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# MISSISSIPPI PRE-K COLLABORATIVES: A STUDY OF DEVELOPMENTAL SCREENINGS

**Submitted to:**

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# EXECUTIVE SUMMARY

Senate Bill 2395 was passed in spring 2013, establishing Mississippi's first state-funded pre-kindergarten programs (pre-K) in 11 sites around the state. In fall 2014, with the start of the new pre-K programs, the Mississippi Department of Education (MDE) also implemented developmental screenings for attending children. The purpose of the screenings was to identify children who might be experiencing a developmental delay, so they could receive services and any necessary referrals, providing them an opportunity to enter kindergarten more prepared for school. Research has shown that children who participate in high-quality preschool programs with early developmental screening and early intervention for delays are more likely to have better educational outcomes in later years, saving state funding that would be otherwise be spent on special education and repeated grades.

Funded by the Center for Mississippi Health Policy, a pilot study was formed around the Mississippi pre-K developmental screenings in order to collect and analyze data on the developmental status of children entering pre-K, as well as the determinants of different stages. Researchers from the Social Science Research Center at Mississippi State University were enlisted to analyze the screening data for MDE. Two developmental screeners were used: The Ages and Stages Questionnaires® Third Edition (ASQ-3), and the Ages and Stages Questionnaires® Social Emotional (ASQ-SE).

The ASQ-3 measures the following child development domains: communication, gross motor, fine motor, problem solving, and personal social. Communication development involves language skills; Gross motor development involves how the child uses his or her arms and legs and other large muscles; Fine motor development involves hand and finger movement and coordination; Development in problem solving involves how the child plays with toys and solves problems; Personal-social development involves the child's self-help skills and interactions with others.

Children may be placed in one of three developmental screening categories based on their scores. These include “On Target,” “Monitor,” and “Referral.” The On Target category indicates that the child is developing typically. The Monitor category indicates there are some concerns around the child’s scores, and the child may need to be rescreened more frequently to detect changes. The Referral category indicates the child should be referred to a professional for additional assessment.

The ASQ-SE measures areas of social and emotional development, including self-regulation, compliance, communication, adaptive behaviors, autonomy, affect, and interaction with others. Children’s scores will indicate typical development (On Target) or a need for a referral (Referral) for additional assessment.

The key findings from the pilot study include the following:

### **Developmental Status**

#### **ASQ-3**

The overall findings from the ASQ-3 developmental screenings (n=1,357) revealed that almost 1 out of every 4 pre-K child screened scored below the cutoff in one or more of the five developmental domains, resulting in a referral to a health care professional for further evaluation.

- 326 children (24%) fell in to the “Referral” range
- 323 children (23.8%) fell into the “Monitor” range
- 708 children (52.2%) fell into the “On Target” range

Communication delays were most common, followed by fine motor, gross motor, problem-solving, and personal-social. Some children had more than one score warranting a referral.

- 173 children had a score indicating a possible Communication delay
- 124 children had a score indicating a possible Fine Motor delay
- 103 children had a score indicating a possible Gross Motor delay

- 89 children had a score indicating a possible Problem Solving delay
- 78 children had a score indicating a possible Personal Social delay

#### ASQ-SE

The overall findings from the ASQ-SE developmental screenings (n=1,351) revealed that almost 1 out of every 5 (18.9%) pre-K child screened scored above the cutoff for overall social emotional well-being, resulting in a referral to a health care professional for further evaluation. The ASQ-SE did not have a “Monitor” range.

- 255 children (18.9%) fell in to the “Referral” range
- 1,096 children (81.1%) fell into the “On Target” range

#### Referral Determinants

Children that were referred in the ASQ-3 and/or ASQ-SE screens were analyzed through cross tabulations of basic demographic information from caregivers.

- Approximately one half of children falling into the “Referral” range had caregivers with a high school diploma or less (ASQ-3=51.5% and ASQ-SE=49.5%)
- 1 out of every 2 children falling into the “Referral” range lived in households of \$20,000 or less annual income (ASQ-3=55.2% and ASQ-SE=50.7%)
- 1 out of every 2 children falling into the “Referral” range referred live in single-parent households (ASQ-3=55.8% and ASQ-SE=51.3%)
- More than 1 out of every 2 children falling into the “Referral” range were read to 0-4 times per week (ASQ-3=56.1% and ASQ-SE=59%)
- More than half of the children falling into the “Referral” range were either overweight or obese (ASQ-3=53% and ASQ-SE=51.7%)

- Almost 3 out of 4 children falling into the “Referral” range attended some type of child care center the previous year (ASQ-3=68.4% and ASQ-SE=75.3%)

### **Overall Well-being**

- Almost all of the children (99%) in this study were covered by some form of health insurance (Medicaid, SCHIP, private, military)
- More than half were overweight or obese (51.2%); 10.7% were underweight; and 38.2% were a healthy weight; however, 93.9% of caregivers reported that their child was a healthy weight
- One out of 2 children (53.7%) lived in households earning less than \$20,000 per year
- 1 out of 4 children (26.2%) lived in a married household, while 1 out of 2 lived in a single-parent household (52.9%)
- Less than half (41.9%) were read to on a regular basis at home (5 or more times per week)

# INTRODUCTION

Research has demonstrated that high-quality early childhood services that include developmental screening and services for developmental delays can improve child outcomes and reduce the need for special education services (Muschkin, Ladd & Dodge, 2015). However, Mississippi kindergarten teachers report that many students are not “school ready” upon arrival (Mississippi KIDS COUNT, 2013). With the passage of Senate Bill 2395 in 2013, Mississippi has now instituted state-funded pre-kindergarten (pre-K) on a limited scale, making it possible to systematically screen children enrolled in these pre-K collaborative programs for delays before kindergarten. The current study was designed to implement a uniform screening process throughout the newly formed pre-K program, document the readiness of children entering pre-K, explore determinants of different child outcomes, create innovative channels to services, and examine relevant policy considerations.

## **Importance of Developmental Screening in Pre-Kindergarten**

Between the ages of 3 and 5, most children experience significant and rapid cognitive, physical, and socio-emotional growth. This is also the time when a child may begin to exhibit signs of a developmental delay. The American Academy of Pediatrics uses the term developmental delay in reference to children under the age of 5 failing to meet developmental milestones by the expected ages (Coughlin, 2007). It is important to note the difference between a developmental delay and a developmental disability. Though a delay may be indicative of a disability, a disability is usually lifelong and requires extended special care (Smyth, 2005). Though a developmental delay may lead to a disability, the terms are not synonymous.

## **Risks for Developmental Delay**

Poverty, minority status, and low parental education also place children at higher risk for experiencing developmental delay(s). Child Trends (2013) reports that, nationally, 19% of children living “at or below the poverty line” are at high risk for developmental delays, compared to just 7% of children living “at more than twice the poverty line.” Additionally, 13%



of Black children are at high risk, compared to 7% of White children. The most profound effect on children's risk of developmental delay, however, is parental educational attainment. Twenty-four percent of children whose parents have less than a high school degree are at risk, compared to 7% of children whose parents have more than a high school degree. Furthermore, family dynamics, such as abuse/neglect, parental mental illness or substance abuse, and having a teen parent can play a role (Brookes Publishing, 2002).

According to the KIDS COUNT Data Center, many children living in Mississippi have one or more of these risk factors. Seventy percent of children in the 2010-2011 school year received free or reduced meals. Among children ages 0-5 in Mississippi, 38% lived in families with incomes below the federal poverty level in 2013, compared to 25% nationwide. In 2013, 43% of children in Mississippi were Black, compared to 14% of children nationally, and 68% of children (ages 5 and under) in Mississippi lived with heads of households having no higher educational attainment than a high school diploma.

### **Types of Developmental Delay**

A fine motor delay can occur when the nerves, muscles and/or bones that are used for precise and minute movements experience some type of dysfunction or disruption (Intermountain Healthcare, 2015). Fine motor delays can make it difficult for children to pick up or manipulate small items, such as holding a crayon or picking up a block.

A child is deemed to have a gross motor delay if they fall short of developmental milestones pertaining to the use of large muscles. This type of delay can be observed when a child has difficulty sitting, walking, running, riding a bike, etc. (Intermountain Healthcare, 2015).

Communication, consisting of language and speech delays, is often a problem for children (Greenspan, n.d.). Children exhibiting communication delays may have difficulty speaking in sentences, using only short phrases, or they may not be able to respond appropriately when asked "why" questions or to follow simple instructions (KidsHealth, 2015). Communication delays may result from physical and/or hearing problems, learning disabilities, or other disorders.

Children exhibiting social-emotional delays may not be able to regulate their emotions or successfully negotiate social interactions with others (Brookes Publishing, 2002). Children may not respond to adults or their peers in anticipated ways. Causes of social-emotional delays result from difficult family and environmental situations for children, such as neighborhood characteristics, poverty, and parental mental illness (Cooper, Masi, & Vick, 2009).

Personal-social delays also involve children's interactions with others, such as sharing, but this delay also highlights the child's self-help skills, such as independent feeding, dressing, grooming, hygiene, and toileting (Brooks Publishing ASQ-3, n.d.; Brookes Publishing, 2002; Extension, 2012). A delay in self-help skills limits a child's independence and may indicate an intellectual disability (Siskin, n.d.).

Children may also experience cognitive delays, including delays in problem-solving, which are assessed through "children's play with toys and problem-solving skills (Brookes Publishing, 2002; Extension, 2012)." Problem-solving delays may indicate that other types of delays exist (Chapman, n.d.) and may be manifested through a lack of novel approaches to complex situations (Fenning, Baker & Juvonen, 2011). Indicators of problem-solving delays include the child's ability to identify numbers, letters, and colors and understand relative differences among them (Brooks Publishing ASQ-3, n.d.).

### **Importance of Early Detection**

It is important that developmental delays be detected early while a child's neurological system is involved in the acquisition of a variety of skills (Pool & Hourcade, 2011). Children whose developmental delays are identified and given intervention services early will be more prepared for the academic setting of elementary school, as well as more socially and emotionally successful (Pool & Hourcade, 2011). Waiting to refer a child could mean missing the critical window for successful intervention, as delays, if left unchecked, may become ingrained and more difficult to correct over time (Brookes Publishing, 2002).

A recent evaluation study of North Carolina’s early childhood programs revealed that *participation in high-quality preschool programs with early developmental screening and early intervention for delays reduced the likelihood that children would be in special education by the conclusion of third grade, particularly for children of less educated, minority mothers* (Muschkin, Ladd & Dodge, 2015). Providing services to children well before elementary school allows many delays to be overcome early and for children to “graduate” out of special services before a more lasting special education classification is required. Furthermore, North Carolina’s financial investments in early childhood programs produced substantial overall savings for the state (Muschkin, Ladd & Dodge, 2015). A report of The White House (2015) similarly states that for every \$1 spent on early childhood education, \$8.60 is saved over the child’s educational career. Additionally, early detection and services for delays impact third-grade reading success (Mississippi Kids Count Data Book, 2013), and high-quality early education reduces the likelihood that children will be required to repeat a grade (National Education Association, 2015).

