Pediatricians' Use of Developmental Screeners to Identify Communication Delays: Trends Across the United States

By

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Abstract

A majority of children are seen in the healthcare setting in the first 5 years of life, specifically for well-child visits, but only a fraction of children with communication delays are identified before school age. Even less receive early intervention (EI) services before three years of age. In recent years the American Academy of Pediatrics proposed recommendations that pediatricians implement formal screening measures at certain well-child visits to increase early identification of developmental delays, including communication delays, and Autism Spectrum Disorder. The current literature does not explicitly address how communication delays are identified. Thus, it is important to capture how communication delay, in particular, is being identified in the developmental screening practices. The overall goal of this project is to better understand early identification and referrals for services by pediatricians in the birth to three populations generally and specifically as it relates to communication delays and disorders. An online survey was administered to pediatricians (N=52) to explore multiple topics that influence screening. This survey gathered data to better understand the four areas: (1) pediatricians knowledge of screening, (2) how they are currently screening in the field (3) barriers they face when screening, and (4) how they are referring after a positive screening result. It was found that pediatricians feel confident in screening but feel that they could use more education. Most pediatricians are screening using ASQ and a majority of pediatricians screen at 18-months of age. This study will guide future research on implementing protocols that will engage pediatricians in screening practices and address consistent screening practices. Furthermore, this study will aid in enhancing screening procedures to increase EI referrals to help promote school-readiness in children with communication delays or disorders.

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Chapter 1: Introduction

Only one third of children with communication delays are identified before early school age (Bates et al., 2014). However, about 95% of children from birth to 3 years of age are seen in primary care settings for routine healthcare appointments (Williams et al., 2015). Thus, there is a need to more efficiently identify children with mild to moderate communication delays and increase the referrals of children to speech-language pathologists in early intervention (EI) programs. Children who are late talking toddlers, children with specific-language impairment, and children with phonological disorders can all benefit from EI services (Dale et al., 2003; Guralnick, 2011; Guralnick, 1998). This improvement of identification of communication delays in addition to increased referrals to speech-language pathologists will provide language-based interventions to toddlers, which will increase school readiness and improve academic achievement in this population. Currently, there is no universal screening protocol for pediatricians to identify communication development. Similarly, there is no universal education opportunity for pediatricians about communication milestones throughout development. The overarching aim of this research is to gather information to ultimately identify an applicable way to increase the identification of early communication delays or disorders and to invoke knowledge about early communication development in pediatricians.

Infants and toddlers are a unique population in the fact that many of these children do not see people outside of the immediate family for the first few years of life. For example, children who do not attend daycare spend most time in the home with a parent or another caregiver. One of the only professionals that all infants and toddlers consistently see in the first few years of life is a pediatrician during their well-child visits (Williams et al., 2015). Whether infants and toddlers are at home with caregivers or at daycare, most infants and toddlers are scheduled for a

series of well-child visits throughout infancy and toddlerhood. During the well-child visits, the overall goal is prevention, tracking growth and development, and a time for parents to raise concerns with their pediatricians (AAP Schedule of Well-child visits, 2018). Therefore, pediatricians are the most logical professionals to target in order to increase identification of communication delays or disorders. Similarly, pediatricians are typically trusted professionals who traditionally assume an authoritative role. Thus, families normally respect their opinions and/or recommendations.

The two ways of identifying early developmental delays, specifically communication delays, include: (1) standardized screening, using a formal measure to assess current abilities (e.g., Ages & Stages Questionnaire), and (2) non-standardized developmental surveillance, informally using clinical judgment to assess current abilities (Council on Children with Disabilities; 2006). In 2006, the American Academy of Pediatrics (AAP) produced guidelines, which recommend that pediatricians conduct routine formal screenings for developmental delays with infants at 9-month, 18-month, and 30-month well-child visits. The AAP also recommends that developmental surveillance be done between each formal screening visit. Additionally, the United States Preventative Services Task Force (USPSTF) has not officially required communication screening as a mandatory protocol. However, the USPSTF has recommended that communication screenings be conducted regularly between birth and five years of age (Siu, 2015). Thus, the intent is to improve rates of screening and subsequently, increase the accurate identification of communication delays. Ideally, this will allow for early age of intervention to address concerns and increase school readiness.

There are four factors that could impact the implementation of AAP-recommended screening practices. First, pediatricians vary in their experiences with formal screening measures

in medical schools, clinical opportunities and residency programs because there are no standards for medical programs to incorporate information on pediatric developmental milestones or assessments into their classes (Accreditation Council for Graduate Medical Education, 2017). Thus, their current knowledge and experiences with developmental trajectories and screening measures could vary between professionals. Although AAP recommends when to screen and when to perform developmental surveillance, AAP does not provide a standard approach to these recommended practices. There is not one screening measure recommended for all pediatricians at this time so the screening measure of choice can vary between pediatricians (Siu, 2015; Screening Time, 2017). Also, pediatricians' views of their role in the screening process can look different between professionals. Third, pediatricians experience barriers when implementing formal screening measures that may hinder the applicability of conducting routine screenings (Ben-Sasson, Habib, & Tirosh, 2014; Fessenden, 2013; Glascoe et al., 2007; Scheffler et al., 2007; Robins et al., 2014; Wiggins, Piazza, & Robins, 2014; Pierce et al., 2011; Macy, 2012; Guevara et al., 2013). AAP does not provide a standard protocol for referring children after a failed screening. Thus, pediatricians' methods of referrals and their role in the referral process after a screener vary depending on practice protocols, pediatricians' views, and staff resources (Marks, Glascoe & Macias, 2011; Pierce et al., 2011; Pierce et al., 2016; Moore et al., 2017).

The overall goal of this project it to better understand early identification of developmental delays at well-child visits and referrals for services by pediatricians in the birth to 5-year populations generally and specifically, as it relates to communication delays and disorders. The long-term goal of this research is to change the way that pediatricians are screening, identifying, and referring infants and toddlers with suspected communication delays or disorders. Thus, the long-term aims include implementing effective screening procedures,

improving knowledge of developmental milestones to aid in developmental discussions and parent education, and employing a proficient referral process. In order to reach these implementation science goals, the foundational knowledge of this topic area needs to be established. Therefore, it is important to understand the target population and use their knowledge and experience to drive the implementation framework for future studies.

The EPIS framework is an implementation science framework that is used to guide and test theory and processes. There are four phases that guide this implementation science process. First, the "Exploration phase" focuses on considering the emergent or existing health needs of patients or communities. This phase identified the best evidence-based practices to address the needs and choose if adopting the evidence-based practice is appropriate. Second, the "Preparation phase" aims to recognize barriers and facilitators of implementation and create a plan how to use facilitators to tackle the barriers. The third phase is the "Implementation phase", which is the evidence-based practice being implemented into the system or the organization. The final phase of this framework is the "Sustainment phase". Within the final phase this is the point of analysis to see how the evidence-based practice is delivered with the supports, if there are adaptations needed, and thus, resulting in the level of public health impact from implementation of the evidence-based practice (Aarons, Hurlburt, & Horwitz, 2011). This study is applicable to the framework by focusing on the first two phases: Exploration and Preparation. Eventually this foundational research will lead to implementing a change in future research using the last two phases of the EPIS framework, Implementation and Sustainment. This study is the foundation for a focus of research that bridges the gap between speech-language pathologists and pediatricians to promote a more inclusive medical and professional environment and improve the screening

procedures while enhancing the knowledge of this population to accurately identify communication delay in infants and toddlers.

Another framework that is used for implementation science is the Theoretical Domains Framework (TDF). The TDF focuses on understanding the important domains, by identifying facilitators and barriers, which will guide the implementation science process (Michie, et al., 2005). However, the TDF specifically focuses on implementation science across interdisciplinary fields and explicitly, changing healthcare professionals' practices. Thus, TDF also plays a role in this study by focusing on implementation science processes and focusing on changing healthcare professionals' practices. TDF will help prioritize constructs that will aid in changing healthcare professionals' behaviors. There are four research areas and research questions addressed in this study. The focus in this study will aim to address the following domains: pediatricians' knowledge and skills, nature of behavior (i.e., what needs to be changed), beliefs about consequences and beliefs about own capabilities, and goal intention (i.e., what to aim for). Similarly, both social and physical environment will be addressed throughout each question.

Review of the Literature

Practice Setting and Purpose of Well-Child Visits

For the first 5 years of life, children have scheduled well-child visits that allow pediatricians to monitor developmental progress and identify early developmental delays. Before children are 5-years of age they are ideally scheduled to be seen for 14 total visits: within 3-5 days after hospital discharge, by 1-month of birth, ages 2-months, 4-months, 6-months, 9-months, 12-months, 15-monhts, 18-months, 24-months, 30-months, 3 years, 4 years and 5 years of age (Periodicity Schedule: Bright Futures/AAP Recommendations for Preventive Pediatric

Health Care, 2017). As a result, there are 14 opportunities for pediatricians to interact, observe and assess children's development before 5 years of age.

Table 1 provides an overview of current AAP recommendations in a visit schedule to illustrate what visits pediatricians implement 3 different assessment strategies: 1) developmental surveillance, which is informally monitoring developmental milestones, 2) developmental screening, which is formally assessing developmental milestones, and 3) Autism Spectrum Disorder (ASD) screening, which is formally assessing ASD. AAP has always recommended that developmental surveillance occur at each well-child visit. In June 2006, in order to increase healthcare professionals' early identification of developmental delays (DD) at well-child visits, the AAP produced recommendations that developmental screening of infants and toddlers be completed at 4 visits. (American Academy of Pediatrics Policy Statement, 2006). In 2015, The US Preventive Services Task Force produced another set of recommendations specifically, for Autism Spectrum Disorder (ASD), which recommended that pediatricians implement an autism-specific screener at 2 visits in addition to the developmental screeners. See Table 1, which outlines how these new recommendations fit into the ongoing developmental surveillance.

Table 1: Current AAP recommendations for screening, developmental surveillance, and Autism Spectrum Disorder screening by visit schedule (ages in months)

Visits (in mos)	3-5 days	By 1mo	2	4	6	9	12	15	18	24	30	36	48	60
Developmental Surveillance	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Developmental Screener						√			√		√			
ASD Screener									√	√				

The overall goal of well-child visits is prevention, tracking growth and development, and a time for parents to raise concerns with their pediatricians (AAP Schedule of Well-child visits, 2018). Well-child visits are the most consistent doctor visits that occurs in the child's first few

years of life (William et al, 2015). The AAP recommended periodicity schedule includes consistent well-child visits every few months throughout infancy and then yearly after 3-years-old continuing all the way through early and middle childhood adolescence (AAP Schedule of Well-child visits, 2018). AAP's purpose of well-child visits is for the doctor to prevent illnesses through scheduled immunizations and a time for parents to check in with the pediatrician about nutrition of the child, wellness of the parent/s, and safety in the home or school, if applicable. These visits also allow the pediatrician to track growth and development as well as discuss developmental milestones, social behaviors and children's learning with the children's parents or caregivers. Finally, AAP anticipates that these visits will be used for families to raise any concerns with pediatricians that include developmental milestones, social behaviors, sleep, eating, or any other related domains (AAP Schedule of Well-child visits, 2018).

The AAP recommends that families bring their top 3-5 questions to the visit due to time constraints with well-child visits (AAP Schedule of Well-child visits, 2018). It is possible that many parents or caregivers anticipate and expect to spend their time on these questions. However, there is also a cultural stigma that exists in which parents should not appear to be overanxious or over concerned about their own children's development during these well-child checks (Glascoe, 2003). Thus, parents may be reluctant to bring up concerns. Furthermore, it is likely that many parents or caregivers do not know what questions to ask or what developmental milestones are achieved at each age; therefore, it is imperative that pediatricians ask the right leading questions and provide materials and resources to families. This will, in turn, empower parents and caregivers to be active participants in their children's care and aid in the early identification of communication delays or disorders (Glascoe, 2003). Again, this leaves a lot of responsibility to the pediatricians to understand, assess, and identify growth and developmental

delays by asking appropriate questions to parents, discussing relevant topics, and/or providing the right screener during these visits.

Pediatricians' Current Level of Knowledge

The first opportunity for medical students to experience pediatric care is in the second two years through clinical rotations (AAP: Caring for Your Baby, 2009). After the four years of school are complete, pediatricians are required to complete a 3-year residency for general pediatrics, which includes hands-on training under supervision of experienced pediatricians. The Accreditation Council for Graduate Medical Education (ACGME) and American Board of Pediatrics control the accreditation process for medical training programs. The requirements are lengthy and are comprised of all aspects of a medical or any educational program, including: oversight, personnel, fellow appointments, educational program components and competencies, evaluation, and the learning and working environments at the program (Accreditation Council for Graduate Medical Education, 2017). Upon closer evaluation of the ACGME Common Program Requirements for Graduate Medical Education (2017), the requirements include reference to the ability to work in inter-professional teams/environments, making diagnostic decisions and effective communication with other healthcare professionals. However, the general program requirements do not mention working specifically with any healthcare professionals (e.g., speech-language pathologists, occupational therapists, physical therapists, etc.). Through these requirements it is clear that the first contact pediatricians may have with assessing developmental milestones is residency (Accreditation Council for Graduate Medical Education, 2017). It is not clear that all pediatricians receive the same knowledge about screening measures and procedures to identify developmental delays and/or early communication delays or disorders during their residency. Thus, it is unclear what pediatricians' current knowledge is about

developmental milestones, specifically communication milestones, after completion of residency.

Once pediatricians are out in the field, they are expected to identify delays, disorders and diseases at routinely scheduled well-child visits and at sick visits from children birth to 18-years of age. It is expected that pediatricians gain knowledge in many different areas and are able to implement this knowledge into practice for many years following training with the expectation to also stay up-to-date with the ever-changing evidence-based practices and recommendations in the healthcare field. When thinking about communication development and communication milestones, it is not standard that all pediatricians gain specific experience in these areas prior to residency. Similarly, their experiences can be variable depending on supervision and placements. It appears that this experience is encouraged to promote diagnostic abilities and therapeutic recommendations but it is dependent on the resident experience whether pediatricians gain adequate experience, knowledge and understanding about communication development milestones, recognizing delays or disorders and referral practices in pediatric practice settings (Accreditation Council for Graduate Medical Education, 2017). Thus, this leads to better understanding pediatricians' current knowledge as they continue to approach developmental screening in the field. If pediatricians were expected to know, or independently learn, all of the information about biological and behavioral development, it is likely that there are resources available for them to continue to learn about development, specifically communication delays, while they are practicing in the field.

Developmental Milestone Resources Currently Available for Pediatricians

There are limited programs available that provide pediatricians with resources and knowledge of communication development and other milestones. These programs aim to

promote implementation of screening procedures, referral processes for concerns of children who

are at risk and aim to provide resources to families to educate parents on typical child

development. Some of the programs provide resources for pediatricians and others provide

hands-on educational components that educate pediatricians on developmental milestones,

screening options and referral options for further evaluations. Table 2 provides an outline of all

of the resources available and the unique factors that each resource contributes to pediatricians'

knowledge and practice.

