

Association Between Intervention Intensity and Kindergarten Readiness for Children who are Deaf/Hard of Hearing

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Current evidence



- Birth to three is a critical developmental period and importance of 1-3-6
 - **Diagnosis by 3 months:** Early Identification = positive/improved language
 - **Intervention by 6 months:** “Early enrollment in” Early Intervention (EI) enhances language development

Yoshinaga-Itano C et al (1998) Pediatrics 102(5): 1161-71.

Moeller MP. (2000) Pediatrics 106(3) e43.

Kennedy, et al (2006) NEJM 18;354(20): 2131-41.

Meinzen-Derr J et al (2011). American Annals of the Deaf 2011 155(5):580-91.

- For DHH, **achieving 1-3-6** is associated with improved **emergent literacy** and **Kindergarten readiness**

Meinzen-Derr J et al Pediatrics. 2020 146(4):e20200557

Meinzen-Derr J, et al J Dev Behav Pediatr. 2022 43(2):104-110.

- EI program “intensity” may be a factor for improving long-term outcomes (such as school readiness)

Ramey CT, Ramey SL. Ment Retard. 1992 30(6):337-45.

Impact of early EI enrollment on kindergarten readiness and literacy

K-Readiness

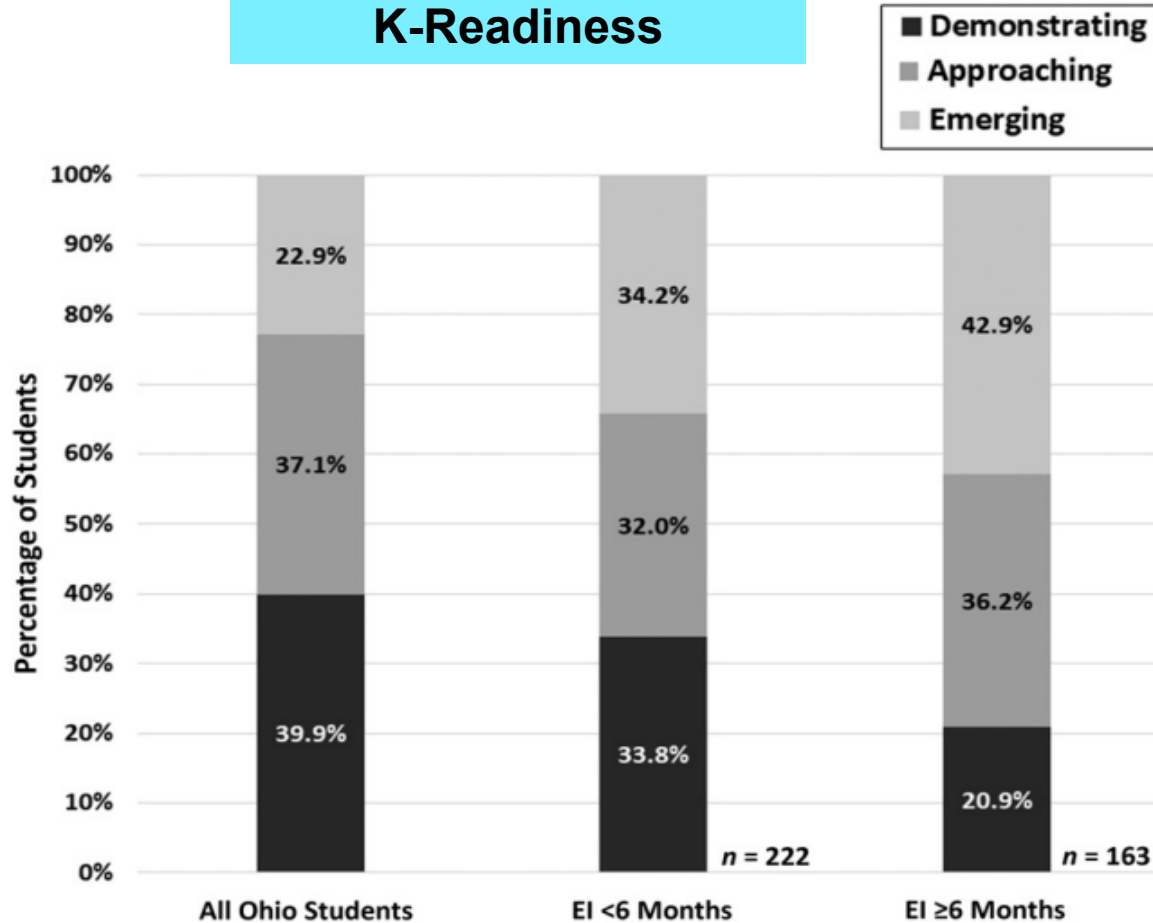


FIGURE 1
The percentage of kindergarten children who were D/HH, had been served by Ohio EI, and demonstrated K-readiness. K-readiness was measured by using the KRA. Children enrolled in EI before the age of 6 months and after the age of 6 months and all Ohio kindergarten students (as a reference) are included in the graph.