### **Kindergarten Readiness in Mississippi**

The need for early and systemic developmental screening in Mississippi was recently documented through the findings of the Mississippi 2013 Public School Kindergarten Teacher Survey (Mississippi KIDS COUNT, 2013). This web-based survey asked 1,789 public school kindergarten teachers, from every school district in the state, about their perspectives on student readiness in the developmental domains of social and emotional development, approaches to learning, general knowledge, physical well-being, motor development, and language and literacy development.

In this survey, teachers reported that over 40% of incoming students were not school ready, lacking basic skills, such as name, color, and shape recognition, as well as fine motor skills, such as being able to hold a crayon, pencil or scissors. Seventy-one percent of teachers reported having one or more child in their classroom repeating kindergarten. Teachers reported that the lack of school readiness was their number one challenge in the classroom, and the teachers

who reported having more children who were “not kindergarten ready” were more likely to report higher levels of stress.

According to teachers, classrooms that were predominantly African American tended to be larger in size, have more children who were not kindergarten ready, and have lower percentages of children without significant adult involvement in their lives. Given these findings, it is not surprising that teachers demonstrated support for universal access to high-quality pre-K, including universal developmental assessment, to prepare all children for kindergarten and elementary school. At the time of the survey, just 17% of children in Mississippi under age 6 received a developmental screening (Ready or Not, Mississippi KIDS COUNT, 2013).

### **History of Pre-K and Developmental Screenings in Mississippi**

The absence of a uniform, statewide pre-K system has produced a patchwork of educational settings and services for young children. As of the 2009-2010 school year, some form of pre-K services were being provided to 84.6% of four year olds in Mississippi. These services were provided by public schools (11%), Head Start (37.1%), and private child care centers (36.5%) (Canter, 2012).

Public schools may be awarded federal dollars through Title I of the *Elementary and Secondary Education Act* to provide pre-K services to children in their district. Title I funding is allocated based on formulas that include census poverty estimates (United States Department of Education, 2011). Of the school districts using Title I funding in the 2010-2011 school year, just 17% administered a developmental screening to attending pre-K children, and the types of screeners used varied widely (United States Department of Health and Human Services, 2011/2012). Consequently, the number of children under the age of 6 receiving developmental screenings in Mississippi was the lowest in the nation (U.S. Dept. of Health and Human Services, 2011/2012). Twenty-eight percent of the school districts in Mississippi providing pre-K services did not receive Title I funding and were instead exploring options using parent tuition,

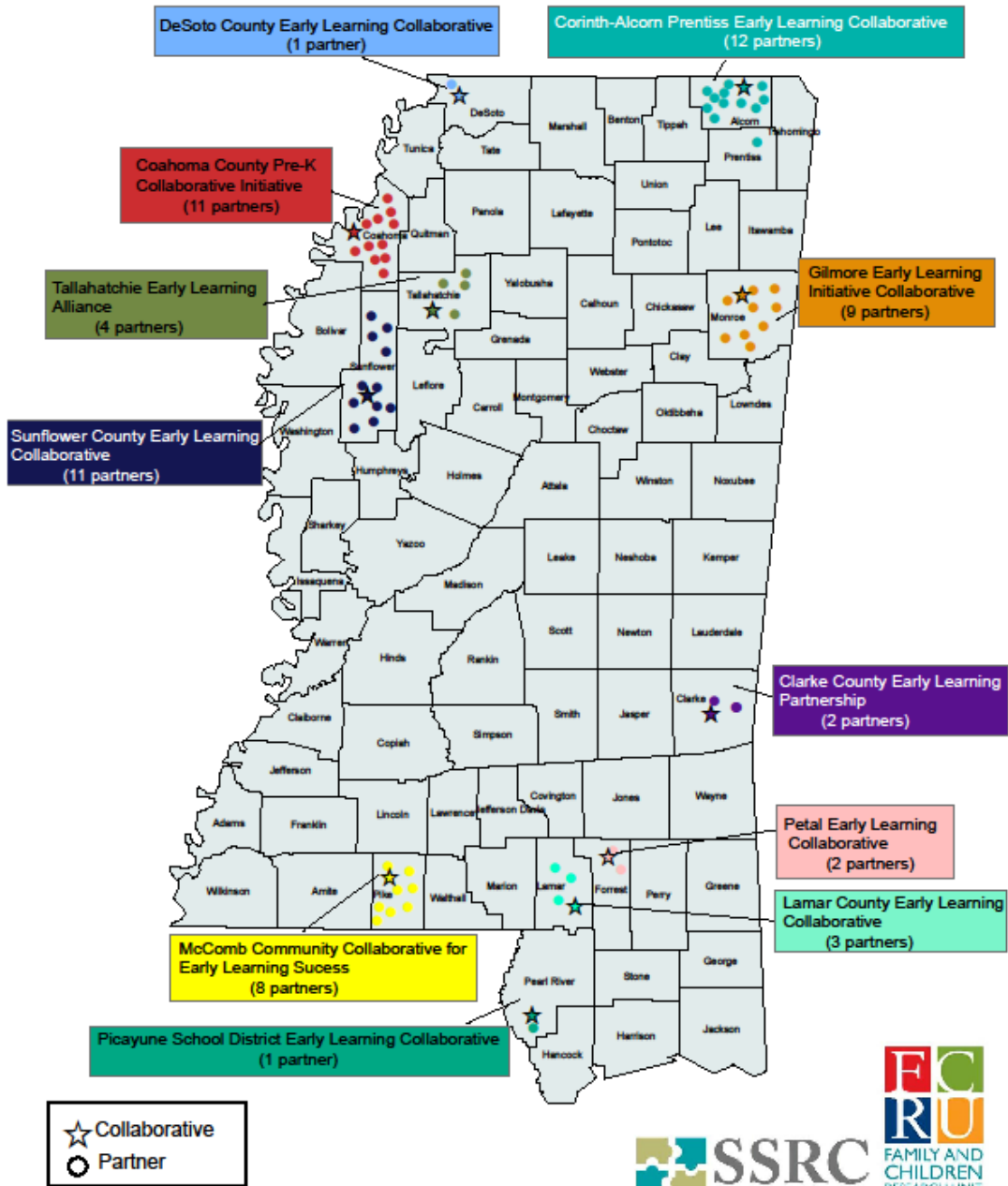
philanthropic grants, and district funds, indicating the strong desire for pre-K services even in the face of limited public monies.

In the spring of 2013, Senate Bill 2395, also known as the *Early Learning Collaborative Act*, was passed. This law enabled, through a competitive application process, the formation of 11 state-funded pre-K collaboratives, which in the current 2014-2015 school year, are serving approximately 1,800 of the 41,000 four year olds in Mississippi (Mississippi KIDS COUNT, 2013). Prior to this bill, Mississippi was one of nine states with no state-funded Pre-K program.

Collaboratives are voluntary pre-K programs that consist of local groups of public, private, and parochial schools; licensed child care centers; Head Start centers serving pre-K children; and resource-providing agencies and organizations (Mississippi Department of Education, 2013a). The local school district serves as the Lead Partner, providing implementation oversight and disbursing funds, while the Mississippi Department of Education (MDE) oversees developmentally appropriate curricula, screening, and other requirements.

Map 1.

## Pre-K Collaborative Site Locations



## The Current Study

In the spring of 2014, Mississippi KIDS COUNT was awarded a “Following the Data” policy grant from the Annie E. Casey Foundation. The purpose of the grant was to educate and serve as a resource on early care and education research to Mississippi’s health and education policymakers. This was followed by a series of meetings among several key child health leaders and researchers in Mississippi, via the Children’s Health Council, representing the University of Mississippi Medical Center’s Department of Pediatrics, Mississippi State Department of Health, Center for Mississippi Health Policy, Mississippi Division of Medicaid, and Mississippi State University’s Social Science Research Center.

The Children’s Health Council endorsed the importance of developmental screenings within pre-K programs, and with a provision of the *Early Learning Collaborative Act* requiring each collaborative to screen and/or refer children for vision, hearing, and other health issues (Senate Bill, 2395), the current pilot study was conceived by the Children’s Health Council and funded by the Center for Mississippi Health Policy.

In the fall of 2014, the current study began. The goal of the pilot study was to answer the following research questions: 1) What are the developmental concerns of children entering pre-K? 2) What are the determinants of different developmental outcomes among children? 3) What are the resulting policy implications for Mississippi?

In order to answer these questions, MDE implemented the *Mississippi Pre-K Collaborative Program Developmental Screening Pilot Study*, wherein they provided training and oversight for the administration of a uniform developmental screening tool in all 11 collaboratives. To follow up on the findings of the screenings, the Center for the Advancement of Youth at UMMC, in conjunction with the MDE, outlined a mechanism for referring children who were identified as having developmental delays for services. Researchers from the Social Science Research Center at Mississippi State University were enlisted to assist with a uniform data entry process across the child care centers and to analyze the screening data for MDE once it was compiled by the collaboratives.

## The Ages and Stages Questionnaires

**ASQ-3.** The Ages and Stages Questionnaires® Third Edition (ASQ-3) was the screening tool chosen by MDE to be implemented in the pre-K collaboratives. The ASQ-3 has demonstrated strong validity and reliability in assessing children’s developmental stage (Moodie et al., 2014). This tool is designed for children ages 1 month to 5 ½ years old and is completed by caregivers (Brookes Publishing, 2009). The screening is intended to be an easy-to-use tool that can be administered to a large number of children, with the results indicating if a child is in need of additional assessment.

Increasingly, early childhood stakeholders are giving attention to caregiver-completed screenings in pre-kindergarten (pre-K) settings as a way of identifying children who may need further assessment for the detection of developmental delays (Schilder & Carolan, 2014). While it is ideally the role of the family physician to identify a developmental delay as early as possible (Coughlin, 2007), screening costs may not be reimbursed in full, and physicians often lean primarily on clinical judgment, which may be unreliable (Dobrez et al., 2001). As a result, only 10% of children with developmental delays receive the intervention services they need (Valleley, Evans, O'Dell & Allen, 2013). Caregiver-completed assessments, such as the ASQ and ASQ-SE, however, take about 20 minutes to complete and 5 minutes to score (Moodie et al., 2014).

The ASQ-3 consists of 21 questionnaires, each with 30 developmental items, to which caregivers to answer “yes,” “sometimes,” or “not yet” to indicate whether their child is currently demonstrating the indicated behavior. The questions are easy to read and often have illustrations to enhance understanding of the item. The questionnaires are modified for children based on age, with intervals ranging from 2 to 60 months. The questionnaires explore the following child development domains: communication, gross motor, fine motor, problem solving, and personal social. The ASQ also has an “overall” section where caregivers can note general concerns.



Communication development involves “language skills, both what the child understands and what he or she can say”; Gross motor development involves “how the child uses his or her arms and legs and other large muscles for sitting, crawling, walking, running, and other activities”; Fine motor development involves the “child’s hand and finger movement and coordination”; Development in problem solving involves “how the child plays with toys and solves problems”; Personal-social development involves the “child’s self-help skills and interactions with others (Brooks Publishing, 2009).”

