

Measuring Developmental Progress over Time: Clinical Implications

EHDI

February 28, 2017



Presenters

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Goal 6 of 2013 Supplement to 2007 JCIH Position Statement

“All children who are D/HH should have their progress monitored every 6 months from birth to 36 months of age, through a protocol that includes the use of standardized, norm-referenced developmental evaluations, for language (spoken and/or signed), the modality of communication (auditory, visual, and/or augmentative), social-emotional, cognitive, and fine and gross motor skills.”

Rationale

- ECI services are not intended to be remedial
- Whole child
- Results

So, what does it look like in practice?



Norm Referenced Assessments

- Kent Inventory of Developmental Skills (KIDS)
 - Birth to 14.7 months, every 6 months
 - Cognitive, Social, Motor, Communication, Self-Help
- Minnesota Child Development Inventory
 - 15 months to 6 years, every 6 months
 - Social, Self-Help, Gross Motor, Fine Motor, Expressive Language, Language Comprehension, Letters, Numbers

Norm Referenced Assessments

- MacArthur-Bates Communicative Developmental Inventory Words and Gestures
 - 8 months to 18 months, every 6 months
- MacArthur-Bates Communicative Developmental Inventory Words and Sentences
 - 16 months to 30 months, every 6 months
- MacArthur-Bates Communicative Developmental Inventory – III
 - 30 months – 37 months, every 6 months

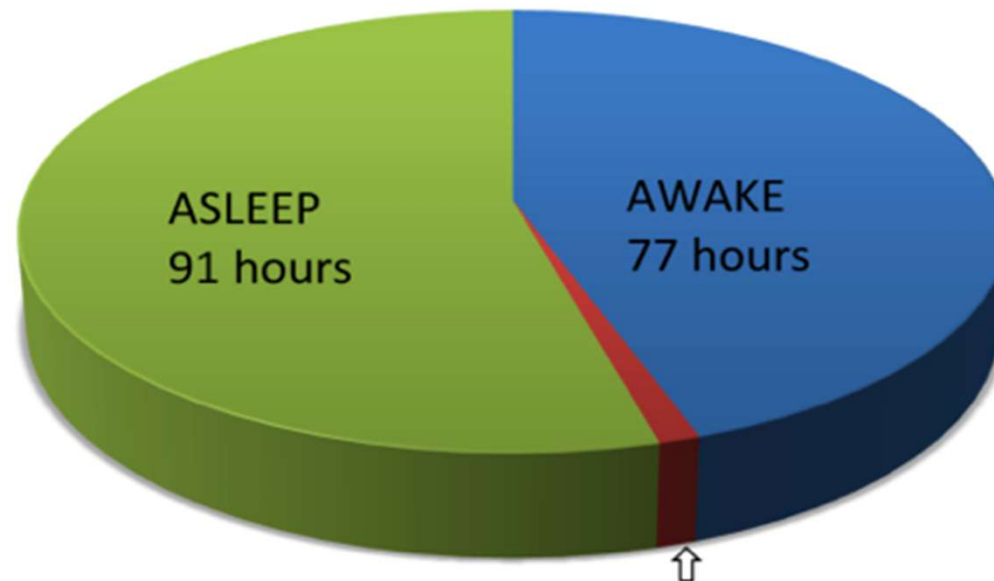
Assessment Record for _____

Assessment	Frequency	Administration Range	Date			
KENT	Every 6 months	1- 14m NECAP: same				
Minnesota CDI	Every 6 months	15m – 6 yrs NECAP: same				
McArthur Words and Gestures	Every 6 months	8-18m NECAP: Boys: ↓49 words Girls: ↓69 words				
McArthur Words and Sentences	Every 6 months	16 – 30m NECAP: Boys: ↑50 words Girls : ↑70 words				
McArthur III	Every 6 months	30-37m NECAP: same				
LENA Recording	4 x year	2 - 48m				
LittleEars	Pre and post CI	Every 2m (for first 24 m of hearing) until scores 35/35				
CASLLS	Ongoing	0-8yrs				
Ski-Hi	Optional ongoing	0-5yrs				

Why Parent Report?



Infant/Toddler's Week



EARLY INTERVENTION—2 hrs.

