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## Increasing Pediatric Health Care Providers' Referrals to Early Intervention Services

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INCREASING PEDIATRIC HEALTH CARE PROVIDERS' REFERRALS  
TO EARLY INTERVENTION SERVICES

BY

IRENE MCIVOR MASON

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE  
MASTER OF SCIENCE DEGREE

IN

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MASTER OF SCIENCE THESIS

OF

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## **ABSTRACT**

This study examined whether an educational mailing explaining Early Intervention services sent to pediatric health care providers would increase the number of referrals to those services. Data was collected from Rhode Island's Executive Office of Health and Human Services describing the number of provider referrals four Rhode Island's four core cities. An examination of the data using a difference in differences design, descriptive statistics, and *t*-tests was utilized to determine if providers who received an educational mailing increased their number of referrals compared to the number of referrals made by providers who did not receive the mailing. While there was an increase in the number of referrals by the group that received the PEM, the control group providers also increased their number of referrals. As the comparison of the treatment group to the control group did not reveal a statistically significant difference in the number of referrals between the groups, the study hypothesis is not supported. This study contributed to the literature that does not support PEMS as a method for changing health care providers' behaviors.

## ACKNOWLEDGMENTS

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## **CHAPTER ONE**

### **INTRODUCTION**

Early Intervention (EI) services promote the growth and development of infants and toddlers who have a developmental disability or delay in one or more areas including speech, physical ability, or social skills. EI is a system of services consisting of speech therapy, occupational therapy, nutritional counseling, education, and support for families whose child (0-3 years of age) has a delay or disability in one or more developmental areas. However, several studies using nationally representative samples have concluded that as many as 16% of young children who are at risk for developmental delays are not receiving EI services (Feinberg, Silverstein, Donahue, & Bliss, 2011; Rosenberg, Zhang, & Robinson, 2008). According to King and colleagues (2010), only 20–30% of children with delays are identified before entering school. Boyle and colleagues (2011) found over the 12 year time period of their study (1997-2008) the prevalence of developmental disabilities increased from 12.84% to 15.04%, with low income children having a higher prevalence of many developmental disabilities.

As of June 30, 2015, 2,195 children equivalent to six percent of Rhode Island's population under three years of age were receiving Early Intervention services under Part C of the Individual with Disabilities Education Act (IDEA) (RI *KIDS COUNT*, 2016). Comparing Rhode Island's child population to the findings of the research studies conducted on national samples, potentially more than 2,000 children residing in Rhode Island who may have a developmental delay are at risk for not being referred

to Early Intervention services. In order for children with developmental disabilities and their families to realize maximum benefits from EI services, early identification and expeditious referral are necessary. Increasing the numbers of children identified as having developmental delays by pediatric care providers referred to EI services would not only increase the number of children receiving services, the amount of time children received services would increase possibly reducing the developmental disability and increase preparedness for school. As Rhode Island EI currently serves 6% of the population under the age of three compared to national estimates of 12-18% of children potentially eligible for services, potentially an additional 6-12% of Rhode Island's children may be eligible for EI services and further exploration of the Rhode Island EI eligibility and referral process is warranted.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

During birth to age 3, there is rapid growth and development of a child's brain and nervous system, allowing for the transition from a helpless infant to a mobile, verbal, and social individual. The frontal lobe undergoes a rapid period of development after birth, with the prefrontal cortex, responsible for executive functions such as planning and impulse control, being particularly vulnerable to early stress and experience (Bailey et al., 2005). During this time, the stimulation received from parents and caretakers is critical to enhancing and preserving a child's potential for future development, knowledge and opportunity to sustain oneself. While experiences that support brain development such as auditory, sensory, and visual stimulation are ever-present in one's environment, parents and caretakers may not always have enough information and education on how to best utilize appropriate stimulation to enhance their child's development. Numerous studies have documented the positive effects of EI on children's developmental outcomes especially for children born prematurely or those with developmental delays (Bailey et al., 2005; Fox, Dunlap, & Cushing, 2002; Guevara et al., 2013). Consequently, the early identification of a developmental delay and delivery of EI services during the first three years of life is imperative (Rose, Herzig, & Hussey-Gardner, 2014).

#### **EI Services**

The origin of EI services can be found in The Education for All Handicapped Children Act of 1974. Enacted in 1975 in response to Congressional concern for two groups of children, those who were entirely excluded from the public school system

due to a disability and those who had access but because of their disability did not receive an appropriate education this legislation ensured a “free and appropriate education to all children including those with disabilities” (Pub. L. No. 94-142). The 1975 act was amended in 1986 by Pub. L. No. 99-457 as a federal grant program to assist state governments in providing EI services to children age’s birth to three years in order to prepare children with a developmental disability to enter school. In 1990, The Education for All Handicapped Children Act was renamed by Congress to the Individual with Disabilities Education Act (IDEA). Additional amendments to IDEA of 1997, mandated the development of community based systems in order to provide for early identification and treatment of developmental disabilities. Consequently, the focus of IDEA expanded from the treatment of children with disabilities to identifying and referring children suspected of having a disability or a condition that could result in a disability (American Academy of Pediatrics, 2001). The IDEA of 2004, reaffirmed the mandate for child health professionals to provide early identification of, and intervention for, children with developmental disabilities through community-based collaborative systems.