Literacy

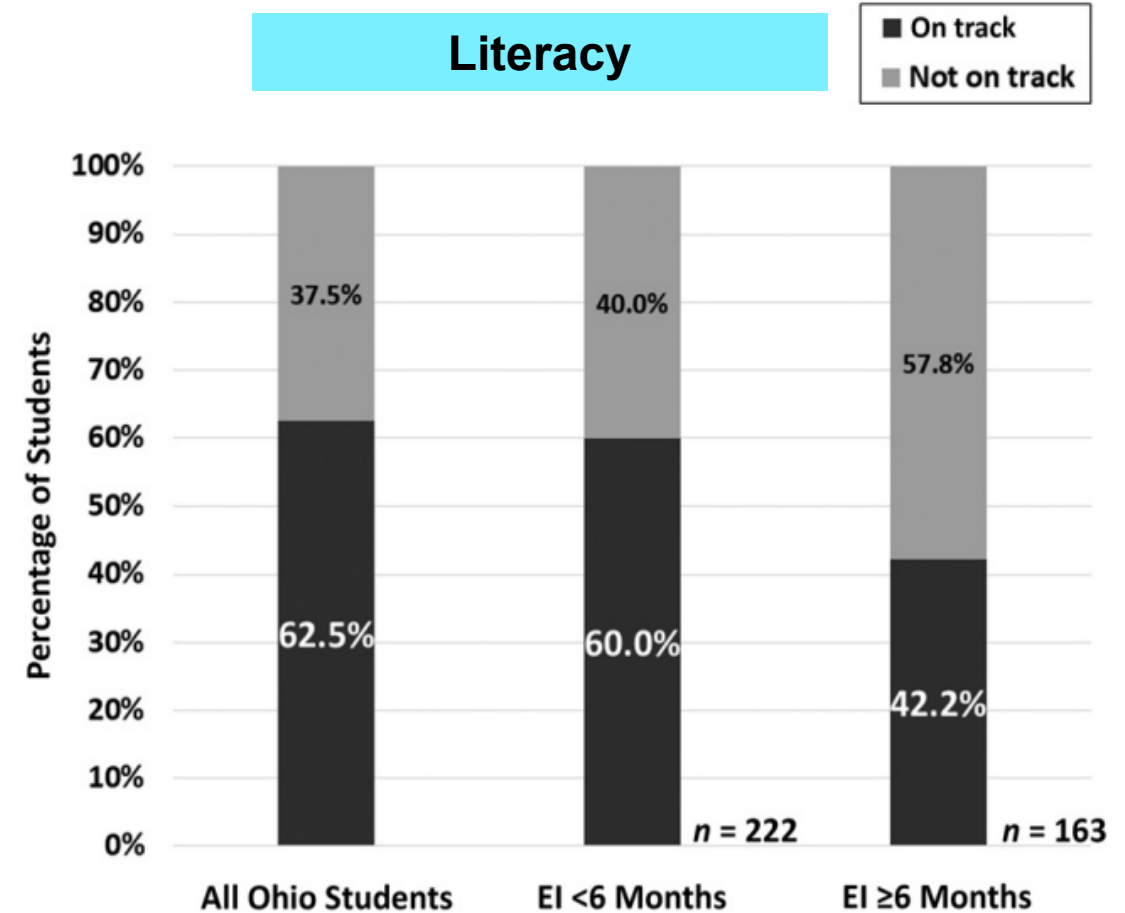


FIGURE 2
The percentage of kindergarten children who were D/HH and considered on track for LL (cutoff score of 263) on the basis of the KRA. Children enrolled in EI before the age of 6 months and after the age of 6 months and all Ohio kindergarten students (as a reference) are included.