Table 2: The education programs currently available for use by pediatricians

Program	Year created	Creator	Goal of Program	Unique factors of the program
Learn the Signs, Act Early	2004	Centers for Disease Control & Prevention	Promote awareness of healthy developmental milestones	Materials are available for use and can be customized with your own contact information to distribute to individual populations, as needed
Milestone Tracker App	2018	Centers of Disease Control & Prevention	Promote at-home monitoring of developmental milestones in between well-child visits and reminding parents of doctors appointments by sending alerts of upcoming well-child visits.	The program tracks progress by looking for milestones using photos and videos for parents to understand what they are looking for in their children. The app provides tips and activities to support milestones acquisition and flags concerns when parents should address milestone delays with their doctors.
HealthySteps	2014	Zero to Three	Committed to healthy early childhood development with the goal to promote nurturing parenting	Yearly costs range from $450-900. Provides recommended screening schedules, a HealthySteps specialist who is a child development professional. The goal of this program is that the specialists provide families with parenting guidance, support between visits, referrals, and care coordination.
Birth to 5: Watch me Thrive	2014	US Department of Health & Human Services, Early Childhood Development	Details developmental and behavioral screening procedures and how pediatricians can implement them into their practices	Provides detailed outlines and ideas on how to implement a screener into practice and links on the website for different resources.

Learn the Signs, Act Early. The biggest program is available through the Centers for Disease Control and Prevention (CDC). This campaign is called Learn the Signs, Act Early (2004). The health education campaign launched in 2004 to promote awareness of health developmental milestones, the importance of tracking development in infants and toddlers and the importance of acting on concerns early to refer children for services as soon as possible. This initiative is promoted for all early childhood healthcare professionals and specialists and also includes resources for pediatricians to learn about and become familiar with developmental milestones and EI services. Daniel et al. (2009) collected data on the Learn the Signs, Act Early campaign, which found that 84% of pediatricians who know about the campaign talk to parents about children's development more confidently versus 74% initially in 2004 (Daniel et al., 2009). Only about 6 out of every 10 pediatricians provide parents with the resources to learn about their own child's development and promote at-home monitoring in between well-child visits. This survey shows pediatric knowledge may improve when pediatricians are provided with useful resources and thus, become knowledgeable about developmental milestones and gain confidence to educate patients' families. However, there is still a need to promote this campaign in order to increase the number of pediatricians who are willing and able to provide resources to parents and help educate parents on at-home monitoring of the acquisition of their children's developmental milestones.

Milestone Tracker Application. There is another resource available to all that is in the form of a digital device application for cell phone or iPad/tablet use. The CDC Milestone Tracker App (2018) was created for families to use in the comfort of their home for easier at-home monitoring between well-child visits. The Milestone Tracker tracks developmental progress by looking for important milestones using photos and videos for parents to understand

what each milestone looks like to better identify them in their own children. This application provides easy at-home monitoring (McCarthy, 2017). There are no statistics to show how many people this application has reached. According to Apple ® Application Store, there are 61 ratings. This is a low number of ratings for an application. Thus, it is possible that many pediatricians are not aware of this resource and are not providing the education to families to use this app for better at-home monitoring between visits, which has the potential to create more productive dialogue about concerns or typical developmental trajectories during well-child visits (Daniel et al., 2009).

  HealthySteps. HealthySteps (2017) is an evidence-based pediatric primary care program within the Zero to Three organization, a group that promotes healthcare in infants and toddlers, which is committed to healthy early childhood development with a goal to promote nurturing parenting. HealthySteps is a program that is offered through a pediatric practice with a HealthySteps Specialist, which is a child development professional. (HealthySteps Tiered Model & Core Components Definitions, 2017). Currently, there are more than 130 pediatric and family practice sites in 20 states, the District of Columbia, and Puerto Rico. This program requires hands-on training of the pediatricians and professionals, which takes 2-3 days, and independent funding by pediatric practice to staff the HealthyStep Specialist. The program has positive outcomes when implemented for increasing pediatricians' knowledge and promoting identification of developmental milestones (MacLaughlin, Gillespie, & Parlakian, 2017). While this program has seen positive outcomes, it takes time to train a specialist and it costs the practice money to implement the program. Each year the program services range from $450-900 and the specialist salaries and employee benefits are responsibilities of the practice (HealthySteps Frequently Asked Questions, 2017).

Birth to 5: Watch Me Thrive. There are a few resources available through other agencies that help pediatricians learn about developmental milestones and promote screening for developmental delays. Birth to 5: Watch me Thrive (2014) is a guide provided by the US Department of Health and Human Services, Early Childhood Development that details developmental and behavioral screening procedures and how pediatricians can implement these procedures in their practices (Birth to 5: Watch Me Thrive, 2014). There is no initiative, campaign, or research associated with this guide to examine its effectiveness but this document serves as a guide for pediatricians.

Further Training and Continuing Medical Education Unit Topics

AAP provides online courses for pediatricians' Continuing Medical Education (CME), which is mandatory for maintaining certification and licensing. Currently, there is one CME available through Hagan, Shaw, & Duncan's Bright Futures Guidelines (2017) for pediatricians on the AAP website: Education in Quality Improvement for Pediatric Practice (EQIPP): Bright Futures-Infancy and Early Childhood. This CME is described to illustrate the importance of AAP Bright Futures' guidelines and detail how pediatricians should prioritize health supervision visits. This CME details the AAP Periodicity schedule and recommendations for screening and how to elicit or address patient/family concerns at every well-child visit. Furthermore, this CME describes the way pediatricians can figure out how to sustain successful changes to systematically integrate them into their particular practice while considering the current processes and workflow of their own practice. Another CME opportunity is through the STAR Center, which is a screening resource for pediatricians. This CME opportunity allows AAP and non-AAP members to learn more about early childhood screening and integrate a workflow into their practice. This training is eligible for free CME's for AAP members (Screening time, 2017).

There is no data to show how often pediatricians utilize these CME opportunities. However, it is clear that these are available.

These are the only programs out of many CME programs that focus on screening. H. Von Bevern at KUMC described that many of her colleagues get CME opportunities through conferences where there may be presentations on developmental milestones and/or screening and identification practices in the field (H. Von Bevern, 2019). This is also an opportunity for pediatricians to continue to learn about changing recommendations, new screeners available and new implementation practices in the field.

In conclusion, pediatricians have limited exposure to developmental milestones, and even less exposure to communication development, specifically, during school and training. The goal of medical school training is to provide a broad foundation for all students pursuing the medical field (Accreditation Council for Graduate Medical Education, 2017). Pediatricians do not specialize in pediatrics until they reach residency, so they do not have to make the decision to pursue pediatrics until well into their medical school training. Thus, pediatricians may not begin to think about pediatrics, developmental milestones, communication development or serving infants and toddlers until residency. This leaves a lot of variability with observations and experiences before and during residency. There are some good resources available to pediatricians. However, it is unclear how many pediatricians take advantage of these programs. There are not many programs that aid in developing a knowledge base for early identification of developmental delays and similarly, no resources that exist specifically for communication delays or disorders.

Research Question #1: How Does Knowledge Influence Identification and Referral for

Communication Delays?

Research question 1 falls within the "Exploration phase" of the EPIS framework, which includes identifying the best practice and considering if evidence-based practice is appropriate (Aarons, Hurlburt, & Horwitz, 2011). Two topics within this question also fall within the "Preparation phase" of the EPIS framework, which includes recognizing facilitators (Aarons, Hurlburt, & Horwitz, 2011). The facilitators that are explored by this question include developmental milestone resources and topics that pediatricians are interested in learning more about in the future. Identifying facilitators will drive the implementation phase of future research.

Research question 1 also focuses on the "knowledge and skills" and "beliefs about own capabilities" domains in the TDF framework (Michie et al., 2005). Thus, this research question evaluates pediatricians' current knowledge about available screening measures, current screening recommendations, and resources and/or programs available for use to improve knowledge and screening implementation. Likewise, this research question also addresses the beliefs about own capabilities domain. Research question 1 allowed the researcher to better understand how pediatricians feel about identifying communication delays or disorders and the importance of identification during well-child visits.

Pediatricians Current Screening Practices in the Field

Language delays are under the umbrella category of developmental delay in the pediatric and ASD screening literature. The most prevalent delays in birth to 7 year old children and thus the most likely to be identified by pediatricians are: (1) language delay with a prevalence of 2.3-19%, (2) general developmental delay with a prevalence of 12-15%; (3) ASD with a prevalence

of 1 in 59 children (Rosenberg, Zhang & Robinson, 2008; Baio et al., 2018; McLaughlin, 2011). Research has focused on three main topics: (1) pediatric screening methods, which include both developmental surveillance and standardized screening measures, (2) pediatric rates of screening since the AAP guidelines in 2006, and (3) pediatricians' thoughts and opinions about screening procedures.

Developmental Surveillance

The US Census Bureau completed a nationally represented survey to collect data on standardized developmental surveillance and screening (US Census Bureau, 2016). Harai and colleagues (2018) did further analysis to investigate the survey specifically with children ages 9-months to 35-months of age. Within this population, 37.1% of children received developmental surveillance, which was defined as a health care professional asking the parent or caregiver if they had any concerns about their development. Since the 2006 recommendation, developmental surveillance has been recommended to be conducted at all well-child visits from birth to 5 years of age. See Table 1, which details the current AAP developmental surveillance recommendations throughout the well-child visits schedule.

In 2011, Radecki and colleagues surveyed non-retired AAP pediatricians and found that most pediatricians used mainly developmental surveillance without a screening tool. Another survey found that half of the providers, about 51.8%, did surveillance and/or screening at all health encounters including both well-child and sick visits and about half, 48.2%, conducted surveillance at well-child visits only (Porter et al., 2016). A survey of 57 New Jersey pediatric primary care providers found that 73.7% of providers began developmental surveillance at the first nonhospital health visit, which is typically within a week of birth (Porter et al., 2016). Developmental surveillance is non-standardized so can be characterized in many different forms

including asking a specific question about a developmental skill or domain or asking parent or caregiver if they have any concerns about their child's development at this time (Harai et al., 2018). It seems that pediatricians often use some form of developmental surveillance during well-child visits. However, there is no specific description of what constitutes as developmental surveillance during these visits. Furthermore, using informal approach, on its own, may not accurately identify all of the children who need follow up evaluations. There may also be difficulty with tracking parents or caregivers who have expressed concern at previous visits. In conclusion, developmental surveillance can be a constructive tool that is currently in use by many pediatricians. Similarly, it may continue to prove to be a valuable tool if it is used in tandem with standardized screening measures.

The developmental surveillance seems to be a tool that is utilized with parents or caregivers to make sure that there are no concerns. It also has the potential to open up the conversation for parents to understand what skills or onset of skills they can be monitoring in between doctor's visits. However, it is a very informal approach that has limited description as to how it is used, it has little sensitivity and specificity when accurately identifying the children who are in need of a full developmental assessment, and limitations for children who need to be monitored for a specific developmental domain at the next visit due to parents' or caregivers' spoken concerns. In studies where pediatric care providers worked without screening instruments, pediatric care providers achieved a specificity "consistently near or higher than 70%" but a sensitivity that was lower than 54% (Sheldrick et al., 2011). On the contrary, the AAP recommends that screeners have a sensitivity and specificity of 70% or greater (American Academy of Pediatrics Policy Statement, 2006). Therefore, it seems that there is a need to better

understand pediatricians' thoughts and processes behind developmental surveillance as an informal screening tool.

In a study examining developmental surveillance versus using formal screening measures, when using surveillance alone, about 50% of children with ASD were missed (Pierce, Courchesne, & Bacon, 2016). Similarly, 50% of children with ASD who could have identified positive on a formal screening measure were missed due to developmental surveillance alone (Miller et al., 2011). In certain circumstances, there is a need for developmental surveillance. However, as a stand-alone tool developmental surveillance has poor detection for children who may qualify for a full developmental evaluation. Thus, screening measures in conjunction with strategic developmental surveillance, as the AAP recommends, seems like a good fit to identify the children in need for further evaluation to address potential delays.

Developmental Screening Measures

The US Census Bureau reported that in 2011-2012 about 1 in 3 children received standardized parent-complete developmental screening from a health care professional (US Census Bureau, 2016). Harai and colleagues (2018) did further analysis with the data to investigate the prevalence of developmental screening with children ages 9-months to 35-months, which estimated that only 30.4% of parents or caregivers of this population reported they received a parent-completed developmental screener from a health care professional. Thus, 3 out of 10 children in this age range were receiving developmental screeners from any health care professional (e.g., family practitioner, nurse practitioner, family medicine physician, or pediatrician). This project will focus on only pediatricians' methods of screening and use of screening measures to better understand what is currently known about screening practices with this specific group of medical professionals.

At this time, there is one national survey to gather information about developmental screening but no survey about screening for communication delays, specifically. In 2004, the average rate of screening in pediatric primary care was 15.3% for infants and toddlers birth to 24-months of age. The percent of children eligible for EI services is much higher than the percent of children actually receiving services at this time (Pinto-Martin et al., 2005). After the AAP recommendations were released another study was published that surveyed pediatricians across 6 states in the US (Arunyanart et al., 2012). The survey results revealed that only 17.8% of pediatricians are compliant with all 3 AAP screening recommendations including: (1) screening at recommended ages, (2) screening at surveillance visits if parents bring up concerns, and (3) screening for autism. 41.6% of pediatricians screened for developmental delays at the 9-month well-child visits, 58% screened at the 18-month visit and 52% screened at the 24-month or 30-month visit. 6 years after the AAP recommendations, still only half of pediatricians are reporting that they screen at well-child visits and less than a quarter of pediatricians report that they follow all AAP recommendations. When asked to compare their screening procedures to those of the practice 5 years ago, 44.8% of pediatricians screen for developmental delays more often and 72.2% report screening for ASD more often (Arunyanart et al., 2012). The survey of 57 New Jersey pediatric care providers reported that 63.6% of providers use a formal screening tool (Porter et al., 2016). Thus, there is some increase in screening practices. However, only half of pediatricians screening at 24-month or 30-month well-child visits makes it difficult to identify children with speech and language delays early enough to target skills needed for adequate school-readiness.

Table 3 describes the AAP recommended 5 screeners: the Ages and Stages Questionnaire (ASQ), the Communication and Social Behavioral Scale-Developmental Profile (CSBS-DP), the

Parents' Evaluation of Developmental Status (PEDS), the Parent's Evaluation of Developmental Status-Developmental Milestones (PEDS-DM) and the Survey of Wellbeing Young Children (SWYC). The Denver Developmental Screening Test-II (DDST-II) has also been reported as the most commonly used by pediatricians in recent years (Sices et al., 2003; Radecki et al., 2011). Thus, it has been added to the list as well to see how this screener compares to the AAP recommended screeners from the AAP STAR Center. The AAP STAR Center is a website and program that provides a list of choices for screening, depending on what are you are targeting (Screening Time, 2017). This program encompasses screening training, screening tools, simulations and other resources. The Screening Tool Finder is a database that can be filtered or sorted depending on multiple factors including: (1) Categories of screeners (E.g., development, autism, social determinants of health, etc.); (2) topics covered in screening measures (E.g., language development, developmental screening, autism, child care, income, parental depression, safety, stress, behavior, domestic violence, parental stress, education, etc.); (3) number of items on the screener; (4) languages that the screener is available; (5) cost of the screener. For the purpose of this study, the "Category" chosen was "Development" and the "Topics Covered" included "Language Development." This search generated a list of five AAP screening measures that were recommended including: ASQ, CSBS-DP, PEDS, PEDS-DM, and SWYC. This system provided the following information for each assessment including a link to the website, the literacy level of each measure, the time it takes to administer the measure, how many items are on the form, and links to learn more about each measure.