### **Benefits of Early Intervention Services**

There are multiple studies documenting the need for (Bagner, Frazier, & Berkovits, 2014) and effectiveness of early intervention services on the developmental outcomes of children at risk for a disability, and with established disabilities and their families (Bailey et al., 2005; Fox et al., 2002; Rose et al., 2014). Children who have a developmental disability fail to meet the expected cognitive, communicative, motor milestones or social-emotional milestones for their chronological age, potentially

resulting in risk for future academic failure (Bagner et al., 2014). The children of families who participated in EI services have demonstrated improved cognitive and socioemotional function (Anderson et al., 2003; Hauser-Cram et al., 2001). EI services such as physical therapy, speech therapy, and occupational therapy, as mandated by Part C of the IDEA have been shown to reduce children's developmental disabilities (Raspa et al., 2015; King et al., 2010) and improve their developmental outcomes, resulting in increased preparedness to enter school (Jimenez, Barg, Guevara, Gerdes, & Fiks, 2013). According to Fox and colleagues (2002), EI programs that provide family centered services have been effective in increasing parents' ability to deal with both current and future problematic behaviors of their children.

An early diagnosis can significantly reduce the impact of a developmental delay on the functioning of the child and his parents (Hauser-Cram et al., 2001). In addition to treatment for the developmental disorder, early identification of the cause may also compel an extensive range of treatment planning, from the specific medical treatment of the child to family support services for the child's parents and siblings. IDEA mandates that EI services be designed so that the families' needs, concerns, and priorities are the driving force behind the services provided; "which is appropriate as the family is the overwhelming influence on the child's behavioral development and functioning and family support and education lead to positive outcomes" (Fox et al., 2002, p. 153). A family's desire and willingness to be involved increases their abilities to support the child and strengthens the effectiveness of the EI services. In a national study, 82% of 2586 parents whose children received early intervention

services, expressed that they felt better able to support their children and that their family was better off due to early intervention (Bailey et al., 2005).

### **EI Referral System**

When Part C of the IDEA was established in 1986 as a federal grant program to assist state governments in providing early intervention services to children, each state was allowed to determine eligibility levels (IDEA, 1986). However, states accepting funding had to ensure that programs would be available to every eligible child and their family. Each state has established eligibility criteria for EI services based on the minimum delay a child demonstrates on developmental domains. Eligibility criteria range from a broad standard of any delay for Hawaii's and Nebraska's children, to needing at least a 25% delay in one domain in 16 states, and as much as a 50% delay in one domain in eight states (Rose et al., 2014). Rhode Island families can receive EI services if the child has a difference of 2 standard deviations or more from the expected age of a developmental milestone in at least one developmental domain (Rose et al., 2014). Only Alaska, Arizona, the District of Columbia, and Missouri serve approximately the same proportion of children as are estimated to be Part C eligible (Rosenberg et al., 2008). However, in all four states, children must have a delay of 50% in at least one developmental domain to be eligible for EI (Rose et al., 2014).

While the eligibility standard is high, the three states and the District of Columbia all have websites providing detailed information for parents about EI services and emphasize the ease of making a referral. Alaska tells its site visitors that the Ages and Stages Questionnaire is the tool used to determine if a child has a delay,

and informs parents to ask for a screening by contacting their local provider (<http://dhss.alaska.gov/dsds/Pages/infantlearning/default.aspx>). A map with all providers, a list of resources for parents, and parent rights video is also posted. Arizona's website emphasizes that EI services support parents' ability to assist their children who have developmental delays (<https://des.az.gov/services/disabilities/developmental-infant>). Missouri's website emphasizes meeting the family's needs to support the child and has an online referral for parents (<https://www.mofirststeps.com/>). The District of Columbia emphasizes the parents' involvement, that EI services are free, and promotes an 800 number to use for referrals (<https://osse.dc.gov/service/strong-start-dc-early-intervention-program-dc-eip-information-families>).

**Rhode Island's EI system.** Rhode Island's (EI) program is overseen by the Executive Office of Health and Human Services (EOHHS), whose objective is to promote the growth and development of infants and toddlers who have a developmental disability or unspecified delay in development resulting from emotional disturbance or environmental, cultural, and/or economic disadvantage (Rhode Island's EI ICD 9 Codes, 2013). The program is designed to assist parents, family members and caregivers of infants and toddlers, birth through three years of age, who have a diagnosed medical or psychological problem resulting in a developmental delay. Children, whose health care providers have diagnosed a specific developmental delay or children who are deemed at risk for a delay in one or more areas including motor, cognitive, socio-emotional, language or adaptive of development are also eligible to receive services.

The EOHHS does not require health care providers to employ a standardized developmental assessment tool to diagnosis a developmental disability or delay and the EOHHS does not compile data on how Rhode Island health care providers determine a delay (Rhode Island's EI ICD 9 Codes, 2013). Providers use various tools such as Denver Developmental Screening Tool, or the Ages and Stages® Questionnaire which is a parent reported assessment. Parents and caregivers, daycare providers, community programs, hospitals, and any person who suspects that a child may have a developmental delay may refer a child. Services are provided until the child's third birthday or until there is a significant improvement in functioning as measured by standardized multidisciplinary developmental assessment tools (Rhode Island's EI ICD 9 Codes, 2013). If a child continues to require intervention services after his third birthday then the family is transferred to the local school district to continue services.

