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Maternal Depressive Symptoms and Participation in Early Intervention Services for Young Children

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Abstract

Many young children with developmental delay who are eligible for early intervention (EI) services fail to receive them. We assessed the relationship between depressive symptoms in mothers, a potentially modifiable risk, and receipt of EI services by their eligible children. We conducted multivariable analyses of a nationally representative sample of children eligible for EI services at 24 months using data from the Early Childhood Longitudinal Study-Birth Cohort. Maternal depressive symptoms were assessed at 9 and 24 months. Birthweight <1,000 g, genetic and medical conditions associated with developmental delay, or low scores on measures of developmental performance defined EI eligibility. Service receipt was ascertained from parental self-report. Models were adjusted for sociodemographic and child risk. Among the 650 children who were eligible to receive EI services as infants, 33.2% of children whose mothers were depressed received services compared to 27.0% whose mothers were not depressed (aOR 1.8; 95% CI 0.8, 4.0). Among the 650 children who became eligible to receive services as toddlers, 13.0% of children whose mothers were depressed received services compared to 2.6% whose mothers were not depressed (aOR 4.6, 95% CI 1.5, 14.6). Among children receiving EI services, prevalence of depressive symptoms was 23.0% for mothers whose children became eligible as infants and 57.5% for mothers whose children became eligible as toddlers. Depressive symptoms in mothers of children eligible to receive EI services did not appear to limit participation. EI programs may be an appropriate setting in which to address maternal depressive symptoms.

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Keywords

Early intervention; Maternal depression; Developmental delay; Part C services; Early Child Longitudinal Study

Introduction

Early intervention (EI) programs, authorized under Part C of the Individuals with Disabilities Educational Act (IDEA), provide services to children from birth to three who are identified as having or being at risk for developmental delay. In 2009, almost 340,000 infants and toddlers received EI services. This number, which represents 2.9% of US children birth to three, has almost doubled in the past 10 years [1]. Despite an increase in the number of children obtaining services and documented effectiveness of early intervention, [2,3] studies suggest that many young children, particularly Black children, who have or are at risk for developmental delays fail to receive them [4,5].

Maternal depressive symptoms are one potentially modifiable risk that may impact child participation in early intervention programs. Depression is negatively associated with parental behaviors and practices critical to promoting the health and development of at-risk children. Depressed mothers have been shown to be less sensitive to lags in their child's development [6–8] and they are less likely to engage their children in age-appropriate activities [9] and to adhere to recommended care and follow-up services [10]. A substantial body of literature documents the negative impact of maternal depression on a child's developmental trajectory, which is already of concern among children who receive early intervention services [6,11–19].

Having a child with a condition that qualifies her for early intervention services is associated with elevated depressive symptom prevalence in mothers. The prevalence approaches 50% among mothers of subpopulations of children with conditions such as prematurity, autism spectrum disorders, and cerebral palsy [20–27]. The demographic characteristics of families whose children receive EI services suggest that mothers of enrolled children are at increased risk for depressive illness. Twenty percent of children receiving EI services have four or more social risk factors associated with maternal depressive symptoms, such as poverty and low maternal educational attainment [28,29].

To date, no population-based studies have examined the relationship between maternal depressive symptoms and receipt of early intervention services. Although the majority of studies assessing the effect of maternal depressive symptoms on parenting practices suggest that the children of depressed mothers might be less likely to receive appropriate EI services, the impact of such symptoms is unknown. We sought to use a nationally representative sample of young children to further understand this relationship.