Table 3: Language development screening measures recommended by American Academy of Pediatrics' STAR Center (screeningtime.org)

Measure	Ages	Sensitivity & Specificity	Number of items & time to administer	Pros	Cons
Ages & Stages Questionnaire (1995)	4-months to 5 years of age	Sensitivity= 86% Specificity= 85%	-30 items -Administered in 10-15 minutes.	This parent-report also allows assessment of parent perceptions of child development. Lots of research on reliability and validity. Test is available in 7 different languages	Children can only be assessed at predetermined ages, which can be ideal for well-child visits but potentially problematic for other times. 4th-6th grade reading level. This test costs a one-time fee of $225 to purchase.
Communication and Symbolic Behavior Scales-Developmental Profile (1993)	6 months to 2 years of age	Sensitivity= 76-88% Specificity= 82-87%	-24 items -Administered in 15-20 minutes	Adequate psychometric properties. Detailed language measure. 7 language predictors including: Emotion and eye gaze, communication, gestures, sounds, words, understanding and object use.	Only a language screening tool. Lengthier time commitment for parents compared to other screening measures. Test is only available in English. Low sensitivity compared to other screening tools. Also, this tests' literacy level is not available. This test costs $399 to purchase.
Denver Developmental Screening Test-II (1990)	0-6 years of age	Variable sensitivity (E.g., 56-83%) and specificity (26-80%	-125 items -Administered in about 20 minutes	Combines direct observation and parent report. Materials are included with test to attempt to elicit skills for direct observation. This only costs $75 to purchase.	Only 31% of items can be addressed by parent report. The rest of the items require direct observation. More time consuming than just parent report measures.
Parents' Evaluation of Developmental Status (2006)	0-8 years of age	Sensitivity= 86% Specificity= 83%	-10 items -Administered in 2 minutes	The shortest administration time. Can be completed online by parents. Test is available in 46 different languages.	Only 10 items to cover 5 developmental domains so 1-3 questions to determine if further evaluation is needed. 5th grade reading level. This test costs $299 to purchase.
Parents' Evaluation of Developmental Status-Developmental Milestones (2006)	0-8 years of age	Sensitivity= 83% Specificity= 84%	-6-8 items -Administered in about 5 minutes	Can be completed online by parents. Short administration time. Test is available in 4 different languages. 3rd to 4th grade	Only 6-8 items to cover 5 developmental domains so it is not ideal for a detailed screening process. Thus, there are only 1-2 items for each

				reading level.	developmental domain to determine if further evaluation is needed. This test costs $299 to purchase.
Survey of Wellbeing of Young Children (2011)	0-5 years of age	Only certain components of the tool have been validated. Thus, there is no sensitivity or specificity available for the test as a whole.	-10-17 items -Administered in 5-10 minutes	This test is FREE. This test assesses not only language development but also Autism, maternal depression and social determinants of health. The test takes about 5-10 minutes to complete. Test is available in 5 languages.	This test has a high literacy level but is noted that it can be administered by a healthcare professional if caregiver has low literacy levels. This test does not have psychometric properties available. Thus, it is hard to determine if this is an appropriate screening tool to identify children in need of further evaluation.

Ages and Stages Questionnaire. See Table 3 for specific psychometric properties, pros

and cons for the ASQ. In general, this screening measure has been one of the most researched

and validated tools to date. In 2004, over 16,000 developmental screens were completed across

North Carolina through Women, Infant and Children (WIC) programs, Early Advantage,

Assuring Better Child Health and Development (ABCD) program and the state advisory group.

The screening rate rose to 75% with implementing the ASQ in outside programs. In North

Carolina, the average rate of routine screening in pediatric primary care in 2004 was 15.3% for

birth to 24-month old children and the percent that were eligible for EI services was much higher

than the percent actually receiving services. The ASQ was a screening tool that could be

completed quickly and allowed children to be identified for further testing efficiently (Pinto-

Martin et al., 2005). In a survey by Radecki and colleagues (2011), the most reported tools were

ASQ and Denver. However, about 50% said they do not use recommended formal screening

tools with patients younger than 36-months of age. Valleley, et al. (2014) found that 85.5% of

1387 well-child visits had evidence of an ASQ screener.

Communication and Social Behavioral Scale-Developmental Profile. The CSBS-DP

is a short screening questionnaire that is a parent-report. It has similar psychometric properties as

the other screening tools and is relatively short in time. See Table 3 for a full description.

However, this screening tool focuses mainly on speech and language milestones more than any

other developmental screening measure recommended by AAP. It has not been used in a lot of

survey literature as a possible screening measure yet.

Parents' Evaluation of Developmental Status & Parents' Evaluation of

Developmental Status-Developmental Milestones. PEDS has been referenced in the ASD

literature but has been shown to better identify delays in specific developmental domains rather

than ASD (Glascoe et al., 2007; Wiggins, Pizza & Robins, 2014). PEDS has also been

recognized as a good test for busy office practices (Hamilton, 2006). The AAP recommends the

PEDS-DM as a shortened version that has relatively similar psychometric properties but this test

is not mentioned as often the screening literature, as described in Table 3.

Survey of Wellbeing Young Children. This survey is not a validated screening measure.

As shown in Table 3, it does not have psychometric properties but it is a free tool to use. This is

the only test that the AAP recommends that does not cost any money. It is also similar in time

that it takes for administration compared to the other screening measures that are recommended

by AAP. There is not any literature on this survey but it is included in the table due to its'

inclusion on the AAP screening guide, STAR Center (Screening Time, 2017).

Denver Developmental Screening Test-II. This tool is the only parent-report and direct

observational screening measure on the list. It is also the only tool on the list that was not

recommended by AAP through their STAR Center System (Screening Time, 2017). As shown in

Table 3, the DDST-II has the most questions out of the list of 6 screening measures with 125

questions. It also is a bit lengthier since it encompasses parent-report and direct observation. The DDST-II is not recommended by the AAP but has been reported to be one of the most commonly used tools in conjunction with the ASQ in surveys (Sices et al., 2003; Radecki et al., 2011). Thus, it is included in the project for the purpose of examining the tools that pediatricians are using most often in the field.

The AAP recommends that developmental screeners maintain a sensitivity and specificity higher than 70%. This means that the test should positively identify at least 7 out of 10 patients who actually do have the disease and accurately rule out at least 7 out of 10 patients who actually do not have the disease. All of the AAP's recommended 5 screeners have sensitivity and specificity higher than 70%. See Table 3 for the breakdown of sensitivity and specificity for each test. Of the 6 screeners listed, ASQ has the highest sensitivity and specificity. The CSBS-DP, PEDS, and PEDS-DM all have relatively similar sensitivity and specificity. There is no sensitivity or specificity information for the Survey of Wellbeing Young Children. The DDST-II, according to AAP recommendations, does not meet their recommendations for adequate psychometric properties (Hamilton, 2006). Thus, there is no standard screening measure that is better or more accurate than the rest of the available screeners.

Pediatricians' Opinions on AAP Recommendations

In 2006, AAP produced guidelines that state pediatricians should conduct formal screening for developmental delays with infants and toddlers at 9-month, 18-month, and 24-month or 30-month well-child visits. Similarly, the AAP recommends that developmental surveillance be conducted between each formal screening well-child visit. There is not research to understand how pediatricians feel about these recommendations and if they believe they are feasible. Thus, the aim is to better understand pediatricians' thoughts, feelings and opinions on if

the AAP recommendations are feasible and if they are currently participating in AAP's recommendations for formal screening and developmental surveillance at specific well-child visits.

Research Question #2: How Do Pediatrician Practices and/or Office Procedures Influence Identification of Communication Delays?

Research Question 2 focuses on current practices, which is directly related to the "Exploration phase" of the EPIS framework (Aarons, Hurlburt, & Horwitz, 2011). Gathering this information will inform future research on the potential outcomes depending on strategies of developmental surveillance and/or standardized screening. Furthermore, this research question explores the domain "nature of behavior (E.g., what needs to be changed)" in the TDF framework (Michie, et al., 2005). Many pediatricians feel that their clinical expertise should be used in conjunction with screening procedures instead of relying exclusively on one or the other. This research question focuses on discovering the best and most efficient approach to screening and accurately identifying communication delays or disorders in infants and toddlers.

Pediatricians' Barriers to Implementing Formal Developmental Screening Measures into Infant and Toddler Well-Child Visits

Pediatricians operate as generalists throughout their day-to-day practice since pediatricians are expected to know a little about many different domains including: disorders, genetics, infections, social issues, maternal issues and family issues. Additionally, pediatricians are expected to know about all stages of developmental domains spanning a range of ages, which comprise of infancy, toddlerhood, early childhood, adolescents and early adulthood. Thus, when considering all of the identifications, diagnoses, treatment plans, recommendations, and referrals that are made on a daily basis, it becomes increasingly clear that there are significant demands

placed on these professionals. In regard to communication screening, barriers faced by pediatricians occur with implementing screening, identification and referral procedures and sustaining these processes across all patients from infancy to early school age. The barriers identified across the literature include: (1) no choice of "gold standard" screener for pediatricians; (2) pediatricians' lack of time in their daily practice; (3) pediatricians' familiarity with screeners; and (4) pediatricians' comfortableness with the referral process following a positive screener. However, none of the literature has comprised a full list of pediatricians' barriers that they feel inhibits them from choosing a screener. Consequently, the third research question focuses on discovering all the barriers preventing pediatricians from following AAP's current recommendations. This question aims to investigate and comprise a full list of barriers that pediatricians' report are hindering their ability and/or desire to implement screening procedures.

No Most Efficient and Effective Screener Available

AAP provided recommendations for ages to screen and options for screening measures but did not provide a "gold standard" for which screener is best used to identify DD or ASD. Thus, this has created considerable discussions surrounding the sensitivity and specificity of developmental screeners available and which, if any, should be deemed "the gold standard" (Ben-Sasson, Habib, & Tirosh, 2014; Fessenden, 2013; Glascoe et al., 2007; Scheffler et al., 2007; Robins et al., 2014; Wiggins, Piazza, & Robins, 2014; Pierce et al., 2011; Macy, 2012; Guevara et al., 2013). When surveyed, pediatricians reported that they feel there is a lack of availability of validated screening tools (Barton, Matheiu, & Fein, 2012; Morelli et al., 2014). Thus, this is one of the main areas that potentially halted pediatricians from implementing screeners since there are many screening measures from which pediatricians can choose. Since

AAP is the association that provides the screening recommendations for pediatricians, the screening measures recommended by AAP were the utilized measures in this project. Table 3 provides a list of pros and cons of each one compared to the other tools on the list. This list does not give the "best" option for a screener but does narrow it down quite a bit for pediatricians to choose from. However, most of the measures on this list are very similar so it could potentially be hard for pediatricians to choose which is best for their practice aside from independent trial and error. This list was also compared to other available resources including a literature review on developmental screening and a chapter in a book titled "Assessing Children's Well-Being: A Handbook of Measures" (Naar-king, Ellis & Frey, 2004).

Marisa Macy (2012) reviewed the literature on developmental screening measures used to identify children with developmental delays. In her literature review she describes the literature that demonstrates the reliability and validity of developmental screeners. For the purpose of Macy's study, the screening measures had to include multiple developmental domains. Macy's list of 14 measures was determined based on the measure having at least 2 research studies that met research criteria for understanding diagnostic measures. This list was crosschecked with the list from AAP screening tools. The screening tools that overlapped include ASQ, and PEDS, which are the only two tools on the list that have at least 2 research studies that meet research criteria for diagnostic measures (Macy, 2012).

The "Child Development" chapter provides pediatricians' with a resource to choose the best assessment available for their daily practices (Naar-King, Ellis, & Frey, 2004). The measures that were available in the book include ASQ. Thus, the ASQ seems to be the test that is most referenced across the literature. This leads to further investigation to examine if the ASQ is the most commonly used screening measure among pediatricians. However, it is important to

note that because a measure has multiple research studies does not mean that it is the best choice for screening (Macy, 2012). As you can see from Table 3, the tests have similar characteristics, costs, and completion times. Thus, it is up to the pediatricians to choose which screener is best for their individual practices. This leads to the aim to investigate if pediatricians are in need of more information about appropriate screeners or what screener they are currently using. Specifically, are most pediatricians using screeners off of the AAP recommendations list and how did they choose that screener? Similarly, is there another screener not on this list that is being used more often by pediatricians?

Fear of Positive Screener

Once pediatricians choose a screener, the implementation does not stop after the parent completes the screener. The pediatricians then need to think about how they will refer the patient for further evaluation following a positive screen. If pediatricians do not have protocols in place for referrals, this may affect their desire to implement a screening measure. It is likely that if pediatricians do not have familiarity with screening procedures then they also have decreased familiarity with referral procedures or how to handle a positive screen. Another study revealed that a fear of positive screening and talking with families about results is a barrier contributing to the implementation of screeners (Pinto-Martin et al., 2005). Pediatricians report that they feel that their amount of familiarity with referral process influences their desire to want to implement a screener into their practice (Moore et al., 2017; Morelli et al., 2014). Pediatricians may not be comfortable with the procedures due to lack of knowledge regarding to whom or where the referral goes after a positive screen. Also, there is unfamiliarity surrounding how to submit a referral so that the child is able to get the appropriate evaluation. This might also be a factor that is currently discouraging pediatricians from implementing procedures since they do not feel

comfortable with answering questions following a positive screen or handling the referral appropriately (Devito et al., 2012; Pinto-Martin et al., 2005). As a result, there is a need to investigate if pediatricians' fear of handling a positive screener is hindering their desire or ability to implement screeners due to inadequate knowledge or comfortableness with the referral procedures.

Pediatricians' Perceptions of Screening

Another barrier in this question aims to understand if pediatricians' overall perceptions of formal screeners (E.g., what they are, importance of formal screeners, importance of referrals, etc.) are contributing to their desire to implement formal screening procedures. There are pediatricians who do not see the need for formal screening. One research study revealed that the pediatricians did not use screeners due to their perceived lack of need for formalized testing (Devito et al., 2012). However, this mindset contributes to pediatricians' low referral rates. Studies show that a fraction of SLP referrals in EI services are from pediatricians (Guralnick, 1998; Silverstein et al., 2006; Hess, Dohrman, & Huneck, 1997). This mindset can potentially be contributing to the lack of screening after AAP recommendation because pediatricians do not see immediate changes from the screeners (Pinto-Martin et al., 2005). There's also a possibility that pediatricians' are emphasizing developmental surveillance and believe that this, alone, can identify developmental delays. However, research tells us that about 50% of children are missed without formal screening (Pierce, Courchesne, & Bacon, 2016; Miller et al., 2011). Thus, this research question aims to understand any barriers pediatricians face and if pediatricians' perceptions of the importance of formal screeners are contributing to pediatricians' desires to implement a screener into their practice.