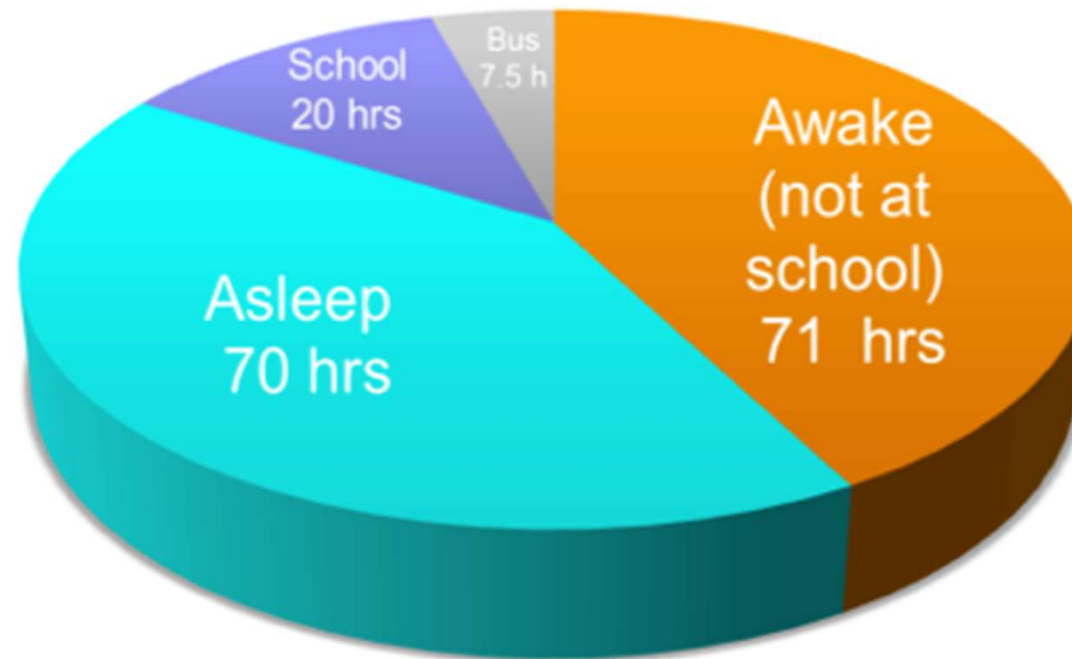
From "How Do Infants and Toddlers with Hearing Loss Learn to Listen and Talk?" presented on March 13, 2013 by:



Clarke Schools
for Hearing and Speech

Soundbridge

Preschool Child's Week



From "How Do Infants and Toddlers with Hearing Loss Learn to Listen and Talk?" presented on March 13, 2013



Clarke Schools
for Hearing and Speech

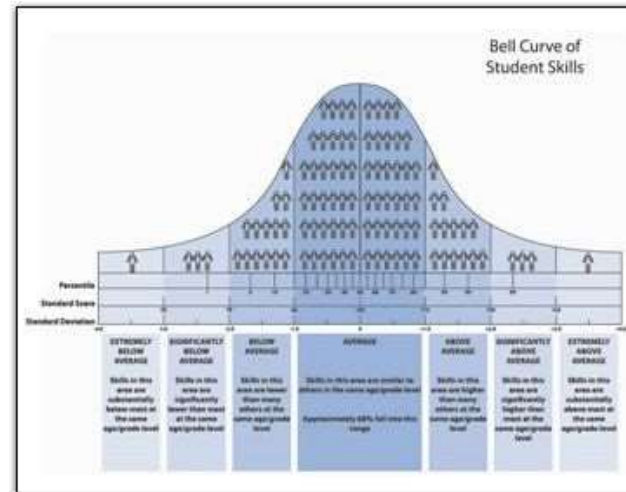
Soundbridge

How do we get these done?

- Completing assessments with parents
 - Help to clarify questions
- Methods
 - During sessions
 - On home visits
 - Giving to parent to complete at home

Sharing Reports With Parents

- Understanding the Bell Curve



- Goal setting and decision making

Data Repository

- See Recommendations 2 & 3 of Goal 6
- Systematic monitoring to ensure appropriate early intervention practices
 - REDCap (OPTION Schools)
 - National Early Childhood Assessment Project (NECAP)
- How has this helped us to improve our practice?