Caregiver responses are assigned numerical values and tallied by trained staff (Brookes Publishing, 2009). Responses may be recorded and tallied by hand or on the ASQ online system. Children’s scores are then compared to cut-off scores, which have been normed using over 18,000 questionnaires to indicate typical development. Children may be placed in one of three developmental screening categories based on their scores. These include “On Target,” “Monitor,” and “Referral.”

The On Target category indicates that all of the child’s scores were above the cut-offs, and the child is developing typically. The caregiver should be notified of the results and informed of when the next screening will occur. ASQ recommends that On Target children be rescreened in 4-6 months. The Monitor category indicates that some of the child’s scores were close to the cut-offs, and the child may need to be rescreened more frequently to detect changes. Caregivers should be notified of the results and provided with Child Intervention Activity Sheets, provided by ASQ, to strengthen the child’s abilities in lower-scoring domains. The Referral category indicates that the child’s scores fell below the cut-offs in one or more developmental domains, and the caregiver should be contacted directly to discuss assessment options. ASQ also recommends providing families with a list of resources in the community and sending the child’s primary care provider the results of the screening with the consent of caregivers.

**ASQ-SE.** Many children in Mississippi also have risk factors, such as experiencing poverty, for social and emotional problems, including anxiety, depression, and antisocial behavior. Therefore, the Ages and Stages Questionnaire: Social-Emotional (ASQ-SE) was administered.

ASQ-SE is also completed by caregivers and identifies social and emotional areas in need of further assessment. This separate screener is intended to complement the ASQ-3 and is divided into age intervals ranging from 6 to 60 months.

ASQ defines social competence as “the ability to use a variety of communicative and interactive responses to effectively manage his or her social environment” and emotional competence as “managing or regulating one’s emotional response to obtain desired goals in ways that are acceptable to others.” ASQ notes that the two domains overlap.

The specific social and emotional developmental areas that are measured in the ASQ-SE include self-regulation, compliance, communication, adaptive behaviors, autonomy, affect, and interaction with others (Brookes Publishing ASQ-SE, n.d.). Parents respond to questionnaire items, indicating if the child exhibits the behavior most of the time, sometimes, or never or rarely. Parents are also provided an opportunity to indicate if they have a concern about a particular item.

### Definitions of Behavioral Areas Measured by the ASQ-SE

Behavioral Area	Associated Definition
Self-regulation	Child's ability or willingness to calm or settle down or adjust to physiological or environmental conditions or stimulation
Compliance	Child's ability or willingness to conform to the direction of others and follow rules
Communication	Child's ability or willingness to respond or initiate verbal or nonverbal signals to indicate feelings, affective, or internal states
Adaptive Functioning	Child's success or ability to cope with physiological needs (e.g., sleeping, eating, elimination, safety)
Autonomy	Child's ability or willingness to self-initiate or respond without guidance
Affect	Child's ability or willingness to demonstrate his or her own feelings and empathy for others
Interaction with People	Child's ability or willingness to respond to or initiate social responses to parents, other adults, and peers

Definitions provided by Brookes Publishing (2002).

As with the ASQ-3, items in the ASQ-SE may be recorded and scored by trained staff online or by hand. ASQ recommends that, for children with total scores exceeding the normed cut-offs, parents should be consulted, provided with activities to strengthen the child's skills, and options for further assessment, when appropriate, should be discussed. ASQ recommends that all children be screened every 6 months and that their primary health and mental health care providers be informed of the results (Brookes Publishing, 2002).

# METHODOLOGY

The Family and Children Research Unit of the Social Science Research Center (SSRC) was commissioned by the Center for Mississippi Health Policy to analyze Mississippi Department of Education (MDE) developmental screening data from children enrolled in the pre-K collaboratives. The developmental screenings/data collection began in September 2014 and continued through December 2015. Analyses of these developmental screening data have been approved by the Mississippi State University Institutional Review Board.

Researchers from the SSRC assisted in a one-day training session prior to the screening administration, in order to ensure consistency with data collection methods and entry. Attending the one-day training were staff from MDE, collaborative teachers experienced with the developmental screens, medical staff from the Center for the Advancement of Youth (CAY), and a staff member from Brookes Publishing (via Webcast). Brookes Publishing staff reviewed the capabilities of the ASQ online system and demonstrated data entry for the developmental screens. MDE staff also conducted a hands-on demo of a child screening using props (e.g., puzzles, blocks, ball, etc.).

In addition to the two developmental screening tools, the ASQ-3 and the ASQ-SE, there were also 10 additional demographic questions collected. After administering the developmental screens, collaborative staff entered the data into an online portal maintained by Brookes Publishing. Researchers from the SSRC then downloaded and analyzed the data for this report. ASQ recommends that a child be referred for further assessment by a professional if scores fall into the “Referral” category in even **one** domain. Results for Referral in this report were analyzed and visualized following that protocol.

Child care staff from the 61 child care centers comprising the pre-K collaboratives administered the developmental screens in a variety of ways. Screens were administered as follows:

- Caregivers were interviewed face-to-face
- Caregivers were interviewed over the phone
- Questionnaires were sent home and filled out by caregivers
- Collaborative staff conducted the screening at the child care center

Analyses were conducted using SPSS 21.0, and the significance level was set at  $p < .05$ .

Researchers conducted descriptive analyses (i.e., frequencies, cross tabulations, and correlations) to examine the developmental status of the pre-K children and determinants for developmental delays. Both the ASQ-3 and the ASQ-SE screeners contained questions with Likert-type responses, as well as “yes,” “no,” or “not yet” responses. The responses were scored, and based on the scores, children were either classified in categories of “On Target,” “Monitor,” or “Referral” for the ASQ-3. Children were either in categories of “On Target” or “Referral” for the ASQ-SE. Race/ethnicity was recoded as White=1, Black=2, and other=3 for all other races. Marital status was recoded as married=1; single, separated, divorced or widowed=2; and cohabiting=3. Income was recoded as <20,000=1; 20-40,000=2; 40-60,000=3; and >60,000=4. Data collected by individual collaboratives were aggregated and reported as one cohort in order to remove any identifying information.

Body Mass Index (BMI) was calculated in this study using the following Centers for Disease Control and Prevention (CDC) formula:  $\text{weight (lb)} / [\text{height (in)}]^2 \times 703$ . Caregivers and teachers collected the height and weight of the children and reported the information online. SSRC researchers then used the CDC formula to categorize the BMI status of the children in one of the following four weight categories – underweight, healthy weight, overweight, or obese.

Body Mass Index	Weight Category
Below 18.5	Underweight
18.5-24.9	Healthy
25.0-29.9	Overweight
30.0 and Above	Obese

## FINDINGS

### Pre-K Population

The tables below show the demographics of the children screened in the *Mississippi Pre-K Collaborative Program Developmental Screening Pilot Study*. Not all of the 1,786 children who attend the Mississippi pre-K collaboratives were screened, and a portion of the children were only screened with one of the two developmental screeners—either the ASQ-3 or the ASQ-SE. The total number of children screened for the ASQ-3 was 1,357, and 1,351 were screened for the ASQ-SE.

Many of the 10 extra demographic questions were left blank. These questions either were not asked of the caregivers, were not sent home along with the screeners to the caregivers, or were not known by teachers/staff who conducted the screenings. Also, many of the “refused or don’t know” responses may have occurred during data entry because the software required an answer in order to move forward in the data input process.

Table 1.

Gender	
Male	49.6% (719)
Female	50.4% (730)
<b>Total = 1,449</b>	

Table 2.

Race/Ethnicity	
Black	63.7% (418)
White	32.9% (216)
Other	3.4% (22)
<b>Not Answered (793)</b>	<b>Total = 656</b>

Tables 1 & 2 show the gender and racial distribution of the children who were screened. A total of 1,449 children were screened with either the ASQ-3 or the ASQ-SE, with 719 males and 730 females. Table 2 shows that less than half of the screened children’s race/ethnicity was recorded/collected. Of the 656 recorded, 63.7% were Black (418), 32.9% were White (216), and 3.4% fell into the “Other” category (22), which includes Asian, Hispanic or Latino, and more than one race. In comparison to the entire state of Mississippi, for the same age group, estimates in 2013 were 48% (White) and 43% (Black) (United States Census Bureau, 2013).

Table 3.

Attended Preschool Last Year	
YES	70.7% (700)
NO	29.3% (290)
<b>Not Answered (459)</b>	<b>Total = 990</b>

Table 4.

Pre-K Center Type	
Head Start	12
Public Center	29
Private Center	20
<b>Total</b>	<b>61</b>

Table 3 shows that 70.7% of children attended a Head Start or other type of preschool in the previous year, while almost one-third of the children did not attend a child care center in the previous year. Table 4 displays the types of child care centers that comprise the pre-K collaboratives in this study, they are as follows: Head Starts (12); public pre-K centers (school-district-based) (29); and private pre-K centers (20).

Table 5.

Premature Births	
Not premature	95.5% (1,384)
1-2 weeks	0.3% (4)
3-4 weeks	1.8% (27)
5-8 weeks	1.4% (20)
9-13 weeks	1.0% (14)
<b>Total</b>	<b>1,449</b>

Table 6.

Medical Risk Factors	
None	98.2% (1,423)
Allergies	0.7% (9)
Asthma	0.8% (10)
Hearing/Speech	0.2% (4)
Other	0.2% (4)
<b>Total</b>	<b>= 1,449</b>

Table 5 depicts the children (65) in this study that were born premature (less than 5%), although researchers believe this number may be underreported. The software forced the interviewer to enter an answer to the premature question in order to move forward in the data input process. Given this knowledge, and the fact that almost half of the respondents did not answer other demographic questions, an incorrect tally of the “not premature” response may have occurred. Of the 4.5% premature births reported, 2.1% babies were 1-4 weeks premature (31), 1.4% babies were 5-8 weeks premature (21), and 1.0% were very premature at 9-13 weeks (12).

Table 6 shows very few medical risk factors among the children—just 1.9% for allergies, asthma, hearing/speech and other conditions combined (26 children). This question was also a required field in the data input process in order to move forward, and therefore may not reflect the true figure.



Figure 1.