Lack of Time

Pediatricians spend on average 25-26 hours per week on clinical care and 14.5 hours per week on non-face-to-face clinical work including documentation, phone calls, consults, scheduling and administrative work (Adair, 2010). In a typical 40-hour workweek, this leaves essentially no time for teaching, research, learning/implementing new procedures or advocacy. Time is a major challenge for pediatricians to implement new procedures or keep up with changing recommendations provided by governing agencies including AAP. Time is reported by physicians to be the biggest barrier across multiple clinical settings and referenced as a barrier to new clinical implementation (Leon, Holliker, & Pepe, 2015; Pinto-Martin et al., 2005; Barton, Matheiu & Fein, 2012; Morelli et al., 2014). It is difficult to find the time to learn new procedures or new measures on their own and teach/train office staff on the new procedures. In order to implement a new screener, a pediatrician would first have to research and select an appropriate screener. This would involve understanding the pros and cons of each screener and evaluating the cost of each screener. The pediatrician would then have to create and describe the new office procedures for other doctors, nurses, front desk staff, and other office workers. This would require individual descriptive protocols for each position and potentially in-person training and/or meetings. This constraint can be linked to issues with no validated or universal set of procedures. For example, the newborn hearing screening initiative produced a national set of procedures of exactly what to screen for and how to interpret the results. With this type of procedure practitioners knew exactly what to implement and how to proceed depending on results (Mehl & Thomson, 1998). Thus, with pediatricians' already limited time, it is hard to implement procedures when there is no other example to emulate when creating the protocols, procedures or workflows.

Similarly, there are time constraints within well-child visits. The results of a phone survey revealed that about one-third of parents reported seeing their doctor for less than 10 minutes at the last well-child visit. Half of the respondents reported seeing the doctor for 11-20 minutes and only 20% spend more than 20 minutes with the doctor (Halfon, Stevens, Larson & Olson, 2011). Pediatricians found that it was difficult to incorporate screening for multiple disorders into short routine well-child visits due to not knowing which tool to choose or how long it will take to screen (Halfon, Stevens, Larson & Olson, 2011). If pediatricians are restricted to less than 20 minutes due to scheduling, it is difficult to conduct all routine assessments for growth and development, answer any of the parents' questions or concerns, and also score and interpret results of a screener. We do not currently know how developmental screening procedures align with other service delivery activities throughout short well-child visits. The pediatricians reported that it was hard to find a validated screener that is easy for parents to complete during the allotted time, for staff members to quickly score, and for pediatricians to review and discuss results with families (Barton, Matheiu, & Fein, 2012). Similarly, one screener (E.g., DDST-II) asks for clinical observation, which would be virtually impossible for a doctor's visit that lasts less than 10 minutes.

Research Question #3: Which Factors Impact Pediatricians' Abilities to Implement Formal Screening Procedures into their Practices?

Research question 3 dives into the "Preparation phase" of the EPIS framework (Aarons, Hurlburt, & Horwitz, 2011). Specifically, this question focuses on exploring and identifying the barriers that pediatricians face when screening for communication delays or disorders. It also aims to understand what facilitators are currently working well in practice or could work well if implemented in the future. Similarly, this allows the researcher to recognize the TDF domains,

"beliefs about consequences" and "goal intention (E.g., what to aim for)" (Michie et al., 2005).

The beliefs about consequences domain is explored by determining what pediatricians feel are

barriers and are facilitators. For example, if pediatricians feel that the barrier is cost, the belief of

the consequence is if they implement this screening procedure then they will not have enough

money. Investigating facilitators allows the researcher to understand what pediatricians' goals

are in relation to screeners. The facilitators allow a better understanding of what pediatricians

aim for when thinking about this subject.

Understanding pediatricians' perceptions to the importance of screening and the barriers

they face will facilitate how to obtain buy-in for pediatricians to adopt a new protocol or

screening process into their practice in the future. It is known that pediatricians are facing

barriers when attempting to implement screeners into their practices and appropriately handle the

referrals after a positive screen. Currently, there is no comprehensive list of barriers that

pediatricians' are facing. This list is important to generate in order to begin proposing solutions

for pediatricians so they are more equipped to implement formal screening measures and handle

the referral processes. The major barriers that have been reported thus far include: lack of a "gold

standard" screener, lack of time potentially due to knowledge and comfortableness,

pediatricians' fear of positive screener and pediatricians' perceptions of the need for formal

screening procedures. Thus, the third research question aims to identify barriers and comprise a

list of difficulties that pediatricians are currently facing when attempting to implement formal

screening measures into their well-child visit and referral processes.

Referral Processes

Early identification and prompt referral to EI programs have a positive impact on

children's behavior, development, academics and cognitive growth across home and school

environments (Isaacs, 2008). However, the actual process of referral in pediatric practices is not documented in the current literature. There are scarce studies that aim to identify adequate referral processes for pediatric practices. Specifically, how are pediatricians determining from the screening results or conversations with the parents if a child needs a referral immediately for further evaluation or if the child can wait and do another screener to see if children improve spontaneously on their own between visits (E.g., "wait and see"). The factors that impact referral procedures by pediatricians include experiences during training, experiences and/or approaches to identifying early delays (E.g., "wait and see" or immediately refer for further evaluation) and how pediatricians' view their own role (E.g., they are the ones responsible for starting the referral, parents are responsible for self-referral, they are only responsible for writing the script, etc.). Likewise, referral processes have not been the focus across the literature to address pediatricians' current views of their own roles and responsibilities for screening and referring patients for further evaluation. Previously, pediatricians had consistently low referral rates that do not equate to the prevalence of delays (Hix-Small, 2007). Thus, pediatricians would benefit from referring more infants and toddlers for either EI services or a specific service, dependent on their screening results, for a follow-up evaluation to determine if there is a need for services. By increasing referrals, the children who are in need of the EI services will potentially be able to get the support they need to ultimately promote school readiness.

In regards to referral processes, a majority of directors of residency programs, 90-93% reported that they had low to moderate familiarity or knowledge of family centered EI referral steps and the services that EI provides families. Specifically, the uncertainty was the difference between referring to their own hospital outpatient clinics' services versus the services that EI provides families. The design in the residency program regarding referrals may be problematic as

many program directors are unfamiliar with or are not teaching about the referral options (Edwards, 2018). Thus, it is impractical for EI service professionals to expect pediatricians' to be the major referral source when they are not properly trained for early identification and referral in developmental delays or ASD. Since pediatricians cannot go back and "re-do" their residency program, we now need to understand how their previous knowledge and experience impacts how they understand and approach referral processes. Specifically, do they base their decision and approach off of what they already know (E.g., developmental surveillance is driving decisions) or are they using resources and formal screeners to make informed decisions. This question specifically investigates what happens after the screener and how pediatricians decide to refer after seeing screener results and how they learn about their options that impact their decision to refer children with suspected communication delay, DD and/or ASD for further evaluation.

Pediatricians' Approach to Screening Results to Identify Delays and Refer for Further Evaluation

As previously discussed, a majority of the literature focuses on which screeners to use and how to identify early communication delays, DD and ASD. However, the question remains how pediatricians are currently using the screening results to navigate the referral process. There are a few options for identification to lead to referral for further evaluation. First, pediatricians can use the screener as a whole to indicate yes there is a delay or no there is no delay. For example with ASD screeners, which AAP recommends implementing at 18-month and 24-month well-child visits, pediatricians can confirm that there is suspected ASD from the screener or no suspected ASD. However, these screeners also cover a variety of developmental domains including cognition, behavior, and communication. Thus, pediatricians can also use these screeners to look at individual domains and refer for a speech and language evaluation due to

low communication profile or a developmental psychologist due to low cognition or behavior scores. There is limited literature that explores how the results of the screener impact pediatricians' decision to refer or not to refer for further evaluation. Pierce, Courchesne & Bacon (2016) agree that while increasing screening is still important, it is just as important to understand what happens after the screening to increase the EI component of children with early communication delays, DD and ASD.

Crais et al., (2014) showed that less than half of the children noted with behavioral concerns were referred for follow-up evaluation even when pediatric healthcare professionals noted characteristics of ASD. However, when asked about referrals, 80% of pediatricians reported that they refer to specialists if they suspect ASD. Additionally, Marks, Glascoe, & Macias (2011) revealed in their literature review that pediatricians refer more so when confidently suspecting a delay but do not refer if the child has less common symptoms of developmental delay. Thus, it is important to understand what aspects of the screener or conversation drives the pediatricians to refer for further evaluation.

Another approach that is commonly taken by pediatricians is a "wait and see" approach to see if the delay subsides or continues to persist throughout development. For pediatricians who take a "wait and see" approach, there is no process identified in the literature for how to monitor follow-ups after a negative screener, how to monitor and follow-up with patients who are suspected at risk, and no process identified for how to check on referral outcomes. Edwards (2018) asked pediatric residency program directors about a situation where the attending did not see "red flags" but the patient's parents have major concerns. Almost half of the directors felt that it was appropriate "to do nothing but monitor" at the next well-child visit. However, there was no monitoring process detailed for how to monitor at the next visit. This is an important

insight into how residency programs are preparing pediatricians to interpret parents' views on development as well. Therefore, there is a need to better understand pediatricians' views and approach to referrals according to screening results and continue to work on validated referral procedures for pediatricians.

Pediatricians' Views on their Roles/Responsibilities in their Referral Processes

Lastly, many researchers are calling for more specific questions to pediatricians about how they view their roles and procedures following screening practices to more accurately identify current screening and referral processes (Marks, Glascoe & Macias, 2011; Pierce et al., 2011; Pierce et al., 2016; Moore et al., 2017). Typically children with concerning screening results are not consistently being referred and interlinked with EI (Marks, Glascoe & Macias, 2011). Thus, it is possible that pediatricians do not view their role as the one to identify and/or refer children for further evaluation and services. It is possible that pediatricians are either still using a "wait and see" approach or are voicing concerns to parents in order for the parents to take their own action. However, pediatricians can play an imperative role in this process because even if the child is deemed ineligible for EI after further evaluation, this opens up the opportunity for families to ask other related professionals (E.g., speech-language pathologists, occupational therapists, physical therapists, etc.) questions about concerns and learn about other resources. Many EI professionals are able to help guide parents in another direction for other options that are related to EI if their child does not meet the strict criteria in that particular program. Thus, it is possible if we can change pediatricians' views of their roles and create a more cyclical approach between pediatricians and parents. Then, both parties can work together to get the child the support and services that best fits that child and his or her family.

Two studies examined how pediatricians view their roles. Leon, Holliker & Pepe (2015) found that pediatricians have no relationship between comfort of referral processes and implementing screeners. They will implement screeners even if they are not comfortable with the referral process. This could translate to children with delays getting lost or forgotten in the referral process. Edwards (2018) surveyed pediatricians and found that about one-third of pediatricians felt they play an equal role with other professionals in screening. However, a majority of residency directors felt that pediatricians have the "most important" role in Child Find (Edwards, 2018). However, these same people could not provide an explanation as to why pediatricians may be the lowest rate in early detection and screening. Thus, this created a follow-up question to see if there was interest in collaborating with state EI leaders to examine this issue further. Only about half were extremely or somewhat interested in interdisciplinary collaboration with state EI leaders to solve this problem. It is evident that there is still a divide between pediatricians in regards to this process and interdisciplinary collaboration to bridge this gap and increase identification and referrals in this area.

Research Question #4: What Factors Influence Pediatricians' Decisions to Refer for Further Evaluation?

Research question 4 tackles the first phase of the EPIS framework, "Exploration phase", which focuses on considering the emergent needs of patients (Aarons, Hurlburt, & Horwitz, 2011). Within the TDF framework, this research question focuses on "nature of behavior (E.g., what needs to be changed)" and "beliefs about consequences" (Michie, et al., 2005). Specifically, research question 4 aims to investigate what drives pediatricians to refer for further evaluation. Specifically, are pediatricians referring based on screeners alone or are they waiting to see if the children will spontaneously catch up on their own? In addition, this research question focuses on

pediatricians' knowledge about their referral options and if they are aware of the services available, which specifically target infants and toddlers. Thus, the "nature of behavior" domain explores how pediatricians are referring for further evaluation and if that thought process needs to be changed. The beliefs about consequences domain explores pediatricians' knowledge about referrals and if they are accurate in the process that follows a referral that is identified with delay or a referral that is not identified with a delay.

Research Questions

The evidence surrounding screening practices is growing but evidence about communication delays, specifically, is scarce. Therefore, there is a need to capture how infants' and toddlers' communication delay, in particular, is being addressed in the developmental screening and currently being implemented in practices. The overall goal of this project is to better understand the following topic areas: 1) pediatricians' current knowledge, 2) pediatricians' early identification practices, 3) pediatricians' barriers or facilitators in relation to screening and 4) pediatricians protocols for referrals for services for developmental delay, in general, and specifically, as it relates to communication delays. The four main research questions include:

1. How does knowledge influence identification and referral for communication delays?

    1.1 What are pediatricians' current level of knowledge about communication development in infants and toddlers?

    1.2 Are pediatricians aware of programs and resources available?

    1.3 Are pediatricians interested in learning more about topics related to screening, early identification, and/or referral for early intervention services?

    1.4 Do pediatricians know about what early intervention services involve, how to refer to services and what early intervention qualifications include?

2. How do pediatrician practices and/or office procedures influence identification of communication delays?

2.1 What aspects of developmental surveillance are pediatricians currently using? Which aspects do they feel are most important?

2.2 What are the current practices and/or procedures for screening and identifying early communication delays?

2.3 At which well-child visits are pediatricians using screening measures? Who is responsible for interpreting the results?

2.4 Do pediatricians agree with current AAP recommendations?

3. Which factors impact pediatricians' abilities to implement formal screening procedures into their practices?

3.1 What barriers are pediatricians currently facing when implementing formal screening measures into pediatric well-child visits?

3.2 What facilitators currently help or could help in the future with implementing formal screening procedures into pediatric well-child visits?

4. What factors influence pediatricians' referral procedures for further evaluation?

4.1 What factors influence pediatricians' decision to refer for further evaluation or "wait and see"?

4.2 Who is responsible for doing the referrals?

These questions were addressed through an online survey sent out to pediatricians who currently practice in the United States. Pediatricians had the opportunity to participate in a subsequent follow-up phone interview, which addressed the research questions more in-depth.

Chapter 2: Methods

The overall goal of this project is to understand pediatricians' process of early identification of communication delays or disorders and increase referrals for EI SLP evaluations and services. The University of Kansas Institutional Review Board (IRB) approved the survey, recruitment information and the project's informed consent forms before data collection began. The data was protected through the Qualtrics system and stored on a protected drive through the University of Kansas. This project utilizes a sequential mixed-methods approach. The online survey was distributed first and the follow-up semi-structured interviews were completed afterward with survey participants. The follow-up interview data was used as a subcomponent of the online survey. The survey development and script for the semi-structured interviews are outlined below.