Components of EI for DHH



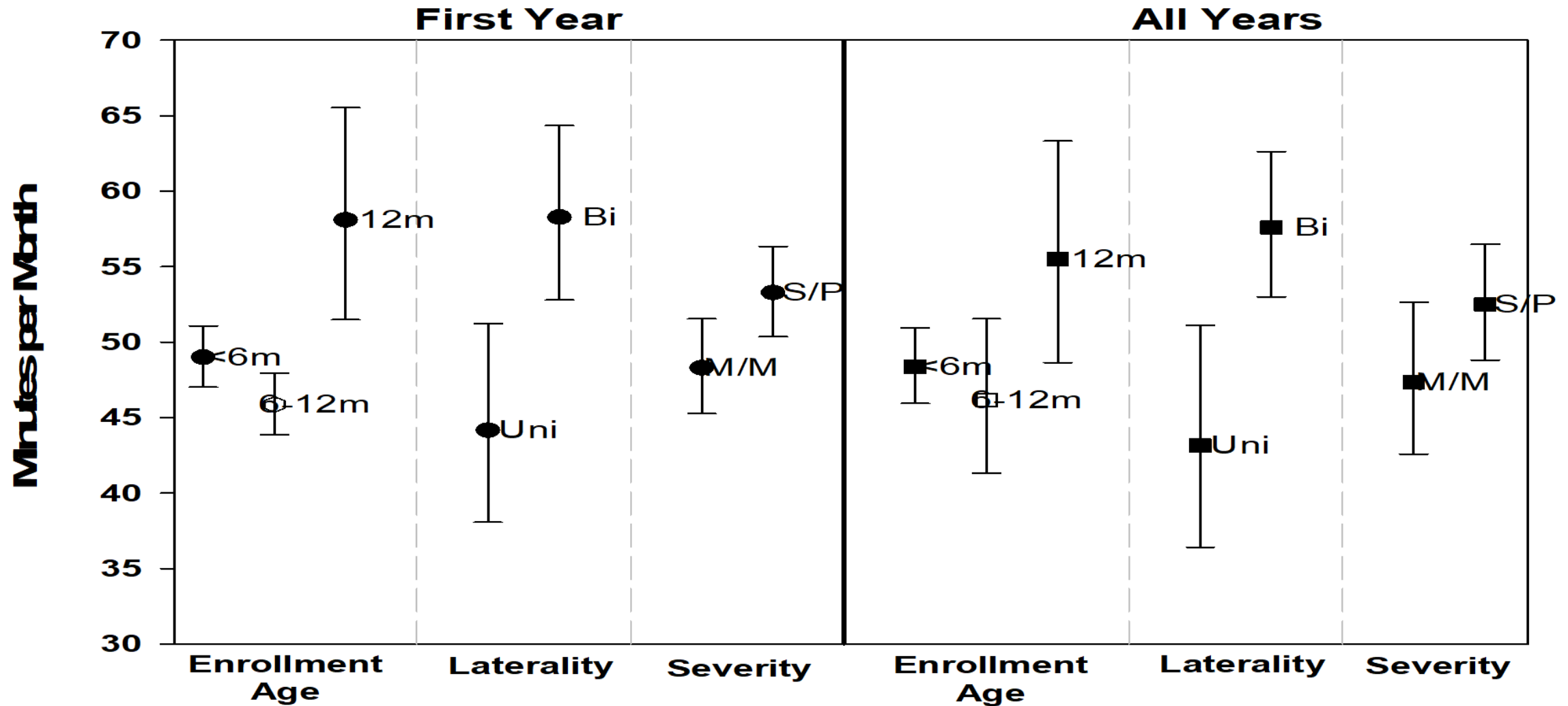
- Home-based family support
- Unbiased parent education on communication choices
- Assistance with follow up audiological appointments, and connections to community resources
- Guidance in communication and language development
- Opportunities to interact with the D/deaf community
- Parent-to-parent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

“DHH specialized services”

Characterized Intensity and Cumulative Exposure

- In the first year of EI, median intensity for those receiving Specialized DHH Services was 59 min/mo [45-60] (for those receiving
 - for all EI services was 121 min/mo [IQR 76-205]
- 50% of children received <20 hrs of cumulative (total) exposure to Specialized DHH services
 - 34% of children never received these services

Factors associated with intensity of DHH services received in first year of EI



Objective of current work



- Evaluate the relationship between EI intensity for children who are DHH and Kindergarten readiness at age 5 years.
- EI intensity was characterized for Year 1
- Specific focus on specialized DHH services

Methods

- This study leverages the Ohio EHDI Data Linkage Project of **1262 DHH infants (born 2008-2014) and enrolled in EI.**

Folger, A. et al JEHD), 28-35. 4(1

- We focused EI intensity (minutes per month) for specialized DHH EI services received in the first year enrolled.
- Analysis included data on 385 DHH kindergartners; 58% who enrolled in EI by age 6 months.
- K-readiness was assessed using the Kindergarten Readiness Assessment at the beginning of kindergarten.