Methods

Data Source

This study used data from the Early Child Longitudinal Study, Birth Cohort (ECLS-B). The ECLS-B draws from a nationally representative probability sample of the nearly 4 million US children born in 2001. It includes data from face-to-face parent interviews, direct cognitive and developmental assessments, and information from birth certificates. Details of the ECLS sampling strategy are available at <http://nces.ed.gov/ecls/birth.asp> (last accessed 13 July 2010). Data used in this analysis were collected during the 9- and 24-month rounds

of data collection. The ECLS-B cohort included 10,700 infants at 9 months and 9,850 children at 24 months.¹

Study Design and Sample

We used a cross-sectional design to examine the associations between depressive symptoms in mothers and receipt of EI services at 24 months of age among eligible children. To create a cohort of eligible children, we selected children of non-Hispanic white, non-Hispanic black, and Hispanic mothers who met the EI eligibility criteria described below. Children were stratified based on the age when they first became eligible for EI services: (A) children who became eligible to receive services as infants (ascertained at the 9 month assessment) and continued to meet eligibility criteria at 24 months and (B) children who did not meet eligibility criteria at 9 months but did so at the 24 month assessment based on their developmental performance at that time. This latter group is referred to as “newly eligible.”

Measures

Eligibility for Early Intervention Services Under Part C of IDEA—Children ages birth to 3 years with demonstrated developmental delays or a diagnosed physical or mental condition known to increase risk of developmental delay are entitled to receive services through state-run EI programs as defined by Part C of the federal Individuals with Disabilities Education Act. However, determining definitions of developmental delay and criteria for service eligibility has been a major challenge to states responsible for delivering these services. Although states have developed methods to define developmental delay and developmental risk, there is wide variability in such criteria. We defined eligibility for EI services to be consistent with the major existing study that used ECLS-B data to examine participation in EI [4]. The published eligibility algorithm was validated using 44 states and the District of Columbia and demonstrated 94% sensitivity and 68% specificity in appropriately classifying eligible children. We made minor changes to the algorithm, with the aim of increasing its specificity. Based on documented state eligibility policies, we decreased birthweight eligibility from 1,500 to 1,000 g and included children with medical conditions that automatically qualify children for EI services [30].

The four criteria used for study inclusion were (1) birth weight <1,000 g; (2) medical conditions associated with developmental delay, such as blindness and deafness, determined from parental self-report at the 9 month and 24 month interviews; (3) genetic and congenital conditions associated with developmental delay, such as Down syndrome and fetal alcohol syndrome, and major congenital anomalies such as cleft lip and palate, ascertained based on information from the birth certificate; and (4) developmental delay, evaluated through direct assessment separately at the 9 and 24 month interviews using the Bayley Short Form-Research Edition (BSF-R) Mental Scale and Motor Scales. The BSF-R includes a subset of items from the Bayley Scales of Infant Development, 2nd Edition (BSID-II); [31] scores are similar to those obtained from the full BSID-II [32]. We used the BSF-R Scale Scores based on guidance from the ECLS-B study team [33] and included children who scored >1.5 SD below the mean on the Mental Scale or >1.5 SD below the mean on the Motor Scale, or >1 SD below the mean on both scales.

Maternal Depression—Maternal depressive symptoms were measured at child age 9 and 24 months using two different validated scales. At 9 months, depressive symptoms were measured by a 12 item abbreviated form of the Center for Epidemiologic Studies Depression Scale (CES-D), [34] a valid reliable measure of depressive symptoms [35–37]. We combined responses to individual CES-D items to create a raw symptoms score. We

¹All unweighted *N*'s are rounded to the nearest 50 subjects in accordance with the ECLS-B restricted data use license.

considered those with raw score >9 to have clinically significant depressive symptoms, corresponding with the most commonly used clinical cut point (score >15) indicative of depression on the full CES-D [38]. Scores $>9-15$ (equivalent to scores of 16–26 on the full CES-D) were considered moderate symptoms and scores >15 (equivalent to scores >26 on the full CES-D) were considered severe [39].

At 24 months, the ECLS-B study team changed the instrument used to measure depressive symptoms to the World Health Organization's Composite International Diagnostic Interview short form (CIDI-SF) [40]. The interview used two stem questions to evaluate the respondents' experience of depressed mood or anhedonia since the last interview (on average, during the previous 15 months). Follow-up questions queried the duration and intensity of the symptoms and their impact on overall functioning. We considered those who had depressed mood or anhedonia for at least a 2-week period to have clinically significant depressive symptoms, based the approach used in the Patient Health Questionnaire 2 [41]. Because the CIDI-SF was designed for diagnostic classification, we also identified the subset of women who met diagnostic criteria for a major depressive episode.