Instruments

Survey Development.

The following description of the survey is based on the CHERRIES checklist for web-based surveys, which is provided by the Journal of Medical Internet Research to ensure that authors are providing full, in-depth descriptions of the survey construction (Eysenbach, 2004).

First Survey Draft: Review of the Literature. The survey process went through many steps. First, the survey was constructed through a review of the literature and through construction of the main research questions according to the gaps in the literature. The first draft of the survey was comprised of 33 questions with four research topics including; 1) pre-service training and current knowledge, 2) current screening practices, 3) barriers and facilitators to screening, 4) referral decisions and processes. After the review of the literature, the survey was distributed to two statisticians in the Lifespan Institute at the University of Kansas who went

through each question to check for clarity and set up a data analysis approach. Feedback was taken into account for the construction of the second draft.

Second Survey Draft: Expert Input. According to the statisticians' feedback there were 10 questions that addressed multiple content areas. Thus, the questions were broken down into individual questions and the survey then had a total of 63 questions still focused on the four research topics (E.g., pre-service training/knowledge, current screening practices, barriers/facilitators, referral decisions and processes). The questions were not randomized due to the topics and progression of the questions. The survey questions progressed in a similar fashion to how pediatricians experienced being introduced to screening procedures and implementing them into their own practice, which potentially makes it easier for pediatricians to process and answer each question. For example, the first set of questions was about themselves and their experiences so pediatricians can think back to when they were in medical school and their experiences in residency. The second set of questions was about current practices, which related to the third set of questions about barriers that they face in their current practice. Putting these two topics in order allowed pediatricians to focus on what they are doing and what barriers they face during their current screening practice. Lastly, the final set of questions focused on referral processes, which allowed pediatricians to think about the last step of screening and how they determine when to refer and handle referrals in their own daily practice. Each question had a non-response option where participants were able to check "I prefer not to answer" to allow for full completeness of survey. They were able to go back and look at the survey after completion to check for completeness and/or change answers.

The survey included seven pre-service training questions. The question topics included asking about how pediatricians have been prepared through their training to screen for and

identify speech and language communication. Three questions include information about experiences in pre-service training, two questions include information about pediatricians' experiences and knowledge gained during residency, and two questions ask about current resources and continuing medical education units in which pediatricians are now interested while they are out practicing in the field. Ten current screening practice questions were asked. These questions included the current developmental and communication screening practices section, including asking about pediatricians' current procedures, how they view their role in identification and their individual thoughts and opinions about the feasibility of the AAP recommendations. There were two open-ended questions, which explored the barriers to screening. Finally, seven questions encompassed the referral process. The topics in this section included knowledge about EI referrals, how pediatricians are referring and to whom the referrals are made, and pediatricians' personal views on roles and responsibilities in this process.

The survey took about 40-45 minutes to complete. A panel of pediatricians within a private practice group in South Carolina reviewed the survey and it was concluded that the most important topics needed to be prioritized. The pediatricians agreed that pre-service training is not used as often as they increase their time in the field. The feedback revealed that pediatricians rely on the type of practice and their colleagues more than their experiences in medical school and/or residency. The researcher went back to the experts in the field to narrow down the important topics in order to shorten and focus the survey on the most important content areas. Thus, it was concluded that pre-service training was not as important as the other topics for this particular study. Therefore, section 1 was shortened significantly for feasibility.

Third Survey Draft: Combining the Literature with Expert Opinion. Given the information provided by the experts in conjunction with the review of the literature, another draft

of the survey was constructed based on the most important information. Thirty-six questions were included in the third draft. The topics and questions were first informally discussed with four individual pediatricians. Feedback was provided to the researcher, individually over the phone and in person, regarding the importance of the survey in their daily practice and the importance of the four topic areas. Then, through two more informal meetings with individual pediatricians, the information from the six experts revealed that current knowledge, current screening practices, barriers/facilitators and referral decisions/processes were more important than pre-service training (E.g., experiences during medical school and residency).

There were two significant alterations done in the third draft. The initial draft included questions that outlined pediatricians' pre-service training experience. Because there is no standardized curriculum for residency, the intent was to examine what type of experience related to screening and developmental milestones pediatricians' received in residency. Due to feedback, it was acknowledged that some newer pediatricians might use their residency experience more than others who have been in the field for quite some time. All experts who were consulted believed that their daily practice was most influenced by their experiences after residency and their current colleagues and/or practice type. The questions were then refined to what knowledge pediatricians currently have regardless of how they obtained it. Therefore, the pre-service training questions were removed due to the feedback given by the experts. This resulted in tabling the pre-service training topics for future research to focus on the most relevant information in this project. The information gathered from the remaining topics can be used to drive this research forward in an implementation-based manner.

Second, the researcher added scenario-based questions to better understand pediatricians' thought processes when referring. The experts reported that these two questions provided them

with more tangible examples of the information within the survey and allowed them to critically think about their own practices. These scenario-based questions will lead to better analysis of how pediatricians handle these scenarios and where there may or may not be a divide in decision making.

Finally, it was revealed that different practices screen at different ages and many practices do not use a formal screener for developmental milestones, including speech and language milestones. The feedback revealed that many pediatricians are not familiar with the current AAP recommendations due to limited time with reviewing any new literature. Similarly, most pediatricians believe, regardless of the recommendations, that screenings should be done at all well-child visits and their informal EMR checklists are sufficient. The biggest barrier still seems to be "time" across all practices, including both time to administer the screener and time for parents to complete the screener. This feedback confirmed that it is necessary to explore the differences and/or similarities in current practices, barriers to screening, and referral processes. Thus, these topics were the focus of the final survey.

Fourth Survey Draft & Pilot Data: Combining the Literature, Expert Opinion and Feasibility. Given the information provided by the experts in conjunction with the review of the literature, another draft of the survey was constructed based on the most important information. It was shortened to the most important questions so that the survey will take participants about 10-15 minutes to complete. Seven pediatricians completed the survey in the online format to confirm that the survey took about 10-15 minutes to complete. Three pediatricians provided feedback about the relevancy of the topics and clarity of the questions. There were minor changes in grammatical edits and answer choices. First, one answer choice was broken into two choices. This appeared in a scenario-based question, which included the answer choice of

"Screen between visits or at next visit." The feedback that was provided said that this choice is too vague and pediatricians have strong feelings about whether they bring a child in for follow-up between visits or wait until the next visit. Thus, this answer choice was split into two different options, 1) Wait and see/monitor at next well-child visit or 2) Schedule a follow-up visit BEFORE next scheduled well child visit. The second minor change included word choice to increase clarity. It was found that EI is a more recognized term for birth to three services in pediatrics than IDEA Part C, which is the name of the formal grant program for EI programs. Thus, when pediatricians were asked how familiar they are with the following topics related to EI, the statement referred to EI as "Birth to 3 Early Intervention services" instead of "IDEA Part C."

Final Survey: Content & Questions.

The final draft was sent to four pediatricians and the statisticians at Lifespan Institute at the University of Kansas to ensure that the questions were understandable, direct and focused. Again, only minor grammatical changes were implemented for this final draft. Thus, the final survey was approved and sent out to participants.

The survey was comprised of the following sections: 1) informed consent, 2) demographic information, 3) current knowledge, 4) current screening procedures, 5) barriers to screening, and 6) referral processes. Appendix A shows the online survey consisting of 34 questions including both multiple choice, scaled, scenario-based and short answer questions. Appendix B breaks down the four sections, focused on each research topic and question, to identify the major topics and the survey questions derived from each topic. This method for survey question design is from Dillman, Smyth & Christian's (2014) book titled "*Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th edition*".

Criterion Questions. There are 3 questions that pediatricians filled out to gain access to the survey. Question 1 says, the participant must agree to consent and affirm that they are at least 18 years of age. On question 2, the participant must answer, "yes" that he or she is currently practicing as a pediatrician. The third and final question asks the participant to describe what percentage of their current patient caseload is within the age-range of birth to 3 years of age. As long as pediatricians were actively seeing patients for well-child visits, they were able to continue their participation in the survey.

Demographic Questions. There are 7 demographic questions to better understand and categorize the type of pediatrician that is completing the survey. The information gained in these questions included: geographic information, practice experience, number of well-child visits in a week, and the type of SES served. These questions provide the researcher with information to group participants for analysis or find trends in the data according to the demographic variables.

Current Level of Knowledge Questions. There are 3 questions regarding current knowledge to see what the pediatrician knows and is interested in before completing the survey. The first question asks about confidence in identifying communication delays or disorders and confidence in referral procedures. The second question asked which developmental milestone resources respondents were familiar with from a list of all available education programs (e.g., Learn the Signs, Act Early). The last question asked pediatricians what CME topics they would be interested in learning more about in the future (e.g., Autism, developmental delay, screening, etc.). This question aimed to address potential facilitators for screening.

Current Screening Procedures Questions. There are 7 questions focused on current screening practices asking about pediatricians' current procedures, how they view their role in identification and their individual thoughts/opinions about the feasibility of the AAP

recommendations. These questions aim to identify current screening experience, rates and practices. Two questions identify screeners through experiences and current practice. One question investigates the ages at which standard screeners are implemented. One question considers how pediatricians implement developmental surveillance and which process is most important. One question identifies pediatricians' roles in identifying early speech and language delays through screening. Lastly, two questions ask about pediatricians' thoughts and opinions of the feasibility of AAP developmental screening recommendations.

Barriers to Implementing Formal Screening Measures into Visits Questions. The barriers pediatricians face with screening is still very unexplored, which means that this is a unique opportunity to further investigate. This section will aid in comprising a full list of barriers that pediatricians are currently facing and address any facilitators that are currently used. This section has four questions total: two Likert scale questions and two open-ended questions. The first Likert question asks the pediatricians to rank barriers, from major barrier to not a barrier, that have already been identified in the literature that are in their current screening practices (Leon, Holliker & Pepe, 2015; Pinto-Martin et al., 2005; Morelli et al., 2014; Barton, Matheiu, & Fein, 2012; Devito et al., 2012, Marks, Glascoe, & Macias, 2011; Crais et al., 2014; Wiggins, Piazza, & Robins, 2014). The second Likert scale question asks pediatricians to agree or disagree, strongly agree to strongly disagree, with the importance of formal screening measures. Then the two open-ended questions will (1) identify facilitators that pediatricians' feel improve and encourage screening for delays and (2) identify barriers, aside from time, that pediatricians feel are the most influential.

Referral Processes Questions. Eight questions encompass the referral processes section of the survey. This section incorporates topics about referral processes including scenarios that

may or may not warrant a referral, knowledge about EI referrals, how pediatricians are referring and to whom the referrals are made, and pediatricians' personal views on roles and responsibilities. The first four questions are nested within 2 scenarios to explore what approach pediatricians would take depending on the situation. The first scenario describes a visit in which child #1 is only showing communication delays and parents expressed concern. However, child #1 is meeting every other developmental milestone. In the second scenario, Child #2 is showing delays in various developmental domains including communication. After both of these scenarios the pediatricians are asked what approach they would take and to what professional would the child be referred? The next three questions investigate pediatricians' current knowledge about EI services and knowledge about EI services in their specific location. The final question inquires about their interest in inter-professional collaboration to improve referral processes.

Follow-Up Interviews

The last question in the survey asked participants if they were interested in participating in a 15-20 minute phone interview with the primary investigator. If the participant chose no, the survey went directly to the final thank you note. If the participant chose yes, the survey was directed to get more contact information and the best time of day to schedule the phone call.

Eleven of 45 respondents participated in a 15- to 20-minute follow-up semi-structured interview done on the phone or through video chat. The platform was the participant's choice of which one was more convenient for the individual pediatrician. The semi-structured interviews were designed to get a better understanding of the pediatricians' perceptions and understanding of screening including importance, what screening measure is being used, how pediatricians determine if a referral is needed, how the screening and referral process works in the office,

barriers faced in the office and what changes they would make if it was up to them to implement new procedures or measures. In the interviews, pediatricians were asked to talk specifically about what their current procedures look like in the office (e.g., what screener is used, at what ages do you screen, who gives the parent the screener, who scores the screening measures, who talks to parents about results, how do you talk with the parents about results, etc.). Pediatricians are then specifically asked about the AAP screening recommendations to see if they agree or disagree with the current recommended ages (E.g., 6-, 9- and 30-months). Next pediatricians were asked what barriers they face and what procedures currently work well in the office to further explore barriers and facilitators. Lastly, pediatricians were specifically asked about their decision to refer and if that decision is based solely on screening measures or also dependent on parents' feelings and situations. See Appendix C for the full semi-structured interview script.

Procedures

Data collection began in October 2019 and was completed February 2020. Recruitment was closed at 45 pediatricians, prior to the planned number of 100 participants was reached due to the time constraints of the project and limited access to target population.

Recruitment

Following IRB approval and survey finalization, pediatricians were recruited locally and nationally. First, announcements were sent via AAP online forums to all of the 53 AAP state chapter representatives via email flyer. Three AAP chapters included the survey in their monthly newsletter. The AAP chapters who participated include Florida, Utah, and Oklahoma. Next, virtual flyer announcements were posted and shared on social media on Facebook and Instagram through personal accounts. Lastly, 50 pediatricians were contacted via flyers in the low country

area in South Carolina. Cities and towns that were targeted in South Carolina include Charleston, West Ashley, North Charleston, Beaufort, Bluffton.

At the same time, 971 pediatricians were contacted via postcards across all 50 states of the United States of America. Four pediatric practices were targeted in each of the 50 states through an Internet search. The practices were chosen at random and each state included two urban practices and two rural practices. Both urban practices held addresses in the most populated city of each state. The rural areas were chosen according to the United States Census Bureau classification, which declares that an area is considered rural if it has less than 2,500 residents (Ratcliffe, Burd, Holder, & Fields, 2016). According to the classification, two rural areas were identified for each state. Practices that were located in or near these rural locations were identified through similar Internet searches. Some rural practices were more difficult to find due to the unpopulated areas, particularly in the Northwest region of the United States. It was common to have a clinic with a family medicine doctor close to these areas but rare to find a practice with a pediatrician in the rural areas. Thus, the practices were chosen based on the closest pediatrician to the geographic location. The two pediatric practices that were closest to each rural area were recruited for each state.

For the first round of postcard recruitment, postcards were sent to one urban and one rural practice of each of the 50 states. Individual postcards were addressed to the pediatricians in that practice. The number of pediatricians varied from 1 to 25 in each practice. A total of 460 post cards were sent out for the first round of recruitment.

A second round of recruitment was done 2-4 weeks later, which included a different urban and a different rural practice from each state. These practices were part of the Internet search process detailed above and classification of rural areas followed the same procedures as

the first round. The same procedure was followed and the cards were addressed to individual pediatricians in each practice. A total of 425 post cards were sent in the second round.

A third and final round of recruitment was conducted for the remaining 86 post cards. These practices were chosen at random to complete the post card recruitment phase. Sixty post cards were sent for a second time to individual pediatricians within the practices and 26 were sent to individual pediatricians for the first time in new practices chosen at random.