References

- Clarke School Pie Charts (Slides 10 & 11) in webinar: How do Infants and Toddlers with Hearing Loss Learn to Listen and Talk? available online:
<https://www.youtube.com/watch?v=4JPxsSHesk4>
- Dale, P.S.(1991). The validity of a parent report measure of vocabulary and syntax at 24 months. *Journal of Speech, Language, and Hearing Research*, 34, 565-571.
doi:10.1044/jshr.3403.565
- Feldman, H. M., Dale, P. S., Campbell, T. F., Colborn, D. K., Kurs-Lasky, M., Rockette, H. E. and Paradise, J. L. (2005). Concurrent and predictive validity of parent reports of child language at ages 2 and 3 Years. *Child Development*, 76, 856–868.

References

- [Hamadani, J.D., Baker-Henningham, H., Tofail, F., Mehrin, F., Huda, S.N., Grantham-McGregor, S.M.](#) (2010). Validity and reliability of mothers' reports of language development in 1-year-old children in a large-scale survey in Bangladesh. *Food and Nutrition Bulletin*, 31(2 Suppl), S198-206.
- JCIH Supplement (2013) to Position Statement (2007) available online: <http://pediatrics.aappublications.org/content/131/4/e1324.long>
- Johnson, S., Marlow, N., Wolke, D., Davidson, L., Marston, L., O'Hare, A., Peacock, J. and Schulte, J. (2004) Validation of a parent report measure of cognitive development in very preterm infants. *Developmental Medicine and Child Neurology*, 46, (6), 389-397.

References

- [Marchman VA, Martine-Sussmann C.](#) (2002). Concurrent validity of caregiver/parent report measures of language for children who are learning both English and Spanish. *Journal of Speech, Language, and Hearing Research*, 45(5), 983-97.
- Miller, J.F., Sedey, A.L., Miolo, G. (1995). Validity of parent report measures of vocabulary development for children with Down syndrome. *Journal of Speech, Language, and Hearing Research* 38(5), 1037-44.

Measuring Developmental Progress over Time: National Outcomes

EHDI

February 28, 2017



Presenter

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Today's Topics

- Describe NECAP
- Briefly summarize sample characteristics
- Present language outcome data over time
- Identify characteristics of children with more successful language outcomes

Participants

- All families are participating in NECAP
 - National Early Childhood Assessment Project
 - CDC-supported project examining language outcomes at a national level
 - Birth to 3
 - Children who are deaf or hard of hearing

States Represented in Sample

- Arizona
- California
- Florida
- Idaho
- Indiana
- Maine
- Minnesota
- New Mexico
- North Dakota
- Oregon
- Texas
- Utah
- Wisconsin
- Wyoming

Participant Criteria

- Bilateral, pre-lingual hearing loss
 - (all degrees -- mild to profound)
- No diagnosis of auditory neuropathy
- English is written language of the home
- No other disabilities that would affect speech or language development
- Parents: hearing (80%) or deaf/hard of hearing (20%)



(Minnesota) Child Development Inventory

Minnesota CDI Analysis: Number of Participants/Assessments

- Outcomes are a combination of cross-sectional and longitudinal data
- 457 children
- Assessed on 1 to 5 occasions
- Total assessments = 739

Minnesota CDI Analysis: Participant Characteristics

- Chronological age
 - Range = 12 to 35 months
 - Mean = 24 months
- Boys = 52%; Girls = 48%

Minnesota CDI Analysis: Participant Characteristics

Age at...	Median (mos)	Range (mos)
Identification	2	.25 to 31
Amplification	4	.75 to 36
Intervention	4	.25 to 35

