

# Intensity of Early Intervention Services for Children who are Deaf or Hard of Hearing

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# Current knowledge/evidence

- Birth to three is a critical developmental period
  - Early Identification = positive/improved language
    - Recent research looked at **3 months**
  - “Early” early intervention (EI) Enrollment = provided more robust evidence
    - Emphasis on **6 months**
- EI program “intensity” is a critical factor in ensuring significant and long-term benefits — Ramey & Ramey 1998

# Evidence to support importance of exposure

- Children who received services specific for DHH infants/toddlers had improved longer term outcomes
  - Higher scores in emergent literacy skills
  - Higher likelihood of being kindergarten ready
  - Higher likelihood of having language and literacy skills “on track” for 3<sup>rd</sup> grade proficiency
- Receipt of DHH services associated with race, insurance status, parental education. Not associated with hearing factors.
- ***Little is understood regarding EI intensity of services for infants/toddlers who are DHH***

# Objective



- Evaluate EI service intensity for children who are DHH
  - Characterize EI intensity in Year 1 and all years
  - Evaluate changes over time in intensity
  - Identify factors associated with intensity
- Specific focus on specialized DHH services (“Habilitative services for hearing loss”)

- >260 infants identified annually
- >50% enrolled into EI
- >50% enrolled into EI by 6 months of age
- 1746 infants born 2008-2014
- **1262 infants enrolled in EI**



# Components of EI for DHH



- Home-based family support
- Unbiased parent education on communication choices
- Assistance with follow up audiological appointments, and connections to community resources
- Guidance in communication and language development
- Opportunities to interact with the D/deaf community
- Parent-to-parent support
- Planning for transition to preschool

“Habilitation Services for Hearing Loss”

# Ohio Data Linkage Project



- Multi-agency collaboration with **the goal to link data across public health and education agencies** in order to better understand outcomes in children who are deaf/hard-of-hearing
- Shared data across state agencies allows a state's EHDI system to be assessed for effectiveness, particularly around child outcomes

# EI Service Definitions



- Classified within the Individualized Family Service Plan
  - Each service includes a start and stop date

Variable	Value examples
Types	34 different categories
Interval	Weekly, Monthly, Every 180 days
Frequency	Once, twice, 4 times
Duration of encounter	30, 60 minutes
Duration of service	Start to end dates

# EI Service Quantitative Definitions



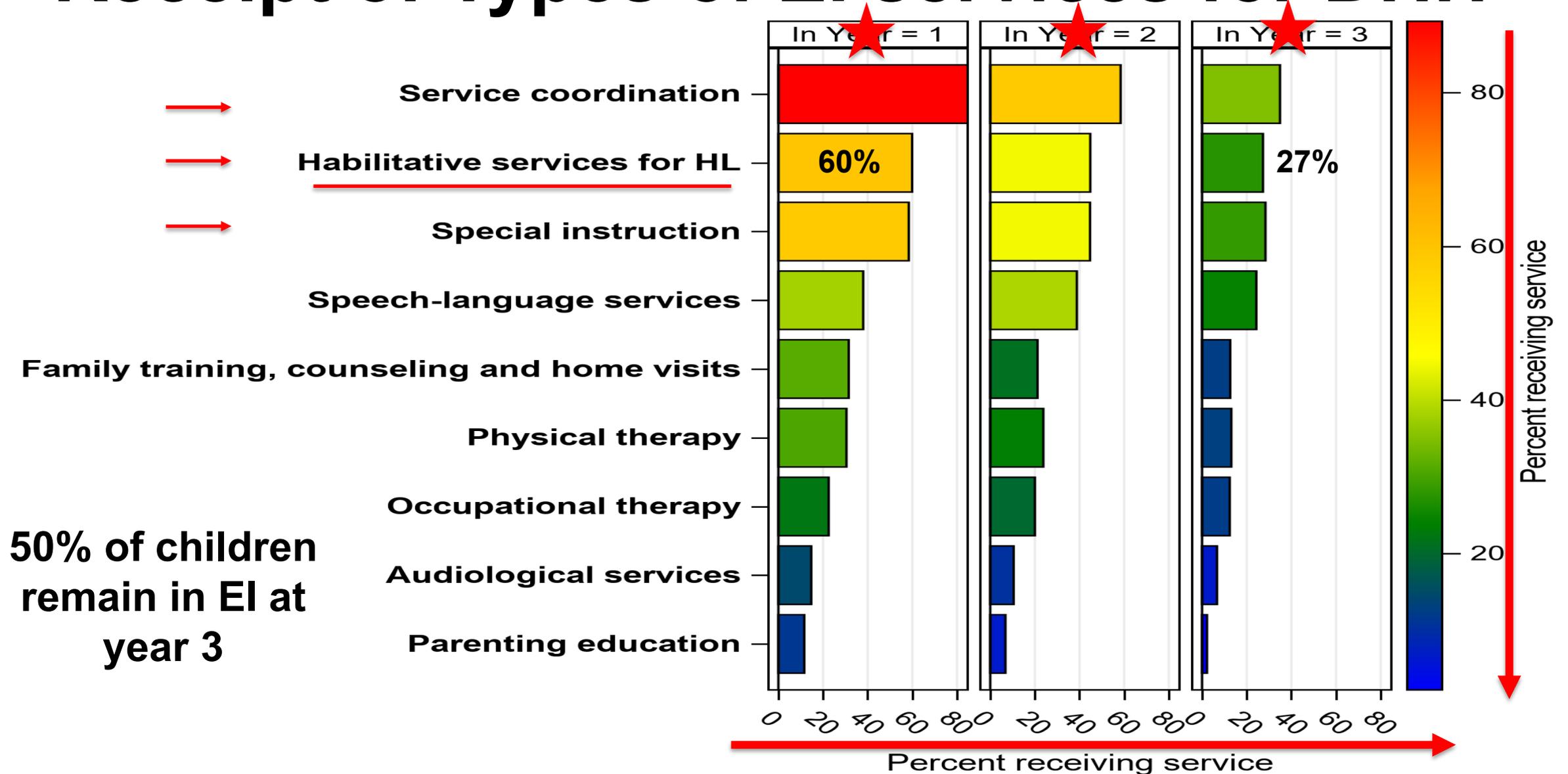
- Any vs. No service
- Cumulative exposure by service
  - Total hours of exposure for the duration of EI
- Minutes per month for all and each service
  - For entire EI duration
  - By year

# Basic demographic characteristics of 1262 infants enrolled in EI

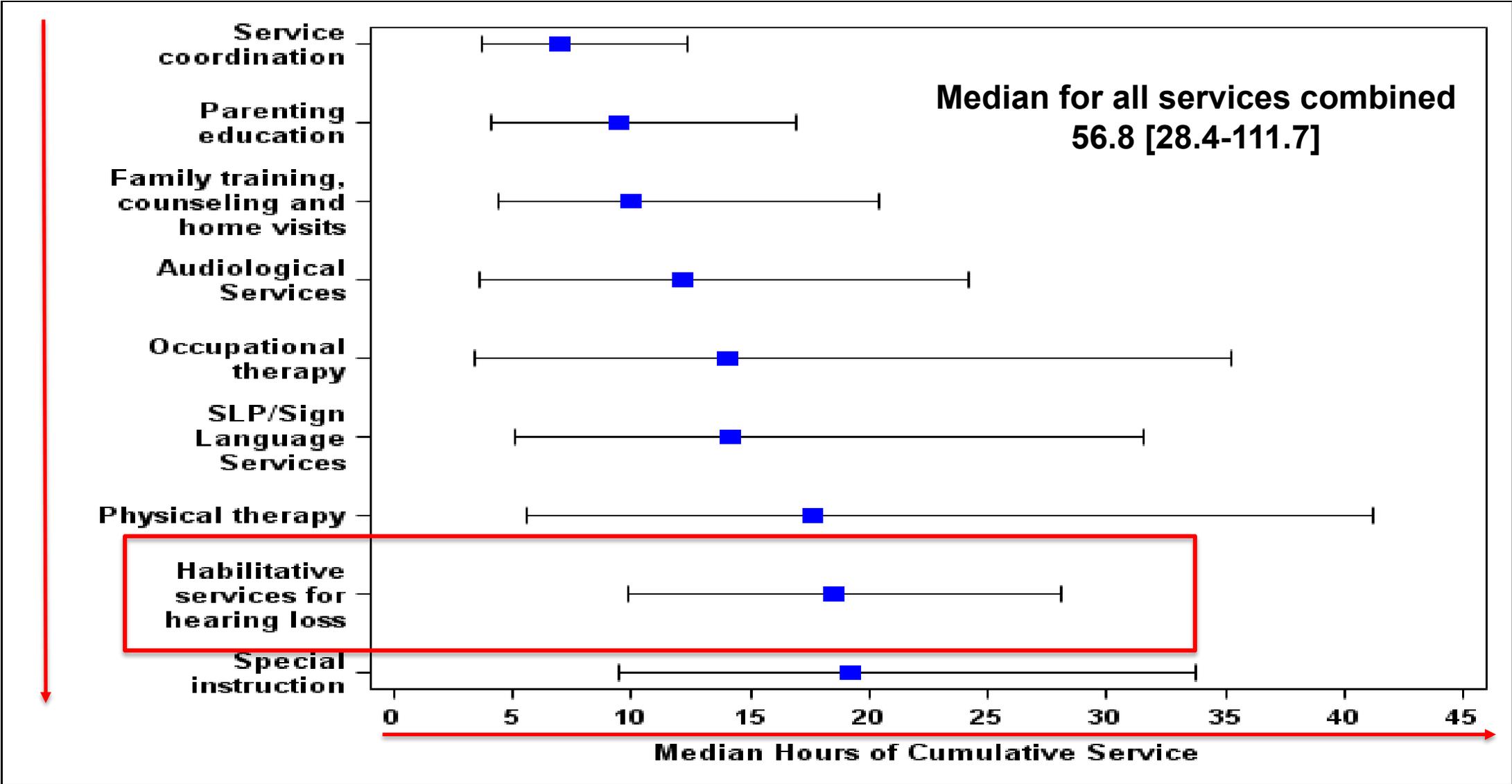
Characteristic	Overall
Race	
White	75.4% ←
Black/African American	12.3%
Hispanic	4.4%
Premature birth	21.4%
Private insurance	47.5% ←
Higher maternal education	56.4% ←
Higher paternal education	45%
Bilateral hearing loss	75.6% ←
Severe to profound hearing loss	35.3%
Age at identification in months	3.9 [1.9-9.0]