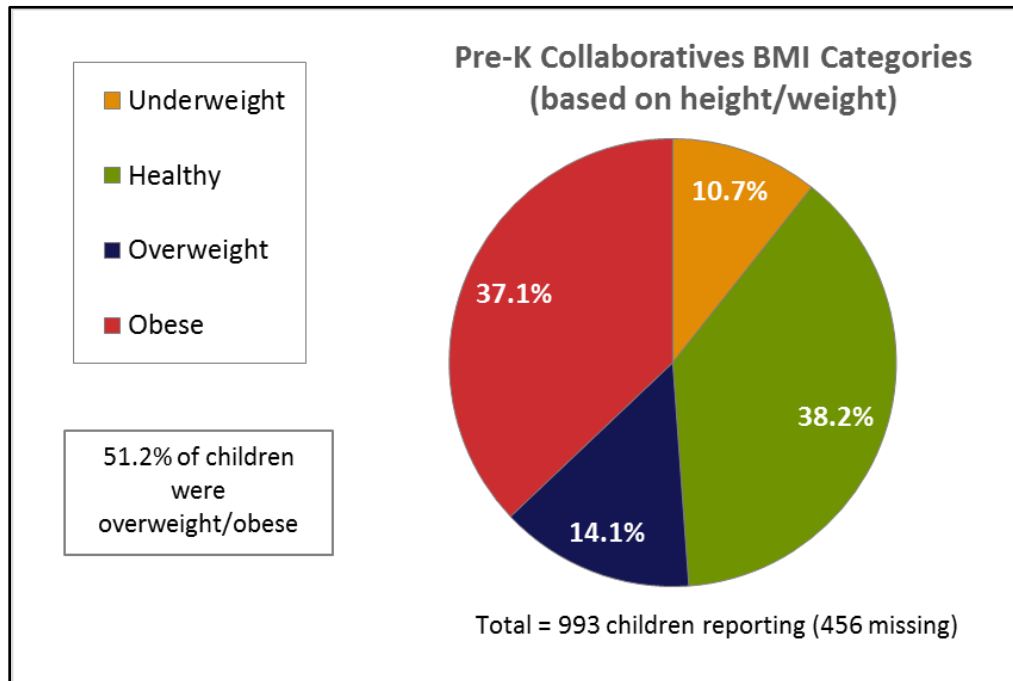


Figure 1 shows the overall BMI categories of the 993 children for whom height and weight was reported. After using the CDC formula to calculate the BMI of the pre-K children, researchers found that only 38.2% fell into the healthy category. The rest were as follows: obese (37.1%), overweight (14.1%), and underweight (10.7%).

Figure 2.

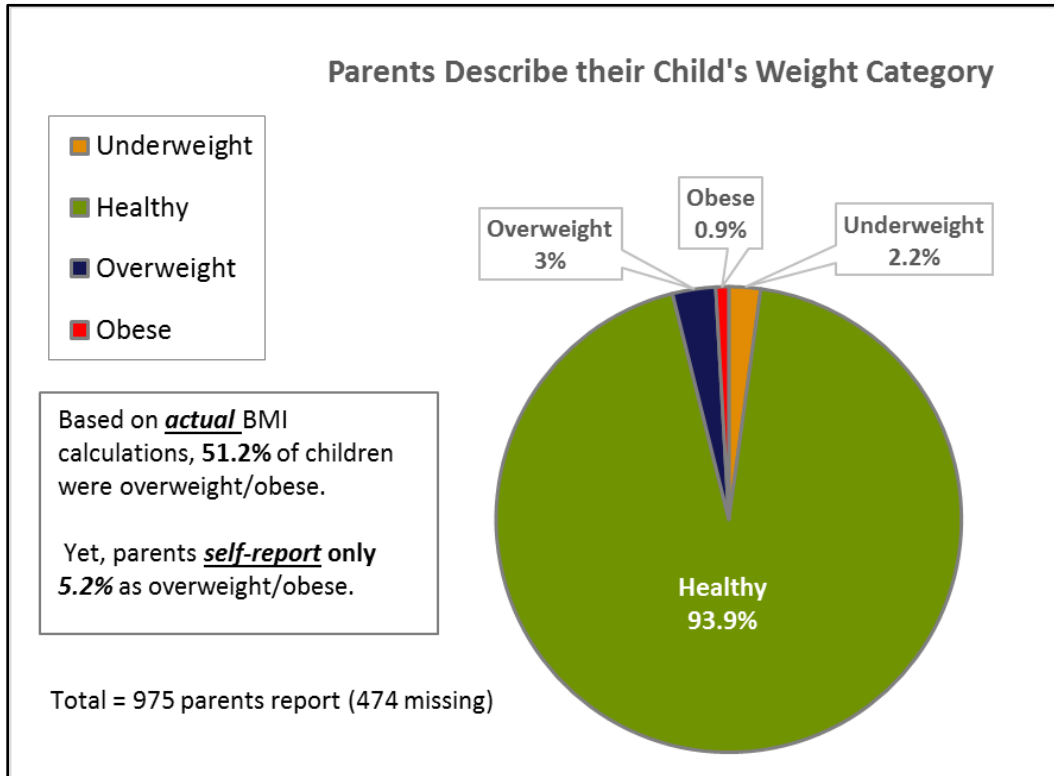


Figure 2 shows how caregivers answered the question, “*What would you say best describes this child’s weight?*” The discrepancy between Figure 1—the actual weight category of the children based on BMI, and Figure 2—the caregiver perception of their child’s weight category is considerable. The majority of caregivers described their child as healthy (93.9%), while the BMI calculation only had 38.2% of the children categorized as healthy.

## Pre-K Caregiver Population

Table 7.

Caregiver Type/Screen Intake	
Mother	87.4% (1,267)
Father	4.6% (67)
Grandparent/Relative	3.0% (43)
Teacher	2.8% (40)
Guardian	1.0% (15)
Foster parent	0.3% (4)
Other	0.9% (13)
<b>Total</b>	<b>1,449</b>

Table 8.

Caregiver Marital Status	
Married	26.2% (337)
Single, separated, divorced	52.9% (681)
Cohabiting	3.0% (39)
Refused	17.9% (231)
<b>Not Answered (161)</b>	<b>Total = 1,288</b>

Table 7 reveals that the screening information was mainly reported by the mothers (87.4%), followed by the fathers (4.6%) and grandparents or another relative (3%), and the remaining respondents were teachers, guardians, foster parents, and others (5%). As seen in Table 8, more than half of the caregivers were single, divorced, separated or widowed (52.9%), followed by caregivers who were married (26.2%), cohabiting (3%) or refused (17.9%). In comparison, caregivers in this study closely resemble the proportion of single parent families in Mississippi (45.2%) (U.S. Census Bureau, 2009-2013).

Table 9.

Education of Caregiver	
<HS Diploma	8.6% (86)
HS Diploma	38.2% (383)
1-3 years of college	33.7% (338)
Professional certified	2.1% (21)
Bachelor degree	12.1% (121)
Master's/Doctorate	5.3% (53)
<b>Not Answered (447)</b>	<b>1,002</b>

Table 10.

Annual Income	
< 20,000	53.7% (620)
20-40,000	13.5% (156)
40-60,000	4.2% (48)
> 60,000	4.1% (47)
Refused	24.5% (283)
<b>Not Answered (295)</b>	<b>Total = 1,154</b>

Tables 9 and 10 show the education and income levels of the caregivers of the screened children. The majority of caregivers had a high school diploma (38.2%), followed by at least 1-3 years of college (33.7%), a bachelor's degree (12.1%), "did not complete high school" (8.6%), master's or doctorate degree (5.3%) or a professional certificate (2.1%). More than half of the

caregivers reported an income of less than \$20,000 annually, followed by \$20,000-40,000 (13.5%), \$40,000-60,000 (4.2%), and greater than \$60,000 (4.1%). Almost a quarter of caregivers refused to answer the question (24.5%). In comparison, head-of-household educational attainment overall in Mississippi is as follows: high school diploma (53%), associate degree (11%), bachelor degree (13%), did not complete high school (15%), and masters or doctorate degree (8%), while median income was \$38,191 (U.S. Census Bureau, 2014).

Table 11.

Insurance by Type	
Medicaid	71.0% (739)
Private	17.2% (179)
CHIP	10.3% (107)
No Coverage	1.0% (10)
Military	0.6% (6)
<b>Not Answered (408)</b>	<b>Total = 1,041</b>

Table 12.

Read to Child Last Week	
None	1.3% (12)
1-4 times	56.7% (543)
5-8 times	28.9% (277)
9-12 times	12.2% (117)
13-20 times	0.8% (8)
<b>Not Answered (492)</b>	<b>Total = 957</b>

Almost all screened children (99%) had some type of insurance coverage at the time of this study. Table 11 displays the types of insurance, with 71% covered by Medicaid, followed by private insurance (17.2%), CHIP (10.3%) and military (0.6%), while 10 children did not have any type of coverage (1%). In comparison, 10% of children are not insured in the state of Mississippi (U.S. Census Bureau, 2011).

Table 12 depicts the numbers of times caregivers read to their child in the week prior to the screening. Slightly more than half (56.7%) read 1-4 times, followed by 5-8 times (28.9%), 9-12 times (12.2%), none or zero times (1.3%), and 13-20 times (0.8%).

## Overall ASQ Developmental Screening Findings

Table 13.

<b>Pre-K Developmental SCREENS</b>			
<b>Pre-K Collaboratives (1,786 enrolled)</b>	<b>ASQ-3</b>	<b>ASQ-SE</b>	<b>Total Screens</b>
<b>Total</b>	<b>1,357</b>	<b>1,351</b>	<b>2,708</b>

Table 13 is a snapshot of how many children were enrolled in the pre-K collaboratives during the 2014/2015 school year (SY) for this study. There were 11 collaboratives, comprised of 61 partners/child care centers, with a total of 1,786 children enrolled. There were 1,357 children that were screened with the ASQ-3, and 1,351 screened with the ASQ-SE. Currently 30% of children in the U.S. are screened annually for developmental delays, while approximately 17% are screened in Mississippi (Child Trends Data Bank; United States Department of Health and Human Services, 2011/2012).

## ASQ-3 Developmental Screenings

Table 14.

<b>ASQ-3 Screen by Age-Interval</b>				
<b>36 Months</b>	<b>42 Months</b>	<b>48 Months</b>	<b>54 Months</b>	<b>60 Months</b>
<b>0.5% (7)</b>	<b>0.4% (5)</b>	<b>20.6% (280)</b>	<b>41.6% (565)</b>	<b>36.8% (500)</b>

Table 14 is a breakdown of the age intervals for the ASQ-3 screenings that were used on the 1,357 children in this study. The majority of the children were screened with the 54-month questionnaire (41.6%), followed by the 60-month (36.8%), 48-month (20.6%), the 42-month (0.4%) and the 36 months (0.5%). Using the age-appropriate screener is important in order to precisely gauge developmental skills.

Table 15.

Table 16.

<b>ASQ-3 Pre-K Referrals</b>			
Pre-K Collaboratives	Screen #	Referral %	Referral #
<b>Total</b>	<b>1,357</b>	<b>24%</b>	<b>326</b>

<b>ASQ-3 Pre-K Needs Monitoring</b>			
Pre-K Collaboratives	Screen #	Referral %	Referral #
<b>Total</b>	<b>1,357</b>	<b>23.8%</b>	<b>323</b>

The ASQ-3 screener focused on communication, fine and gross motor, problem solving and personal social skills for the age-interval of the child (based on months). Table 15 shows 24% of children (326) scored in the “Referral” range, with a recommendation to be referred to a professional for further assessment. Table 16 shows that 23.8% of children (323) scored in the “Monitor” range. Children scoring in the Monitor range are recommended to be rescreened more frequently to detect any changes, as well as work on particular activities that encourage skills for the deficient skill(s) domain(s). Fifty-two percent of the children (708) scored developmentally “On Target,” according to the ASQ-3 screener.

Table 17.