*72% of children were identified by 3 months of age

*66% of children were in intervention by 6 months of age

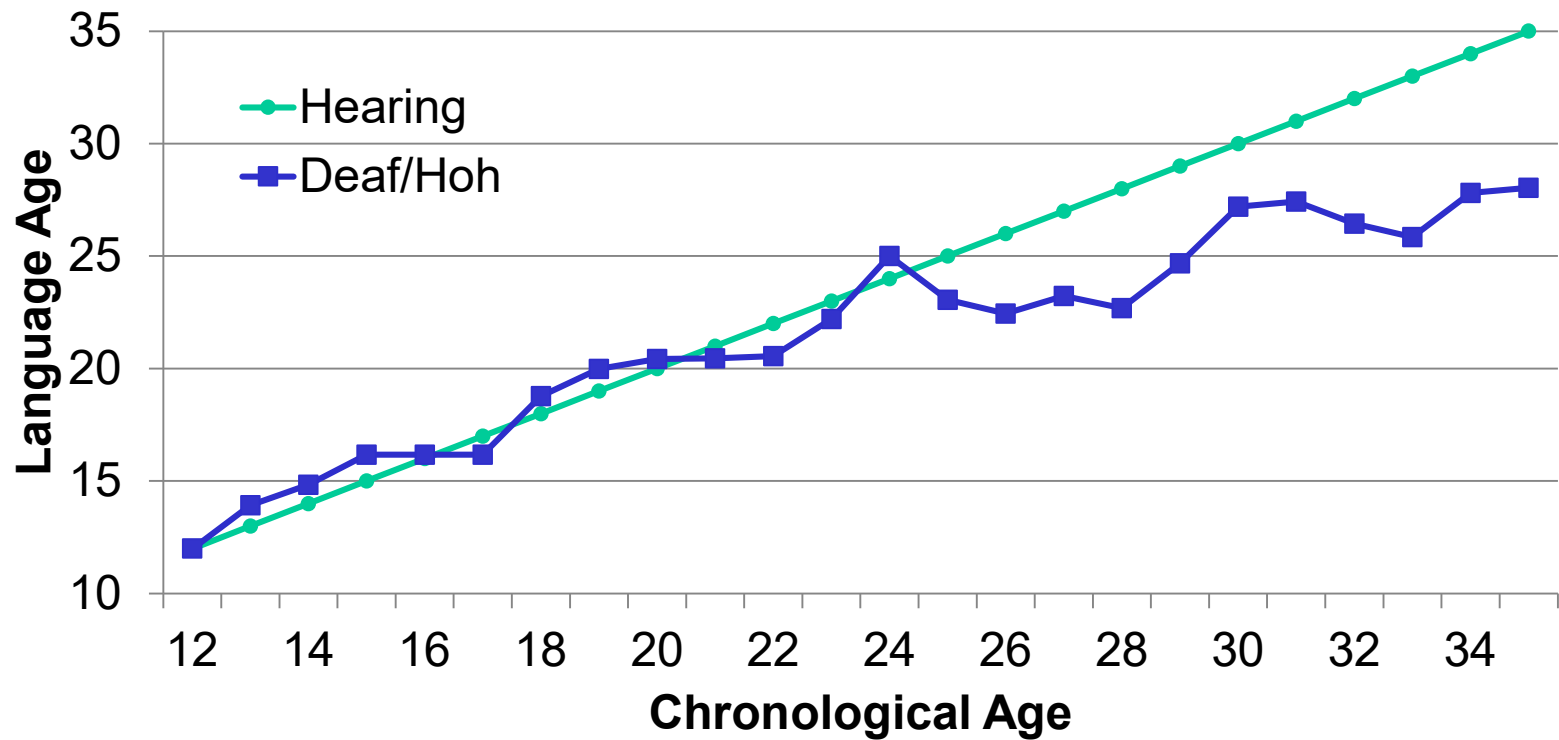
Minnesota CDI Analysis: Participant Characteristics

Highest degree completed	% of primary caregivers
Less than HS	9%
High school diploma	38%
Vocational or Associates	18%
Bachelor's degree	23%
Graduate degree	12%