Characteristic	Overall
Age at EI enrollment in months	5.3 [3.2-9.3]
EI enrollment by 6 months	56.5%
Has risk indicator for hearing loss	40.2%
Has documented diagnosed disability	25.6%
Child has identified skill delays <sup>a</sup>	
Communication	28.1%
Cognitive	13.1%
Motor	17%
Social	7.3%
Adaptive	12.4%
Identified skill delay in any domain	33.0%
Number of main EI services received over entire EI	
1	3.6%
2	14.3%
3	22%
4 or more	60.2%

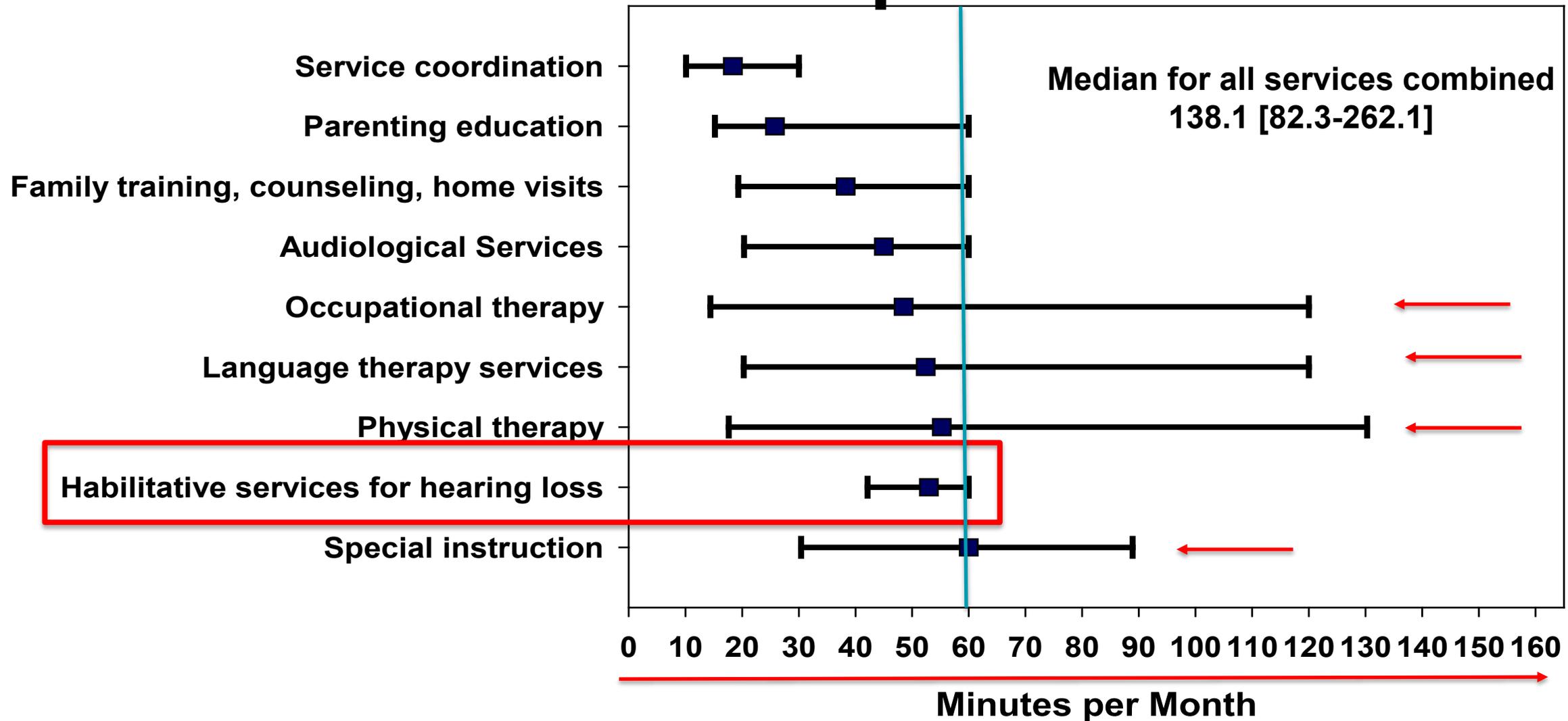
# Receipt of Types of EI services for DHH



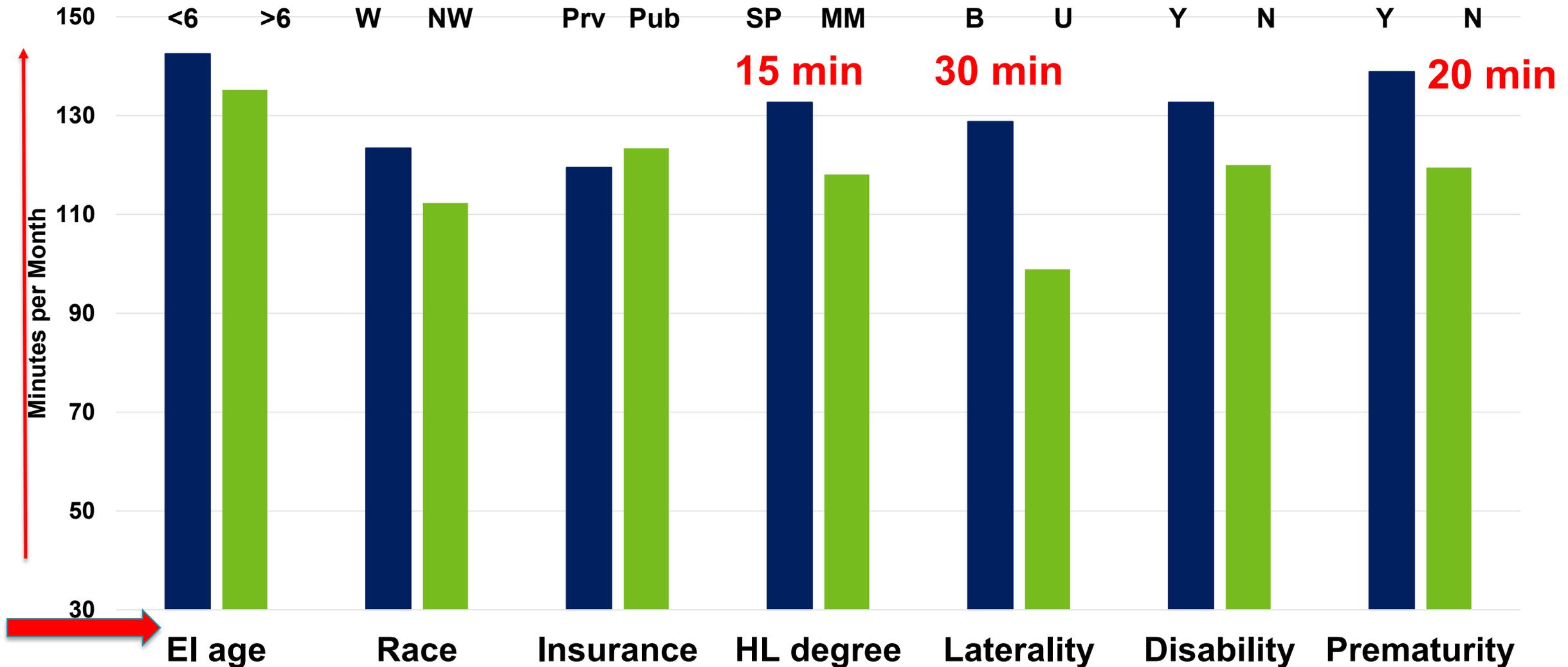
# Median cumulative exposure in hours per service



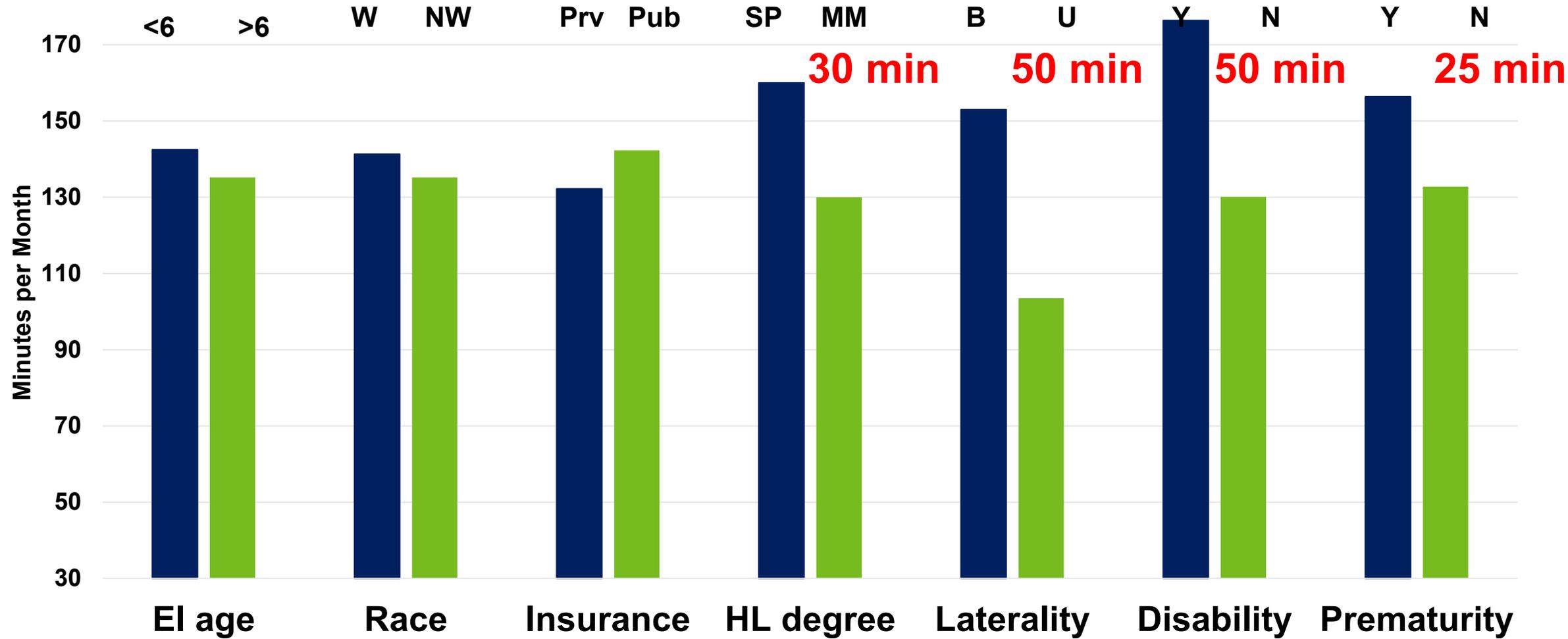
# Intensity of services median measured in minutes per month



