.

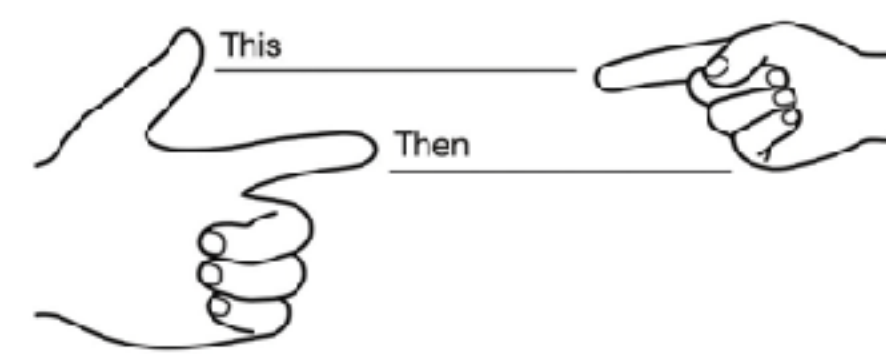
**Pattern Recognition:**
Unlike unpredictable environmental movement, ASL is highly structured and predictable. Pattern recognition replaces sign-by-sign decoding and increasing fluency reduces the visual-processing demand.

**Spatial Mapping:**
Instead of words, ASL uses 3D spatial mapping to lay out physical environments. This predictable structure makes information easier to process and strengthens a child's spatial orientation.

**Iconicity:**
ASL signs often look and move like the real-world objects they represent. This clear visual connection facilitates learning through experience, taking the guesswork out of matching signs to meaning.

Spatial Structure

An Example You Can Use Now: ASL Listing



Spatial listing anchors items in space (first, second, third) and may support this–then understanding, sequencing, routines, and choices.^{3,4}

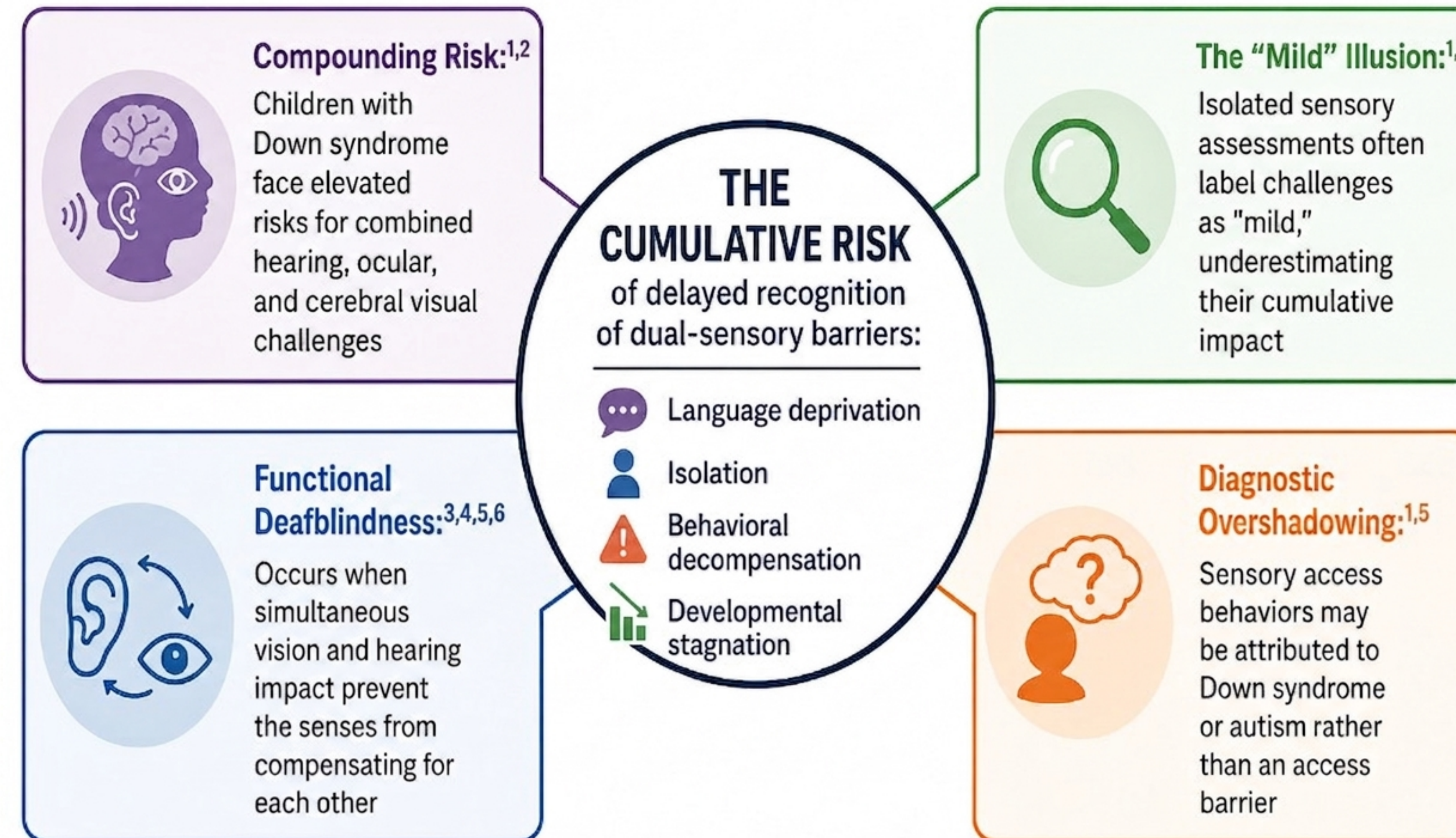


Clinical Takeaways

From “Language Delay” to “Language Barrier”