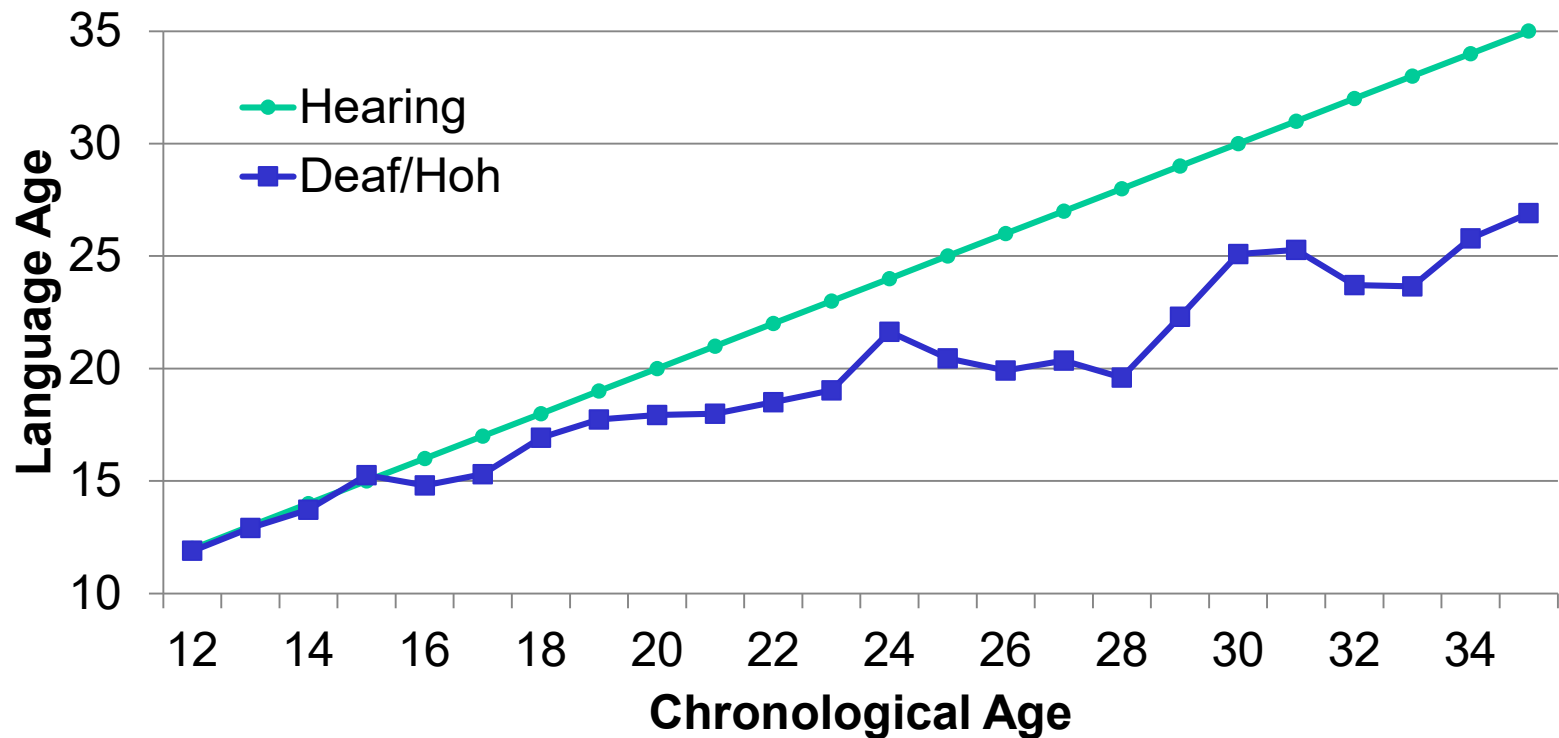
Minnesota CDI Analysis: Participant Characteristics

