A Comparison of Language Outcomes and Predictors of Success across Children with Bilateral Loss, Unilateral Loss, Cochlear Implants, and Spanish-Speaking Parents

EHDI Conference

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Presenters

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Today's Topics

- Present language outcome data across four groups of children who are d/hoh
  - Unilateral loss
  - Bilateral loss, English and/or ASL homes
  - Bilateral loss, Spanish homes
  - Cochlear implant users
- Identify characteristics of children with more successful language outcomes

NECAP Project Overview

- NECAP = National Early Childhood Assessment Project

- CDC-supported project to collect language outcome data on deaf and hard-of-hearing children birth to 4 across the United States

States Represented in Results

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

Assessments Completed

- 2,828 assessments completed (not including Colorado)
- 1,553 children assessed 1 to 6 times each
- Colorado: 300 assessments per year

Participant Description for Current Analysis

- Ages 15 to 39 months
- All degrees of hearing loss
- English, Spanish or ASL as the language of the home
- All communication modes (ranging from spoken language only to sign only)
- No other disabilities that would affect speech or language development

Participant Characteristics: EHDI

EHDI Guideline	Percentage Meeting
Identification by 3 months	68%
Intervention by 6 months	64%
Meets EHDI 1-3-6	55%

Assessment: MacArthur-Bates Communicative Dev. Inventories

- Assesses expressive spoken and sign vocabulary
- 680 words divided into a variety of semantic categories
- Parent-report instrument – Parent checks words child can produce in spoken and/or sign language

Determining Language Quotient

Language Age/Chronological Age x 100
- ➢ If LQ = 100, Language Age = CA
- ➢ If LQ < 100, Language Age < CA
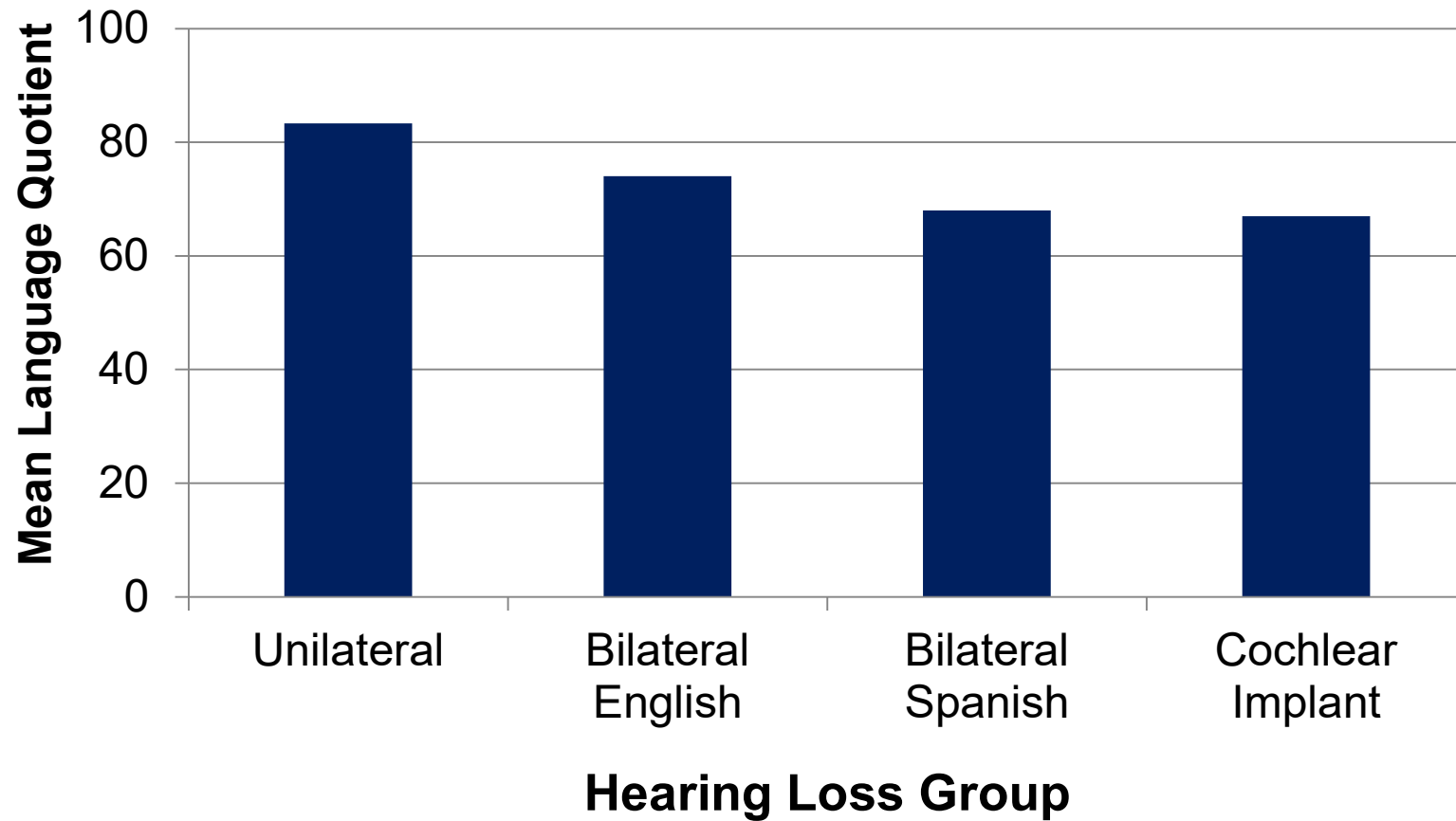- ➢ If LQ > 100, Language Age > CA