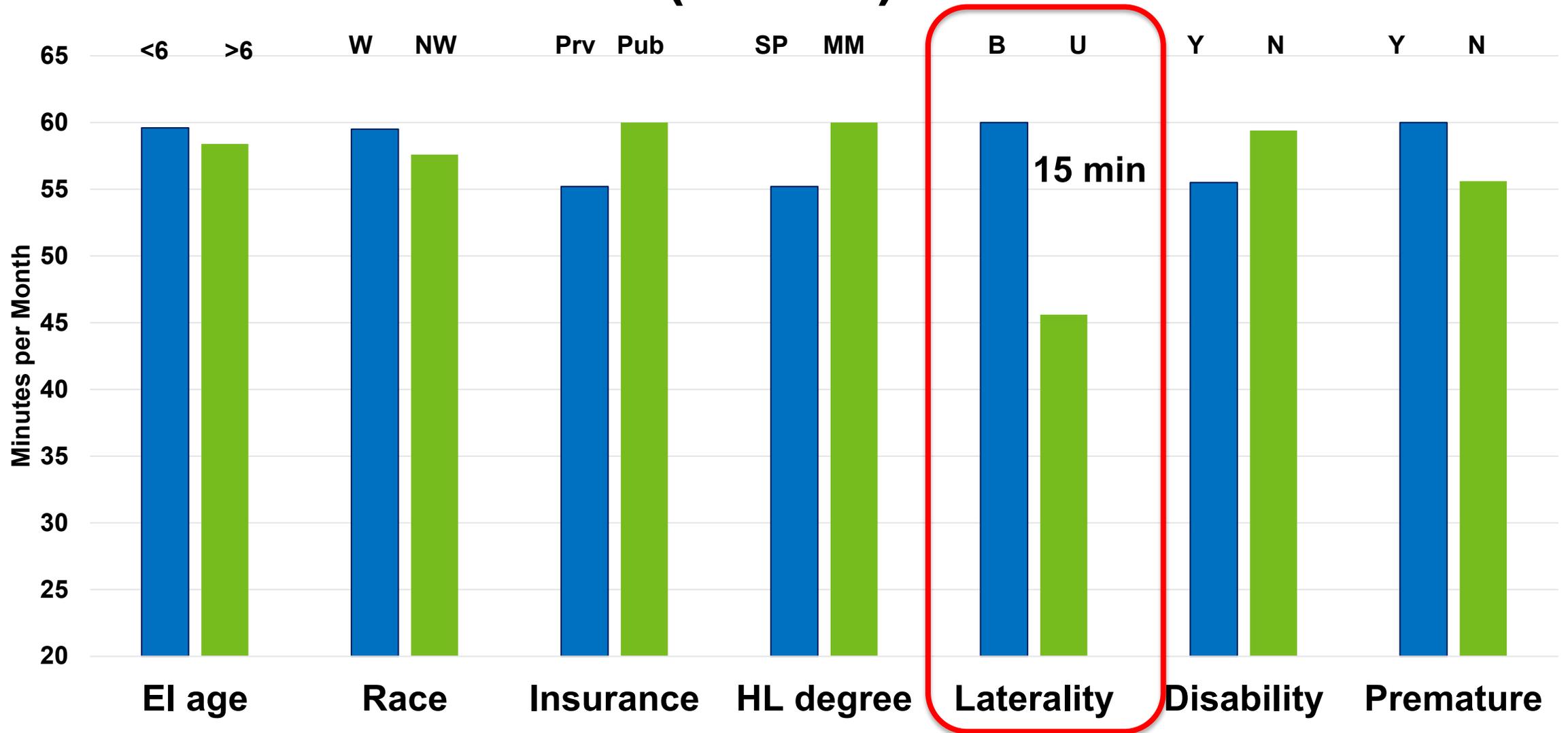
# Factors associated with overall service intensity (Year 1)