The most common source of referral is the child's parents or guardian and the pediatrician or family practice physician (EOHHS, n.d.). The greatest number of referrals to EI services came from parents/guardians in state fiscal year (SFY) 2015 (37.08%) and SFY 2016 (37.05%), but declined to 31.79% in SFY 2017. Pediatricians/family practice physicians made 30.3% of all EI referrals in SFY 2015 but for unexplained reasons the number of referrals declined to only 22.78% in SFY 2016. In SFY 2017, pediatricians/family practice referrals rose to 34.33% which eclipsed the number of parent referrals (31.79%).

Once a child is referred to one of the nine EI provider agencies located throughout Rhode Island, the agency member will attempt to contact the family to



offer services. An initial consultation between an EI provider and the family takes place usually at the family home, the reason for referral is explained and the parents/caregivers are offered an initial evaluation. Once the offer of an evaluation is accepted, the EI provider will arrange to have the multi-disciplinary assessment performed and will meet with the family members to discuss the results. If the child is eligible and the parent or legal guardian agrees to services, an Individual Family Service Plan (IFSP) is written reflecting the goals the primary caregivers have for the child and the child's needs. After the parents sign the IFSP, services are mandated to begin within 30 days.

EI services provided to the child include occupational therapy, speech therapy, physical therapy, and behavioral interventions. Services to support family members and primary caretakers including foster parents, adoptive parents, legal guardians, and child care providers are also provided. Education of family members and primary caregivers concerning child development, assistance with transitioning to school based intervention services upon the child's third birthday, and provision of sources of resources to meet the child's various needs and to support and strengthen the family so they can meet the child's needs is also an integral part of EI providers job (Rhode Island's EI ICD 9 Codes, 2013).

### **Role of the Health Care Provider**

National campaigns and policy statements by the American Academy of Pediatrics have promoted the importance of early screening for developmental delays and referral to EI services (American Academy of Pediatrics, 2001, Radecki, Sand-Loud, O'Connor, Sharp, & Olson, 2011). The goal of a developmental screening is to

detect problems that can be referred to Early Intervention services so that children will be prepared to enter school. In 2006, the American Academy of Pediatrics (AAP) recommended that all children receive developmental screening as part of their well child visits. Pediatric health care providers have a major responsibility for identifying children with suspected developmental delays and referring them for EI services as they see their patients frequently throughout the first three years of life. As a result, health care providers have multiple occasions to assess progress towards meeting developmental milestones. The recommendations from the AAP call for developmental surveillance at all 14 recommended well-child visits for children birth through age five and developmental screening with a standardized tool at the 9, 18, and 30 (or 24) month visits (Committee on Children with Disabilities, 2001). Pediatric health care providers are in the unique position to not only provide developmental scrutiny and administer formal screenings, they can also elicit parental concerns, document and maintain a longitudinal developmental history, identify protective and risk factors, and obtain input from others who interact with the child (e.g., day care providers). Suspicion or identification of a developmental disorder should prompt the provider to refer the child and parents to the EI agency for an in-depth evaluation and possible treatment. In Rhode Island, a health care provider can make a referral to EI services by directly calling one of the nine statewide EI provider agencies to make the referral.

National studies using representative longitudinal samples of children indicate there are potentially many more children with undiagnosed developmental disorders than the number which is being reported (Feinberg et al., 2011; Rosenberg et

al., 2008). This implies that there is much more work to do to identify children with developmental disorders (Rosenberg et al., 2008; Sand et al., 2005). The estimated prevalence rate of development delays is higher than the number of referrals, suggesting that health care providers are not detecting delays or are under reporting the number of suspected delays in development. Pediatric providers may find it difficult to detect developmental delays as children develop at different rates. In addition, they may also be reluctant to identify a child as in need of an EI evaluation for fear of provoking anxiety in parents and there may be concern about a backlash from parents as a result of reporting what is later assessed as a normally developing child (Guevara et al., 2013). Furthermore, providers may not refer to EI due to lack of knowledge about the EI referral process, how services are provided, and not understanding or accepting that services are provided at no cost to families. However, waiting until a developmental milestone is missed in order to make a definitive diagnosis could potentially delay services which could prove detrimental to the child's well-being (APA, 2001).

### **Printed educational materials (PEMS)**

While the effectiveness of printed educational mailings (PEMS) in changing healthcare providers' behavior is often assumed, the findings of the research scientifically testing this hypothesis are mixed. Although the provision of EI services is well-supported in the literature, the best strategies for implementing a system to ensure health care providers refer their patients to this service is not well researched or documented. A project conducted by the Food and Drug Administration in cooperation with the Rhode Island Department of Health determined that using

educational mailings significantly increased the reporting of suspected adverse drug reactions compared to a national group of physicians who did not receive the mailings (Scott et al., 1990). In a review of more than 200 studies, “researchers employing randomized control trials targeting increasing provider compliance with standards of care through provider reminders, reported changes ranging from a one percent decline to a 34% improvement in adherence to guidelines with interventions involving passive dissemination such as educational materials producing modest but consistently positive improvements” (Shojania & Grimshaw, 2005, p. 139). Freemantle and colleagues (1996), conducted a systematic review of nine studies that compared the impact of PEMS against a non-intervention control group and concluded while there was a wide range of the estimates of the benefits of PEMS, (-3% to 243.4%), the effect was not statistically significant. As these efforts did not target EI, additional research is warranted due to the ease of use and relative inexpensiveness of this approach as it could potentially yield tremendous financial and benefits to EI families.