Interpreting Language Quotient

- LQ of 75 approximates the 10th percentile
- LQs of 75+ are considered to be within the normal range compared to hearing children
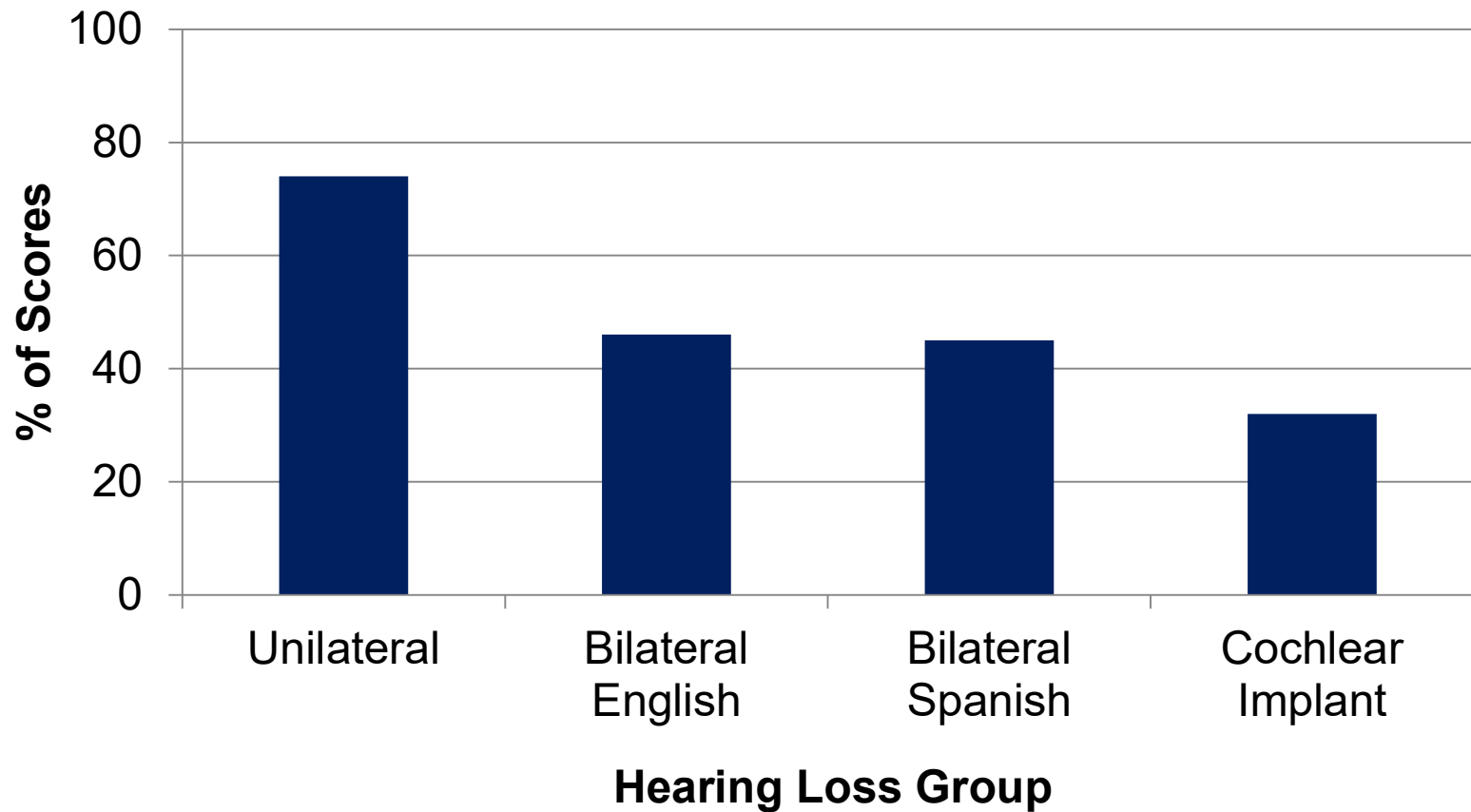
Number of Participants