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

Outcome measures: 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*

Basic demographic characteristics of DHH infants/children enrolled in EI



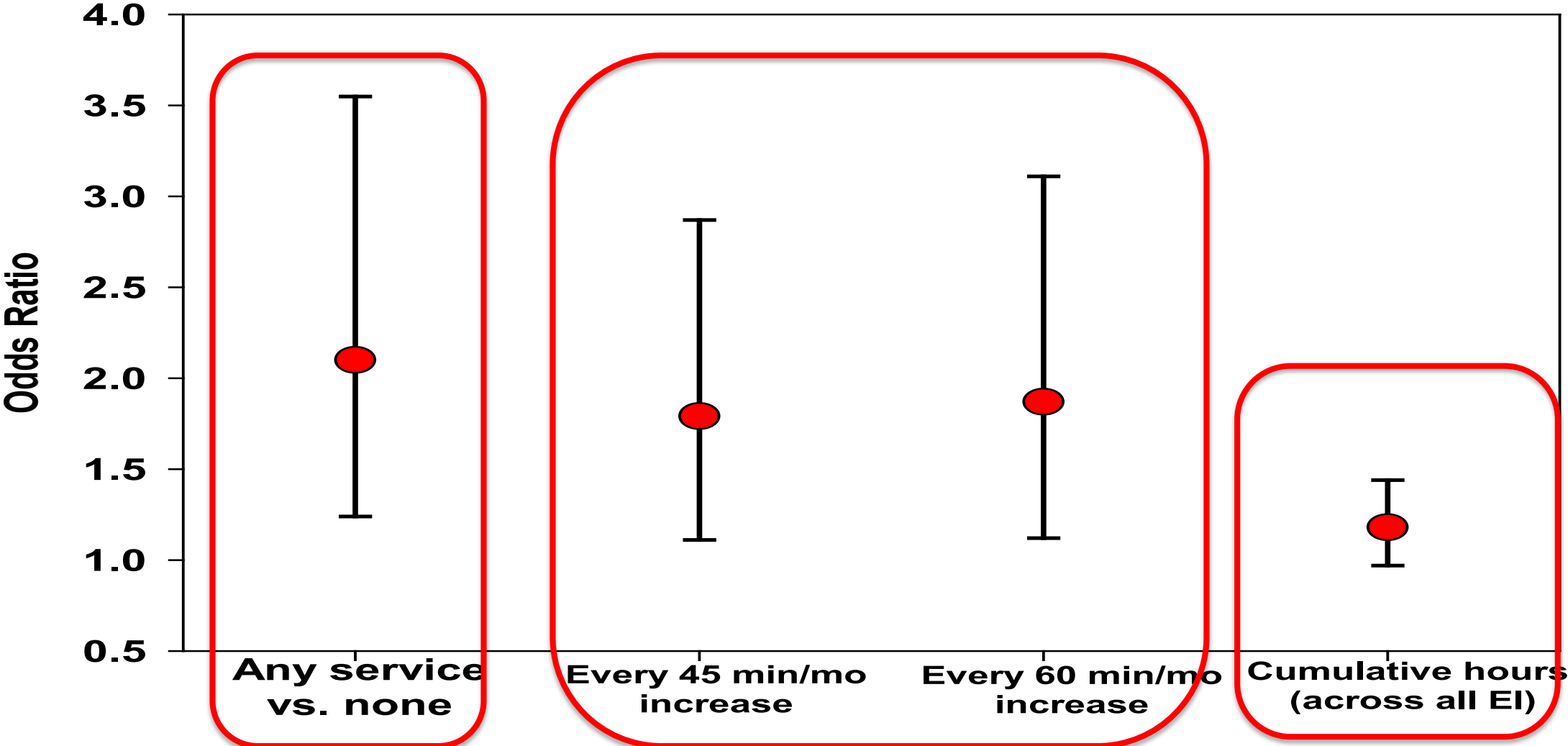
Characteristic	Overall (1262)	Kindergarten (385)
Race		
Black/African American	12.3%	12.2%
White	75.4%	81.6%
Hispanic/Latinos	4.4%	2.1% ←
Private insurance	47.5%	52.7%
Higher maternal education	56.4%	59.5%
Higher paternal education	45%	48.8%
Bilateral hearing loss	75.6%	74.3%
Severe to profound hearing loss	35.3%	29.1% ←
Age at identification in months	3.9 [1.9, 9.0]	3.5 [1.6, 7.5]
EI enrollment by 6 months	56.5%	57.7%
Documented diagnosed disability (in EI)	25.6%	30.4% ←