<b>ASQ-3 Domain REFERRALS</b>			
SKILLS	Screens #	Referral %	Referral #
Communication	1,357	12.7%	<b>173</b>
Fine Motor	1,357	9.1%	<b>124</b>
Gross Motor	1,357	7.6%	<b>103</b>
Problem Solving	1,357	6.6%	<b>89</b>
Personal Social	1,357	5.7%	<b>78</b>
<b>TOTAL</b>	<b>1,357</b>		<b>567</b>

Table 17 shows the domains in which the 326 children scored in the “Referral” category on the ASQ-3. Some children were referred in more than one domain. There were a total of 567 Referral scores with the highest in communication (173), followed by, fine motor (124), gross motor (103), problem solving (89), and personal social (78).

Figure 3.

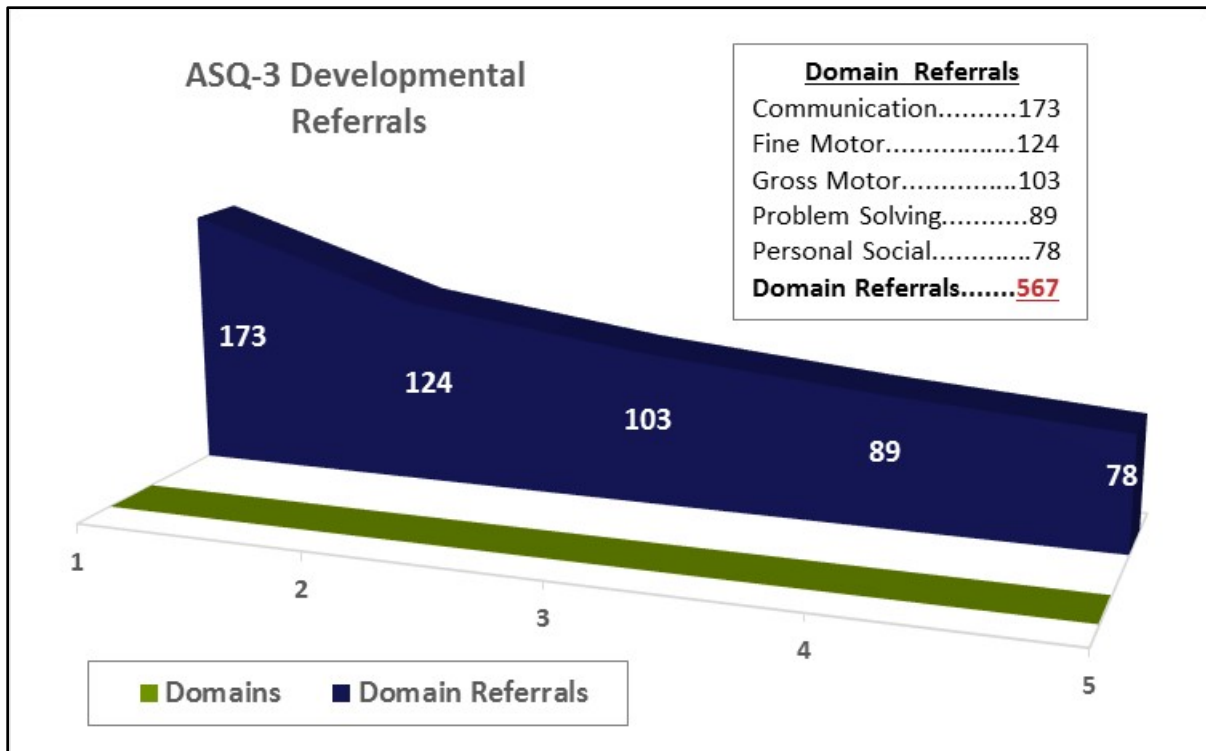


Figure 3 displays the ASQ-3 Referral domains for the 326 children that scored in the “Referral” category. The green bar depicts the five domains as follows: 1) communication, 2) fine motor, 3) gross motor, 4) problem solving, and 5) personal social. The parallel blue bar represents skill domains that the children were actually referred in. There were 567 total domain Referrals - in communication (173), followed by fine motor (124), gross motor (103), problem solving (89) and personal social (78).

Figure 4.

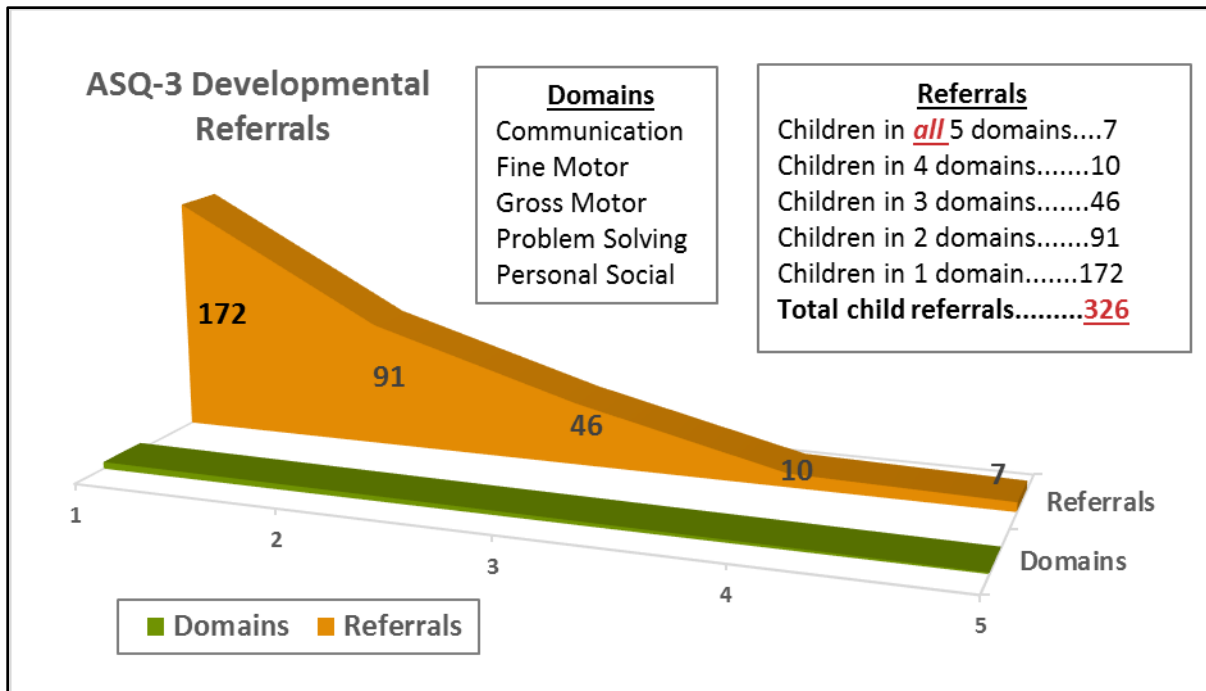


Figure 4 shows the children falling into the Referral category and how many domains each child was referred in, based on the developmental screening scores. The green bar depicts the five domain types: communication, fine motor, gross motor, problem solving, and personal social. The parallel orange bar represents how many Referrals for each child. Of the 326 children who scored in the “Referral” range, 7 were referred in all 5 domains, followed by 4 domains (10 children), 3 domains (46), 2 domains (91) and 1 domain (172). As mentioned earlier, the ASQ-3 developmental screener recommends that if a child has just one Referral, the recommendation is that they are referred to a professional for further assessment.

### ASQ-SE Developmental Screenings

Children were also screened with the ASQ-SE screener. The ASQ-SE screener focuses on social emotional development. As seen in Table 18, 1,351 children were screened with the ASQ-SE, which consists of 33 questions, ranging from toilet training, temper tantrums, length of anger, moods, and empathy.

Table 18.



<b>Overall ASQ-SE Domain REFERRALS</b>			
<b>Pre-K Collaboratives (1,786 enrolled)</b>	<b>Screens #</b>	<b>Referral %</b>	<b>Referral #</b>
<b>Total</b>	<b>1,351</b>	<b>18.9%</b>	<b>255</b>

Table 19.

<b>ASQ-SE Screen by Age-Interval</b>		
<b>36 months/ 3 years old</b>	<b>48 month/ 4 years old</b>	<b>60 month/ 5 years old</b>
<b>0.7% (10)</b>	<b>39.3% (531)</b>	<b>60% (810)</b>

Table 19 shows the screens by the age intervals that were used in this study. The questions were the same for each age interval (i.e., 36 months, 48 months, & 60 months); however, the cutoff was lower for the 36-month screener ( $\geq 59$ ) than for the 48- and 60-month screener ( $\geq 70$ ). The series of questions used the following responses: “rarely or never,” “sometimes,” “most of the time.” In addition, parents were asked if they had a concern for their child for each of the 33 questions.

Figure 5.

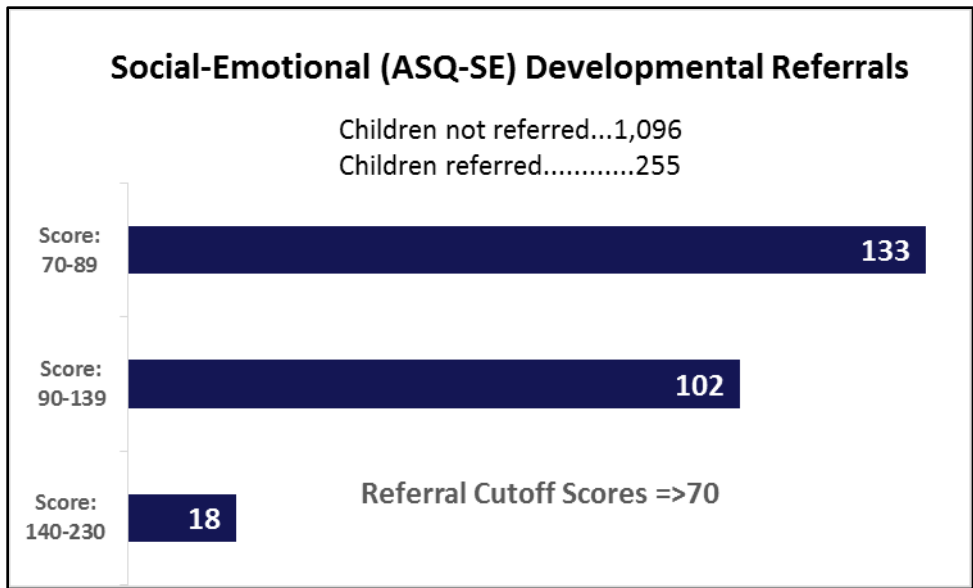


Figure 5 shows the score ranges for the 255 children that scored in the “Referral” range for the social emotional developmental screening. Most of the referred children scored within 20 points of the cutoff range (133 children), followed by within 70 points above the cutoff range (102 children), to within 160 points above the cutoff range (18 children) for the recommended Referral to a professional for further assessment.

Figure 6.