Receipt of Part C Early Intervention Services—Receipt of EI services was determined based on parent response at the 9 and 24 month interviews. At each assessment, respondents were asked whether or not their child was participating in an early intervention program or regularly receiving services to help with their child's special needs from their local school district, state, health or social service agency, health care provider, or some other source. Receipt of services was coded as yes or no independently at 9 and 24 months.

Child and Family Characteristics—Child and family characteristics hypothesized to affect both the likelihood of enrollment in EI and a mother's depressive symptoms were included as covariates in multivariable models. Child characteristics included: birthweight; having a medical, congenital, or genetic condition associated with developmental delay (see above for examples); score on the BSF-R Motor or Mental Scales; child temperament, defined by maternal response that the child was very difficult to raise; and child health status as rated by the maternal respondent. Family characteristics included maternal race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic); presence of partner in the home; child's insurance status; and household socioeconomic status (SES quintile), which was quantified as an ECLS-B composite variable and comprised parental education, household income, and social prestige of parental occupations.

Data Analysis

For analysis, the 1,300 children who met inclusion criteria were stratified by the age at the time the child first became eligible to receive EI services: either eligible as infants based on the 9 month assessment or newly eligible as toddlers based on the 24 month assessment. We elected to stratify eligible children in this manner because of differences in the pattern of service receipt. We used individual level weights from ECLS-B to account for the study's complex sampling design and to yield valid national estimates. On weighted data we used the chi-square test to describe sample characteristics by EI service receipt. We used multivariable logistic regression models to examine associations between maternal depressive symptoms and receipt of EI services at 24 months, employing Taylor series estimation to accommodate ECLS-B's sampling design and arrive at valid confidence intervals. Based on our stratification scheme, separate models were estimated for children who became eligible for EI services as infants and children newly eligible as toddlers. All models were adjusted for child and family risk characteristics. Because we believed that the effect of maternal depressive symptoms on enrollment might differ depending on the child's birthweight, medical condition, or family demographic characteristics, we tested for a

differential effect of maternal depressive symptoms on enrollment by significant child and family characteristics by including interaction terms in multivariable models.

We conducted additional exploratory analyses to (1) test the stability of study findings in a sample that restricted eligibility based on developmental delay to children who scored >2 SD below mean on the BSF-R Mental Scale or >2 SD below mean on the Motor Scale, or >1.5 SD below the mean on both scales, criteria that meet or exceed EI eligibility standards in all states [30]; and (2) examine the effect of depressive symptom severity on EI service receipt. We performed analyses using SAS v9.1 [42].

The Boston University Medical Center Institutional Review Board reviewed the study and determined it to be exempt from further review based on the fact that we used existing data that is publicly available and the information was recorded in such a manner that subjects cannot be identified. This manuscript was reviewed for compliance with the terms of the ECLS-B restricted data use license by the National Center for Educational Statistics prior to publication.

Results

Population

Among the 9,850 infants included in the ECLS-B cohort at 24 months, 1,600 met the study's eligibility criteria for EI services. Of these, we excluded 100 children whose mothers were not the survey respondent, 50 children whose mothers had incomplete information on depressive symptoms, and 150 children whose mothers were of Asian, Pacific Islander, Alaskan native, or American Indian backgrounds due to insufficient numbers to conduct planned analyses. There were no differences in child illness severity, household demographics, maternal depressive symptoms, and EI service receipt between excluded and included children. Overall, the sample was 50.4% non-Hispanic white, 16.3% non-Hispanic black, and 33.3% Hispanic; 46.8% fell within the lowest 2 SES quintiles; 6.3% had birthweight $<1,500$ g; and 53% had medical or genetic condition associated with developmental delay (Table 1). The mean Bayley motor score among eligible children was 73.9 and mean Bayley mental score was 112.9, which corresponds to scores approximately 1.5 SD below the population mean for both scores. Of the 1,300 children in our sample, 650 became eligible for EI services as infants (ascertained at the 9 month assessment) and 650 were newly eligible at the 24 month assessment based on their developmental performance.