According to the work of Glanz and Bishop (2010), creating public health programs that successfully change participants’ behavior requires an understanding of the crucial influences on behaviors and behavior change. Ajzen’s Theory of Planned Behavior (TPB) posits that intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control. This theory predicts and explains human behavior in specific contexts and has been used to evaluate the effectiveness of various types of interventions on changing the behavior of health care consumers and health care professionals. Ajzen links beliefs and behavior, postulating that the greater the

intention to engage in a behavior, the more likely the behavior will be performed (Ajzen, 1991). Beliefs about the likely consequence of behavior (behavioral controls) and the intention to perform the behavior (subjective norms) can predict the actual behavior. Individuals who possess the necessary knowledge and skills and have the ability to overcome any external obstacles should be able to perform the behavior. The knowledge to engage in the desired behavior, a referral to EI services, is provided by the educational mailing containing all the information needed to make a referral. Therefore, the educational mailing provides the behavioral control - the information the provider needs to understand and confidently act on his/her behavior. The intention to perform the behavior (referral to EI) comes from the healthcare provider's knowledge and understanding of the impact of a delay in development can have on a child and his or her family.

Whether PEMS can influence health care providers' EI referral behavior has not been studied. This investigative study aims to help close this gap in the literature by testing the hypothesis that pediatric health care providers who receive a PEM about EI services will refer more children to EI services than similar providers who do not receive a mailing.

## **CHAPTER THREE**

### **METHODOLOGY**

This study focuses on the referral process to EI and examines whether a printed educational mailing (PEM) (Appendix A) explaining EI services sent to pediatric health care providers increases the number of referrals to EI services. The card mailed was developed by the Rhode Island Department of Health; it describes EI services and includes the telephone numbers for the EI offices in the state so a referral can be made. The hypothesis being tested is that pediatric health care providers who receive a PEM about EI services will refer more children to EI services than similar providers who do not receive a mailing.

#### **Study Population**

Pediatric health care providers were defined as pediatricians, family practice physicians who treat children, and nurse practitioners. Treatment and control group participants were identified through listings of providers obtained from the EOHHS, Department of Health (DOH), and major systems of health care providers, Lifespan, Care New England, and Southcoast Community Health Care. Names of providers were also obtained through a search of Medicaid based systems including Neighborhood Health Plan and United Healthcare Rite Care. Once a potential provider was identified, an extensive search of websites including healthgrades.com, doximity.com, lifespan.org, lifescrpt.com, webmed.com, vitals.com and md.com was conducted to ascertain the provider's office location.

Although nurse practitioners were originally included in the design, they were excluded from the analysis as whether they were the actual provider of pediatric health

services was unable to be determined. Nurses licensed as registered nurses (RNs) do not provide direct care; nurse practitioners (NPs) are licensed to provide direct care. Several categories of nurse practitioners were listed in the data, however, whether the nurse who made the referral was an RN or NP was not consistent across all three years of data. Potentially, as part of their job description an RN might have simply made a referral to EI for a physician without ever having provided any health care.

Analyses focused on the providers' number of referrals to EI during the third quarter of each year. The PEM was sent via US mail to 143 providers with an office in Providence. A review of the Providence providers who received the mailing revealed that two providers were deceased, one dying prior to the study and one dying during the study resulting in a treatment group of 141 providers. Twelve pediatric providers located in Providence were not identified prior to the mailing, consequently they did not receive the PEM and were removed from the study. Only one provider belonging to the core group was not identified before the study and therefore was not included in the group. All other Rhode Island providers (n = 46) who made an EI referral but were not located in one of the study's four cities were also removed.

Rhode Island's four core cities (Providence, Central Falls, Pawtucket, and Woonsocket) were selected for the study as they have a significant number of similar demographic characteristics that correspond to risk factors of having a developmental delay. Risk factors for a child having a developmental delay include low birth weight (LBW), being a member of a minority population, offspring of a teenage mother, and having a mother with less than a high school education (Boyle et al., 2011; Feinberg et al., 2011; Rosenberg et al., 2008). Young children in these cities are more diverse