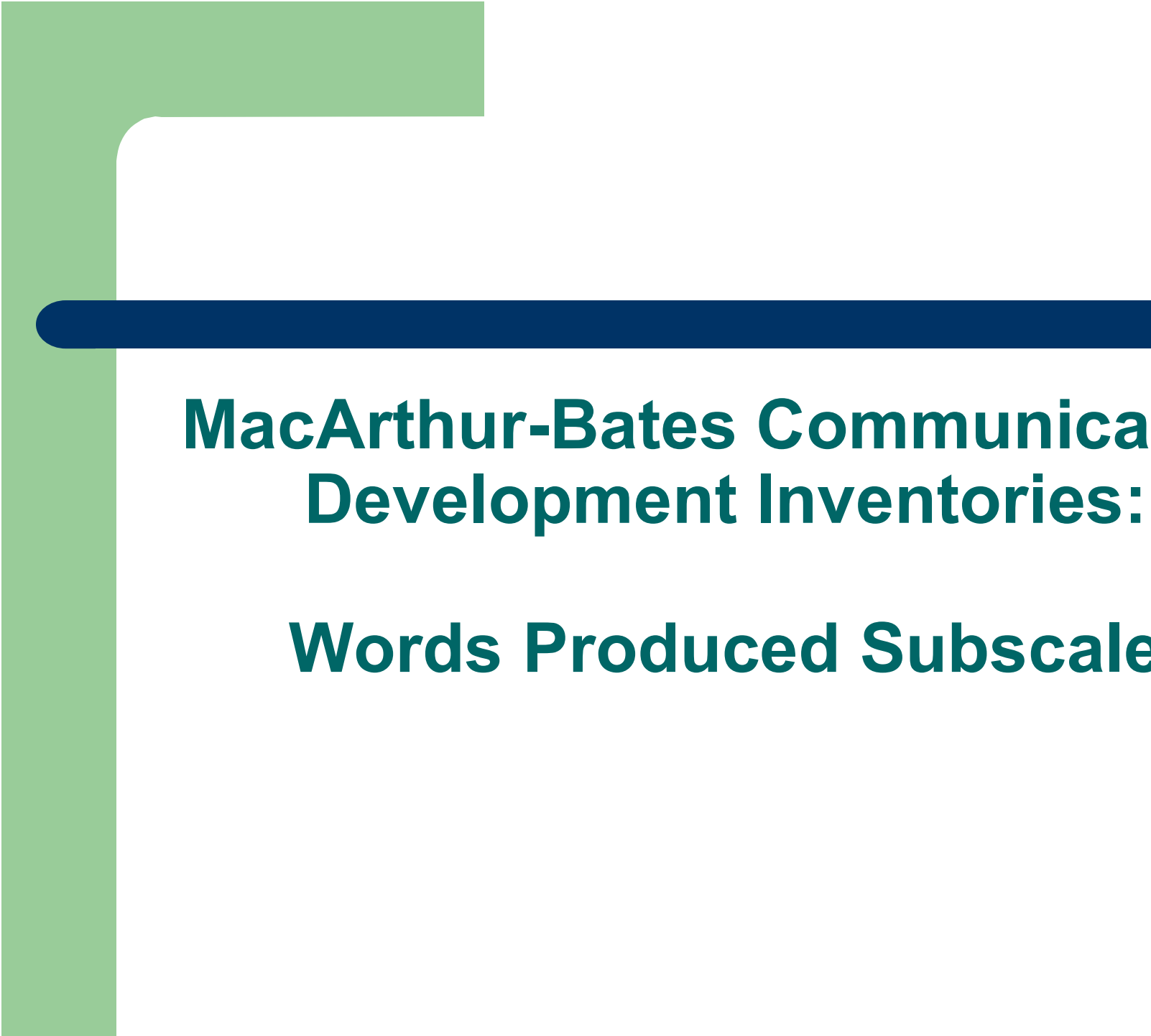
Communication mode used with child by family	% of primary caregivers
Primarily spoken language	70%
Spoken only	28%
Very occasional sign used	42%
Spoken + sign language	25%
Sign only	5%

Minnesota CDI: Expressive Language Subscale



Minnesota CDI: Language Comprehension/Conceptual Lang





MacArthur-Bates Communicative Development Inventories:

Words Produced Subscale

MacArthur CDI Analysis: Number of Participants/Assessments

- Outcomes are a combination of cross-sectional and longitudinal data
- 634 children
- Assessed on 1 to 5 occasions
- Total assessments = 1,066

MacArthur-Bates CDI Analysis: Participant Characteristics

- Chronological age
 - Range = 12 to 35 months
 - Mean = 23 months
- Boys = 53%; Girls = 47%

MacArthur-Bates CDI Analysis: Participant Characteristics

Age at...	Median (mos)	Range (mos)
Identification	2	.25 to 31
Amplification	5	.5 to 32
Intervention	4.3	.25 to 35