The interview recruitment was done at the end of the online surveys. The last question on the survey asked pediatricians if they were interested in participating in a follow-up interview. The goal was to obtain 25% of the survey participants for follow-up interviews. Of the 45 online survey participants, 11 pediatricians participated in the follow-up interview (24%). Thus, the goal was nearly met for number of follow-up interviewees.

Follow-up Interviews

The researcher contacted the follow-up participants via email to schedule a 15-20 minute phone interview via Zoom. Participants had the choice to do video conference or connect via phone. At the start of the interview the researcher read the script to remind the participant of the study aims and to obtain verbal consent to record the interview. Once a verbal consent was obtained, the researcher began the interview questions. Interview times ranged from 15 to 40 minutes.

During these interviews, pediatricians were asked to detail their thoughts, feelings, and opinions about screening procedures and AAP recommendations. The interviews revealed that pediatricians have positive or negative thoughts and feelings about using formal screeners. Furthermore, pediatricians are divided in their methods of how early they like to send the referral. Pediatricians had similar thoughts and feelings regarding the current AAP

recommendations. Interviewees were also asked what barriers they face in their own practice in regard to screening. Finally, pediatricians were asked to describe their perfect-world scenario for effectively implementing formal screeners into well-child checks. See Appendix C for the script of the semi-structured interview.

Participants

Survey Respondents

Of the 45 (N=45) pediatricians who participated, a majority of them hold an MD (89%) and the rest obtained a DO (11%). The sample is evenly split between pediatricians who completed their residency before the 2006 AAP Screening recommendations (47%) and pediatricians who completed their residency after these recommendations were released (47%). The remaining 6% did not respond to this question. Thus, the number of years in practice also varied with pediatricians just starting out (16% practicing for 0-5 years; 22% practicing 6-10 years), some pediatricians who have been practicing for over a decade (18% practicing for 11-15 years; 13% practicing for 16-20 years) and about 1/3 practicing for more than 2 decades (31% practicing for more than 20 years). Furthermore, the sample was evenly split between pediatricians who serve a caseload of less than 50% of infants and toddlers (56%) and pediatricians who serve a caseload of more than 50% of infants and toddlers (44%). Recruitment targeted pediatricians in rural, urban, and suburban areas. A majority of the respondents practice in suburban areas (60%), some respondents serve urban areas (27%) and a few serve rural areas (13%).

Follow-up Interview Participants

Survey respondents ended on a question to opt-in for an additional follow-up semi-structured phone interview to gather more information about screening protocols and

pediatricians thoughts and/or feelings on screening for communication delays overall. 15

pediatricians responded that they are willing to participate in a phone interview. Of the 15

pediatricians who opted-in for the follow-up interview, 11 pediatricians (N=11) responded and

scheduled the follow-up interview. 90% of the pediatricians obtained an MD (10% obtained a

DO). Additionally, 45% pediatricians practice in a suburban area, 27% of pediatricians practice

in a rural area and 27% of pediatricians practice in an urban area. Most pediatricians were in a

private practice (90%) and 10% work in a non-teaching hospital. Lastly, 45% of the sampled

pediatricians serve a caseload of less than 50% infants and toddlers and 55% serve a caseload of

more than 50% infants and toddlers.

Data Analysis

Fully completed questionnaires were used for analysis. The researcher attempted post-

hoc exploratory analyses with various responses by demographic variables including the

percentage of pediatricians' caseload of infants and toddlers (e.g., a caseload of less than 50%

infants and toddlers versus a caseload of more than 50% infants and toddlers) and groups

depending on when the pediatricians' residency was complete (e.g., before 2006 or after 2006

when the AAP recommendations were released). Preliminary analyses of between group

comparisons were completed using chi-square tests and correlations. These results were not

statistically significant by these grouping factors potentially due to the small sample size of the

study. Thus, the between group analyses results were dropped from this study.

Survey Analyses

The researcher conducted descriptive analyses on all of the survey questions. The

descriptive analyses are explored in the results section, which lead to insight into what is

currently happening in the field. The data is depicted in figures and tables, if possible, to show the distribution of survey respondents' answers.

The survey also included open-ended questions, which lead to qualitative analyses for these responses. These responses were summarized for frequency of response and theories were elaborated on in the results section below.

Follow-Up Interview Analysis

The researcher conducted a text analysis to identify perceptions and views that emerged from the pediatricians' responses. The semi-structured interviews were transcribed verbatim and the researcher coded the interviews according to themes that emerged from the data.

A text analysis approach was used to develop codes and describe themes. This approach uses the data to develop working theories instead of testing an a priori hypothesis. The data was coded using thematic analysis (Braun & Clarke, 2006) to identify the themes throughout the transcriptions. The researcher did open coding with a microanalysis by coding the transcription line-by-line to identify and develop emerging concepts. Then, these concepts were included based on the number of pediatricians who spoke about the theme.

In order to identify themes and subthemes, the researcher then provided a second analysis to highlight various themes and subthemes according to topics initially identified after the microanalysis. The themes and sub-themes were identified with patterns in codes to get a condensed overview of the main points. The themes and individual sub-themes are coded and illustrated in the results.

Chapter 3: Results

Data were collected through the survey and the follow-up phone interviews. There were 45 survey respondents (N=45). Within the survey there were a variety of questions including: 1) Yes or No questions, 2) Likert Scale type questions and 3) short open-ended questions. The descriptive analyses for all survey respondents consisted of percentages for the Yes/No and Likert scale questions. All survey responses had a choice of "I prefer not to answer." Thus, some questions did not add up to 100% in survey responses because a few survey respondents chose "I prefer not to answer" for that specific question. The short open-ended questions were analyzed using a text analysis. There were 11 participants who participated in the follow-up interview and a standard text analysis was used to identify perceptions and views that emerge from the pediatricians' responses.

Descriptive Results

The survey was presented in four sections, which aligned with the four research questions. Thus, the descriptive results are also described in that format to follow the questions as they were presented in the online survey. The descriptive results for each question are described below.

Research Question #1: How Does Knowledge Influence Identification and Referral for Communication Delays?

This section aimed to gather a better understanding of pediatricians' knowledge, thoughts, feelings and perceptions. The questions covered a variety of topics including thoughts/feelings of importance of screening, confidence in ability to screen, knowledge of available developmental milestone resources and of EI services.

Pediatricians' Current Level of Knowledge. Table 4 describes the percentage of pediatricians who answered how confident they are in their ability to identify communication delays, global delays and refer for communication delays. Pediatricians generally were confident in all three areas with 58-69% being very confident, 13-31% being moderately confident and 11-13% being confident.

Table 4: The percentage of pediatricians who are confident in their ability to identify and refer for delays

How confident are you in your ability to…	Not at all confident	Slightly confident	Confident	Moderately Confident	Very Confident
Identify communication delays			11%	31%	58%
Identify global delays			13%	22%	64%
Refer for communication delays			13%	18%	69%

To better understand pediatricians' thoughts and feelings about screening during well-child visits, pediatricians were asked about the importance of formal screening to identify communication delays, to identify developmental disorders, and to identify ASD. Table 5 shows the breakdown in responses for each identification option. A majority of pediatricians chose "Strongly agree" and "Agree" with 63-65% of pediatricians "strongly agree" that formal screening is important and 26-30% of pediatricians "agree."

Table 5: Percentage of pediatricians who agree with the importance of the importance of formal screening

The importance of formal screening to identify…	Neutral (Neither agree nor disagree)	Somewhat Agree	Agree	Strongly Agree
Communication Delays	2%	7%	26%	65%
Developmental Delays	2%	7%	28%	63%
Autism Spectrum Disorder	5%	2%	30%	63%

Finally, it is important to understand the importance of identifying communication delays, developmental delays and/or ASD to pediatricians. A majority of the survey respondents

"strongly agree" (65%) or "agree" (26%) that identifying communication delays using a formal screener is important. The same was true for pediatricians who responded, "strongly agree" (63%) or "agree" (28%) for identifying developmental delays using a formal screener is important. Lastly, a majority of pediatricians "strongly agree" (63%) or "agree" (30%) that identifying ASD using a formal screener is important.

Available Developmental Milestone Resources. Pediatricians were surveyed on the familiarity of current developmental milestone resources that are available for public use. Figure 1 shows the highest responses fell into two categories: "Healthy Steps" (37%) and "None of these" (33%). There were almost an equal amount of pediatricians who were familiar with the resources as ones who were not familiar with any of the developmental milestone resources available to them.
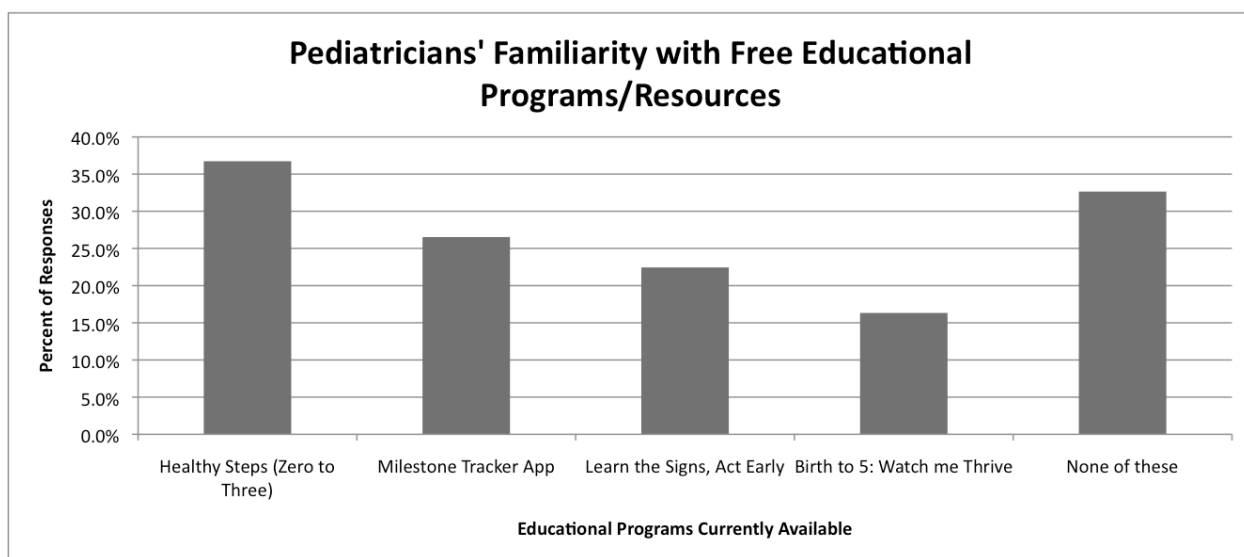

Figure 1: Pediatricians' level of familiarity with each available education programs.

Continuing Medical Education Unit Topics. This question focused on pediatricians' interest in Continuing Medical Education topics. See Figure 2 for all the topics presented and the percent of pediatricians interested in each topic. A majority of pediatricians were interested in

"Implementing changes into their practice," which includes new screening or referral procedures. Thus, pediatricians are interested in a better workflow for their office. Pediatricians were also interested in "Autism," and "Early intervention and referrals" as additional CMEU topics. Additionally, one pediatrician reported that "Adverse child events" would be a topic he or she is interested in learning more about.
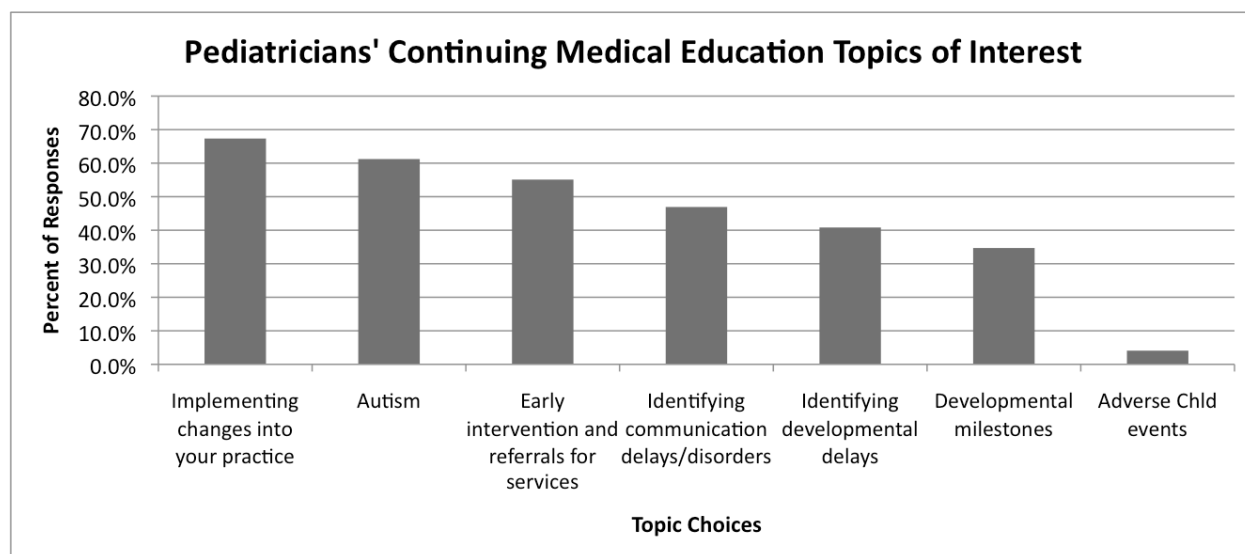
Figure 2: Pediatricians interest in topics related to the identification of communication delays and disorders

Knowledge of EI Services. This research question also examined pediatricians' knowledge of what services are included in EI. Figure 3 shows the responses for all choices and which services that pediatricians believe are included with EI teams. Most pediatricians were aware that speech-language pathologist, occupational therapists and physical therapists are all part of EI (84% of respondents chose all three). However, two pediatricians chose other to report feeding therapy, which is not recognized as a speech-language pathologist or occupational therapy scope of practice to some pediatricians.
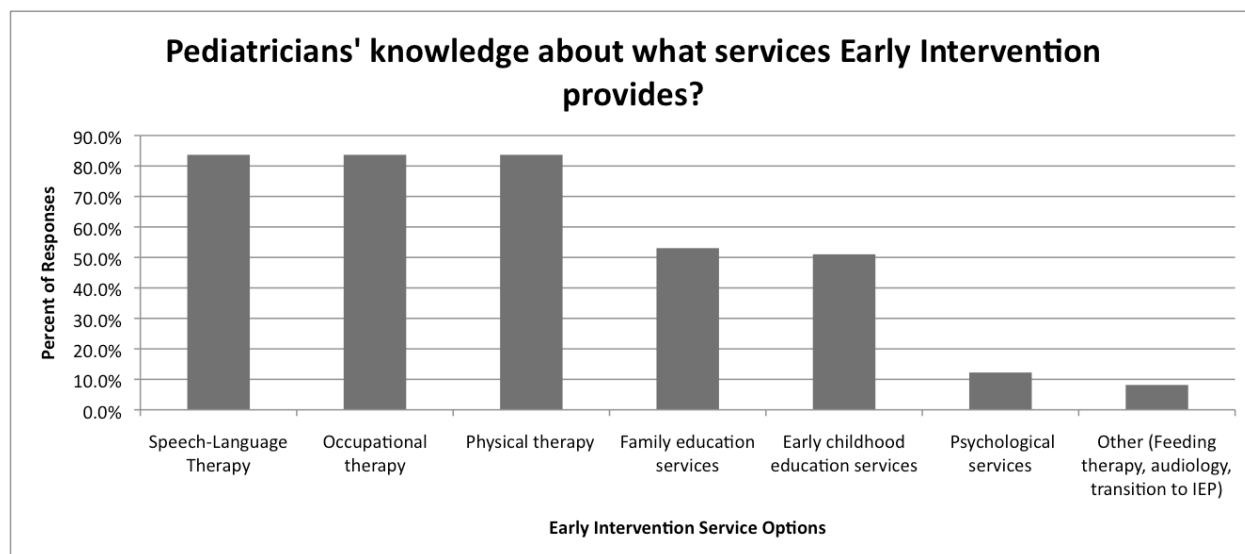
Figure 3: Pediatricians' knowledge about each service that Early Intervention provides to children