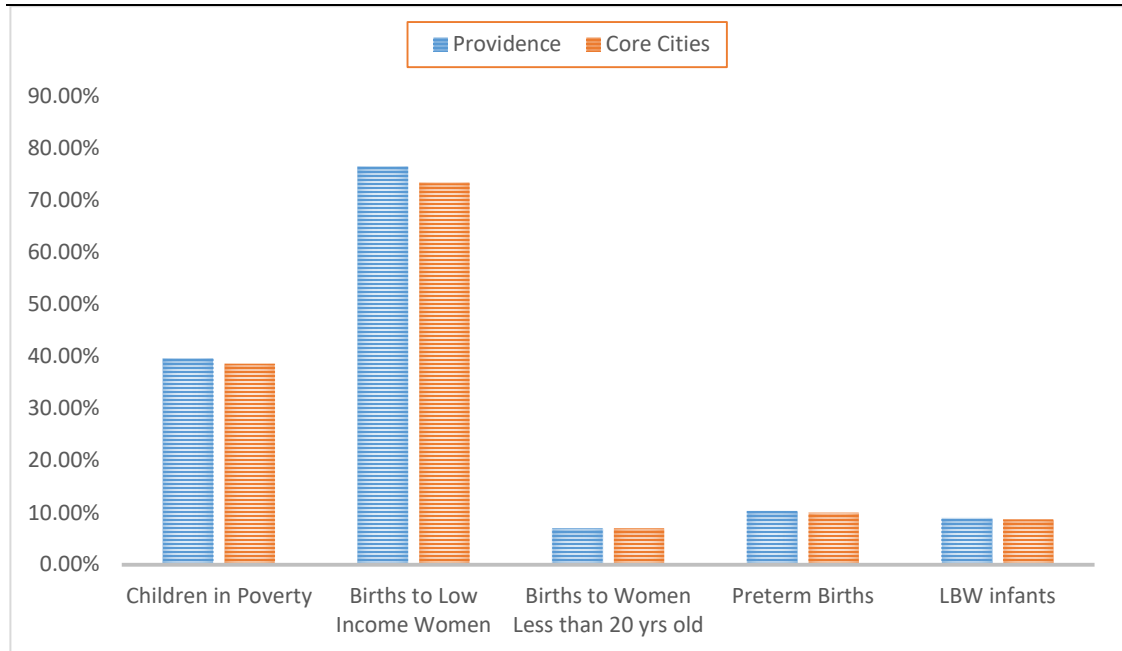
than any other age group with 84% of children in Providence and 87% in Central Falls being a member of a racial or ethnic minority group (RI *KIDS COUNT*, 2017).

Children living in the core cities account for nearly 50% of all Rhode Island children who receive medical assistance (Medicaid, CHIP, or other publicly funded health insurance) (RI *KIDS COUNT*, 2017). These four core cities compared to the rest of Rhode Island's 39 municipalities, have the highest percentage of children living in poverty (38.0% to 20.4%), the highest rate of teenage pregnancies (29.3% to 16.8%), the greatest number of mothers with less than a high school education (21.0% to 12.0%), and the highest percentage of LBW infants (8.6% to 7.4%) (RI *KIDS COUNT*, 2017).

Central Falls's, Pawtucket's, and Woonsocket's demographic data were comparable to the data for Providence (Figure 1). For example, in Providence 39.7% of children live in poverty compared to the 38.6% of children living in the core cities, 76.6% of all births were to low income mothers in the treatment city group compared to 73.3% for the control group, and in both groups approximately 7.0% of all infants were born to mothers less than 20 years of age. The percentage of preterm births, infants born before 37 weeks gestation, was similar to Providence (10.4%) compared to 10.0% for the control group cities. The incidence of LBW, infants born weighing less than 2500 grams, was 9.0% for Providence residents and 8.7% for the core cities. During the first six months of 2015, the number of children under the age of three who were newly enrolled in EI services was 7.0% in Providence, 9.0% in Central Falls, 6.0% in Pawtucket, and 7.0% in Woonsocket.



Figure 1 Comparison of Demographic Data of Providence to Rhode Island's Other Core Cities 2015



Providers with an office location in Providence, total population of 179,002 in 2015 including East and North Providence, were assigned to the treatment group (N=141) (RI Department of Labor and Training, 2015). The control group, total population of (131,112), consisted of pediatric care providers (N = 32) located in Central Falls, Woonsocket, and Pawtucket (RI Department of Labor Training, 2015).

**Key Variables**

The dependent variable in this study was the average number of referrals made by pediatric providers in each of the four cities in the 3<sup>rd</sup> quarter, July, August, and September combined, of years 2015, 2016, and 2017. The data were collected through the Rhode Island Early Intervention Care Coordination System (RIEICCS), powered by Welligent, a web-based system, through a monthly report sent from the EI provider agencies to the Department of Health and Human Services' data analyst. EOHHS

agreed to provide the pre-test referral data to the researcher. The referral report from the EOHHS data analyst contained the post-test data and was generated by the third week of the month it was received. The number of referrals and related data per provider were supplied in an Excel spreadsheet provided by the EOHHS data analyst. The provider data were de-identified. The child related data, (age at referral, gender, reason for referral, number of referrals by month) were not able to be supplied by EOHHS due to time constraints associated with compiling a detailed report.

The PEM mailed to the treatment group, was developed and printed by the staff of the EOHHS EI program. The information was printed in color on a two sided card approximately 4" by 8" inches. The EI program was explained as services to assist a family so they could then support their child and help parents with concerns about a child's development. The age range the child needs to be in to qualify for services, 0-3 years, was mentioned. EI services were described as listening to parents, providing a free evaluation of the child and making a plan for the future. In large print, readers were informed that parents can call EI directly and the name, address and telephone number of the nine EI agencies was provided. Additionally, the telephone number of the RI Parent Resource Network is provided for those needing additional information or help with deciding on which EI agency to contact. The PEMS was mailed through the United States Postal Service via first class postage in a business envelope addressed to the treatment group providers (N = 143). The independent variable, was coded as Mailed PEM, yes=1, no=0.