- Unilateral loss = 179
- Bilateral loss, English and/or ASL = 497
- Bilateral loss, Spanish = 83
- Cochlear implant users = 133

Mean Language Quotients

Percentage of Children in the Average Range (LQ = 75+)

Unilateral Loss

- Factors NOT predictive of language scores:
    - Sex
    - Language of the home
    - ANSD
    - Meets EHDI 1-3-6
    - Has amplification
    - Affected ear (right/left)
    - Degree of loss in affected ear

Unilateral Loss

- Factors PREDICTIVE of language scores:
  - Chronological age
    - ➤ CA increases, LQ decreases
  - Mother's level of education

Bilateral:
English and/or ASL Homes

- Factors NOT predictive of language scores:
  - Sex
  - ANSD
  - Onset of hearing loss (congenital/acquired)

Bilateral:
English and/or ASL Homes

- Factors PREDICTIVE of language scores:
  - Chronological age
    - CA increases, LQ decreases
  - Meets EHDI 1-3-6
  - Deaf parent
  - Mother's level of education
  - Degree of loss

Bilateral: Spanish Homes

- Factors NOT predictive of language scores:
  - Sex
  - Mother's level of education
  - Meets EHDI 1-3-6

Bilateral: Spanish Homes

- Factors PREDICTIVE of language scores:
  - Chronological age
    - CA increases, LQ decreases
  - Degree of loss

Cochlear Implant Users

- Factors NOT predictive of language scores:
  - Sex
  - ANSD
  - Language of the home (English/Spanish)
  - Onset (congenital/acquired)