# Factors associated with overall service intensity All Years

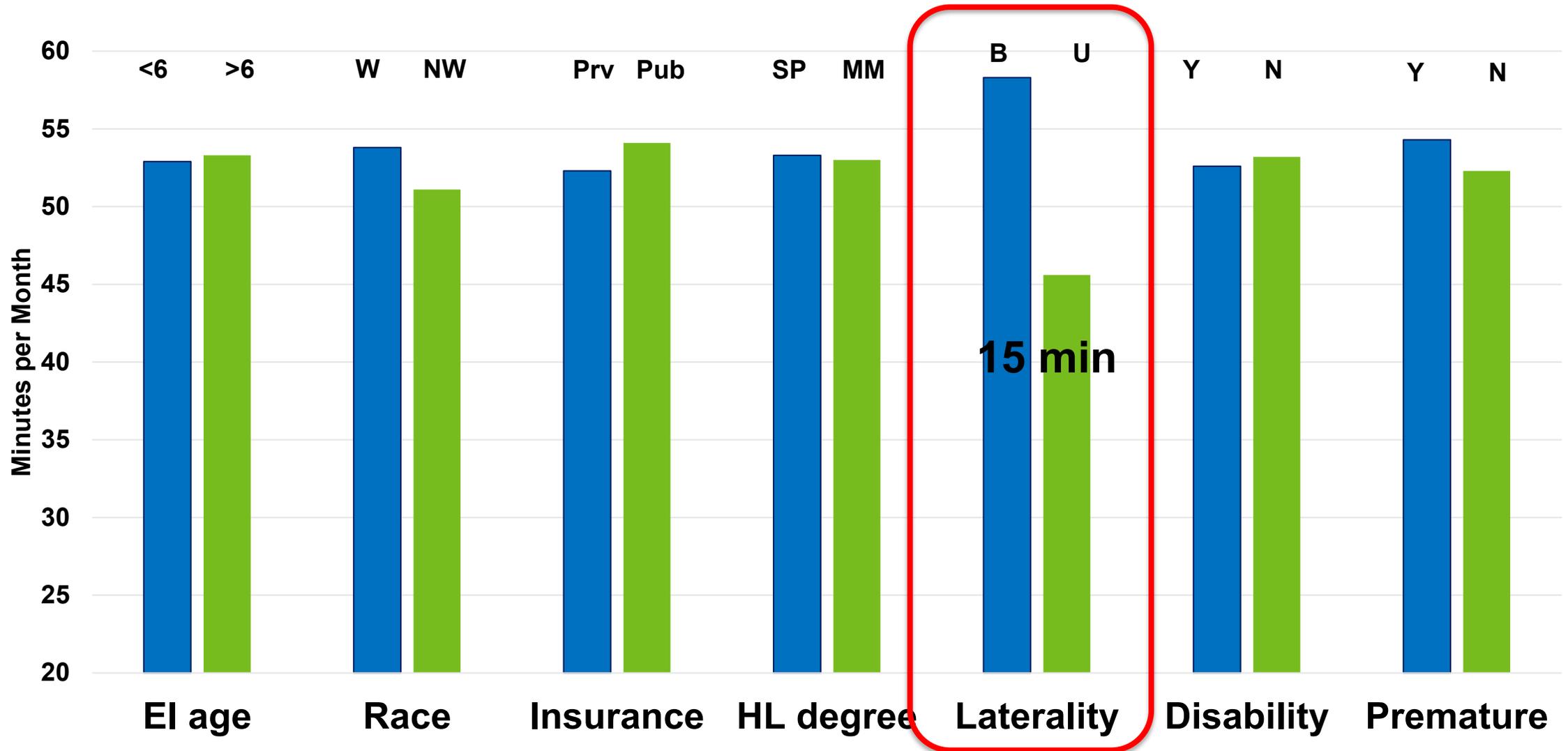


# Factors associated with DHH service intensity (Year 1)

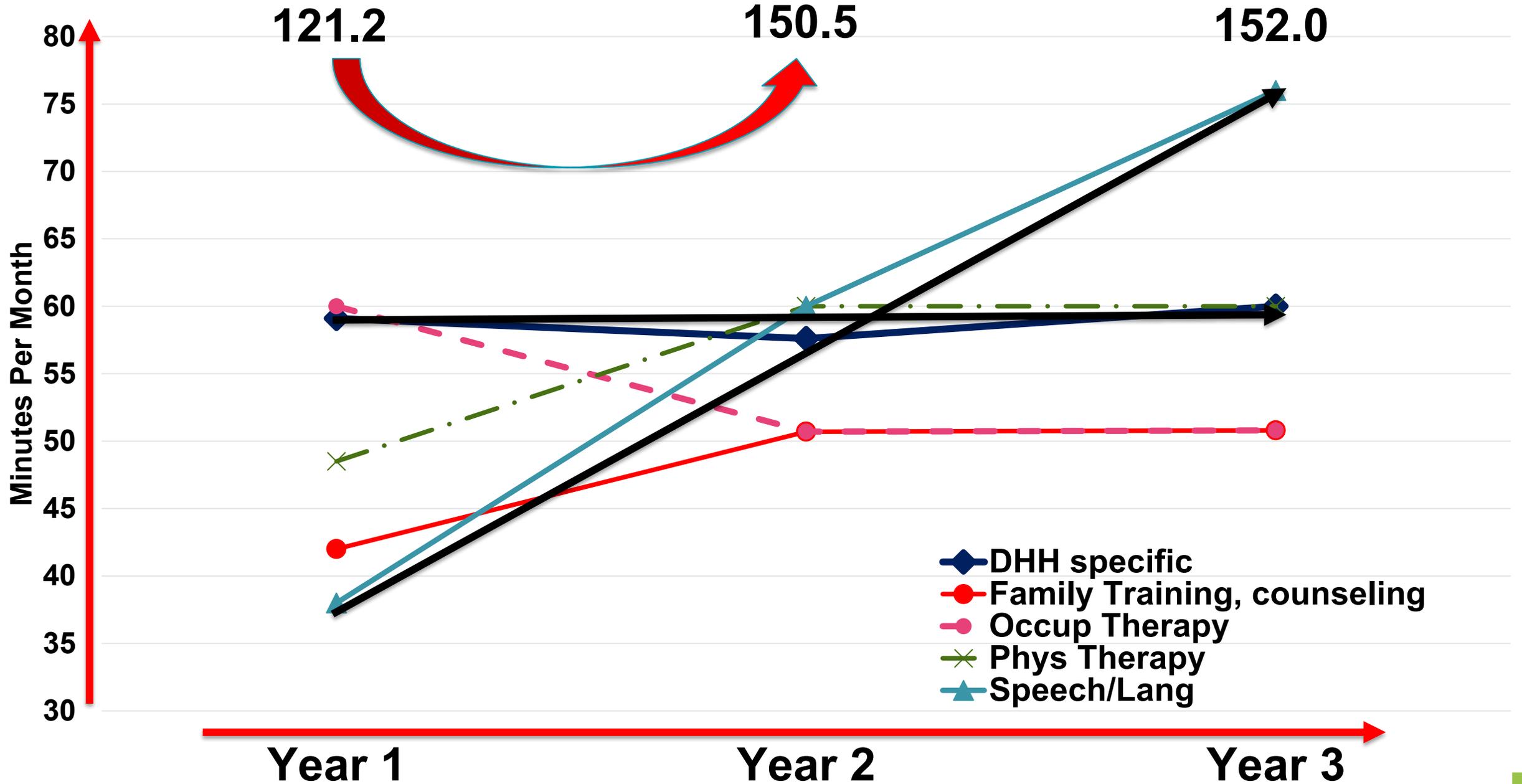


# Factors associated with DHH service intensity

## All Years

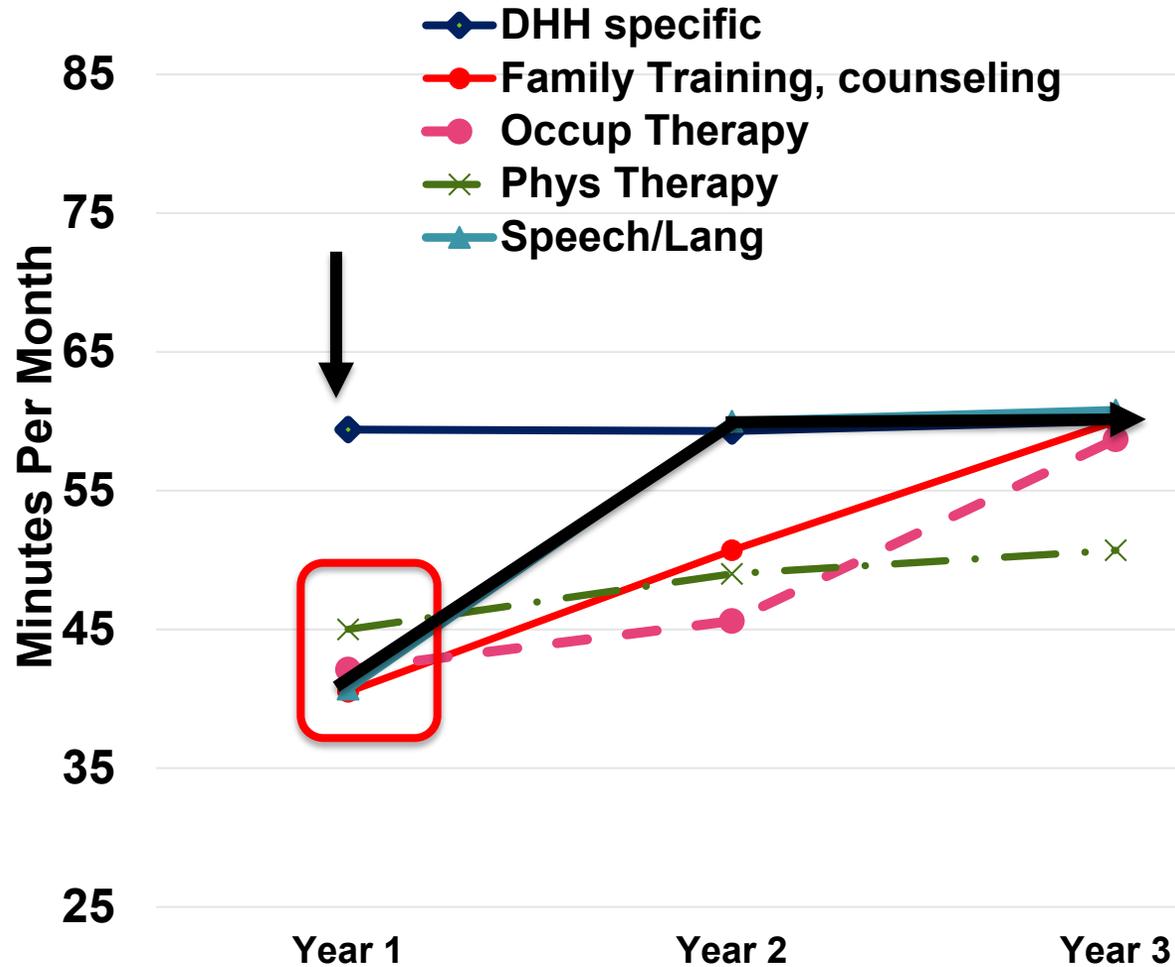


# Change in intensity (minutes per month) over time

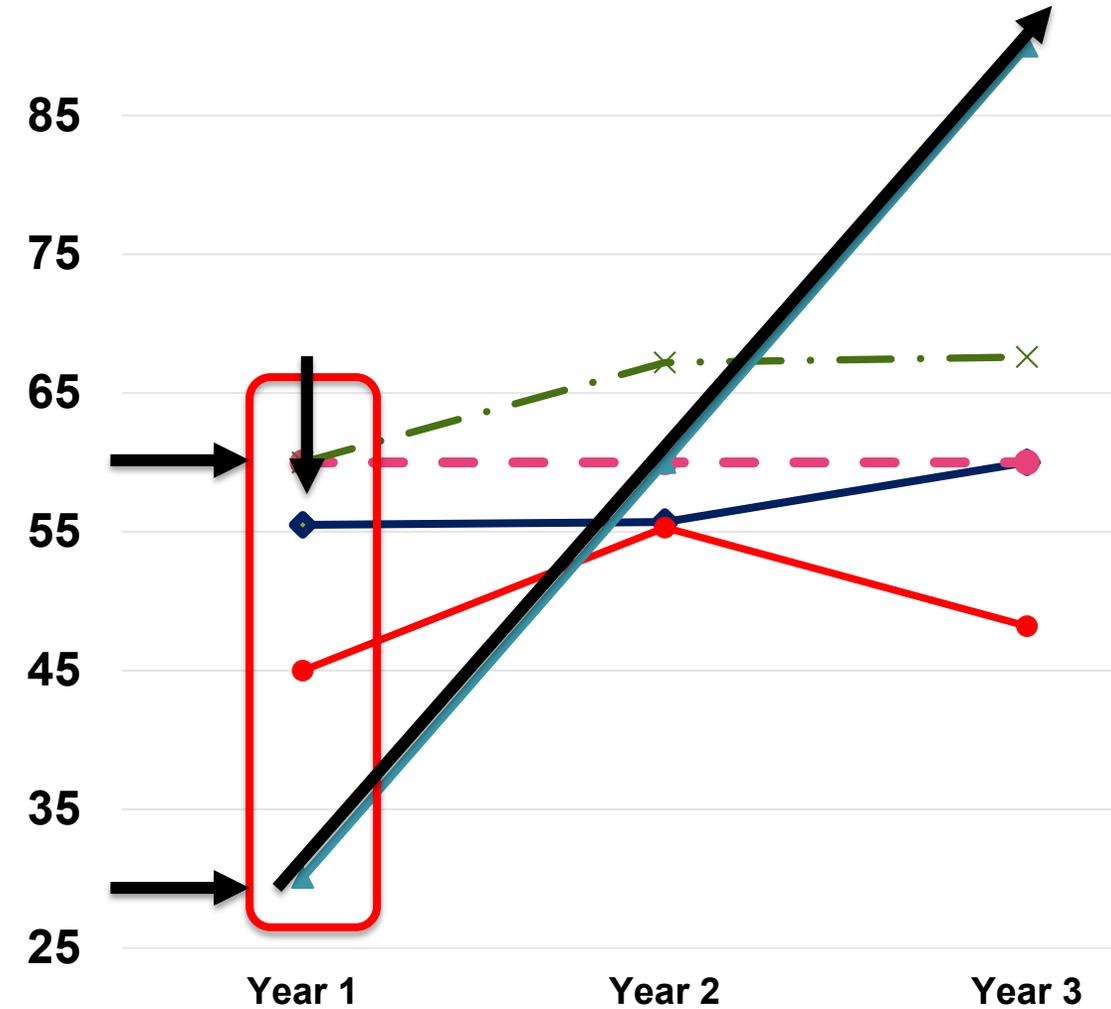


# Change in intensity (minutes per month) over time

## Without disabilities



## Diagnosed disabilities



# Considerations

- Service types were not standardized (there is fluidity across service types)
- Quantified what was in the record but not what a child actually received
- Did not investigate a “threshold” for exposure (could be interesting and impactful)

# In Summary

- Infants/toddlers who are DHH received a number of different EI services (majority received 4+)
  - On average, >2 hours per month of service
- A number of factors were associated with higher intensity
  - More significant bilateral hearing loss, presence of disabilities
- Service intensity changed over time
  - For those who remained in EI, children increased intensity by 30 min/mo
  - Seemed to be driven by specific services as well as presence of disabilities

# In Summary

- Infants/toddlers received <1 hour per month of DHH “preventive” services
  - Bilateral hearing loss only factor associated with increased intensity
- Service intensity did not change over time
- Change over time not associated with disabilities

# Future directions



- Evaluate differences between those who remain in EI and those who drop out early (before year 3)
- Evaluate factors associated with change in intensity over time (which children need increased intensity by year 3)
- Associate intensity with outcomes