### **Procedure**

The mailing was sent on June 18, 2017, and data were collected until September 30, 2017, the last day that a referral to EI was counted for the study. There were no specific instructions sent to the providers other than the PEM. The PEM did not ask providers to change the way they had previously referred children. The PEM was used as a reminder, to disseminate information about the importance of EI services and to explain the referral process. All referrals that were made to EI by pediatric providers were retrieved from the Welligent data system by the EOHHS analyst. The data from EOHHS required extensive cleaning as there were many inconsistencies. Within each year, providers were misidentified multiple times. Across all three years of data, providers' professional designations were missing or incorrectly identified. The providers' information had to be repeatedly crosschecked against the mailing list to reliably count the total number of referrals made by each provider.

### **Data Analysis**

The data were received in an Excel document, cleaned, and transformed into an SPSS 24 data set, which was then used for the analysis. To establish a baseline, the mean number of referrals from both provider groups during the third quarter of the years 2015 and 2016 and the mean number of referrals from both groups for 2017 were calculated (Figure 2). Both groups have data points for the two time periods before the mailing and for the third quarter interval month interval after the mailing. Next, data for both the control and treatment groups were combined for 2015 and 2016 and averaged to form a pre-treatment referral rate in order to estimate the treatment change effect. The change in the treatment group referrals was calculated by

subtracting the average number of referrals per physician from 2015-2016 from the average number of physician referrals per physician in 2017. The change in the control group was also calculated with this same process.

Data analysis was performed using SPSS version 24. Descriptive statistics, frequencies, means (*M*), standard deviation (*SD*) and percentages for the variables were determined with the referral information retrieved from the Welligent System by the EOHHS analyst. An independent *t*-test, was used to determine if there was a statistical difference in the mean rate of referrals for the treatment and control groups after the mailing. An independent *t*-test was used to determine any statistical difference in the mean rate of referrals between the combined 2015-2016 treatment and 2015-2016 combined control group. In addition, an independent *t*-test was performed to see if change between the 2015/2016 and 2017 varied by group. Consequently, the study hypothesis was tested using a Mann-Whitney U test. This nonparametric test by was used as the study had two independent samples and the providers in the samples were assessed on a dependent scale.

## CHAPTER FOUR

### RESULTS

#### Study Population

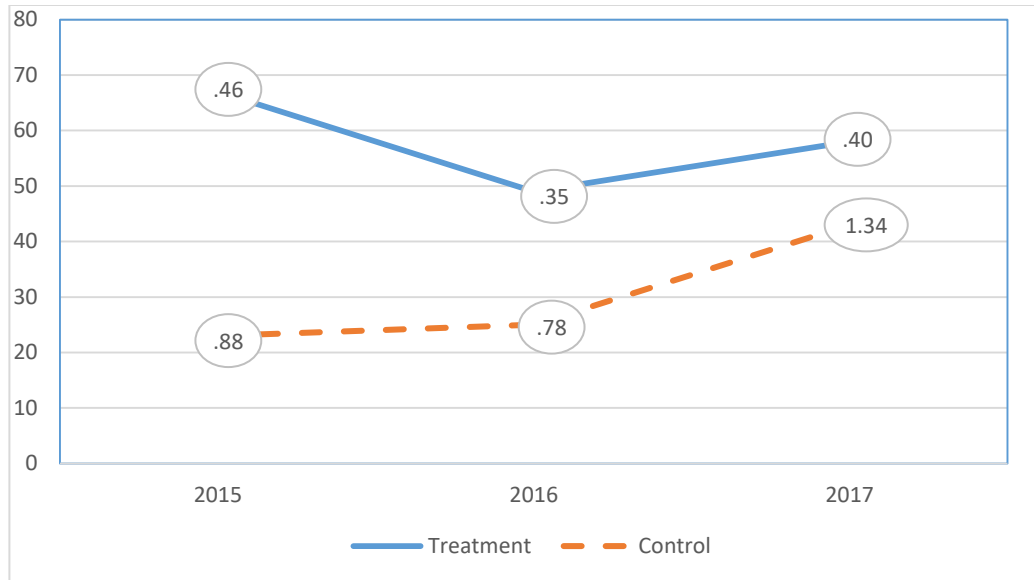
The descriptive statistics analysis of the providers (see Table 1), revealed the majority of referrals came from pediatricians for both study groups.

Table 1 *Descriptive Statistics Pediatric Providers Type of Practice for Treatment and Control Group*

<b>Type of practice</b>	<b>Treatment Group (n = 141)</b>	<b>Control Group (n = 32)</b>
<i>Family Medicine</i>	13	9
<i>Pediatrics</i>	123	22
<i>Osteopathy</i>	4	1
<i>Neuropathic Provider</i>	1	0

In Figure 2, the mean number of referrals from the treatment group and the control group in the 3<sup>rd</sup> quarter 2015-2017 are graphically displayed. While there was a slight increase in the treatment group's referrals from 2016 to 2017, the 2017 mean rate was less than the 2015 rate. In contrast, the mean number of referrals from the control group steadily increased from 2015 to 2017.