## Pre-K Developmental Screen Referrals

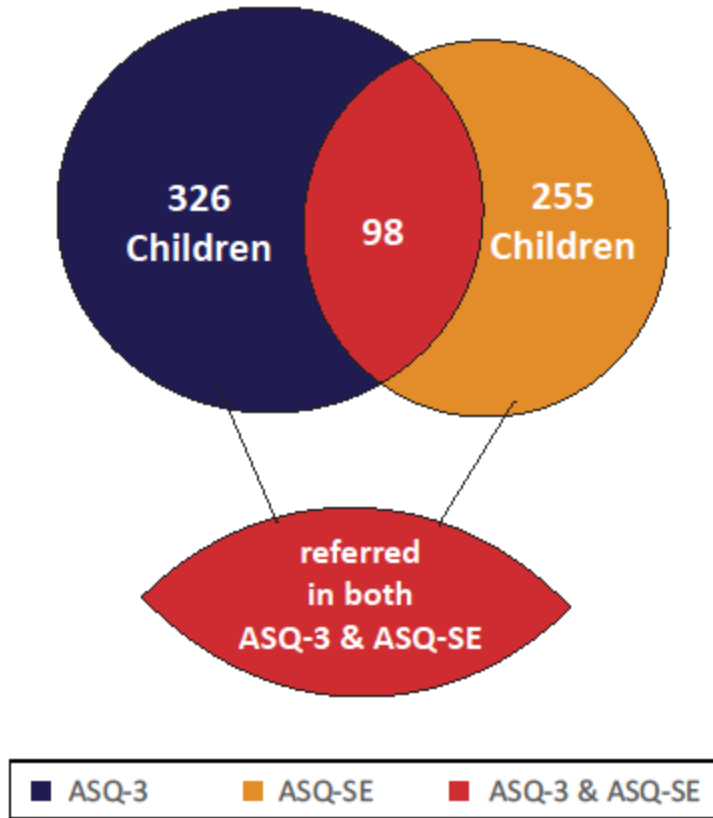


Figure 6 shows the total number of Referrals for the ASQ-3 and the ASQ-SE screenings (326 and 255, respectively). As shown in Figure 6, a total of 98 children scored in the Referral range for both screenings. There were 30 children who were referred in both the social emotional screening (ASQ-SE) and the communication domain, followed by fine motor (23), gross motor (17), problem solving (17) and personal social (11).

Figure 7.

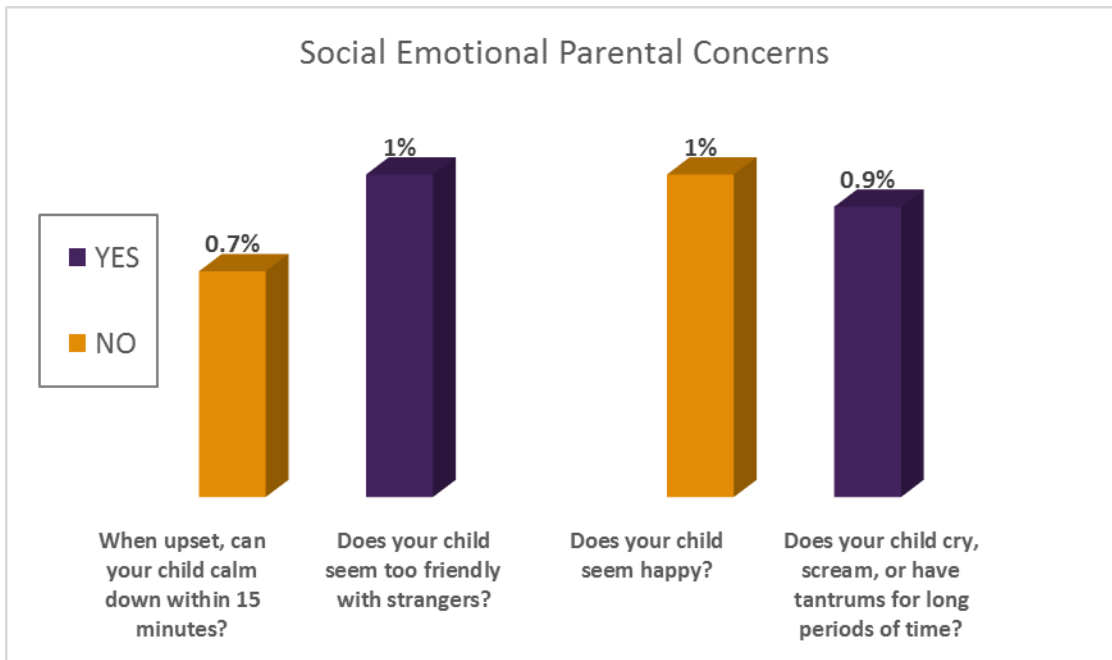
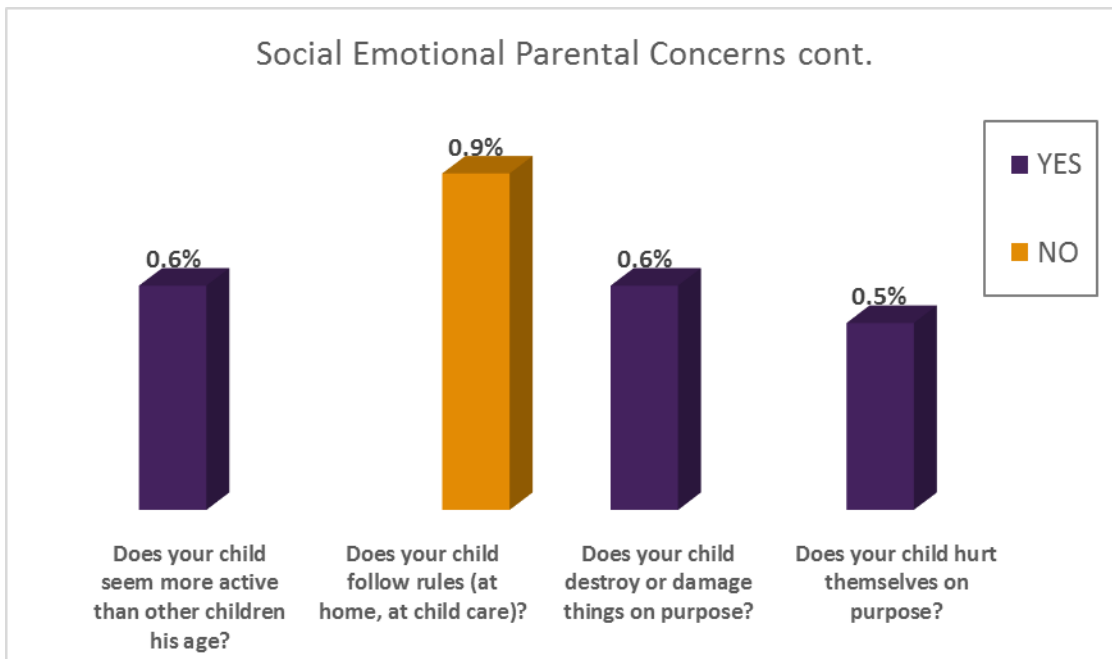


Figure 8.



Figures 7 and 8 show 8 of the 33 questions that caregivers had concerns about. Interestingly, a very small percentage of caregivers had concerns about their child's social-emotional

development (<1%), but 1 in 5 of the children screened scored in the Referral range (255 children). Scoring in the Referral range for the ASQ-SE means that the child should receive further assessment by a professional, according to ASQ.

### **ASQ-3 Qualitative Questions**

The comments below were summarized by theme to relate the most common responses by caregivers.

Q1. Do you think your child hears well? If no, explain – 37 comments

- Currently in speech therapy
- Ear tubes in or were implanted in past
- Does not respond well to voices
- Draining from ears
- Tested in past for hearing problems

Q2. Do you think your child talks like other toddlers her age? If no, explain – 135 comments

- Speech impediments/issues
- Uses baby talk
- Pronunciation problems – using tongue to talk
- Trouble completing sounds and words
- Slurred speech
- Speaks better than other kids of the same age

Q3 & Q4. Can you and others understand most of what your child says? If no, explain – 127 comments

- Similar comments as in question 2
- Talks like a baby
- Hard to understand
- Talks gibberish

- Difficult to understand

Q5. Do you think your child walks, runs, and climbs like other toddlers his age? If no, explain –

14 comments

- Walks side to side
- Concerns with gait – delays
- Does not run or climb
- Need improvements
- Falls a lot

Q7. Do you have any concerns about your child's vision? If yes, explain – 45 comments

- Wears glasses
- Squints
- Born with cataracts
- Sits too close to television
- Can't see well

Q8. Has your child had any medical problems in the last several months? If yes, explain – 130

comments

- Ruptured ear drum
- Premature
- Surgeries – lymph nodes; tonsils; adenoids
- Asthma
- Severe allergies
- Pneumonia
- Mono; breathing problems; bronchitis
- Kidney stones; infections; reflux; blood in urine
- ADHD meds

- Staph infection
- Ear infections

Q9. Do you have any concerns about your child's behavior? If yes, explain – 128 comments

- Hyper (hyperactive; outbursts; lack of eye contact; no or low self-control)
- In counseling
- Trouble getting along with other children (aggressive; violent; lack of emotional connection; likes hitting others)
- Temper Tantrums (hits, kicks, breaks things, throws things)
- Social skills lacking
- Very shy
- Lots of anger comments (hits themselves when angry; pulls own hair)
- Impulsive
- Lack of attention/ability to listen
- Hurts others (animals, kids, smaller children)

Q10. Does anything about your child worry you? If yes, explain – 143 comments

- Speech
- Communication
- Dyslexia type behavior
- Tantrums
- Temper
- Home life is a concern
- Child is very mean at times
- Odd behaviors – tries to kiss other children – all the time
- Weight problem – too small; overweight
- Reads and writes backwards
- Cries a lot

- Asthma
- Hyperactivity
- ADHD
- Difficulty in gross motor skills
- Behavior issues

### **ASQ-SE Qualitative Questions**

The comments below were summarized by theme to relate the most common responses by caregivers.

Q11. Does your child have eating problems, such as stuffing foods, vomiting, eating nonfood items, or \_\_\_\_\_? 12 comments

- Vomiting
- Picky eater
- Stress causes vomiting
- Eat until vomits – won't stop eating
- Chews on clothes

Q22. Does your child do things over and over and can't seem to stop? Examples are rocking, hand flapping, spinning, or \_\_\_\_\_. 36 comments

- Rocking
- Biting himself/herself
- Jumping
- Kicking
- Rolls hands together in a motion
- Talking
- Twisting hair
- Thumb sucking



- Gets mad and bumps head

Q33. Has anyone expressed concerns about your child's behavior? If you checked "sometimes" or "most of the time," please explain – 124 comments

- Fighting at school
- Temper
- Bullying
- Bites himself/herself
- Wets themselves when upset
- Strong-willed
- Throws things during tantrums
- Poor attention span
- Hits, pushes, and kicks classmates
- Social skills lacking
- Extremely shy
- Very stubborn
- When he/she wakes up they are mean and they cry
- Skills are behind
- Cries for no reason
- Throws self on ground
- Can't understand their speech

Q34. Do you have concerns about your child's eating, sleeping, or toileting habits? If so, please explain: 170 comments

- Wets themselves
- Wets at night
- Picky eater
- Won't go to sleep at night – not enough sleep

- Poor eating habits – will not eat vegetables
- Sleep issues – won't sleep through the night; sleeps very little; wakes up screaming; bad dreams
- Obese - never feels full
- Lately having bowel movements in pants during playtime
- Eating until he vomits
- Doesn't like his food to touch
- Wear pull-ups at night
- Too thin

Q35. Is there anything that worries you about your child? If so, please explain: 194 comments

- Lazy
- Memory – cannot remember letters, numbers and colors
- Behavior
- Speech
- Sad
- Quick to anger
- Temper
- Biting himself/herself when mad
- Language development issues
- Hyper
- Eating habits
- Sleeping habits
- Wets herself/himself
- Too friendly to strangers
- Have to watch him 24-7; can't leave alone
- Child having an asthma attack
- Odd behavior – slaps self in face and hugs on to strangers

- Too friendly to strangers; to older men; hugs on them
- Overweight
- Reads backwards
- Think he/she has ADHD
- Tantrums

## Cross Tabulations of Child Screening Referrals and Potential Determinants

Table 20.