# Conclusions



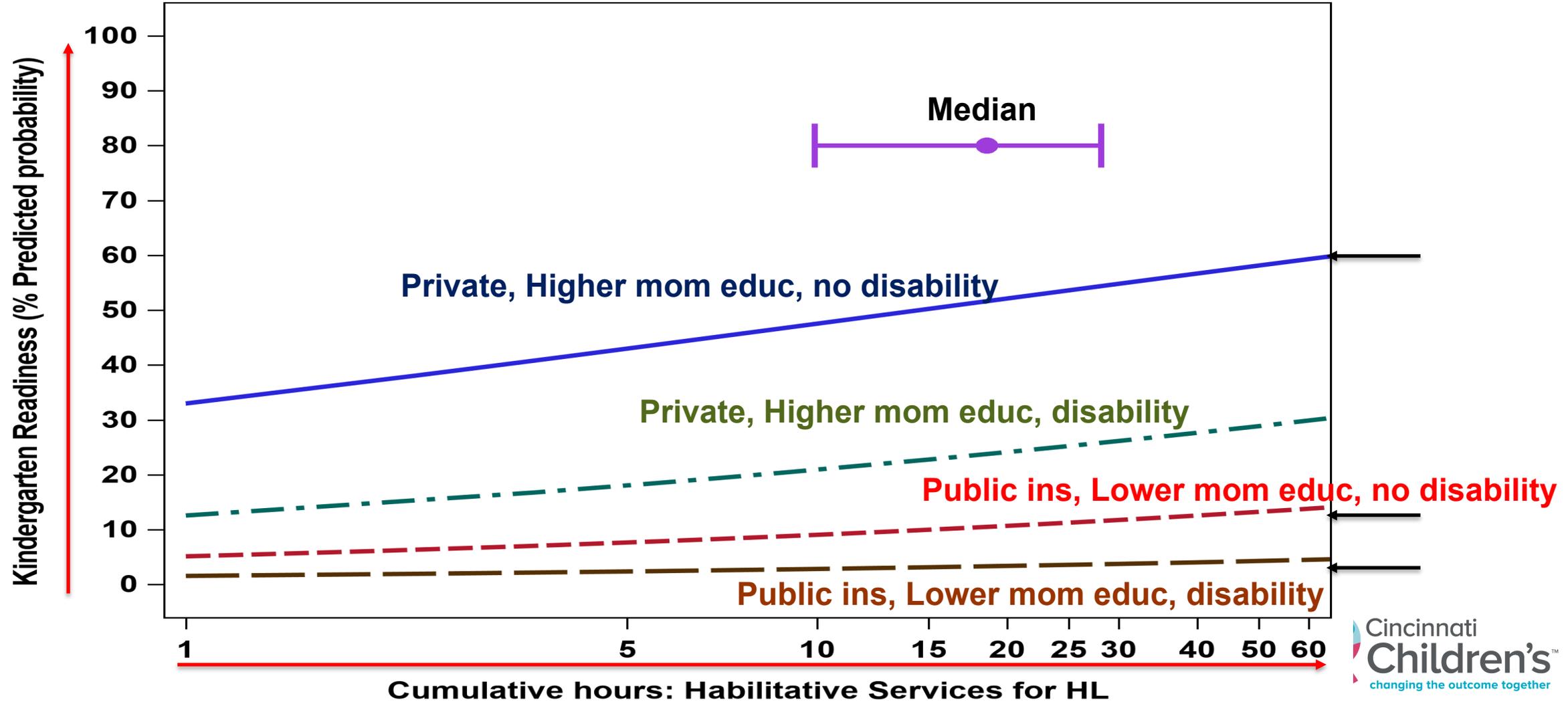
- These data provide us with an opportunity to understand the role exposure to EI services plays in outcomes
  - Expands research beyond the age of enrollment (a proxy for exposure)
  - Could be used in considerations regarding how to best serve DHH children
- Applying intensity metrics to outcomes can help inform public health practices and policies for infants and toddlers who are DHH

# Thank you



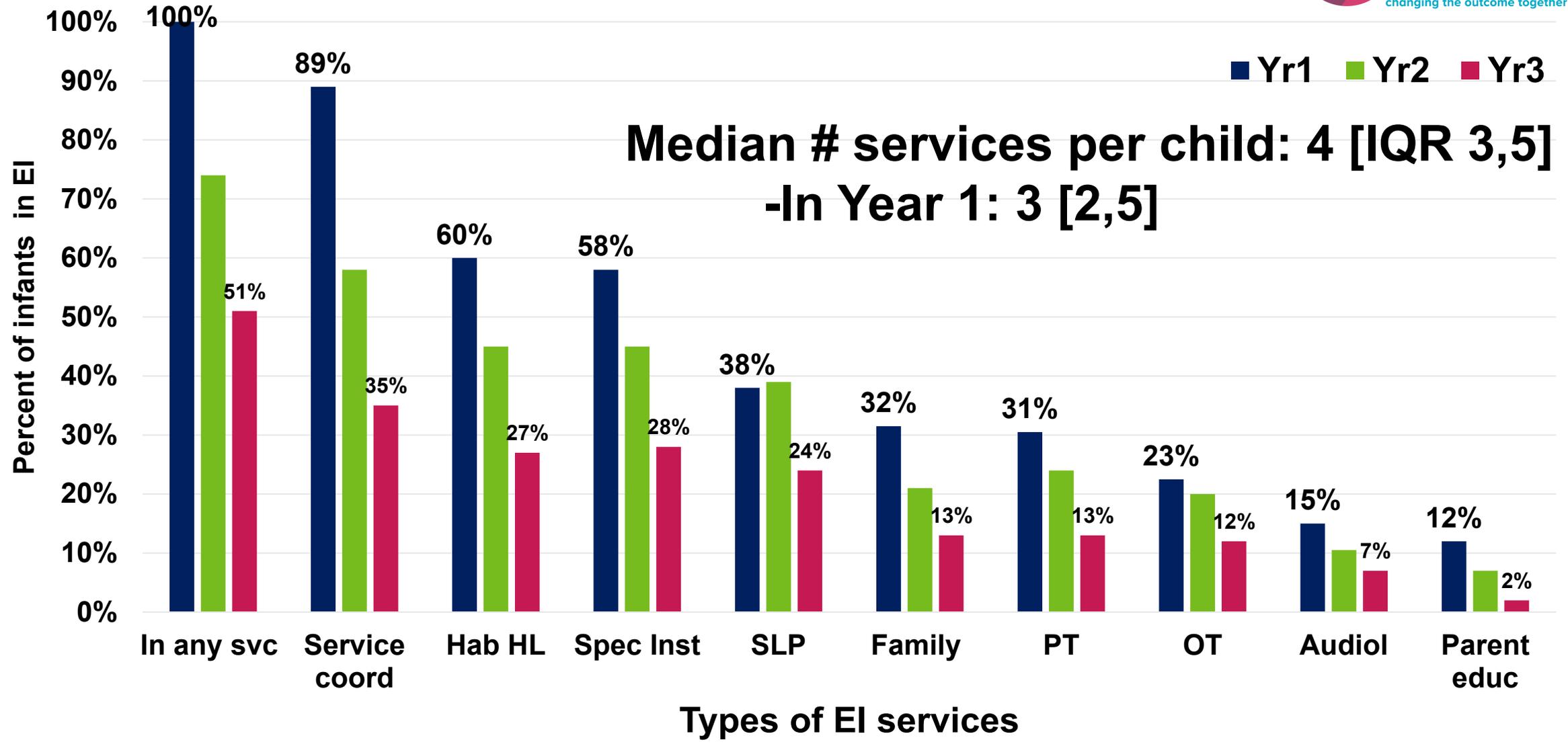
*Questions are the path to learning*

# Probability of being K-ready as a function of exposure to specialized DHH services

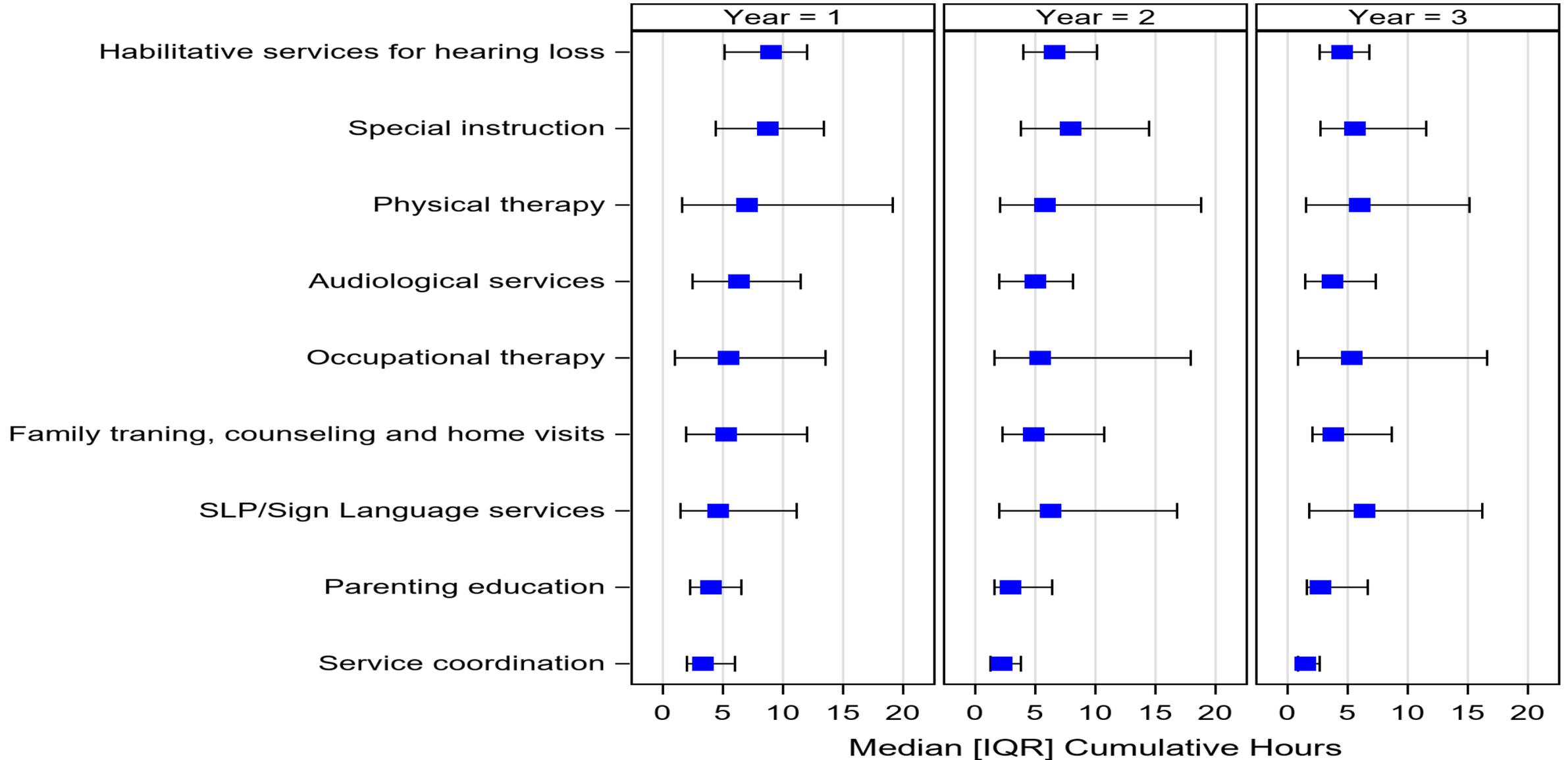


# EXTRA SLIDES

# Receipt of Types of EI services for DHH

# Cumulative hours each year by service type



# Characteristic Differences by Specialized DHH Services

Characteristics	Received any Svcs (n=833)	Received no Svcs (n=429)
<b>Gender-Female</b>	44.7%	48%
<b>Race</b>		
<b>Caucasian</b>	78.2%	70.2%
<b>Black/African American</b>	11.4%	14%
<b>Hispanic</b>	3.1%	8.3%
<b>Premature birth</b>	21%	26.3%
<b>Private insurance</b>	56.6%	43.7%
<b>Mom with some college educ.</b>	61.3%	46.9%
<b>Dad with some college educ</b>	48.3%	38.7%
<b>Disability diagnosis reported on EI form</b>	27.9%	21.2%