Results

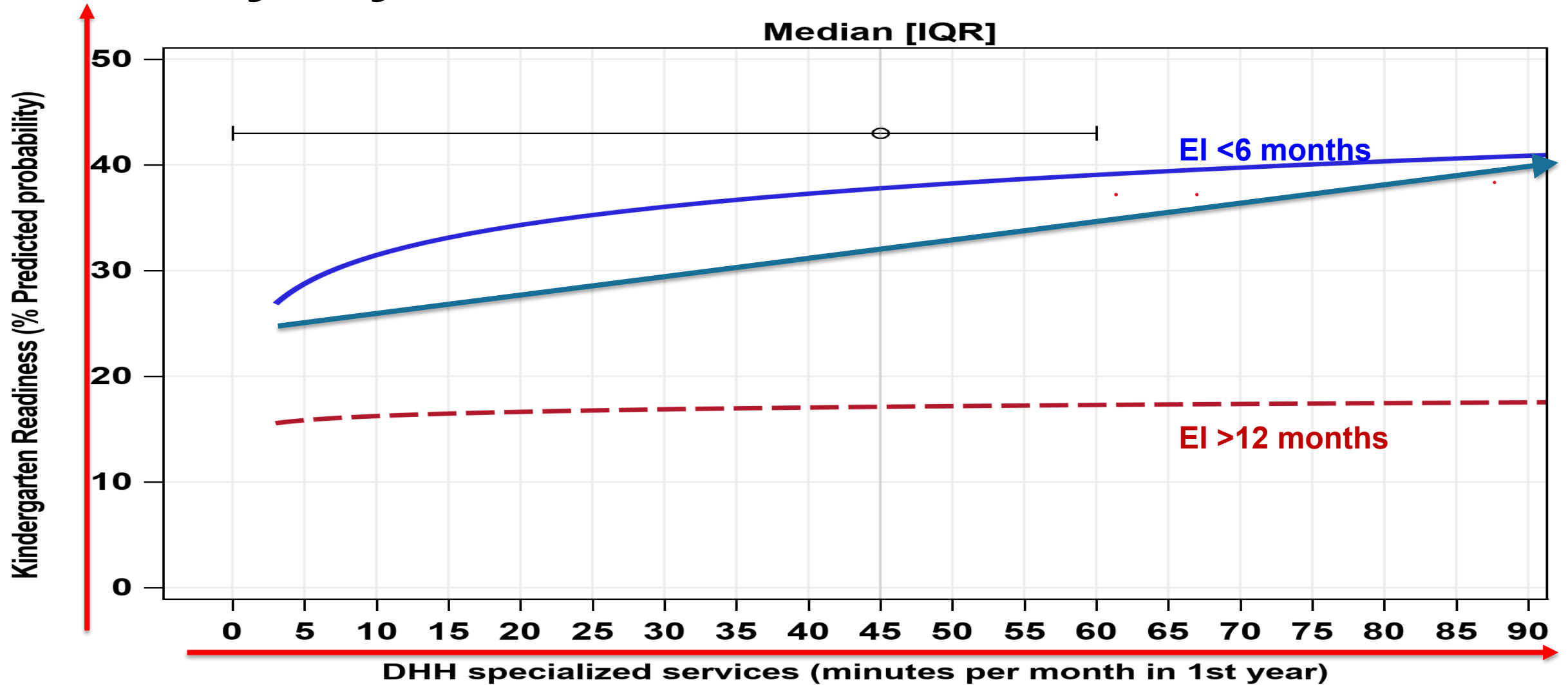


- The majority (79%-305) received DHH services at some point in EI
 - 68% (263) received DHH services in the first EI enrollment year
- Median cumulative hours of service were 13.3 [IQR 3.1, 25.8]
 - DHH service intensity received was 49.3 min/month [20.3, 60.0].
 - 28% of children demonstrated K-readiness.