<b>Pre-K Developmental Child Referrals</b>		
	ASQ-3	ASQ-SE
<b>Parental Education</b>		
<HS Diploma	10.0% (23)	7.0% (13)
HS Diploma	38.9% (89)	39.8% (74)
Professional Cert.	2.6% (6)	2.7% (5)
1-3 Years of college	34.9% (80)	37.6% (70)
Bachelor's	10.0% (23)	9.7% (18)
Master's/Doctorate	3.5% (8)	3.2% (6)
No Answer	97	67
<b>Parental Income</b>		
< 20,000	55.2% (144)	50.7% (102)
20-40,000	13.8% (36)	19.4% (39)
40-60,000	4.6% (12)	5.0% (10)
> 60,000	3.1% (8)	3.0% (6)
Refused	23.4% (61)	21.9% (44)
No Answer	65	52
<b>Health Insurance</b>		
Medicaid	54.0% (176)	60.5% (153)
Private	11.0% (36)	15.0% (38)
SCHIP	8.9% (29)	1.2% (3)
Military	0.3% (1)	0.4% (1)
No Coverage	0.6% (2)	1.6% (4)
No Answer	82	54
<b>Marital Status</b>		
Married	22.8% (67)	28.9% (67)
Single, Separated, Divorced or Widowed	55.8% (164)	51.3% (119)
Cohabiting	3.1% (9)	2.6% (6)
Refused	18.4% (54)	17.2% (40)
No Answer	32	21
<b>Read to per Week</b>		
0 Times	1.4% (3)	1.1% (2)
1-4 Times	54.7% (117)	57.9% (106)
5-8 Times	29.0% (62)	33.3% (61)
9-12 Times	13.6% (29)	7.7% (14)
13-20 Times	1.4% (3)	0.0% (0)
No Answer	112	70

In order identify children that may be developmentally delayed, researchers ran cross tabulations of children that scored in the "Referral" range on various social determinants. Table

20 displays both the ASQ-3 (n=326) and ASQ-SE (n=255) child Referrals, showing that almost 4 out of 10 caregivers of children in the “Referral” category report having only a high school diploma (40%). Half of the caregivers reported incomes of less than \$20,000 per year (ASQ-3=55.2%; ASQ-SE=50.7%). Single-parent families (e.g., divorced, widowed, separated) comprised of half of the children falling into the Referral category (ASQ-3=55.8%; ASQ-SE=51.3%).

Table 21.

<b>Pre-K Developmental Child Referrals</b>		
	ASQ-3	ASQ-SE
<b>Child Gender</b>		
Male	47.5% (155)	51.4% (130)
Female	52.5% (171)	48.6% (123)
<b>Child Age</b>		
Age 3	7.7% (25)	3.4% (8)
Age 4	76.4% (249)	79.4% (185)
Age 5	16.0% (52)	17.2% (40)
<b>Race</b>		
Caucasian	33.5% (52)	40.0% (52)
African American	63.2% (98)	52.3% (68)
Other	3.2% (5)	7.7% (10)
No Answer	171	123
<b>BMI</b>		
Underweight	10.6% (25)	11.8% (22)
Healthy	36.4% (86)	36.6% (68)
Overweight	15.7% (37)	15.1% (28)
Obese	37.3% (88)	36.6% (68)
No Answer	90	67
<b>HS or Other Last Year</b>		
Yes	68.4% (160)	75.3% (146)
No	31.6% (74)	24.7% (48)
No Answer	92	59

Table 21 shows basic demographics of the children falling into the Referral category in this study. Referrals by gender were fairly similar, with roughly half male children (ASQ-3=47.5%; ASQ-SE=51.4%) and roughly half female children (ASQ-3=52.5%; ASQ-SE=48.6%). Racially, the Referrals were similar to the racial makeup of the overall child population in the study. The BMI categories were as follows: underweight (ASQ-3=10.6%; ASQ-SE=11.8%); healthy weight (ASQ-

3=36.4%; ASQ-SE=36.6%); overweight (ASQ-3=15.7%; ASQ-SE=15.1%); and obese (ASQ-3=37.3%; ASQ-SE=36.6%). Seven out of 10 referred children attended some type of child care center in the previous year, such as Head Start or a private center (ASQ-3=68.4%; ASQ-SE=75.3%).

### Cross Tabulation of Potential Determinants – ASQ-3

Table 22.

Parent/Caregiver Demographics	ASQ-3 Pre-K Developmental Referrals			
	Participants	Frequency	%	No %
<b>Race/Ethnicity</b>				
White	216	32.9	75.9	24.1
Black	418	63.7	76.6	23.4
Other	22	3.4	77.3	22.7
<b>Education Level</b>				
< High School education	86	8.6	73.3	26.7
High School graduate	383	38.2	76.8	23.2
Professional certificate	21	2.1	71.4	28.6
1-3 years of college	338	33.7	76.3	23.7
Bachelor's degree	121	12.1	81.0	19.0
≥ 1 year graduate school	53	5.3	84.9	15.1
<b>Marital Status</b>				
Married	337	26.2	80.1	19.9
Cohabiting	39	3.0	76.9	23.1
Single, Separated, Divorced or Widowed	681	52.9	75.9	24.1
<b>Income</b>				
Below \$20,000	620	53.7	76.8	23.2
\$20,000 to 39,999	156	13.5	76.9	23.1
\$40,000 to 60,000	48	4.2	75.0	25.0
Above \$60,000	47	4.1	83.0	17.0
Refused	283	24.5	78.4	21.6
<b>Read Times per Week</b>				
0 Times	12	1.3	75.0	25.0
1-4 Times	543	56.7	78.5	21.5
5-8 Times	277	28.9	77.6	22.4
9-12 Times	117	12.2	75.2	24.8
13-20 Times	8	0.8	62.5	37.5
<b>Total</b>	<b>1,449</b>	<b>100</b>		<b>326</b>

~No Statistical Significance

Table 22 shows the results of the ASQ-3 developmental screening (referred and not referred) in correlation to parental/caregiver demographics for the children that had responses for the questions. As noted earlier in the report, some indicators had a low response rate (i.e., race with 656/1,449; and read times per week with 957/1,449; and education attainment with 1,002/1,449). There was no statistical significance between the variables in this cross tabulation correlation analyses. The lack of any statistical significance may be because little variation was noted among the predictors/demographics. Researchers conclude this may be because the children who are enrolled in the collaboratives are similar in their overall demographic makeup, as opposed to what a random sampling of four year old children throughout the state of Mississippi would be.

Table 23.

Child Demographics	ASQ-3 Pre-K Developmental Referrals				
	Participants	Frequency	%	No %	Yes %
<b>Child Gender</b>					
Male	730	50.4	78.8	21.2	p < .01
Female	719	49.6	76.2	23.8	
<b>Child Age</b>					
Age 3	63	4.7	60.3	39.7	p < .01
Age 4	1,081	80.2	77.0	23.0	
Age 5	204	15.1	74.5	25.5	
<b>BMI</b>					
Underweight	106	10.7	76.4	23.6	p < .01
Healthy	379	38.2	77.3	22.7	
Overweight	140	14.1	73.6	26.4	
Obese	368	37.1	76.1	23.9	
<b>Past Head Start or Other</b>					
Attended	700	70.7	77.1	22.9	p < .01
Did not attend	290	29.3	74.5	25.5	
<b>Total</b>	<b>1,449</b>	<b>100</b>		<b>326</b>	

Table 23 displays the results of the ASQ-3 developmental screening (referred and not referred) in correlation to child demographics from the study. There was a statistical significant relationship between the children’s ages and having a score in the Referral category ( $p < .01$ ). Children age 3 had the largest Referral percentages (39.37%) compared to four year olds (23%) and five year olds (25.5%) that were screened for delays. Gender, BMI status and attending a

Head Start or other center last year were not statistically significant. Again, the variation between the predictors and the Referrals may be due to the non-random sampling.

**Cross Tabulation of Potential Determinants – ASQ-SE**

Table 24.

Parent/Caregiver Demographics	ASQ-SE Pre-K Developmental Referrals					
	Participants	Frequency	%	No %	Yes %	Significance
<b>Race/Ethnicity</b>						<i>p &lt; .001</i>
White	216	32.9	75.9	24.1		
Black	418	63.7	83.7	16.3		
Other	22	3.4	54.5	45.5		
<b>Education Level</b>						
< High School education	86	8.6	84.9	15.1		
High School graduate	383	38.2	80.7	19.3		
Professional certificate	21	2.1	76.2	23.8		
1-3 years of college	338	33.7	79.0	21.0		
Bachelor's degree	121	12.1	85.1	14.9		
≥ 1 year graduate school	53	5.3	88.7	11.3		
<b>Marital Status</b>						
Married	337	26.2	79.8	20.2		
Cohabiting	39	3.0	84.6	15.4		
Single, Separated, Divorced or Widowed	681	52.9	82.4	17.6		
<b>Income</b>						
Below \$20,000	620	53.7	83.4	16.6		
\$20,000 to 39,999	156	13.5	75.0	25.0		
\$40,000 to 60,000	48	4.2	79.2	20.8		
Above \$60,000	47	4.1	85.1	14.9		
Refused	283	24.5	84.5	15.5		
<b>Read Times per Week</b>						
0 Times	12	1.3	83.3	16.7		
1-4 Times	543	56.7	80.3	19.7		
5-8 Times	277	28.9	77.6	22.4		
9-12 Times	117	12.2	88.0	12.0		
13-20 Times	8	0.8	100	0.0		
<b>Total</b>	<b>1,449</b>	<b>100</b>		<b>255</b>		

Table 24 shows the results of the ASQ-SE developmental screenings (Referred and not Referred) in correlation among the parental/caregiver demographics. The social emotional screen analyses did show statistical significance for race categories ( $p < .001$ ). The highest Referral percentage for race was in the *Other* category (45.5%), which includes Hispanic, Latino,



Asian, and two or more races, followed by White (24.1%) and Black (16.3%). As mentioned previously, the other predictors showed little variation between the categories.

Table 25.