*71% of children were identified by 3 months of age

*66% of children were in intervention by 6 months of age

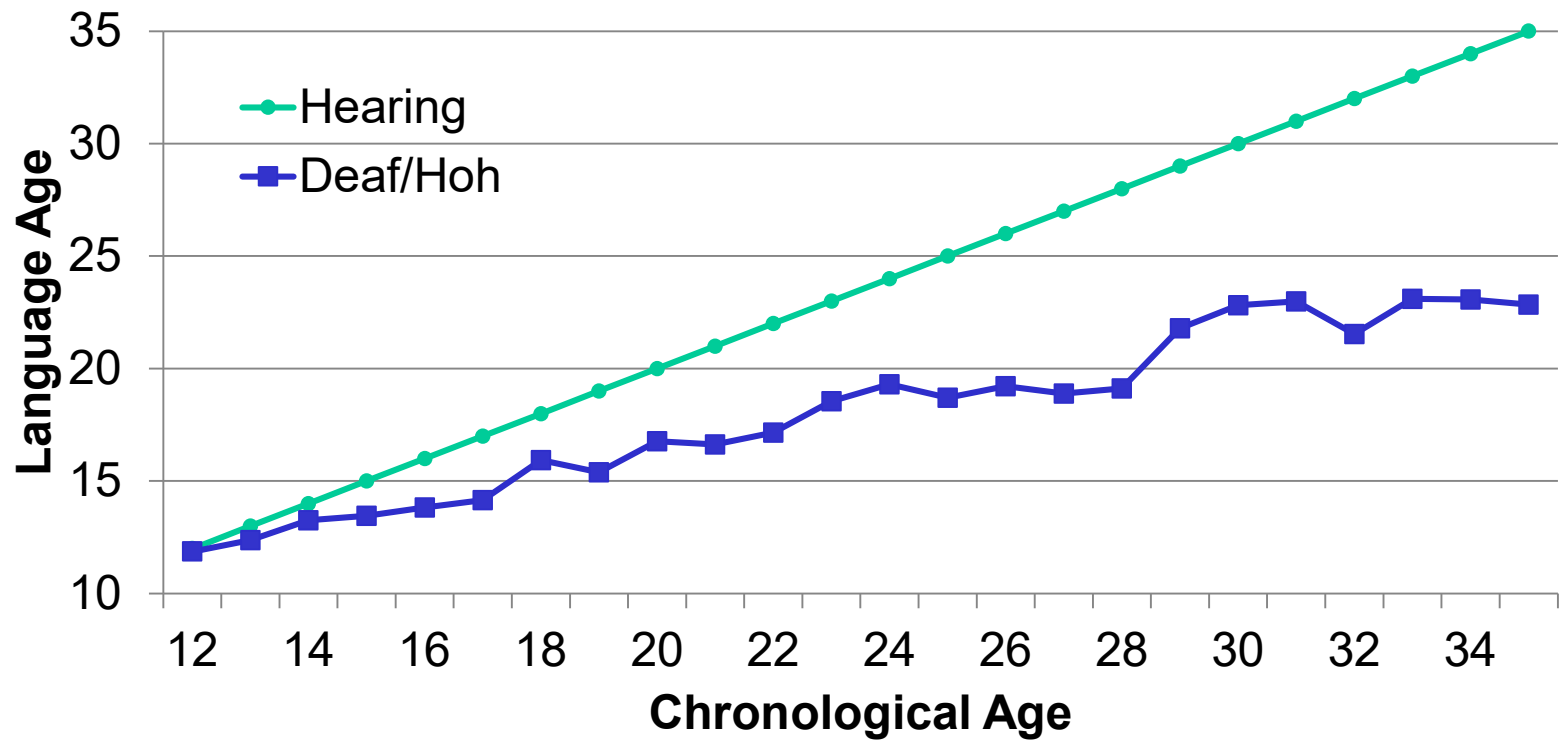
MacArthur-Bates CDI Analysis: Participant Characteristics

Highest degree completed	% of primary caregivers
Less than HS	9%
High school diploma	38%
Vocational or Associates	18%
Bachelor's degree	25%
Graduate degree	11%