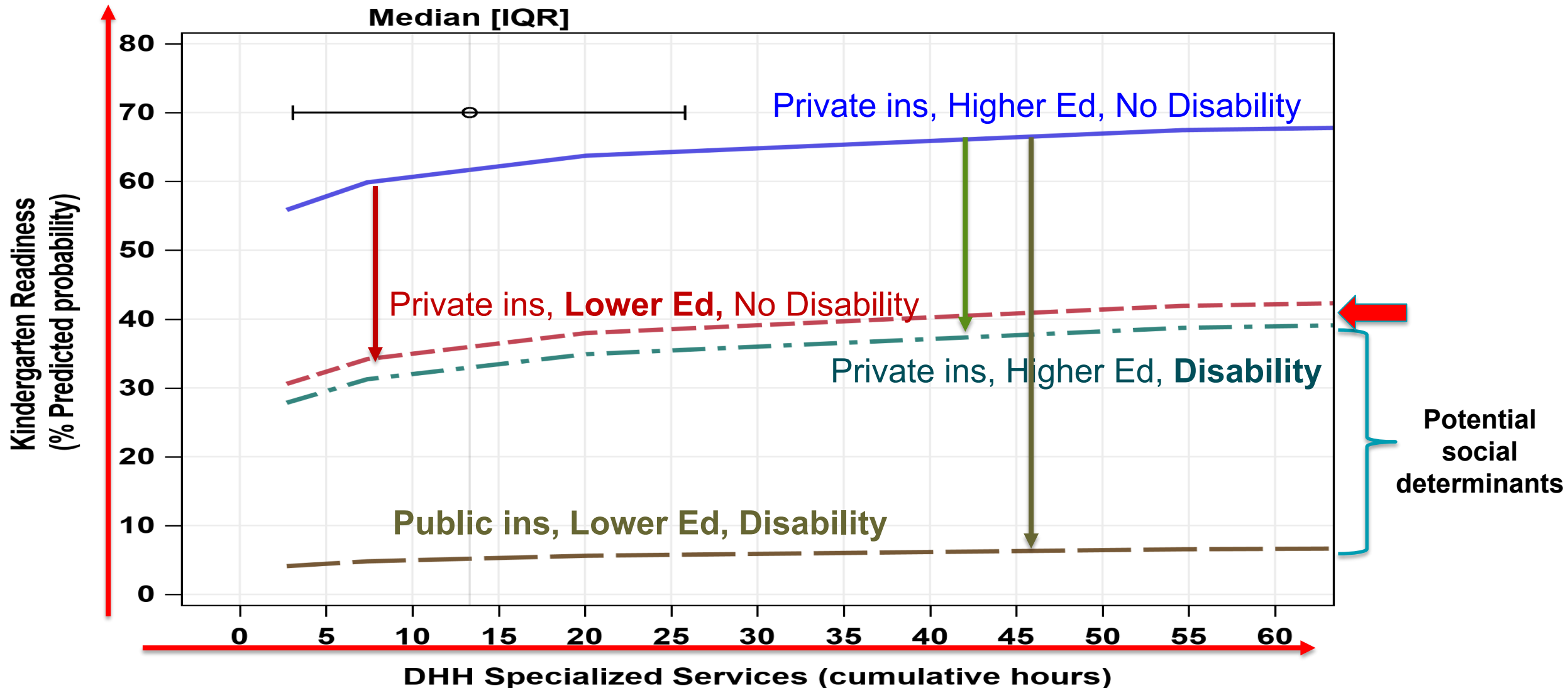
Likelihood of being kindergarten ready by various classifications of exposure to DHH services



Probability of being K-ready as a function of service intensity in year 1



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



Limitations



- Service types were not standardized (there is fluidity across service types)
- Quantified what was in the record but may not be what a child received
- Do not have language or cognitive levels of children.
 - We do have information on educational labels
- Data on social determinants of health were limited
 - having an awareness may help us better understand how to support children and their families

Conclusion



- Independent of enrollment age, intensity of the DHH services in the first EI year was associated with increased likelihood of K-readiness.
- Understanding the impact of service intensity for specific DHH services on outcomes may have implications on Part C EI practices and policies.
- Our current directions
 - EI impact on 3rd grade reading
 - COVID impact on early academic outcomes

THANK YOU