Maternal report of clinically significant depressive symptoms was 18.5% at 9 months and 21.2% at 24 months. At 9 months, 55% of depressed mothers had moderate symptoms and 45% severe; at 24 months, 69% of the mothers with clinically significant depressive symptoms met criteria for a major depressive episode. Almost 8% of the mothers reported depressive symptoms at both 9 and 24 months. Of these mothers with chronic symptoms, 84% met criteria of having a current or past major depressive episode.

Overall, over 10% of eligible children received EI services, with marked difference in service receipt between children eligible as infants (28.2%) and children newly eligible as toddlers (4.9%). In the population of children receiving services, the prevalence of clinically significant maternal depressive symptoms was 35.0%. Among mothers whose children became eligible as infants the prevalence was 23.0%, and among mothers whose children were newly eligible at 24 months the prevalence was 57.5%.

Maternal Depressive Symptoms and Service Receipt Among Children who Became Eligible for EI Services as Infants

Among the 650 children who were eligible to receive EI services as infants, 33.2% of children whose mothers reported depressive symptoms at the 24 month assessment received services compared to 27.0% whose mothers were not depressed ($P = 0.39$) (Table 2). In models that adjusted for child risk and sociodemographic factors, the difference in service receipt between depressed and non-depressed mothers did not reach statistical significance (aOR 1.8; 95% CI 0.8, 4.0) (Table 3). In models that included depressive symptom \times significant covariate interaction terms, we found no evidence of effect modification.

Maternal Depressive Symptoms and Service Receipt Among Children Newly Eligible for EI Services as Toddlers

Among the 650 children who were newly eligible to receive services as toddlers, 13.0% of children whose mothers reported clinically significant depressive symptoms at 24 months received services compared to 2.6% whose mothers were not depressed ($P < 0.001$). In adjusted models, children whose mothers had depressive symptoms were over 4 times as likely to receive EI services as children of nondepressed mothers (aOR 4.6, 95% CI 1.5, 14.6) (Table 3). Similar to the models examining service receipt among children eligible as infants, we found no evidence of effect modification by any of the significant child risk or demographic characteristics.

Maternal Depressive Symptoms and EI Service Receipt Among Children With Greater Development Delays

We replicated our analyses using a sample that restricted eligibility based on developmental delay to children who scored >2 SD below the mean on the Mental Scale or >2 SD below the mean on the Motor Scale, or >1.5 SD below the mean on both scales. The relationship between maternal depressive symptoms and service receipt mirrored the findings from the less restrictive sample. We found no difference in service receipt among children of depressed mothers eligible for EI services as infants and an increased likelihood of service receipt among children who were newly eligible to receive services as toddlers (eligible as infants: aOR 1.3; 95% CI 0.6, 2.5; eligible as toddlers: aOR 2.9; 95% CI 1.2, 7.1).²

Maternal Depressive Symptom Severity and EI Service Receipt

Exploratory analyses that examined the relationship between depressive symptom severity and receipt of EI services at 24 months were conducted by modeling depressive symptoms as an ordered variable. Results suggested the likelihood of service receipt increased as depressive symptom severity increased (among children eligible for EI services as infants: aOR 1.6; 95% CI 1.0, 2.4; among children newly eligible for services at 24 months: aOR 2.5; 95% CI 1.3, 4.6).²

Discussion

We found that clinically significant depressive symptoms in mothers of children eligible to receive EI services did not appear to limit participation in early intervention programs. Our analyses controlled for child risk and demographic factors and stratified children by the age when the child became eligible to receive EI services. We found that among children who first became eligible for EI services as infants there was no difference in receipt of EI service by mothers' depression status. Among children who were newly eligible for EI services at 24 months, children whose mothers were depressed were, on average, 4 times

²Complete data available from authors on request.

more likely to receive services compared to children of non-depressed mothers. Based on research describing decreased health management skills among depressed women [43–48] and less utilization of preventive health services among their children, [10,36,49] one might expect that children whose mothers experienced depressive symptoms would be less likely to receive EI services as a result of the lack of energy, motivation, and organization associated with depressive illness. However, our data do not support this hypothesis. Because of the unexpected direction of our findings, we conducted additional exploratory analyses and our results were confirmed when we used more stringent criteria to define eligibility for EI services and modeled depressive symptoms based symptom severity.