Figure 2 *Mean Referrals of Treatment Group and Control Group, 3<sup>rd</sup> Quarter 2015-2017*



Independent sample *t*-tests were performed to evaluate whether the mean provider referral rate of the 2017 treatment ( $M = .40$ ,  $SD = .97$ ) and control group ( $M = 1.34$ ,  $SD = 2.62$ ) were significantly different. The test was significant ( $t = -2.0$ ,  $p = .05$ ) for 2017 (Table 2). That the control group had a significantly higher number of referrals post mailing than the treatment group was an unexpected finding. An independent samples *t*-test was performed to evaluate whether the means of the 2015-2016 treatment group ( $M = .41$ ,  $SD = 1.00$ ) and control group ( $M = .83$ ,  $SD = 1.32$ ) were significantly different. The test was not significant ( $t = -1.69$ ,  $p = .10$ ) (Table 2). A non-parametric Mann-Whitney U test was also conducted. The U value was significant ( $U = .00$ ) only for the 2015-2016 control group and supported rejecting the study hypothesis.

Table 2 Mean Referral Rates for Providence (treatment) vs Core Cities (control), 3<sup>rd</sup> quarter 2015-2017

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>U</i>
<b>2015</b>					
Providence n = 141	.46	1.12	-1.6	.12	NS
Core Cities n = 32	.88	1.36			
<b>2016</b>					
Providence n = 141	.35	1.12	-1.45	.16	NS
Core Cities n = 32	.78	1.58			
<b>2015-2016</b>					
Providence n = 141	.41	1.00	-1.69	.10	.00*
Core Cities n = 32	.83	1.32			
<b>2017</b>					
Providence n = 141	.40	0.97	-2.0	.05*	NS
Core Cities n = 32	1.34	2.62			

Note  $p < .01^*$

An independent samples *t*-test was performed to see if the change between the 2015/2016 and 2017 varied by groups (Table 3). The test was not significant ( $t = -1.28, p = .21$ ) (Table 3).

Table 3 Mean Change between the 3<sup>rd</sup> Quarter 2015/2016 Groups and 2017 Groups

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<b>2015-2016</b>				
Providence n = 141				
Core Cities n = 32				
<b>2017</b>				
Providence n = 141	.004	.92	-1.28	.21
Core Cities n = 32	.52	2.22		

## CHAPTER FIVE

### DISCUSSION

While the number of referrals to EI services increased in 2017, sending a PEM to pediatric health care providers did not statistically increase the number of referrals to EI services when compared to the number of referrals made by providers that did not receive the PEM. The control group actually made more referrals to EI in 2017 than the treatment group. The hypothesis being tested, that pediatric health care providers who receive a PEM about EI will refer more children to the services than similar providers who do not receive a mailing is rejected.

Research has documented that EI services such as physical therapy, speech therapy, and occupational therapy, as mandated by Part C of the IDEA have been shown to reduce children's developmental disabilities (Raspa et al., 2015; King et al., 2010) and improve their developmental outcomes, resulting in increased preparedness to enter school (Jimenez et al., 2013). As providers of routine health care, pediatric care providers who examine a child more than a dozen times in their first two years of life, have a unique opportunity to identify and refer children with developmental delays. As Rhode Island EI currently serves 6% of the population under the age of three compared to national estimates of 12-18% of children potentially eligible for services, potentially an additional 6-12% of Rhode Island's children may be eligible for EI services. Rhode Island's health care providers may not be detecting delays or potentially under reporting the number of suspected delays as the estimated prevalence rate of development delays found in national studies is higher than the number of RI



referrals to EI. The EOHHS acknowledges that referrals to EI are decreasing and desire to explore the reasons for this phenomenon.

### **Hypothesis**

The hypothesis that PEMS could increase a provider's referrals to EI was not supported by this study's results. That the control group had a significantly higher average number of referrals was an unexpected finding and the referral data were also significantly right skewed. It was hypothesized that health care providers who do not refer children to EI services as they may be unaware of the services or lack the knowledge of how to make a referral are missing the opportunity to support a child's optimal development. Failure to find results may show that providers may not refer to EI for reasons other than a lack of knowledge about the EI process, such as lack of payment by insurers for developmental screening, lack of a standardized tool for an assessment, or unwillingness to coordinate care with the EI team.

While the low cost and ease of reaching a large number of providers at one time appears to make PEMS an attractive method of changing providers' behavior, the results of this study do not warrant their use and support the literature that finds little effect of PEMS on provider behavior (Freemantle et al., 1996). An intervention that involved contact either through an interview or a survey to determine the provider's knowledge of EI before the treatment, may have also resulted in different findings as the provider's knowledge of EI would have been established and served as a baseline for comparison. Policy makers and program directors seeking to increase referrals to EI will need a better understanding of providers' decision making processes when

deciding to refer to EI services in order to select alternative methods for increasing referrals.

### **Limitations**

There was a larger increase in the mean referral rate of 2017 referrals from the control group than the treatment group. The number of and mean rate of provider referrals in 2017 was also less than the number of referrals made by providers in 2015. Possible explanations of why the PEMS had no effect were problems with the research design, including the inability to identify all treatment group providers, and lack of follow up with providers to insure they had received the mailing, and lack of child-related variables. Observation of the data revealed not all of the treatment providers were identified prior to the mailing. As the DOH does not keep a current list of all providers in one database, an extensive search had to be conducted to identify providers and 12 Providence who made EI referrals did not receive the mailing. The design did not include a follow-up with providers to insure they had received the mailing, as the EOHHS was not able to give permission for providers to be contacted without having first notified them they would be included in a study. In addition, because the supervisory position of EI was vacant at the time the study was designed, a request for permission to contact the providers was not able to be initiated.