# Characteristic Differences by Specialized DHH Services

Characteristics	Received any Svcs (n=833)	Received no Svcs (n=429)
Median [IQR] age confirmed in mos	3.4 [1.7-7.5 ]	4.7 [2.4-13.2 ]
Confirmed by 3 mos of age	45.8%	34.7%
Median age enrolled EI	4.8 [3.0-8.3]	6.4 [3.9-13.5]
EI enrollment by 6 mos of age	61.2%	47.3%
Met EHDI benchmarks	35.1%	23.1%
Has risk indicator for hearing loss	39.1%	42.2%
Bilateral HL	23.2%	26.8%
Severe to profound hearing levels	35.3%	35.2%

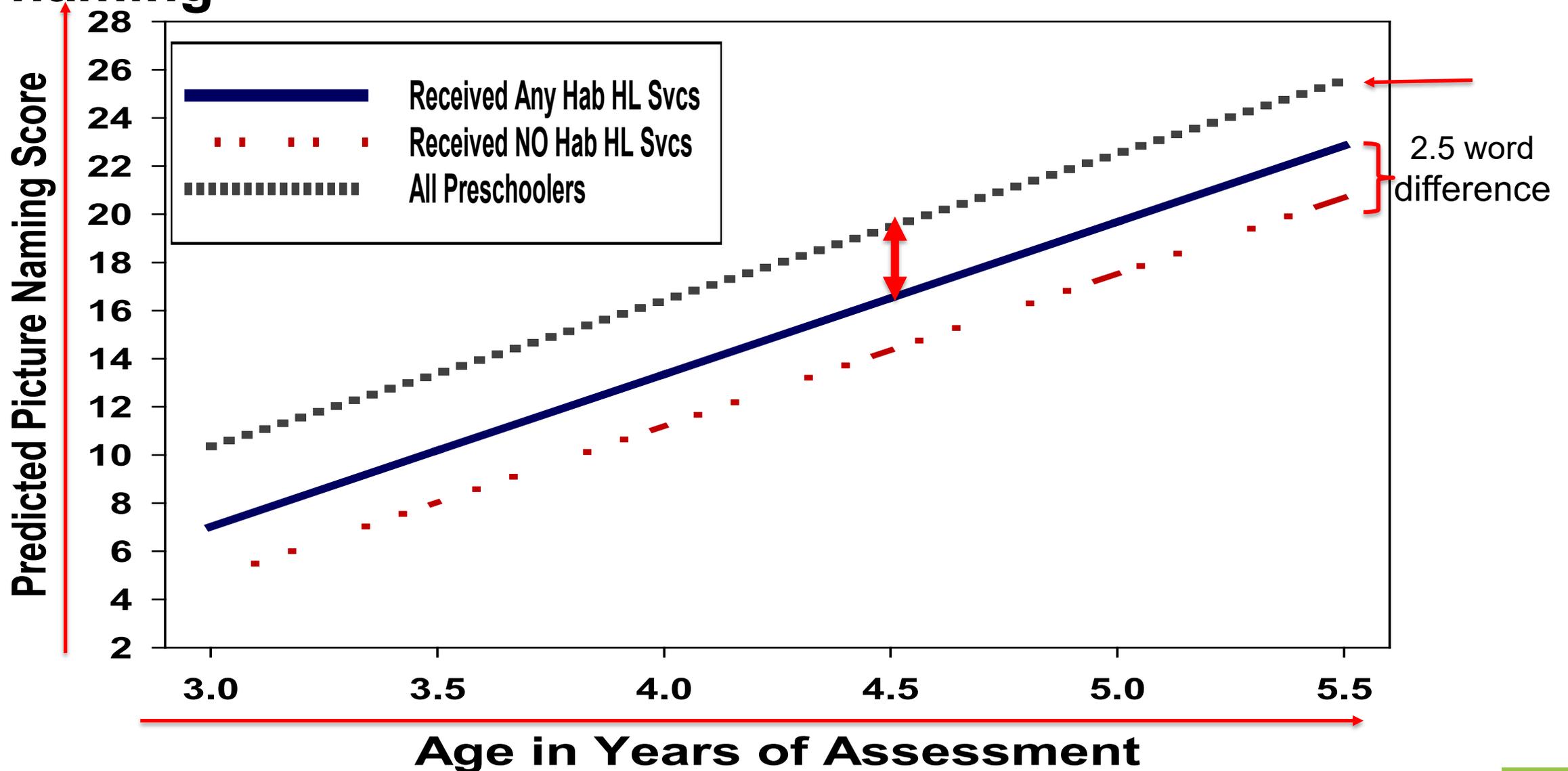
# Emergent literacy outcomes



- *Get it, Got it, Go!*
  - Monitors 3 Individual Growth and Development Indicators: **picture naming, rhyming, and alliteration**
  - Brief and standardized administration and scoring procedures
  - Each task is timed
  - Score = number correct (no maximum score)
  - Given multiple times each year
  - Correlated with Peabody Picture Vocabulary and Preschool Language Scale
  
  - *Until FY2015*

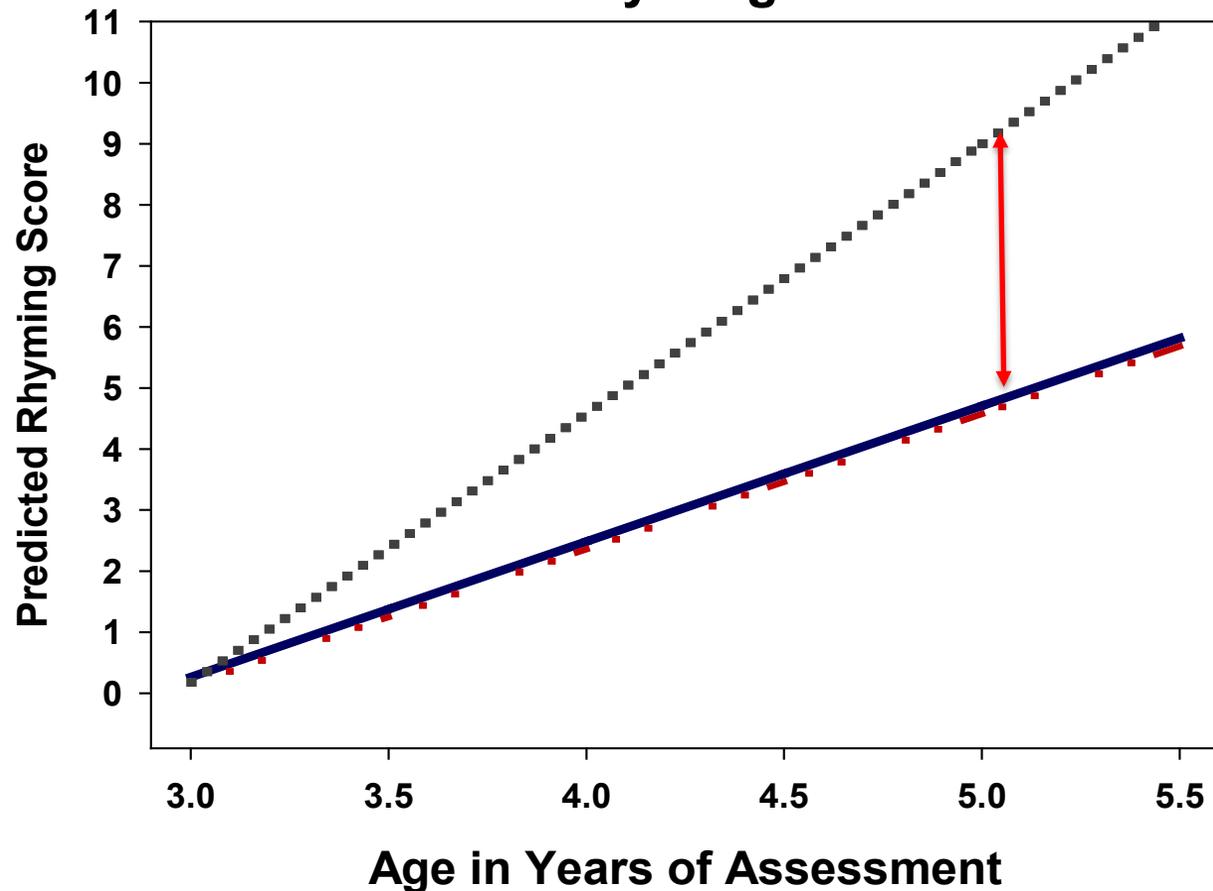
*Early Childhood Research Institute on Measuring Growth and Development, 1998*