Traditional Interpretation	Access-Based Interpretation
The child is delayed	The child may have language capacity but inconsistent access ^{7,10,11}
Behavior reflects Down syndrome (diagnostic overshadowing)	Behavior may signal a sensory or communication barrier ^{1,2,14}
Speech will develop with time	 CRITICAL ACTION: Prioritize accessible language now^{4,9,12}

Background: The ‘Mild’ Illusion & Cumulative Risk



Clinical Case Profile

- Down Syndrome
- Auditory & Vestibular: Mild bilateral conductive hearing loss; mild vestibulo-ocular reflex (VOR) impairment.
- Vision History: Cerebral/Cortical Visual Impairment (CVI) (diagnosed late at age 7); congenital nystagmus; partially accommodative esotropia; left hypertropia; left inferior oblique overaction; hyperopia; astigmatism; hypoaccommodation; meibomian gland dysfunction.

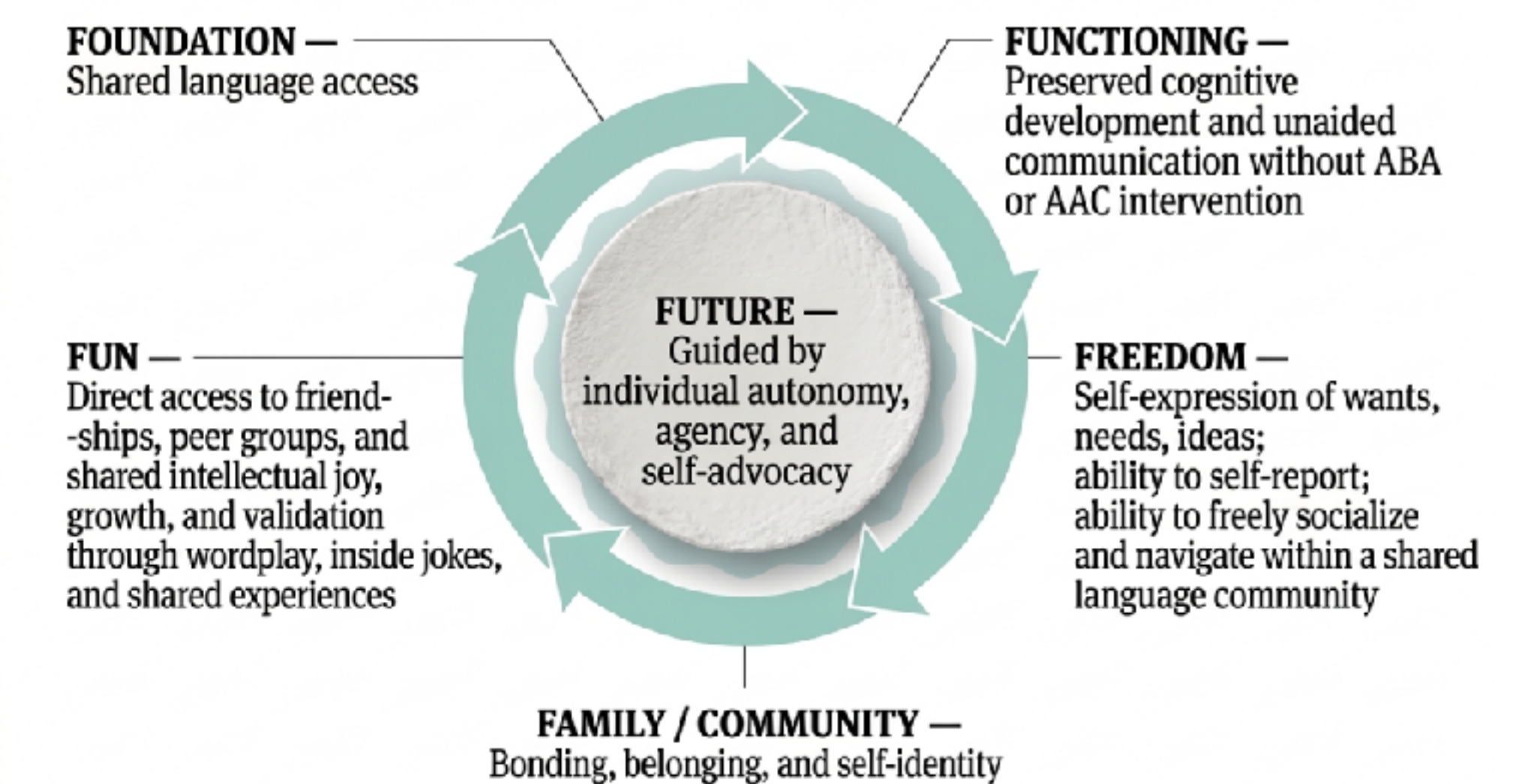
Intervention: Early Accessible Language as a Developmental Foundation