Child Demographics	ASQ-SE Pre-K Developmental Referrals			
	Frequency	%	No %	Yes %
<b>Child Gender</b>				
Male	730	50.4	82.2	17.8
Female	719	49.6	82.6	17.4
<b>Child Age</b>				
Age 3	63	4.7	87.3	12.7
Age 4	1,081	80.2	82.7	17.3
Age 5	204	15.1	80.4	19.6
<b>BMI</b>				
Underweight	106	10.7	79.2	20.8
Healthy	379	38.2	81.8	18.2
Overweight	140	14.1	80.0	20.0
Obese	368	37.1	81.2	18.8
<b>Past Head Start or Other</b>				
Attended	700	70.7	78.9	21.1
Did not attend	290	29.3	83.4	16.6
<b>Total</b>	<b>1,449</b>	<b>100</b>		<b>255</b>

~No Statistical Significance

Table 25 displays the results of the ASQ-SE developmental screening (Referred and not Referred) among child demographics from the study. There was no statistical significance with this analyses. Children age 3 were in the largest Referral percentages (39.37%) compared to four year olds (23%) and five year olds (25.5%) that were screened for delays. Gender, BMI status and attending a Head Start or other center last year were not statistically significant. Again, the variation among the predictors and the Referrals may be due to the non-random sampling.

# DISCUSSION

As previously mentioned, the goals of this study were to implement a uniform screening process throughout the newly formed pre-K program, document the readiness of children entering pre-K, explore determinants of different child outcomes, create innovative channels to services, and examine relevant policy considerations. This report concludes with a discussion of what has been learned regarding each of these goals.

## **Developmental Status of Children Entering Pre-K in Mississippi**

This historic study documents the developmental levels of the first cohort of children attending state-funded pre-K in Mississippi, providing a basis for tracking the students over time and measuring the impacts of public pre-K and the services provided. Furthermore, it provides crucial information on the types of services needed by young children prior to kindergarten, allowing Mississippi policymakers and agency heads to reconceptualize early care and education, as well as health, systems that serve young children. Learning that 1 in 4 children in Mississippi could benefit from developmental assessment by a professional is a profound first step in getting children the services they need to treat delays early and prevent unnecessary special education placements in elementary school.

Currently, children identified as needing additional assessment are eligible to be assessed by the Child Find program located in their local school district's special education department. Child Find is the component of the Mississippi Department of Education (MDE) whose mission it is to "identify, locate, and evaluate all children suspected of disabilities who need special education and related services as a result of those disabilities (Mississippi Department of Education, 2014)." Child Find personnel will determine if children meet the criteria for a disability category that is eligible for services under Individuals with Disabilities Education Act (IDEA) guidelines. These categories include autism, deaf-blindness, emotional disability, hearing impairment, language/speech disability, intellectual disability, orthopedic impairment, multiple disabilities, specific learning disability, traumatic brain injury, visual impairment, or

other health impairment (Mississippi Department of Education, 2014). The disability must be determined to have a negative impact on the child's ability to access their age-appropriate educational instruction in order for a child to be eligible for services.

If the child does not qualify for services under one of these disability categories, then a developmental delay category can be considered for eligibility. However, unlike IDEA guidelines that state children are eligible for services with a developmental delay in **one** or more of the following categories: physical development, cognitive development, communication development, social or emotional development, or adaptive development (United States Department of Education, n.d.), Mississippi State Board Policy 7219 requires that **two** or more of the following developmental delays be present before services will be provided: cognitive development, physical development, communication development, social/emotional/behavioral development, adaptive development (Mississippi Department of Education, 2013b). The key difference is that a child with just one delay that is not deemed to fall under one of the aforementioned primary categories of disability would not receive services.

Therefore, if the children in this study (ASQ-3 screening) who exhibited just one delay for the (n=172) were determined by Child Find not to have an overarching disability, but rather were just developmentally delayed in one area, then they would not be eligible for services. The ASQ guidelines for best practices recommend that all children exhibiting even one delay be referred for further assessment and, if needed, services. Therefore, this study has revealed a gap between recommended best practices and current Mississippi policies and practices.

### **Developmental Status and Risk Factors for Delay**

The literature documents that having minority status, being in poverty, and having a parent with low educational attainment are all significant determinants of developmental delay in children (Child Trends, 2013). This study presents a similar picture for children in need of a referral for a potential developmental delay. Approximately half are cared for by single parents with a high school diploma or less whose income is less than \$20,000 annually, and over half

are minorities, primarily African American. Having a large pool of high-risk children in Mississippi further points to the need for high-quality early care and education with developmental screenings and services for children with delays.

One methodological note, however, is that tests for significance regarding these determinants and the likelihood a child was placed in a Referral category were predominantly insignificant. This is likely due to a lack of variation among this non-random pilot study sample. Children attending state-funded pre-K collaboratives are not typical of the state at large, where the median income is \$38,191; 43% of children are Black (compared to 64% in this sample); and 21% have a bachelor's degree or higher (compared to 17% in this sample). Furthermore, even within this sample, many questions had missing data, limiting variability among respondents.

### **Lessons Learned Regarding the Screening and Referral Process**

#### **Screening Process**

Private childcare centers not associated with a school district or Head Start may not have conducted any screenings if the ASQ had not been administered through this project. In most cases, however, the ASQ-3 screening was considered duplicative given other screeners utilized by the centers. Head Starts already administer a screener per their regulations, and most of the school-district-based centers utilized some form of screening tool, though they ranged widely in type and quality. Collaborative staff also reported that the time span for administering the ASQ screenings and entering the results into the online system was very short, which may have affected the validity of the screenings. These findings raise the need for a uniform screener and screening process across all collaboratives.

Regarding the ASQ screener, some collaborative staff reported that it was comprehensive and user-friendly, but others noted that staff needed additional training on its implementation and interpretation. There was too much variation among collaboratives in how data were collected, and collaborative staff reported that, while most caregiver responses were accurate, some were grossly inaccurate and required follow-up. Furthermore, as mentioned in the findings section of this report, parents often underestimate problems with their children. Additionally,

staff reported that it was sometimes hard to get accurate results if the child did not have established rapport with the staff member completing the screener. Given the proven validity and reliability of the ASQ instrument nationally, it is surprising that so much variation in results existed in the current study. This may have been due to inadequate training of collaborative staff in managing the implementation process and the lack of a consistent data collection methods.

### **Follow-up on Screening Results**

Different follow-up scenarios were devised by MDE based on the outcome of the screening. If a child's scores placed them in the "On Target" or "Monitor" categories, collaborative staff were instructed to send a letter home to parents/caregivers informing them of the results. Parents of children whose scores fell in the "Monitor" category were also supposed to receive activities recommended by ASQ to strengthen the developmental skills that were revealed by the screener to need reinforcement. Protocols for working with children to strengthen developmental skills at the child care centers varied by collaborative, highlighting a need for a uniform plan across all pre-K collaboratives.

For children whose scores placed them in the "Referral" category, initially, medical staff at the Center for the Advancement of Youth (CAY) had conceptualized a referral process where parents of children identified as possibly having a delay would be notified and advised to contact the child's primary health care provider for further assessment. CAY, located in Jackson, would serve as a back-up service provider for children needing specialized assessment or services.

However, this plan was put on hold when complications arose as a result of Child Find regulations and the need to first route children through the Child Find system. Consequently, the goal to create innovative channels to services was not immediately possible; however, as a result of the findings of this study, MDE is currently reviewing Child Find policies and procedures to consider new strategies for assessing and providing services to children who have been identified as needing additional assessment through pre-K developmental screening.

Furthermore, Mississippi Child Find is currently working with collaborative staff to assess children identified as potentially having a delay in the current project year, and new guidelines are being established for the screening and referral process next year. Therefore, this study has been an important first step in modifying policies and procedures to ensure children do not fall through the cracks, allowing delays to become habituated and harder to address. Nevertheless, additional efforts will be needed.

## POLICY CONSIDERATIONS

### **Best Practices in Screening and Referral**

North Carolina is regarded as having one of the best screening and referral systems in place for children. A recent evaluation of their program revealed that state investments in high-quality early education and early developmental screening and referral resulted in fewer children being in special education by the end of third grade, as well as significant savings for the state (Muschkin, Ladd & Dodge, 2015).

North Carolina identifies children through Medicaid well-child visits as infants and toddlers and refers children to services through the North Carolina Infant Toddler Program (North Carolina Department of Health and Human Services, 2012). Children ages 0-35 months are referred by physicians, child care centers, hospitals, parents, and social service agencies. Services are paid by Medicaid or private insurance, or parents are charged based on sliding fee scale. The high rate of referral by pediatricians is facilitated through 14 physician networks located throughout the state that together comprise the Community Care of North Carolina (CCNC) system (Commonwealth Fund, 2009). This network was first utilized to enhance screening by the North Carolina Assuring Better Child Health and Development (ABCD) program, funded by the Commonwealth Fund. This seed grant was used by the CCNC to coordinate children's care from screening to services.

From the Infant Toddler Program, children transfer at age 3 to the Preschool Program for Children with Disabilities, where district-level, trained professionals oversee their care

according to Individuals with Disabilities Education Act guidelines (Public Schools of NC, 2010). Children entering preschool who have not been in the Infant and Toddler program are immediately screened (within a few days) by trained early childhood educators who are supervised by a professional with specialized expertise in early childhood assessment to determine if there is a need for a referral and additional assessment through the Preschool Program for Children with Disabilities (Public Schools of NC, 2010). Only one delay is required for further assessment and services, and children receive assessment at no cost. Therefore, the risk of a child falling through the cracks and not being identified for assessment and services is minimized. As a result, children enter services early and are able to discontinue the need for services sooner, preventing special education placements in elementary school and saving state funding (Muschkin, Ladd & Dodge, 2015).

The Mississippi Department of Education and Mississippi Division of Medicaid, as a part of the Children's Health Council, in conjunction with staff from the Center for Mississippi Health Policy, the Center for the Advancement of Youth, and researchers from the Social Science Research Center, are currently examining the North Carolina screening and referral program as a potential model for Mississippi, highlighting the importance of public-private partnerships for creating solutions and addressing citizen needs. Mississippi has benefitted, and will continue to benefit, from establishing a research agenda around public pre-K with a focus on developmental screening. Such efforts can promote increased cooperation among agencies in meeting children's needs and utilizing private medical and research resources in Mississippi to establish affordable best practices.

### **The Need for Uniform, High-quality Early Care and Education, Screening, and Referral**

The current study has revealed a strong need for high-quality early education for children throughout Mississippi. The risk factors and developmental status of children screened through this study, as well as the lessons learned, portray a pervasive need for a uniform assessment process and provision of services to ensure children are "school ready" upon entering kindergarten. Furthermore, a uniform system of early care and education, screening, and referral will ensure that children do not "fall between the cracks" and are not unnecessarily

placed in special education in subsequent years, when the delay may be too advanced for them to “graduate” from special education services. Other benefits could include improved third-grade reading, increased student retention, fewer repeated grades, and overall savings for the state (Mississippi KIDS COUNT 2013; Muschkin, Ladd & Dodge, 2015; National Education Association, 2015).

## CONCLUSION

This study captures a point in time in Mississippi history where educational policy is in flux, and it informs the debates of the day. Its message is clear: young children in Mississippi need the policymakers and institutions devoted to their care to respond to the challenges they face by providing the basic education and services they need to “catch up” and be successful. Children, when given supports early in life, have improved outcomes, and pre-K developmental screenings are the first step in ensuring they have opportunities for a successful academic, social, and physical trajectory.



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