Cochlear Implant Users

- Factors PREDICTIVE of language scores:
  - Chronological age
    - ➢ CA increases, LQ decreases
  - Meets EHDI 1-3-6
  - Age of cochlear implant activation
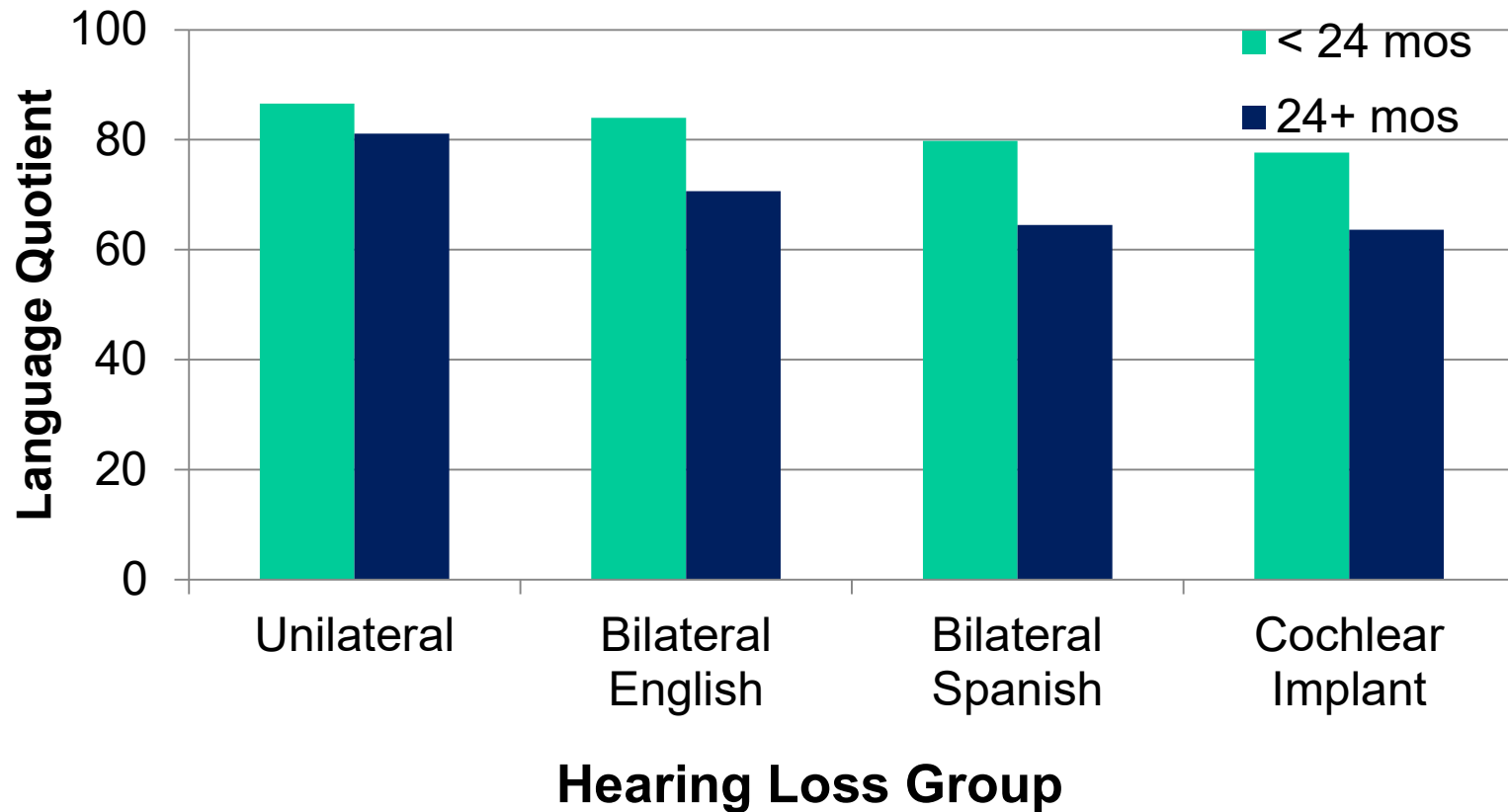 - Mother's level of education

Factors NOT Predictive of Language Scores

- In all 4 groups factors NOT predictive of language scores
    - Sex (boys/girls)
    - ANSD (presence/absence)
    - Onset of hearing loss (congenital/acquired)

Factor Predictive of Language Scores

- In all 4 groups SIGNIFICANT predictor of scores:

    - Chronological Age

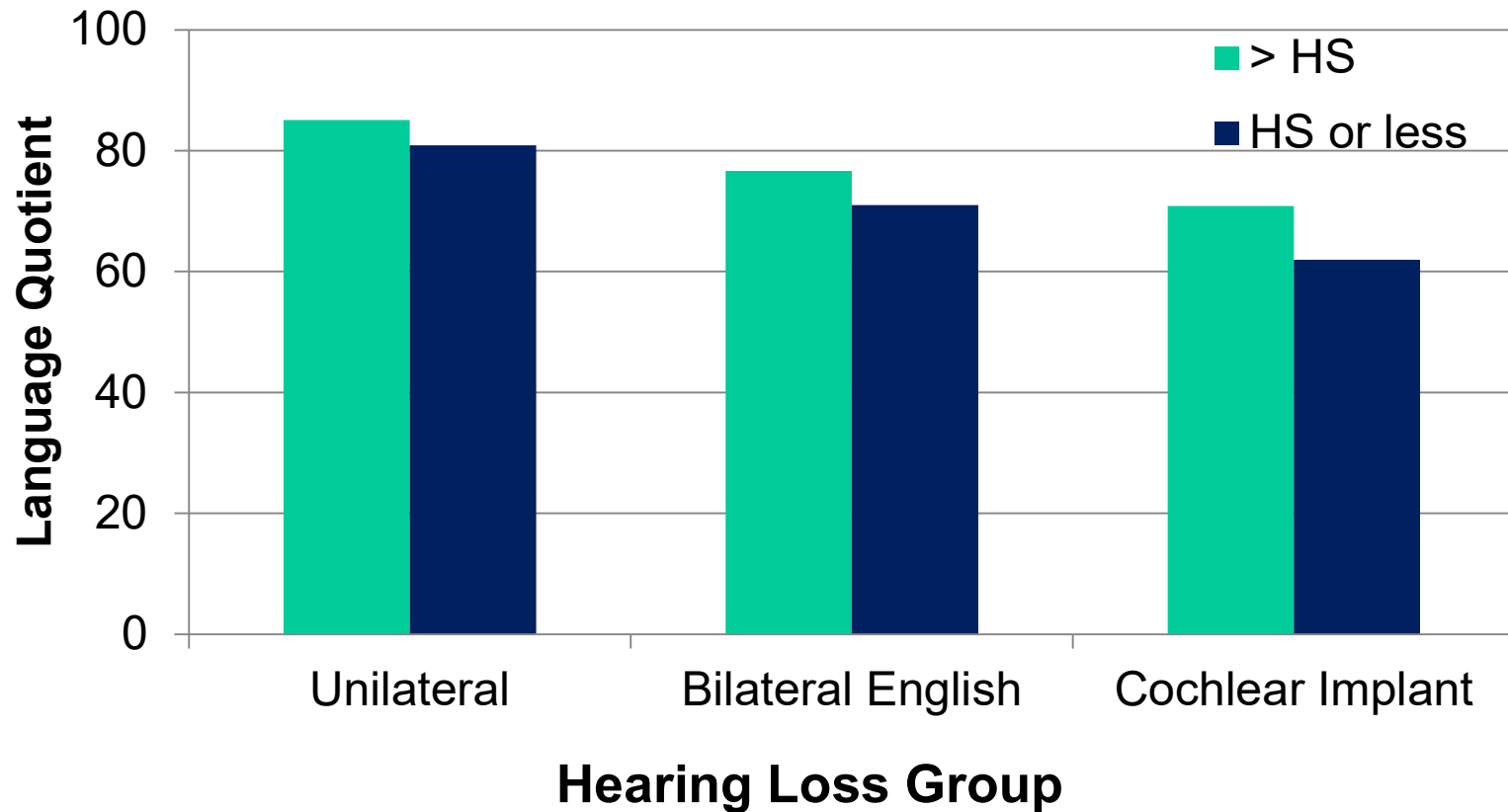 ➤ As *CA increases, language quotient decreases* – so gap between language age and CA is widening over time