Limitations also include the possibility of an extraneous variable which could have potentially increased or decreased the number of referrals made by either the control or treatment group members. Variables such as cultural differences of parents these providers served including whether they would accept a referral, their age, education level, and previous interaction with EI services for another child. In terms

of generalizability, differences in the number of minorities in RI compared to the groups in the national studies, and other health issues possibility related to environmental conditions unique to a geographic area could affect whether these findings apply outside of Rhode Island.

## **Implications**

In terms of research implications, referrals were limited to the four cities due to the amount of time and effort the data analyst would need to compile a list of all Rhode Island providers' referrals. Future studies could attempt to use all EI data to identify groups that might be underreported. A study examining referrals of children discharged from Rhode Island's Neonatal Intensive Care Units, could confirm that population is either accounted for or underreported. Analyzing all providers' referrals over three years instead of one quarter of a year and controlling for the age, gender, and ethnicity of the referred child may yield important data explaining the EI referral process and identify key groups traditionally being under reported. While universal developmental screening is advocated by the AAP, studies have shown that nationally, as many as 80% of pediatricians do not use a standardized developmental screening instrument (Guevara et al., 2013). Rhode Island's EOHHS does not stipulate that a standardized tool be used to screen for EI services. A study of the effect of using a standardized developmental assessment on the number of referrals to EI services may be helpful in identifying children who are not being referred.

Preliminary data indicated that nurses in the control group working for a community health center made a significant number of referrals to EI (28%), and examining those in comparison to other providers may provide information on how to

increase referrals. If the center receives government funding are there any conditions related to eligibility for funding, that are contributing to the large number of referrals? The questions of are the children referred by nurses found to be eligible for EI services at the same rate as those referred by other providers and do the nurses use a standardized assessment tool or procedure that differs from those used by private practice health care providers are potential research topics.

To generalize this study's findings to other states' populations may not be feasible. However, conducting future studies on the use of PEMS to change provider behavior by including a pre and posttest component or a more detailed analysis of providers' knowledge of and inclination to refer to EI services is warranted. Finally, as the largest number of referrals to EI services came from a parent/guardian for two of the three years studied, further investigation into the reason for the parent referral and whether the referral resulted in the determination that a child qualified for services would provide additional information about Rhode Island's EI referral system.

Practical implications of this study for the EOHHS include, considering distributing educational literature in other contexts such as the annual meeting of Rhode Island's pediatricians, and implementing a telephone survey of providers pre and post distribution of future educational literature to ensure their receipt and understanding of the literature. If financial conditions allow, filming an educational video that could be uploaded to the EOHHS website, shown to health care providers at statewide conferences, distributed to local coalitions that pediatric health care providers take part in such as the Rhode Island Coalition for Children and Families, and distributed to health care providers offices could result in an increase in referrals

to EI. Rhode Island EI officials may want to consider designing educational literature that explains the importance of EI and include statistics supporting its benefits.

Educational literature and public service announcements written in multiple languages and directed to parents, family members, caregivers, and teachers potentially could result in an increase in the public's knowledge and understanding of EI services. Such an increase could potentially influence individuals' willingness to discuss EI services with their pediatric care providers resulting in additional referrals.

## APPENDIX A

Printed Educational Mailing Developed by the EOHHS, Side 1

### Early Intervention

Early Intervention is a program designed to help families support the growth and development of their infants and toddlers who are delayed in their development or have a diagnosed medical condition known to cause developmental delay.

#### When you call we will:

- Listen to your concerns and answer your questions;
- Evaluate your child at no cost to you;
- Provide you with information about the development of your child and make a plan for next steps.

Parents can call Early Intervention directly.

#### This program may be good for:

- Parents who have concerns about their child's development. It is for newborns until a child turns three.



## APPENDIX B

### Printed Educational Mailing Developed by the EOHHS, Side 2

"EI does a good job of explaining things to me in a way I can understand and they work with me to learn how to do things on a daily basis to help my daughter progress."

**To make a referral or learn more contact any one of our 9 programs:**

**Children's Friend & Service**  
621 Dexter Street  
Central Falls, RI 02863-2603  
721-9200

**Community Care Alliance**  
245 Main Street  
Woonsocket, RI 02895-3123  
235-7000

**Easter Seals, RI**  
213 Robinson Street  
Wakefield, RI 02879  
284-1000

**Family Service of RI**  
134 Thurbers Avenue  
Providence, RI 02905-4754  
Referral line: 519-2307  
Referral line for Spanish speaking families: 519-2308

**The Groden Center**  
30 Livingston Street  
Providence, RI 02904  
525-2380

**Looking Upwards, Inc.**  
2974 East Main Road  
Portsmouth, RI 02871  
293-5790

**Meeting Street**  
1000 Eddy Street  
Providence, RI 02905  
533-9100  
Referral line: 533-9104

**Seven Hills Rhode Island**  
178 Norwood Ave.  
Cranston, RI 02905  
921-1470

30 Cumberland Street  
Woonsocket, RI 02895  
921-1470

**J. Arthur Trudeau Memorial Center**  
3445 Post Road  
Warwick, RI 02886  
823-1731

For more information or for help choosing a provider, contact the RI Parent Information Network at 270-0101.



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