The final question in this section investigated pediatricians' familiarity with EI services including what they are, how to refer and qualifications for EI services. Figure 4 shows the responses across all three topics and the differences in pediatricians' comfortableness. The responses ranged with a majority of pediatricians responding that they are "Very familiar" with all three topic choices. The last category, qualifications of EI services, is the one option where pediatricians do not show as much confidence. More pediatricians responded "Very familiar" and "Moderately familiar." Less pediatricians are "Extremely familiar" with qualifications as they are with EI services and referrals. Thus, this is another opportunity for education opportunities so pediatricians can better understand situations for EI referral versus situations for a different type of referral for further evaluation (E.g., private practice).
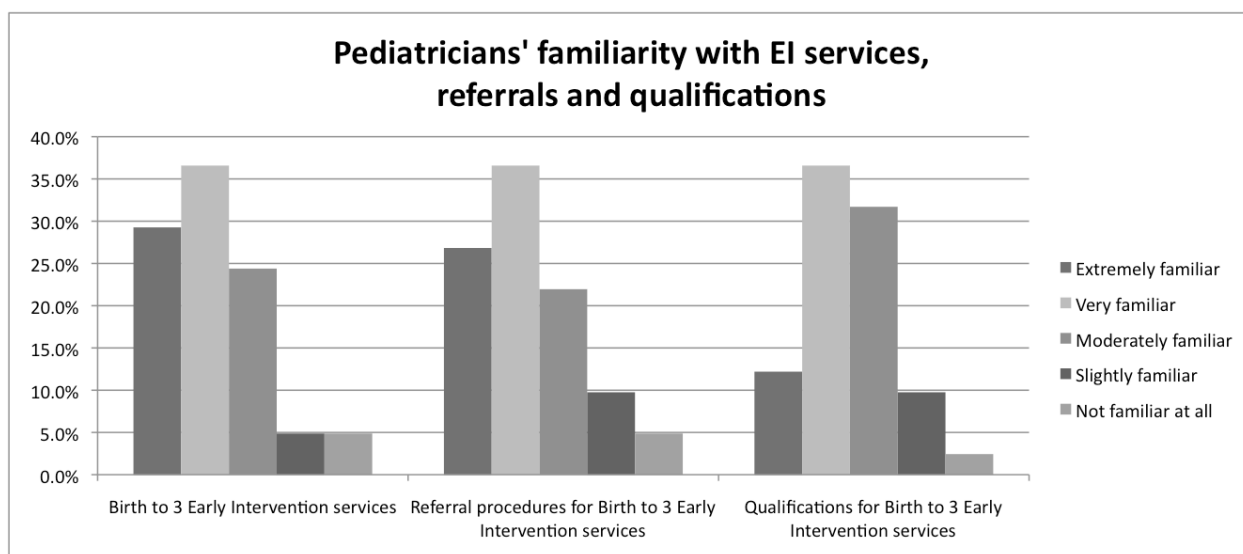
Figure 4: Change in pediatricians' level of familiarity with EI services, referrals to EI, and qualifications for EI.

Research Question #2: How Do Pediatrician Practices and/or Office Procedures Influence

Identification of Communication Delays?

This section was designed to explore what is currently happening in practice. The AAP

provided recommendations for pediatricians to screen at 9-, 18-, and 30-month well-child visits

for developmental delays. However, there is little research to show what is actually happening in

the field and pediatricians' opinions about the AAP recommendations. More specifically, there is

no research that evaluates both pediatricians' current screening workflows and opinions about

screening for communication delays or disorders with infants and toddlers.

Developmental Surveillance. Aside from formal screening, developmental surveillance

is the other method used to identify delays or disorders. Pediatricians were asked to rank four

different aspects of developmental surveillance from "Most Important" (1) to "Least Important"

(4). Figure 5 shows the ranks across each factor in developmental surveillance. Results show that

a majority of pediatricians feel formal checklists are "Least Important" and parent concern is

"Most Important." In general, pediatricians really view the parent as the most important

informant about the child's development, which is why they ranked parent concern and parent

interview as 1 and 2. However, pediatricians felt that observation during well-child visit is not as important. Similarly, they feel that formal checklists are least important during developmental surveillance. Thus, from this rank-order question, it is clear that pediatricians place the most responsibility in the parents to bring up their own concerns and appropriately report their children's abilities during well-child visits when they are implementing their developmental surveillance. They put less emphasis on how the child acts during the visit or the parents' answers to the formal checklist.
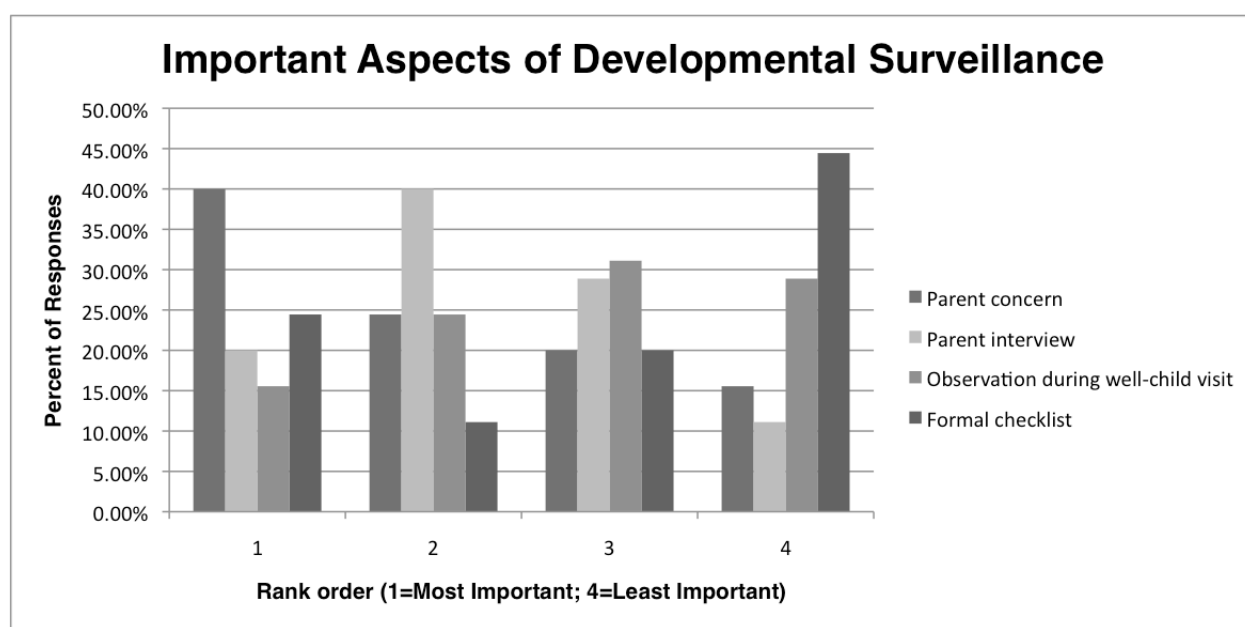
Figure 5. Pediatricians' ranking of which factors of developmental surveillance is most important.

Developmental Screening Measure. The first question was to investigate which screeners pediatricians have any experience using. Figure 6 shows all percentages of pediatricians' experience with the screeners that are recommended by the AAP. A majority of pediatricians have used the ASQ (77%) and the next most used was the Denver (49%) and PEDS (47%). Pediatricians had the option to choose "Other" in the list. There were two responses by pediatricians who responded "Other," which include Modified Checklist for Autism in Toddlers

(MCHAT; 20%) and own method (2%).
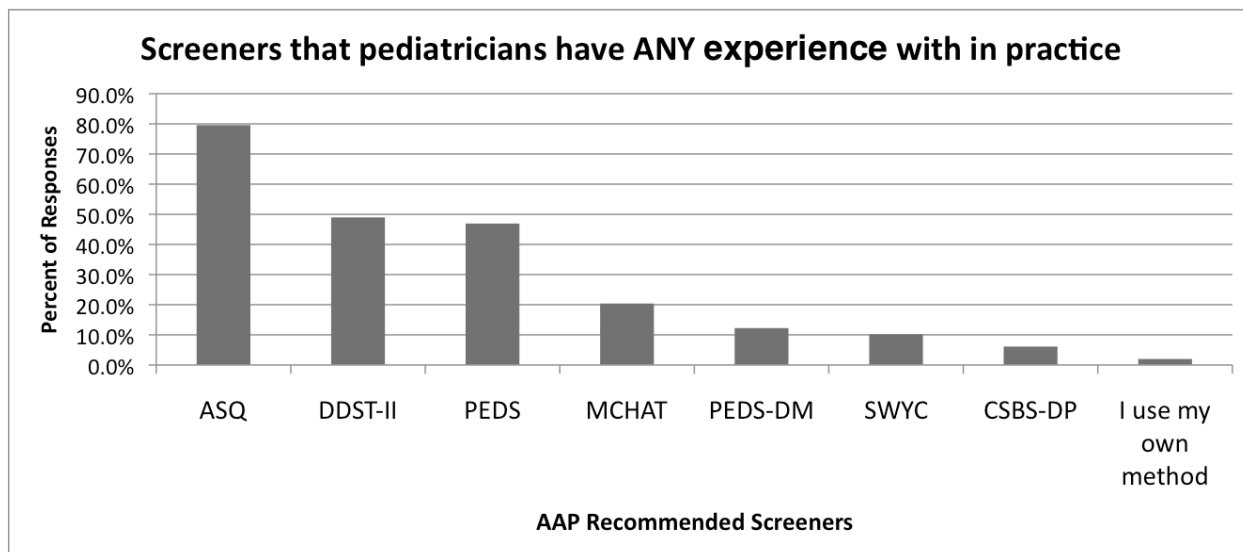
Figure 6: Pediatricians experience with ANY screeners in their own practice

Current Screening Procedures. The second question about screeners focused on what pediatricians are currently using. Figure 7 shows the pattern of reported screening tools that are currently in use. This question revealed a good number of respondents are currently using the ASQ with a little over half of pediatricians reporting that the ASQ is currently being used in their practice (59%). The PEDS-DM was not reported as currently being used. Thus, the PEDS-DM is not included in the results for this question.
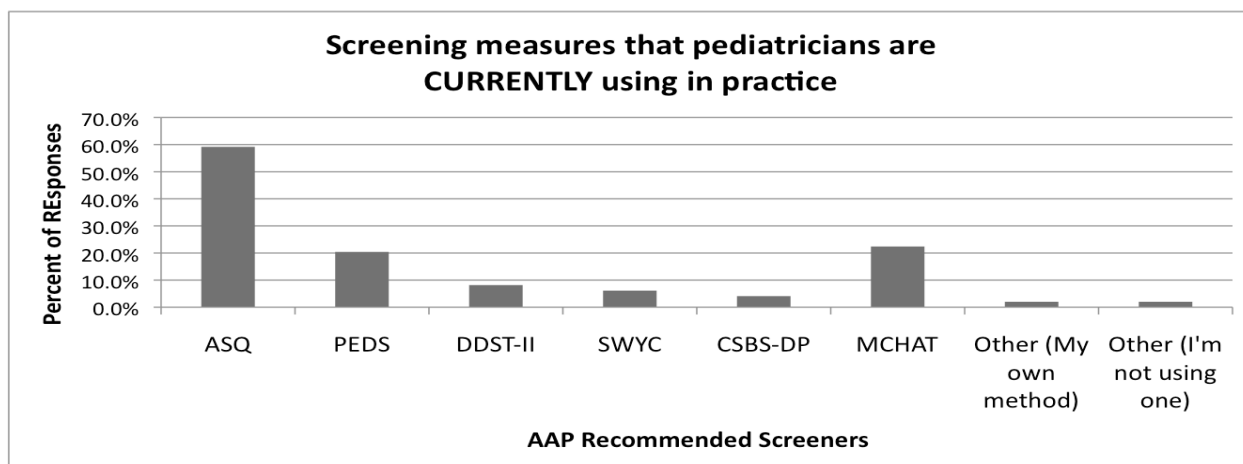
Figure 7: Pediatricians' responses to screening measures that are CURRENTLY used in practice

Next, the survey aimed to investigate at which age these screening measures are being used in practice. Figure 8 shows at which well-child visits pediatricians report that they are formally screening. The majority of pediatricians (84%) reported formally screening at 18-months of age. The next highest percent of responses included screening at 9-month well-child visits (67%) and 24-month well-child visits (65%).
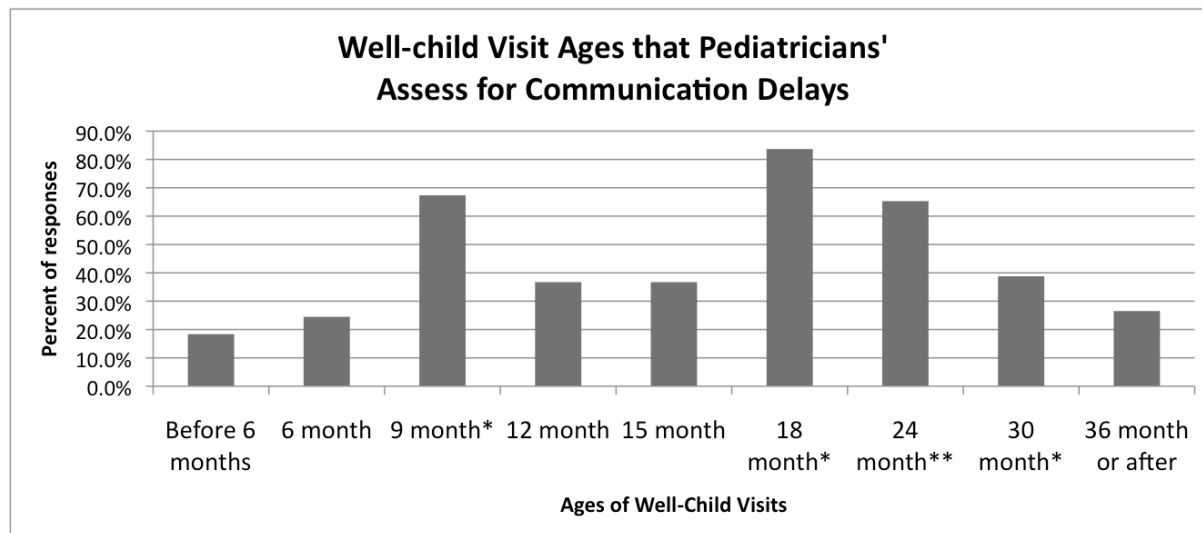
Figure 8: Percentage of responses of when pediatricians screen at well-child visits. A majority of pediatricians screen at 18-months of age for communication
*AAP recommended screening ages
**AAP then recommended that if 30-month visits are not scheduled in your office, they encourage doing formal screening at the 24-month visit instead

The survey also aimed to investigate what the current roles of pediatricians are in relation to identification of communication delays/disorders. Table 6 shows all the pediatricians' responses for whose role it is to speak with parents about screeners and submit referrals for services. In conclusion, 100% of doctors felt that it is their personal role to discuss positive screening results with families and submit the referral themselves (87%). Similarly, most doctors felt that it is not the responsibility of their nursing staff to discuss results with parents (96%) or make the referrals (89%).