Factor Predictive of Language Scores

- For Unilateral, Bilateral English, and Cochlear Implant SIGNIFICANT predictor of scores:
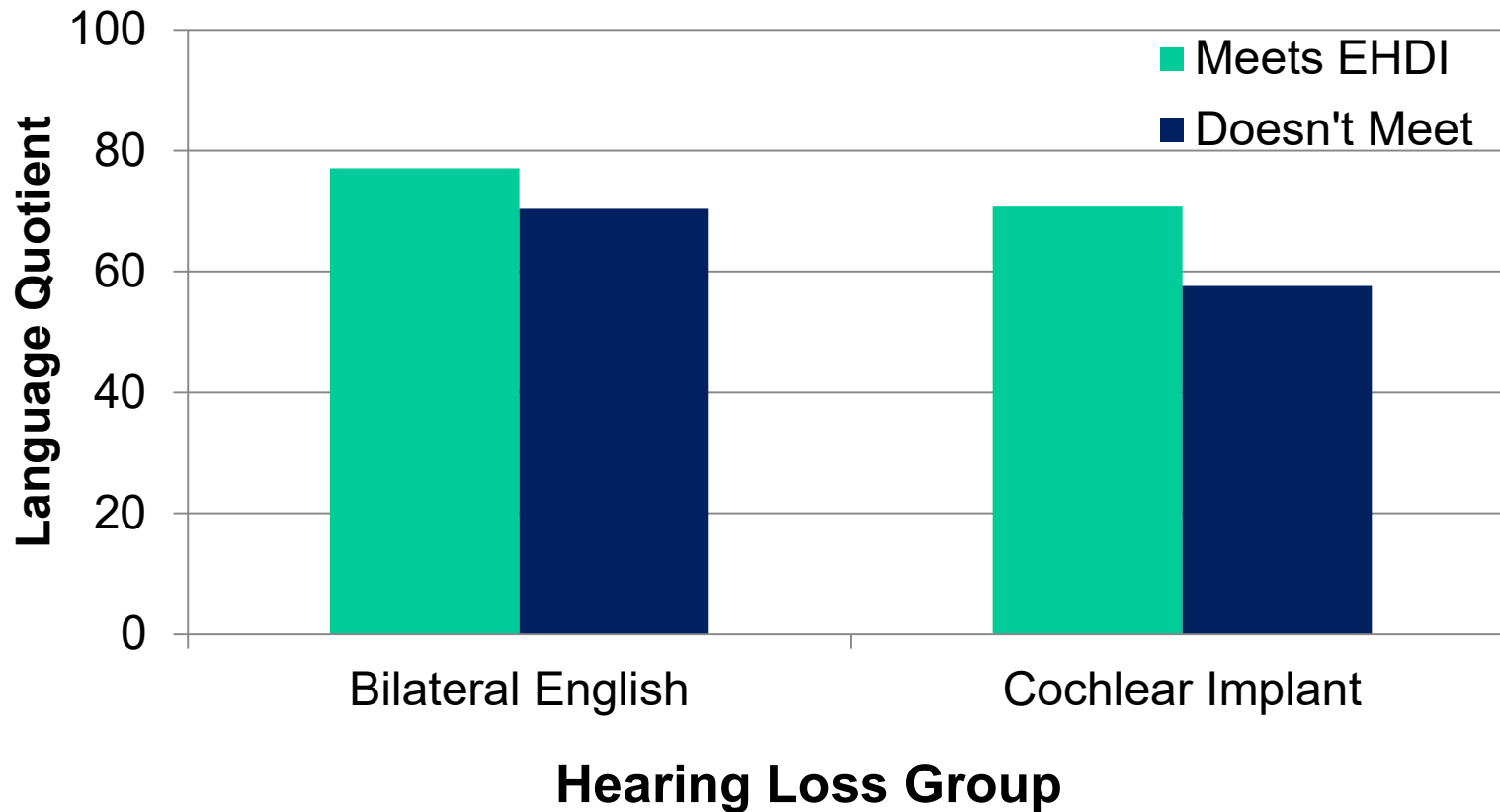
  - Mother's Level of Education

Significant Predictor: Mother's Level of Education

Factor Predictive of Language Scores

- For Bilateral English and Cochlear Implant SIGNIFICANT predictor of scores:

  - Meets EHDI 1-3-6

Significant Predictor: Meets EHDI 1-3-6

Conclusions

- Acquiring an age-appropriate lexicon is a challenge for many children with bilateral hearing loss with more than 50% demonstrating significant delays

Conclusions

- Meeting EHDI 1-3-6 guidelines is a significant predictor of language outcomes
- However, across the United States, on average, only 55% of children meet these guidelines

Conclusion

- Gap between CA and language age increases over the birth to 3 period
  - Language demands increase exponentially after 18 months of age
  - Average expressive vocabulary size at:
    - 12 months = 5 words
    - 18 months = 85 words
    - 24 months = 300 words

Research to Practice: What should we do?

- Consider providing increased support to families who have a more limited educational background
- Consider providing increased support to children with greater degrees of hearing loss

Research to Practice: What should we do?

- Work with your state system/agencies to identify children by 3 months of age
- Work with your state system/agencies to begin intervention by 6 months of age

Research to Practice: What should we do?

- Understand vocabulary size benchmarks and share this info with families
- Even if a child is off to a great start, assess language at 6 month intervals beginning at 24 months of age using norm-referenced instruments