One possible explanation of the positive association between EI participation and maternal depressive symptoms is suggested by Janicke in their study of factors related to child health care use [50]. The authors postulate that a mother's depressive symptoms may limit the personal resources that she can dedicate to her child. Thus, she may be more likely to turn to other sources of support—in this case, early intervention services—for assistance. This explanation is consistent with findings of increased utilization of pediatric acute care services among depressed and emotionally stressed mothers [10,50–53]. Alternatively, the theoretical paradigm of vulnerable child syndrome may provide an explanation for the study findings. Originally described in 1964 by Green and Solnit [54] the vulnerable child syndrome describes a constellation of phenomena in which a child with real or imagined illness early in life is viewed by the caregiver, generally the child's mother, as having increased susceptibility to illness. Some studies have invoked this theory to explain increased service use among children likely to be eligible for EI services [55,56].

Our study is the first to describe the overall prevalence of depressive symptoms among mothers whose children are receiving EI services at 2 years (35.0%). The overall prevalence is consistent with studies of depressive symptoms among women whose children have conditions that make them eligible for EI services [20–27] and those with high social risk [28,29]. We identified differences in depressive symptom prevalence between mothers of enrolled children who became eligible as infants (23.0%) and mothers of enrolled children who became eligible as toddlers (57.5%). The elevated prevalence of depression among mothers of these newly eligible, enrolled children may be related to the characteristics of children who enter EI programs as toddlers. This group generally qualifies for EI services based on expressive language delays and impairments in social interaction and communication, delays associated with autism spectrum diagnoses. The high level of depressive symptoms among mothers of children with ASD is well documented and could contribute to the observed prevalence [57–60].

While our study cannot determine the mechanism by which maternal depressive symptoms are linked to a child's receipt of EI services, the elevated symptom burden among mothers of children enrolled in EI programs identified in our analyses suggests a need to address maternal mental health as part of Part C early intervention programs. Beginning in 2004, all states were required to report on activities related to supporting family capacities in their performance report, expanding the program's sole focus from child outcomes to broader family functioning [61]. This conceptual shift, which emphasized providing a developmentally supportive environment and enhancing the overall quality of family life, is one that fits well with the provision of maternal mental health services within the program model. Furthermore, the 2009 Institute of Medicine (IOM) landmark report *Depression in Parents, Parenting, and Children* [62] called for the development of innovative, community-based initiatives to reduce barriers to care for parents experiencing depressive symptoms. The IOM specifically called for interventions that take place in venues capable of integrating services for parents and children. Early intervention programs represent such a setting.

Our study has several limitations. First, depression tends to be a waxing and waning illness. Although we document depressive symptoms at 9 months and the interval between the 9 and 24 month interviews, we cannot quantify the duration or number of depressive episodes or address the issue of whether or not depressed mothers received treatment for their condition. Second, ECLS-B used different measures to ascertain depressive symptoms at 9 and 24 month interviews, making it difficult to ensure symptom severity equivalence at the two time points. Third, as is typical of cross-sectional cohort studies, the associations reported in this study are not necessarily causal, and residual confounding may exist. Fourth, it is possible that the criteria we used to determine EI eligibility overestimate the number of eligible children and could bias study findings if the proportion of mothers with depressive symptoms among misclassified children differed from the proportion among children truly eligible. Our test of the stability of study findings in a more restricted sample addressed this limitation. Additionally, the study relies on parent report of receipt of early intervention services. Given the varied models of early intervention service delivery, parents may be unclear of whether they are receiving Part C services or developmental services provided through other mechanisms. Finally, we examined the experience of children born in 2001. It is possible that with new American Academy Pediatrics guidelines regarding developmental screening, [63] enrollment in early intervention services has changed during the intervening period.