# Any exposure associated with emergent literacy-picture naming

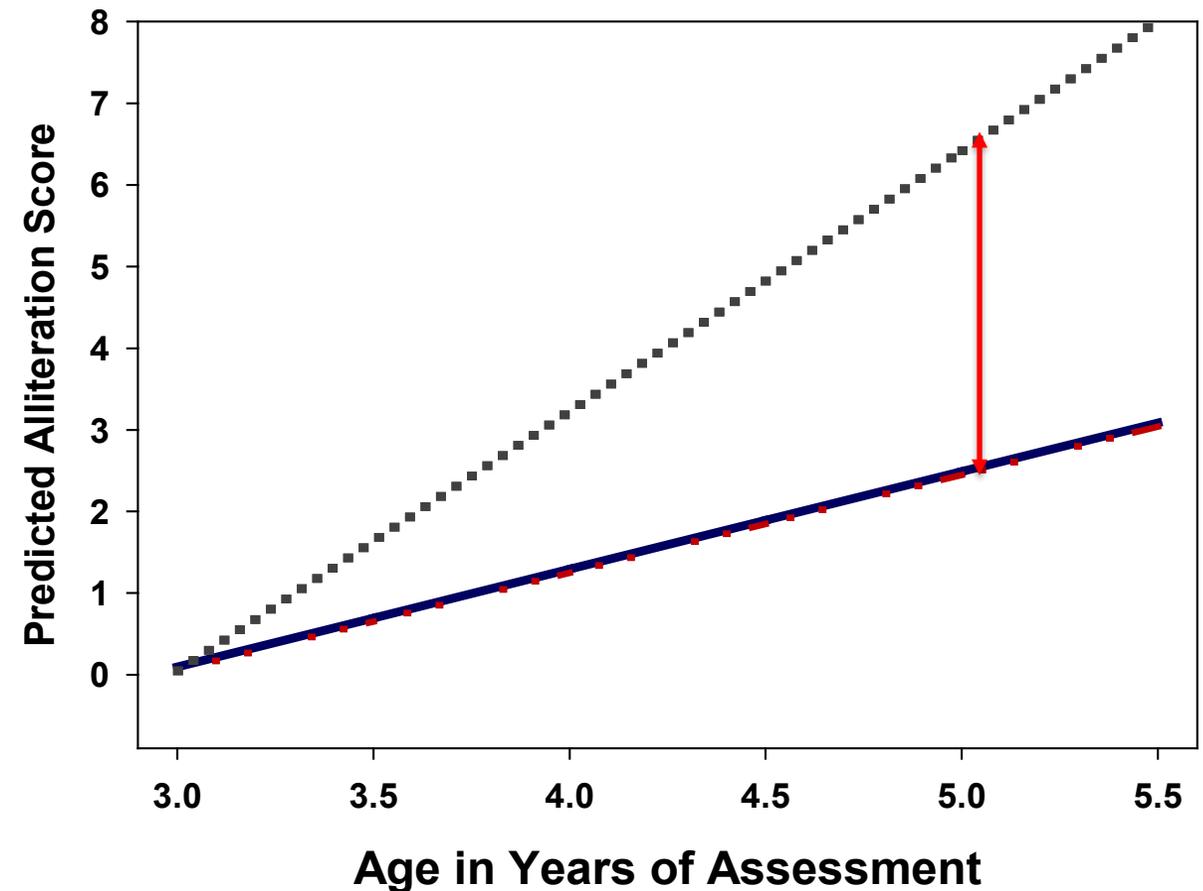


# Any exposure not associated with rhyming and alliteration

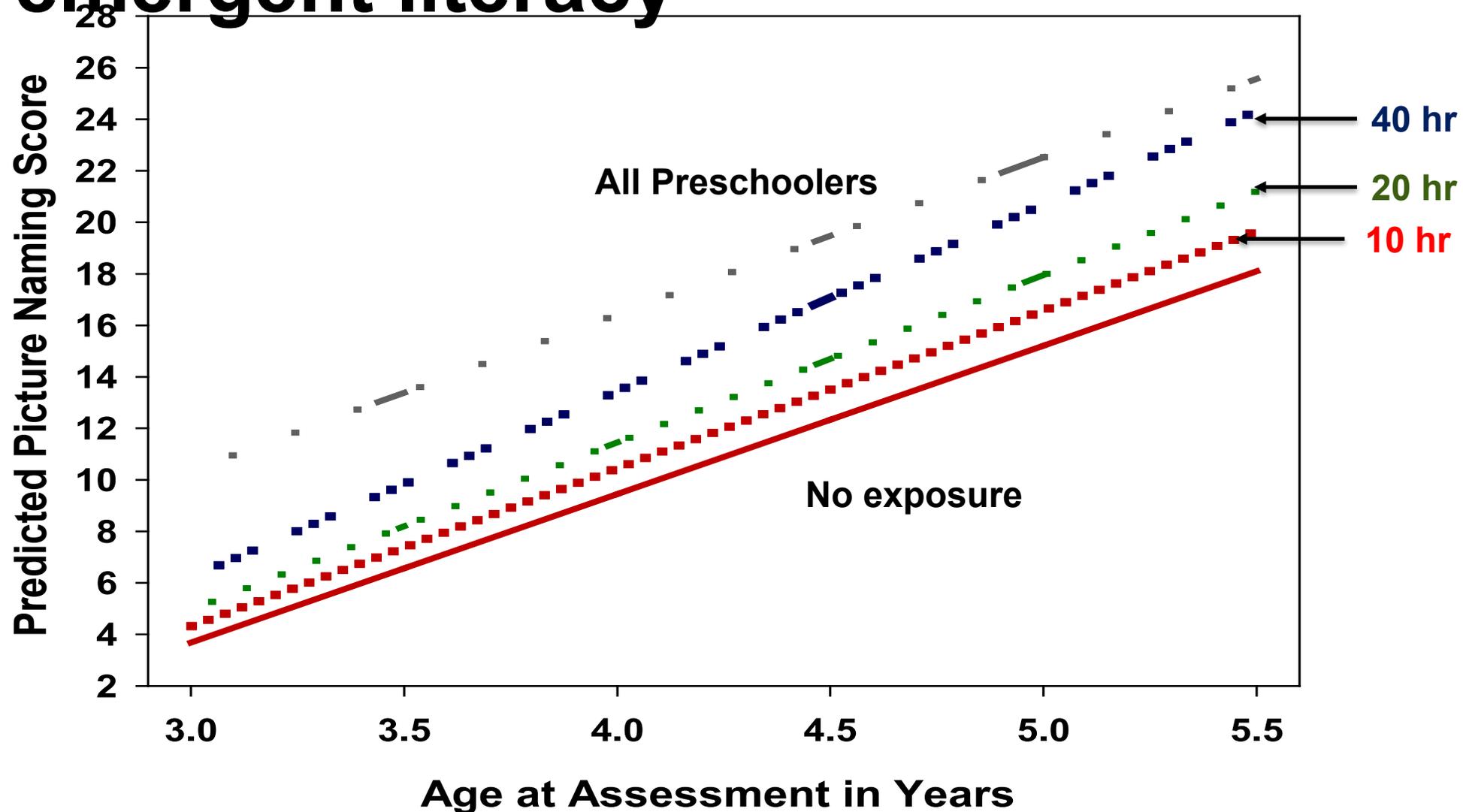
### Rhyming



### Alliteration



# Amount of exposure associated with emergent literacy



# Kindergarten Readiness



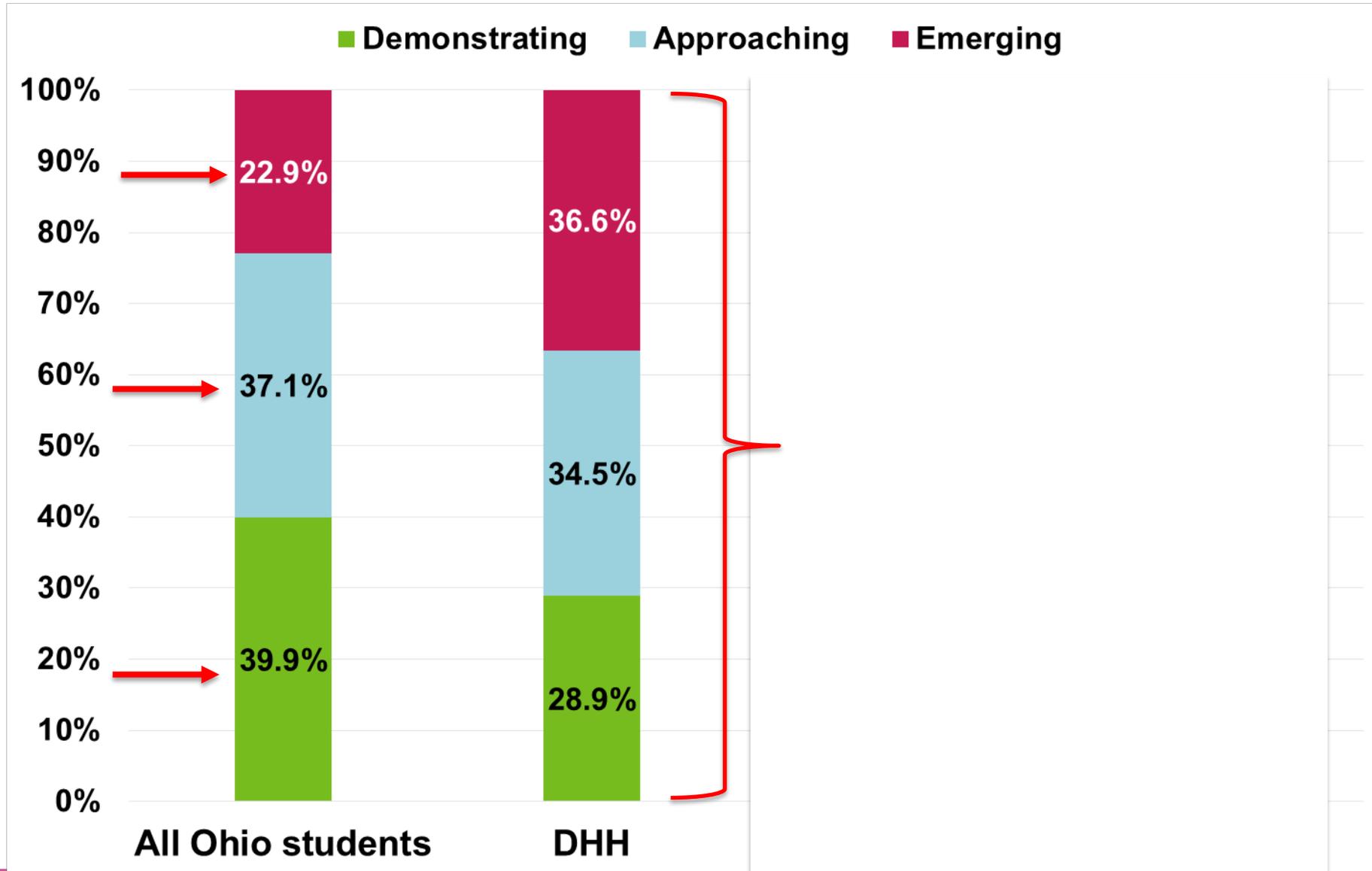
- State determines a child's ability to adapt to kindergarten classroom by assessing four areas of early learning
  - Social Foundations
  - Mathematics
  - Language and Literacy
  - Physical Well-Being and Motor Development