Phase 1: A Gradual, Family-Centered Process	Phase 2: Peer Barriers and the School Transition
- Bimodal approach: ASL for accessible input; spoken language exposure maintained^{9,10} - Early Access: “Signing Time”^{7,11} - Parent ASL: Learned with child + scaffolded (e.g. “Signing Naturally”)³ - Modeling: Consistent, repeated^{3,4} - Labeling: Pointing replaced with signing^{3,4} - ASL progressed; functional spoken language did not emerge despite exposure^{9,10}	- Peer gap (age 3): communication breakdown → self-harm^{3,11,12} - Deaf school (age 4): immediate peer access → rapid integration; self-harm resolved^{7,9,12} - Safety reporting (age 6): articulated safety concerns → successful school transition and restored emotional safety^{5,7} - Later gains: sustained access → academics, culturally Deaf identity (age 7), independent self-advocacy driving accommodations^{7,13}
Outcome: Established early expressive communication, reduced frustration, and strengthened parent–child connection. ^{3,7,12}	Outcome: Restored communication access → social integration and emotional regulation, with emergence of self-advocacy and safety reporting ^{3,4,11,12}

Language Access Optimization

- Reduce Visual Clutter / Increase Clarity:** Simplified background + high-contrast signing (plain clothing, minimal patterns).⁸
- Close, Front-Facing Signing:** In optimal visual field.⁸
- Single-Channel Input:** Separate (not simultaneous) speech and sign to preserve clarity.^{3,4,8}
- Joint Attention:** Continuous monitoring of eye gaze to maintain shared focus.^{3,8}
- Child-Led Pacing:** Slower rate + wait time.^{3,4,8}
- Responsive Validation:** Reciprocating in the modality initiated by the child.^{3,4,5,6}
- Bilingual Co-Exploration:** Immersive modeling of sign and spoken language embedded across daily activities.^{3,4,7}

Outcomes



Adapted from Embry’s Fundamental Framework for Deaf and Hard of Hearing Children and modeled after Rosenbaum and Gorter’s ‘F-words’ in Childhood Disability^{7,13}

Conclusion

- The Access Priority: Shift focus from *speech timelines* to *immediate, consistent language access* across the day.^{7,11}
- Bilingual Safety Net: Early bilingual sign-spoken exposure is protective while a child's complex sensory profile is still being evaluated.^{7,9,10}
- Systemic Protection: Providing structured, multisensory communication preserves cognitive capacity, reduces behavioral distress, and builds relational connections and self agency.^{3,4,5,12}

References

- Boatwright E, et al. Cerebral/cortical visual impairment (CVI) in Down syndrome: a case series. Front Hum Neurosci. 2025;19:1563420.
- Wilton GJ, et al. Behavioural features of cerebral visual impairment are common in children with Down syndrome. Front Hum Neurosci. 2021;15:673342.
- Preisler G. Development of communication in deafblind children. Scand J Disabil Res. 2005;7(1):41-62.
- Bruce SM, Nelson C, Perez A, et al. The state of research on communication and literacy in deafblindness. Am Ann Deaf. 2016;161(4):424-443.
- Wittich W, et al. Development of core sets for deafblindness using the ICF: perspectives of individuals with lived experience. Eur J Phys Rehabil Med. 2024;60:1060-1069.
- Vervloed MPJ, Damen S. Language and communication in people who are deafblind. In: Oxford Handbook of Deafblindness. Oxford University Press.
- Embry DD. Fundamental framework for deaf and hard of hearing children: a model from the child’s perspective. J Child Lang Acquis Dev. 2023. Presents a child-centered framework prioritizing early, consistent language access.
- Pilling RF. Make it easier: 3-word strategies to help children with cerebral visual impairment use their vision more effectively. Eye (Lond). 2023;37(2):285-289.
- Pontecorvo E, et al. Learning a sign language does not hinder acquisition of a spoken language. J Speech Lang Hear Res. 2023;66:1291-1308.
- Humphries T, Kushalnagar P, Mathur G, et al. Language acquisition for deaf children: reducing the harms of zero tolerance to the use of alternative approaches. Harm Reduct J. 2012;9:16.
- Hall WC. What you don’t know can hurt you: risk of language deprivation in deaf children. Matern Child Health J. 2017;21:961-965.
- Fellinger J, Linzner D, Holzinger D, et al. Development of deaf adults with intellectual disability in a therapeutic living community. J Deaf Stud Deaf Educ. 2020;25(3):261-269.
- Rosenbaum P, Gorter JW. The “F-words” in childhood disability: I swear this is how we should think! Child Care Health Dev. 2012;38:457-463.
- Kuenburg A, Fellinger J, Fellinger J. Health care access among deaf people. J Deaf Stud Deaf Educ. 2016;21(1):1-10.