These limitations notwithstanding, we believe our study provides new information from a rigorously tested, nationally representative data set regarding maternal depressive symptoms and participation in Part C early intervention services. Overall, our findings suggest that a mother's depressive symptoms did not interfere with her child's receipt of early intervention services. For the group of children newly eligible for EI services as toddlers, study findings support an increased likelihood of service receipt among children whose mothers reported depressive symptoms. Given the low level of service receipt among eligible children, it is encouraging that children of mothers with clinically significant depressive symptoms participated in EI programs given the increased risk conferred by such symptoms on children with existing developmental risk. Additionally, our findings document a high prevalence of depressive symptoms among the mothers of children receiving EI services, particularly children newly enrolled as toddlers. These data can be used to advocate for expanded maternal mental health services within EI programs. Study findings have the potential to assist states and EI programs to develop strategies to increase improve child and family outcomes by identifying and addressing maternal mental health needs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1
Characteristics of children eligible for early intervention services at 24 months, by child age at initial eligibility

	N Total (N = 1,300)		Eligible as infants (N = 650)		Newly eligible (N = 650)	
	N	% CI	N	% CI	N	% CI
Maternal and household demographic characteristics						
Race/ethnicity						
Non-Hispanic white	650	50.4 (43.2, 57.5)	58.0	(49.7, 66.2)	47.9	(40.0, 55.8)
Non-Hispanic black	300	16.3 (12.4, 20.3)	18.5	(12.4, 24.5)	15.6	(11.5, 19.7)
Hispanic	350	33.3 (26.2, 40.4)	23.6	(17.4, 29.8)	36.5	(28.3, 44.7)
Household SES						
Lowest two quintiles	600	46.8 (42.9, 50.7)	47.3	(39.9, 54.8)	46.6	(42.3, 51.0)
Highest three quintiles	700	53.2 (49.3, 57.1)	52.7	(45.2, 60.1)	53.4	(49.0, 57.7)
Partner present in household	950	74.1 (70.0, 78.2)	75.6	(69.0, 82.1)	73.6	(68.8, 78.4)
Insurance status (none or public insurance)	700	51.6 (46.7, 56.6)	52.6	(44.7, 60.5)	51.3	(45.8, 56.9)
Child risk characteristics						
Birthweight (BW)						
BW ≤ 1,500 g	500	6.3 (5.3, 7.3)	22.1	(18.4, 25.8)	1.1	(0.9, 1.4)
BW 1,500–2,500 g	200	9.7 (8.0, 11.3)	16.5	(12.4, 20.7)	7.4	(5.7, 9.2)
BW >2,500 g	600	84.0 (81.9, 86.2)	61.4	(55.4, 67.3)	91.4	(89.6, 93.2)
Qualifying medical/genetic condition						
Yes	100	5.3 (3.3, 7.4)	21.7	(14.5, 28.9)		
No	1,200	94.7 (92.6, 96.7)	78.3	(71.1, 85.5)		
Developmental risk						
Bayley motor score (mean, SE)*		73.9 (0.2)	74.2 (0.5)		73.8 (0.2)	
Bayley mental score (mean, SE)*		112.9 (0.5)	113.9 (0.9)		112.6 (0.5)	
Health status (parent-rated; Fair/poor)	100	3.9 (2.4, 5.3)	7.4	(4.6, 10.3)	2.7	(1.5, 3.9)
Temperament (very difficult to raise)	50	2.9 (1.3, 4.5)	3.7	(1.3, 6.0)	2.6	(0.6, 4.6)
Maternal clinically significant depressive symptoms						
9 months postpartum	250	18.5 (14.8, 22.1)	15.5	(11.4, 19.6)	19.4	(14.9, 24.0)
24 months postpartum	250	21.2 (17.4, 25.0)	20.9	(15.6, 25.9)	21.4	(16.8, 25.9)
9 and 24 months postpartum	100	7.8 (4.7, 10.9)	5.5	(2.8, 8.3)	8.5	(4.6, 12.4)

	Total (N = 1,300)		Eligible as infants (N = 650)		Newly eligible (N = 650)	
	N	% CI	%	CI	%	CI
Received EI services at 24 months	200	10.6 (8.1, 13.1)	28.2	(22.4, 34.0)	4.9	(2.5, 7.3)