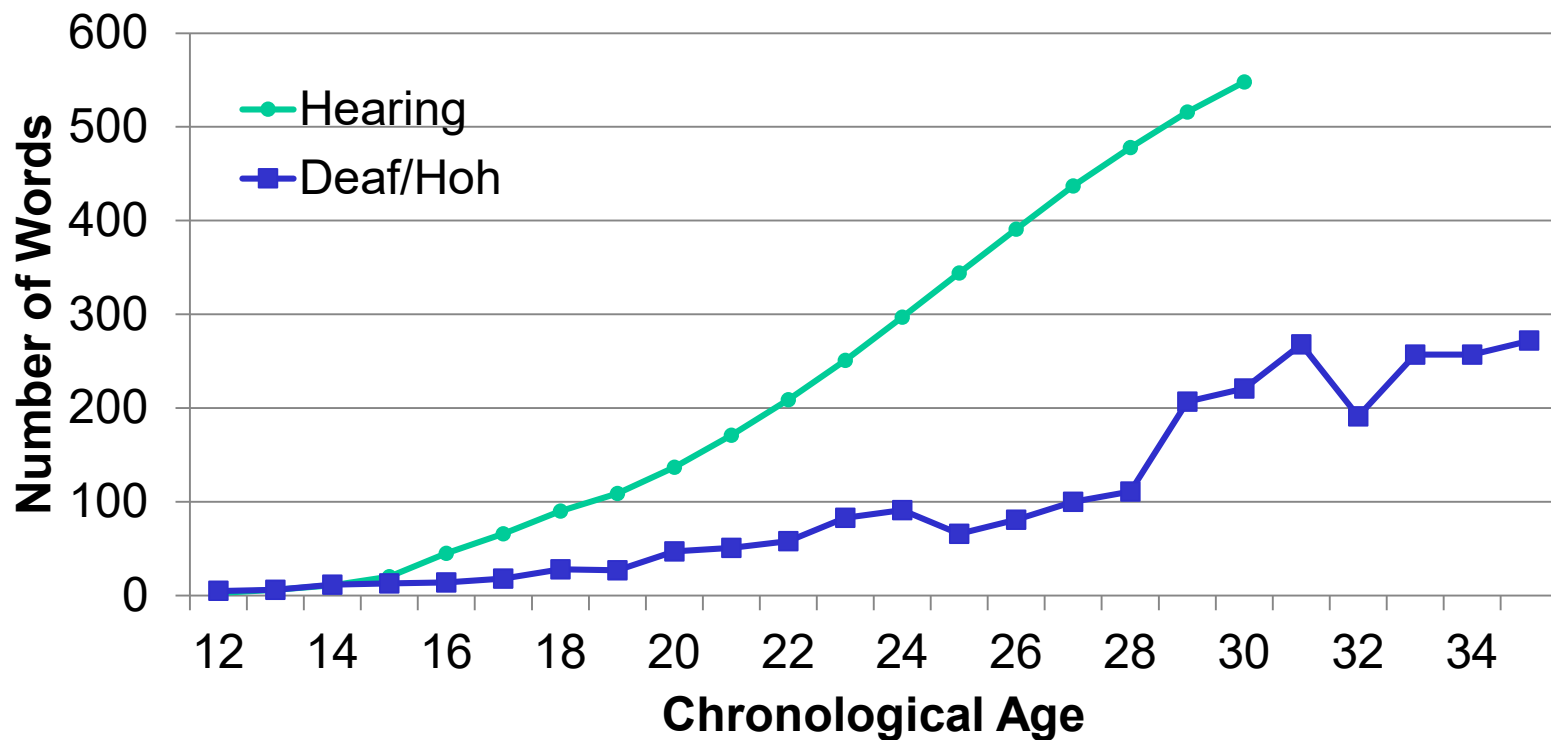
MacArthur-Bates CDI Analysis: Participant Characteristics

Communication mode used with child by family	% of primary caregivers
Primarily spoken language	71%
Spoken only	30%
Very occasional sign used	41%
Spoken + sign language	23%
Sign only	6%

MacArthur-Bates CDI: Expressive Vocabulary



MacArthur-Bates CDI: Expressive Vocabulary – 50th Percentile



Conclusions

- As language demands increase over time, gap between CA and Language Age widens
- Divergence from age expectations starts at:
 - 25 mos for general, surface structure expressive language
 - 20 mos for cognitive-linguistic skills
 - 16 mos for Expressive Vocabulary

Conclusions

- By 35 months of age the gap between language age and chronological age is:
 - 7 mos for general, surface structure expressive language
 - 8 mos for cognitive-linguistic skills
 - 12 mos for expressive vocabulary

Conclusions

- Beginning at 19 mos, hearing children produce 35 to 40 new words per month
- Beginning at 19 months, children who are deaf or hard of hearing average 15 new expressive words per month
- It is important for parents and interventionists to keep typical development in mind when assessing progress and setting goals

Predictors of Better Language Outcomes: Multiple Regression

- Significant predictors of expressive vocabulary (based on most recent assessment):
 - Meeting 1-3-6 EHDI guidelines
 - Parent who is deaf or hard of hearing
 - Lesser degrees of hearing loss
 - Higher mother's level of education
 - Quotient decreases with age so gap between CA and Language Age is widening over time