# Kindergarten Readiness

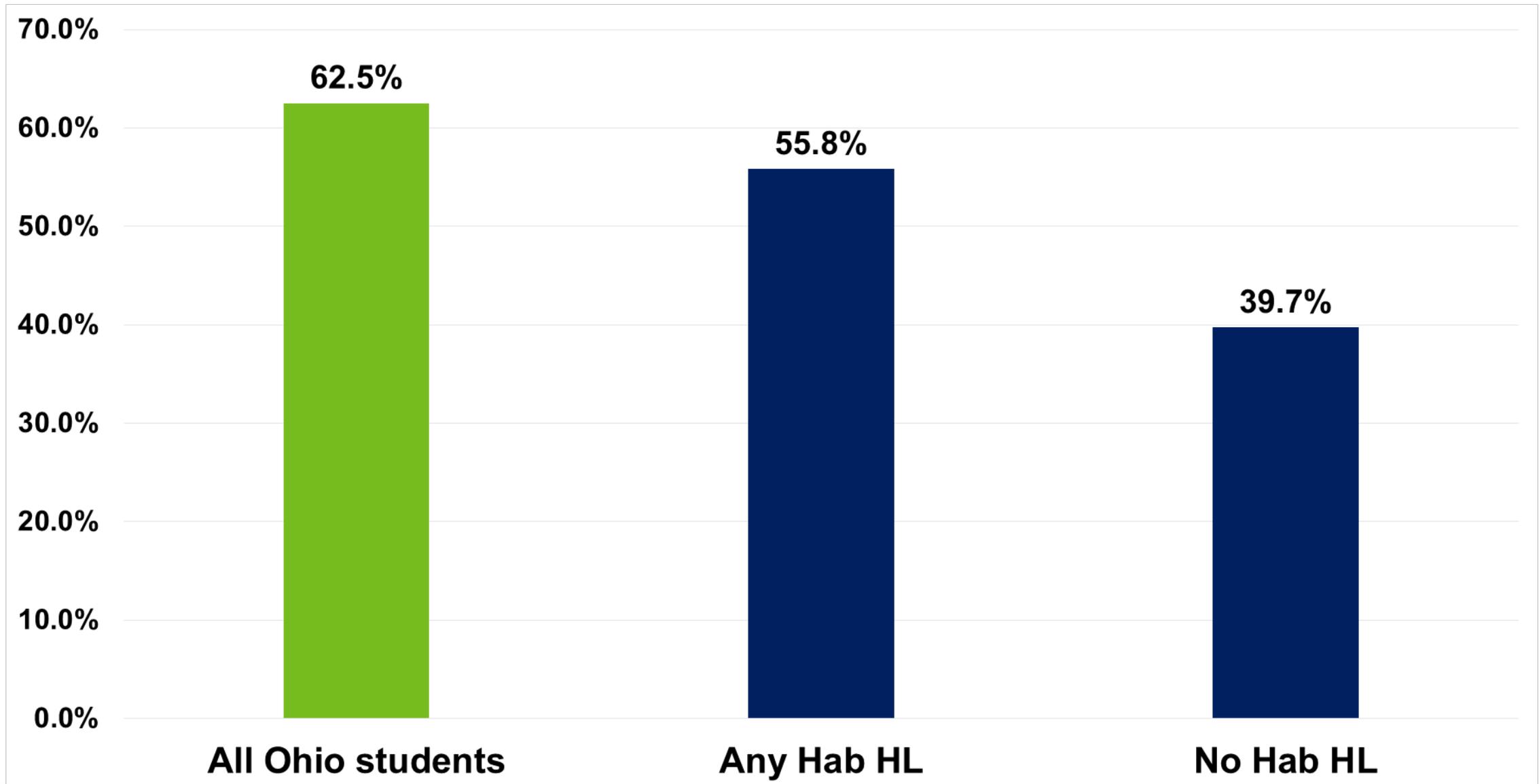


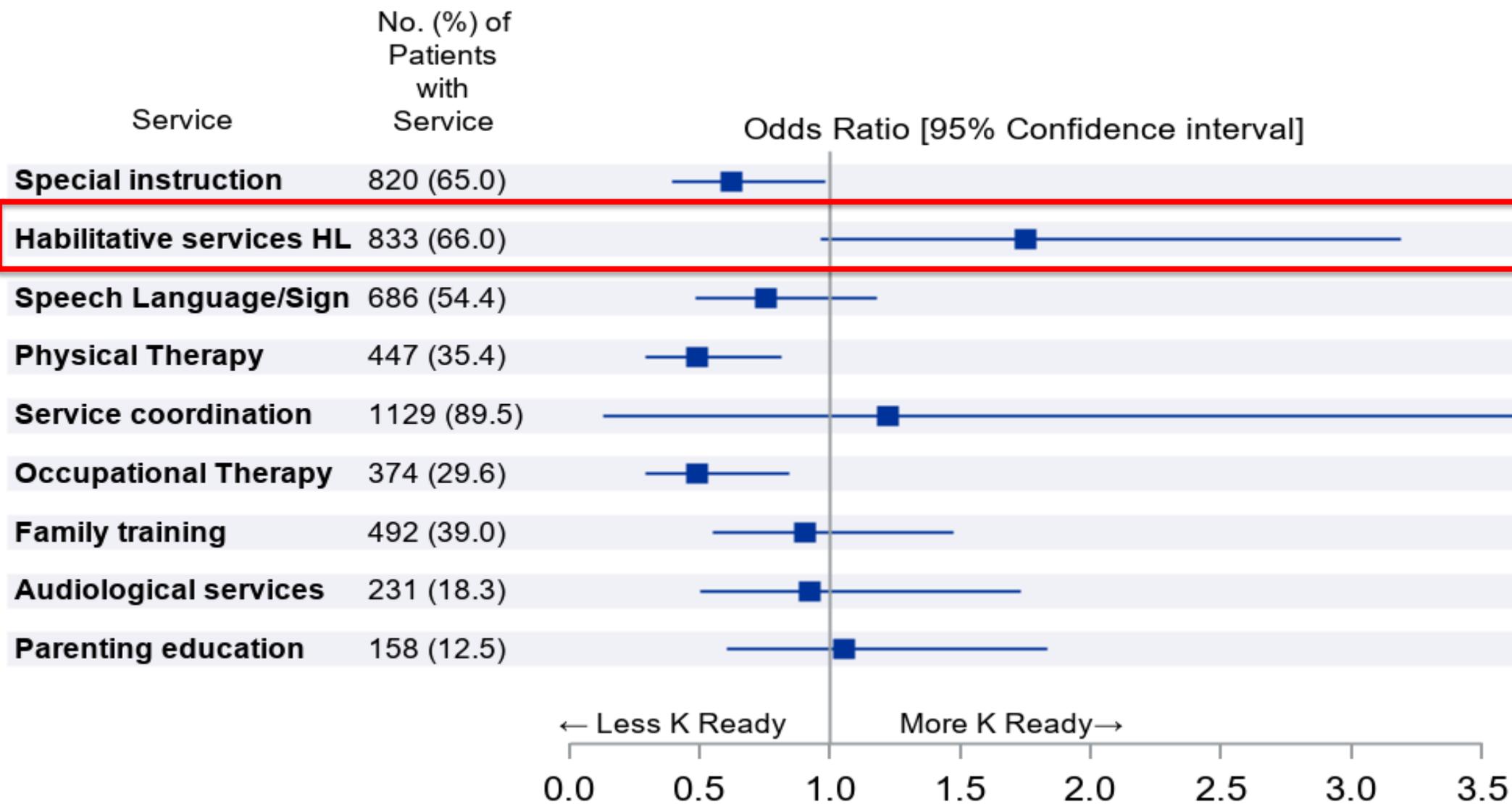
- Kindergarten Readiness Assessment
  - Language and literacy, mathematics, social foundations, and physical well-being and motor development
  - Demonstrating, Approaching, Emerging
  - Language and Literacy area measures skills in early reading, letter recognition and using words in conversations
- *Children assessed at beginning of the year, could be assessed again towards end of year in necessary*

# Kindergarten Readiness



# Language and Literacy “on track”



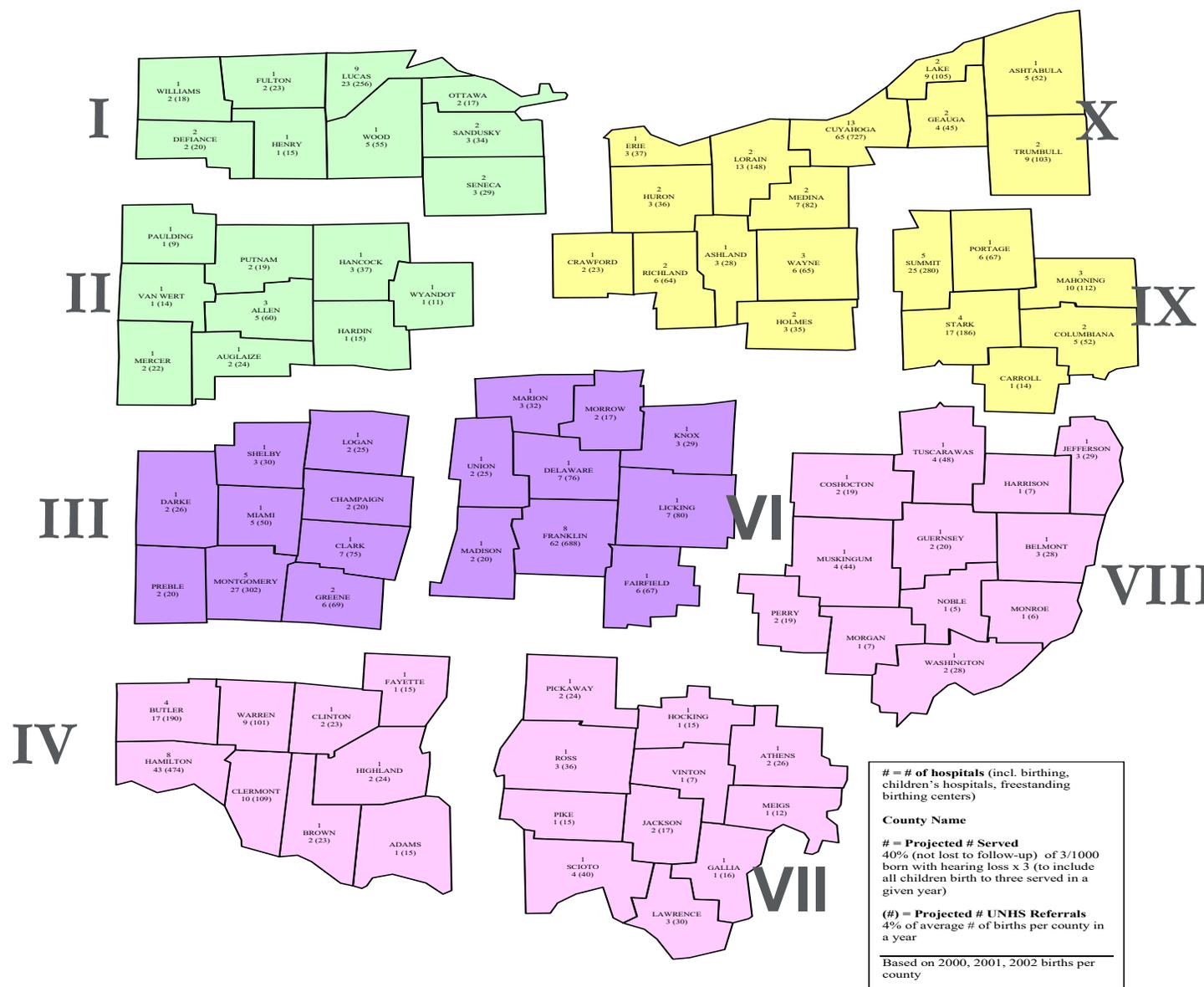


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**# = # of hospitals (incl. birthing, children's hospitals, freestanding birthing centers)**

**County Name**

**# = Projected # Served**  
40% (not lost to follow-up) of 3/1000 born with hearing loss x 3 (to include all children birth to three served in a given year)

**(#) = Projected # UNHS Referrals**  
4% of average # of births per county in a year

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Based on 2000, 2001, 2002 births per county