CI confidence interval, SE standard error

Unweighted N's are rounded to the nearest 50 subjects in accordance with the ECLS-B restricted data use license. Numbers may not add to total due to rounding

* Population scaled scores on BSF-R assessment: motor: mean 81.47, standard deviation (SD) 5.07, range 56.43–108.53; mental: mean 127.09, SD 10.65, range 92.35–174.14 (source: Andraessen and Fletcher [33])

Table 2
Receipt of early intervention (EI) services among children eligible for EI at 24 months, by child age at initial eligibility and child and family risk characteristics

	Total (n = 1,300)		Eligible as infants (n = 650)		Newly eligible (n = 650)	
	% EI	CI	% EI	CI	% EI	CI
Total sample	10.6	(8.1, 13.1)	28.2	(22.4, 34.0)	4.9	(2.5, 7.3)
<i>Risk characteristic</i>						
Maternal depressive symptoms at 24 months postpartum						
Yes	17.6	(10.3, 24.9) *	33.2	(19.9, 46.4)	13.0	(4.6, 21.4) *
No	8.7	(6.2, 11.2)	27.0	(20.6, 33.5)	2.6	(0.7, 4.6)
Child risk characteristics						
Birthweight (BW)						
BW ≤1,500 g	28.0	(22.8, 33.2) *	29.4	(24.0, 34.8)	19.0	(9.3, 28.7) *
BW 1,500–2,500 g	20.1	(12.7, 27.6)	34.9	(22.4, 47.5)	9.6	(3.4, 7.1)
BW >2,500 g	8.2	(5.6, 10.7)	26.0	(17.3, 34.7)	4.3	(1.9, 6.7)
Qualifying medical/genetic condition						
Yes	31.3	(13.1, 49.5) *	31.3	(13.0, 49.6)		
No	9.4	(7.0, 11.9)	27.4	(21.9, 32.9)		
<i>Developmental risk</i>						
Bayley motor score **						
>1.5 SD below mean (raw score range 56.4–73.9; 1.5 SD = 7.6 points)	9.9	(7.0, 12.7)	30.1	(22.1, 38.1)	4.3	(1.9, 6.6)
≤1.5 SD below mean (raw score >73.9)	10.0	(5.2, 14.7)	20.3	(12.2, 28.4)	6.1	(0.8, 11.4)
Bayley mental score ***						
>1.5 SD below mean (raw score range 92.4–111.1; 1.5 SD = 16 points)	14.4	(10.0, 18.8) *	38.3	(28.1, 48.4) *	8.0	(3.9, 12.0) *
≤1.5 SD below mean (raw score >111.1)	6.5	(3.8, 9.2)	20.0	(11.4, 28.5)	1.3	(0.2, 2.3)
Health status (parent-rated)						
Fair/poor	25.2	(8.3, 42.1) *	31.6	(12.7, 50.4)	19.7	(0.1, 39.3) *
Excellent/very good/good	10.0	(7.7, 12.3)	28.0	(22.1, 33.8)	4.4	(2.3, 6.5)
Temperament						
Very difficult to raise	32.1	(7.9, 56.4) *	34.3	(11.0, 57.6)	31.2	(0.0, 64.5) *
Not at all/not very/average/somewhat difficult to raise	10.0	(7.5, 12.5)	28.0	(22.1, 33.9)	4.1	(1.7, 6.6)

	Total (n = 1,300)		Eligible as infants (n = 650)		Newly eligible (n = 650)	
	%	95% CI	%	95% CI	%	95% CI
Maternal and household demographic characteristics						
Race/ethnicity						
Non-Hispanic white	14.3	(10.5, 18.2)	34.7	(25.6, 43.7)	6.3	(3.3, 9.3)
Non-Hispanic black	4.5	(2.9, 6.2)	14.6	(9.9, 19.3)	0.7	(0.0, 2.0)
Hispanic	8.2	(4.3, 12.1)	23.9	(12.7, 35.2)	4.9	(0.9, 8.9)
Household SES						
Lowest two quintiles	9.4	(6.4, 12.4)	27.1	(18.2, 35.9)	3.7	(1.1, 6.2)
Highest three quintiles	11.7	(7.4, 16.0)	29.3	(21.0, 37.5)	5.9	(2.1, 9.8)
Partner in household						
No	11.8	(6.5, 17.0)	27.7	(14.3, 41.0)	7.2	(1.8, 12.5)
Yes	10.2	(6.8, 13.5)	28.4	(20.8, 36.0)	4.0	(1.3, 6.8)
Insurance status						
None or public insurance	9.0	(5.9, 12.0)	24.1	(16.3, 32.0)	4.0	(1.2, 6.8)
Private insurance	12.6	(8.5, 16.7)	33.4	(24.4, 42.4)	5.9	(1.9, 9.9)

CI confidence interval

Unweighted N's, weighted percentages. All unweighted N's are rounded to the nearest 50 subjects in accordance with the ECLS-B restricted data use license. Numbers may not add to total due to rounding

* Chi square P value < 0.05

** Population scaled scores on BSF-R assessment: motor: mean 81.47, standard deviation (SD) 5.07, range 56.43–108.53; mental: mean 127.09, SD 10.65, range 92.35–174.14 (source: Andressen and Fletcher [33])

Table 3

Association of maternal depressive symptoms with child receipt of early intervention (EI) services at 24 months

	aOR	(95% CI)
<i>Children eligible for EI as infants</i>		
Maternal depressive symptoms	1.8	(0.8, 4.0)
Child risk characteristics		
Birthweight [‡]	1.5	(1.1, 2.2)
Qualifying medical or genetic condition	2.5	(0.8, 7.6)
Bayley motor score [†] (per-10 points)	2.4	(1.2, 4.8)
Bayley mental score [†] (per-10 points)	1.5	(1.0, 2.4)
Child fair/poor health	0.8	(0.3, 2.4)
Very difficult to raise	1.9	(0.6, 5.5)
Maternal and household demographic characteristics		
Race/ethnicity		
Non-Hispanic black (vs. non-Hispanic white)	0.3	(0.1, 0.6)
Hispanic (vs. non-Hispanic white)	0.5	(0.2, 1.1)
Household SES (lowest 2 quintiles vs. highest 3 quintiles)	1.6	(0.7, 3.5)
No partner present in household (vs. partner)	0.8	(0.4, 1.9)
None or public insurance (vs. private insurance)	0.5	(0.3, 1.1)
<i>Children newly eligible for EI</i>		
Maternal depressive symptoms	4.6	(1.5, 14.6)
Child risk characteristics		
Birthweight [‡]	2.9	(1.8, 4.6)
Bayley motor score ^{**} (per-10 points)	2.0	(0.7, 6.2)
Bayley mental score ^{**} (per-10 points)	3.1	(1.9, 5.0)
Child fair/poor health	4.7	(1.2, 18.0)
Very difficult to raise	11.0	(2.8, 43.9)
Maternal and household demographic characteristics		
Race/ethnicity		
Non-Hispanic black (vs. non-Hispanic white)	0.05	(0.01, 0.43)
Hispanic (vs. non-Hispanic white)	0.7	(0.3, 2.0)
Household SES (lowest 2 quintiles vs. highest 3 quintiles)	0.4	(0.2, 1.0)
No partner present in household (vs. partner)	3.6	(1.3, 10.2)
None or public insurance (vs. private insurance)	0.4	(0.2, 1.0)

aOR adjusted odds ratio, CI confidence interval

* Results based on multivariable logistic regression models (separate models by child age at eligibility entrance), with each model adjusted for the other variables in the table

[‡] Birthweight is modeled as an ordered variable with 3 categories: >2,500, 1,500–2,500, ≤1,500 g

[†] Population scaled scores on BSF-R assessment: motor: mean 81.47, standard deviation (SD) 5.07, range 56.43–108.53; mental: mean 127.09, SD 10.65, range 92.35–174.14 (source: Andreassen and Fletcher [33])