Table 6: Percent of yes/no responses by pediatricians to determine whose role it is to speak with families about positive screening results.

Screening Result Roles	Yes	No
Doctor talks to parents about screening results	100%	0%
Nurse talks to parents about screening results	2%	96%

Opinions on AAP Recommendations. The final topic in this question examined how pediatricians feel about current AAP recommendations for screening procedures. First, pediatricians were asked how strictly they follow the AAP screening recommendations for ASD. A majority of pediatricians responded that they follow it "very strictly" (60%) or "strictly" (29%). Few pediatricians responded "somewhat strictly" (2%) or "not very strictly" (7%).

Second, pediatricians were asked if they agree with the 2006 AAP recommendations on developmental screening (Siu, 2015). They were already asked if they follow the AAP screening recommendations. Thus, this question examined their thoughts and opinions on the AAP recommendations. A majority of pediatricians responded "very much agree" (44%) or "agree" (38%). Few pediatricians responded "somewhat agree" (13%) or "not at all agree" (2%).

Lastly, the survey aimed to investigate how interested pediatricians are about inter-professional collaboration in relation to the topic of workflow, specifically screening and referral processes in the office. A quarter of respondents were "very interested" (24%) and half of the pediatricians responded "interested" (51%). An additional subset of pediatricians responded "somewhat interested" (17%). This question, in particular, will guide future research to help pediatricians with their own workflow by providing speech-language pathology expertise. Similarly, in conjunction with the understanding of pediatricians' barriers, future research will focus on implementing an efficient and effective workflow to effectively implement screening procedures to improve early identification of communication delays/disorders and increase referral rates by pediatricians.

Research Question #3: Which Factors Impact Pediatricians' Abilities to Implement Formal Screening Procedures into their Practices?

Since there is no comprehensive list of barriers that pediatricians' experience in regard to screening, the survey targeted pediatricians' perceived barriers and ideas for improving screening protocols. Specifically, pediatricians were asked to rate barriers and provide current barriers that they face and factors that they feel will improve the implementation of screeners during well-child visits.

Barriers to Screening. The first question looked at which barriers are perceived as a major deterrent for pediatricians. See Figure 9 that shows the major barriers and the potential barriers, which pediatricians feel are not barriers to them implementing formal screening measures during well-child visits. Pediatricians reported that limited time during well-child visits to implement the screener and limited resources are two of their biggest barriers. Forty-seven percent of pediatricians replied that lack of time to implement screeners during well-child visits is a "major barrier" or "moderate barrier". Similarly, 40% of pediatricians' felt that the lack of resources is a "major barrier" or "moderate barrier". Furthermore, lack of a "gold standard" screener or a screener that is better than others was seen as a "slight" or "moderate" barrier by almost half of the pediatricians surveyed (42%). Pediatricians felt confident in their time to learn a screener, their knowledge of the screener and their comfort with the screener. They did not see any of these as barriers.
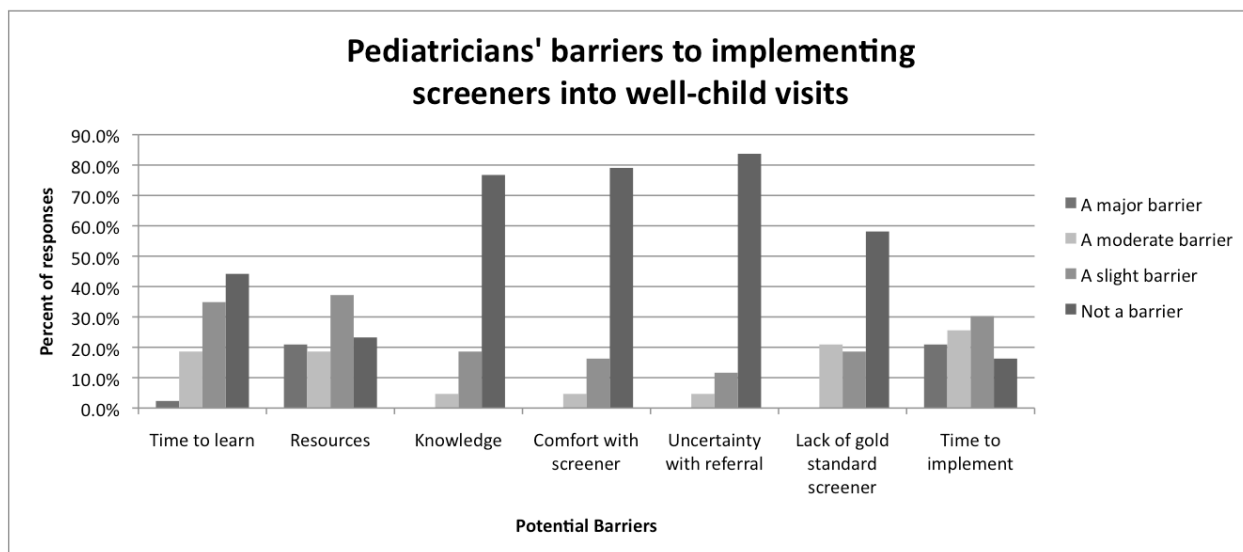
Figure 9: Pediatricians' opinions on major barriers when implementing formal screeners into well-child visits

Pediatricians were asked to provide the biggest barrier to screening that they face in their practice aside from time. Of the 43 responses, the prominent topic area that emerged from the responses was about parents. Sixteen pediatricians reported difficulty with parents with the following areas: 1) difficulty with getting parent "buy-in", 2) parents refusing to complete the screening forms or not having enough time to complete the long screening forms, 3) parents' difficulty with screening forms due to literacy level, 4) parents not completing the form accurately because of misunderstanding the questions, and 5) inaccuracy of screener or not completing the screener due to parent distracted by child and/or other children with the parent. The next barrier that appeared about half as much as parents is the actual screening tool. Seven pediatricians voiced the following topics related to the screening tool: 1) screeners are not available in certain languages (E.g., Chinese), 2) pediatricians' limited knowledge of the screener, 3) no concise screener available, 4) scoring is time consuming, 5) the screener is not integrated into the electronic medical record, and 6) there are too many choices of screeners. Finally, the last theme that was voiced equally between respondents is the limitations with staffing/support staff, voiced by 5 pediatricians, and unequal reimbursements by insurance

agencies when considering cost and time of screening during well-child visits, which was also voiced by 5 pediatricians.

The second part of the short response aimed to gather information about what will help pediatricians implement screeners. There were four themes that emerged relatively equally out of the 43 responses. Nine pediatricians responded that parents completing the screeners prior to getting to the office for well-child visits helps cut down on in-office time and increases accuracy of answers to the questions. This could be done through mailing the screener or sending it online. The second theme, which was voiced by 7 pediatricians, is accessing the screener in the electronic medical record to help keep the information in one place and also to view the results before entering the room. The third theme, which 7 pediatricians described, is an efficient and clear protocol/procedure/workflow so all office staff knows their role, how to score the screener and what to talk about with the families or the doctors. The final theme that emerged with 6 responses is that pediatricians do not like the current screening tools available due to a multitude of factors (E.g., time, literacy levels, questions, etc.). Thus, they are less likely to prioritize the screening tools when they do not like the current tools.

Research Question #4: What Factors Influence Pediatricians' Referral Procedures for Further Evaluation?

The final topic focused on when pediatricians make referrals for EI services and their familiarity with the EI services in their area. This question focused on pediatricians' role in referral. Table 7 shows all the pediatricians' responses for whose role it is to submit referrals for services. In conclusion, a majority of doctors (87%) felt that it is their own responsibility to submit referrals. It is almost equal that pediatricians' reported an in-house staff member who

handles referrals (62%) or pediatricians provide the number for the family to submit the referral themselves (60%).

Table 7. Identified referral roles after a positive developmental screener during a well-child visit.

Referral Roles	Yes	No
I submit referrals	87%	13%
An in-house staff member does the referral	62%	36%
I provide the number for the family to do the referral	60%	40%
Nurses submit referrals	9%	89%

Survey respondents were presented with two scenarios to better understand thought processes when choosing which patients to refer for further evaluation. The first scenario included a 24-month old child who had communication delay concerns, only. Pediatricians were asked what their next step would be considering the child's only concern is communication. A majority of pediatricians said that they would "Refer to early intervention" (49%) or refer for further evaluation with a specialist (27%). The last quarter of pediatricians responded that their next steps would "depend on other factors" (24%). There were 6 suggestions that individual pediatricians reported that included: 1) results from an audiologist/hearing test, 2) evaluating for ASD first, 3) other environmental factors (e.g., multiple languages spoken at home), 4) trajectory of speech over the next 3-6 months (e.g., "wait and see"), 5) encouraging reading and engagement for 4-6 weeks and then re-evaluate, and/or 6) conduct a full developmental assessment. The second part of this question asked pediatricians who would do the referral. 39% of pediatricians said they would do the referral themselves and 39% said they have a person on staff that will complete the referral. The last quarter responded the family will contact the service (12%), another staff member (5%) or the audiologist/speech therapist will do the referral (5%).

The second scenario presented asked what the next steps would be for an 18-month old child with delays in multiple domains (e.g., communication, social, motor, etc.). For this

question there were only two options chosen by all respondents. The majority said they would refer to EI (81%) and the other group said that they would refer for further evaluation to a specialist (20%). The answers for who would complete the referral steps mirrored the responses from the previous question including: the doctor will make the referral (39%), a person on staff will complete the referral (37%), the family will make the call (12%), another professional will complete the referral (10%) and one person responded that the front desk will do the referral with the parent (2%).

Follow-up Semi-structured Interview Results

Semi-structured interviews were conducted with 11 participants who provided additional details about the screening and referral process.

Research Question #1: How Does Knowledge Influence Identification and Referral for Communication Delays?

Reasons for More Education and Resources for Both Pediatricians and Parents. Many pediatricians felt that they would always appreciate and accept more education not about developmental screeners but about EI services and early childhood education services. One pediatrician said, "I think there will always be a role for more education. I think both on the providers' sides and the parents' sides of what options actually are for discussion of services" (Interview 1). Similarly, the pediatricians reported that they would like more information about timing of referral and what the transition from EI to early school age services looks like so they can discuss that with parents. One pediatrician stated, "I think it would really help pediatricians to know what the timing is of that transition. There is a preconceived notion that around (age) two and a half, EI is not going to do anything for a kid because they are going to be interested in transitioning them from then on" (Interview 1). Likewise, pediatricians felt that parents

sometimes have a skewed perception of development that is clear through under reporting and over reporting their abilities or clear through their answers on screeners, which do not match what the pediatrician is seeing in the clinic. One pediatrician said, "I try to see where the parent is and meet them halfway. If they are not concerned but I am, I gently broach the topic and not to create alarm but to let them know that there is something that needs to be addressed and it is easier to do earlier rather than later" (Interview 5).

Research Question #2: How Do Pediatrician Practices and/or Office Procedures Influence Identification of Communication Delays?

Reasons for Using Formal Screeners. Pediatricians were divided in their reasons for using formal screeners. Some pediatricians felt that using formal screening questions helps to drive the conversation during the well-child visit. One respondent said, "I think it's easy to blow past the questions [when you're already under the assumption that the child is developmentally normal] but I think if somebody writes down, 'Gosh, I'm concerned about his speech' on a PEDS form than I am much slower and careful in that way. I will ask about receptive and expressive speech" (Interview 1). Other pediatricians felt that formal screeners are better to use than their own checklist in their head because it directs the focus of milestones at each visit age. One pediatrician stated "Standardized assessments are a little better than a seasoned pediatrician on the fly picking up [delays or differences]. Sometimes I have to do a mock or brief ASQ in my mind [if it's not at an age that we do formal screeners], which is not nearly as thorough" (Interview 2).

Opinions on AAP Recommendations. Throughout the literature, pediatricians are not always in agreement with the current AAP recommendations. Two sub-themes emerged from the interviews. First, pediatricians felt that they need to be able to screen at more ages than

recommended. One pediatrician stated, "[AAP recommendations] seem too wide because again, you pick up so many of those kids right around their second birthday. If they have not gotten [caught up to developmental milestones] by two, let's get moving" (Interview 3). However, it is also understood that reimbursement is a major reason that screening does not happen as often as it should. Another pediatrician said, "If you are a perfectly normal healthy child, all the way to the right column [answering the highest score on the ASQ], then they [insurance companies] give you a hard time about charging for it" (Interview 6). Similarly, pediatricians felt that the screenings need to happen earlier than the recommended months: earlier than 9-months and earlier than 30-months. One interviewee stated, "My practice has informed me that [our state] only pays for 9-, 18- and 30-month screenings. If I try to screen at any other time, parents will call and complain about me and I will lose another patient. My practice policy is that we are not allowed to give any ASQs [outside those visits] because they are not billable…that is most definitely my biggest barrier. Not screening a kid officially until 9-months is crazy to me" (Interview 11). Another pediatrician said, "In my philosophy, I think the 24-month screener is key. That allows a lot of parents' access to services before [the child turns] 3" (Interview 3).

Research Question #3: Which Factors Impact Pediatricians' Abilities to Implement Formal Screening Procedures into their Practices?

Biggest Barriers to Screening. The quantitative barriers showed that time and resources were the biggest barriers to screening. However, more in-depth interviews also revealed other barriers in regard to screening. The biggest barrier reported across all interviews include both parents not understanding development and parents not "buying in" to the idea that EI will help facilitate early development. Many pediatricians voiced their difficulties with parents during well-child visits. One pediatrician said, "Parents are a little surprised. [They say], 'are they

supposed to be doing that,' when I bring that up as a potential concern. It is pretty split which ones will go, 'yeah, I think that is a real problem we need to aggressively approach that' and I have the other half, which is like 'I think they are fine'" (Interview 9). Another pediatrician said, "There are definitely some parents who their perception and my perception are pretty different. So I gently breach the topic. There are some that are spot on and we have the same concerns. So I'd say it's a 50/50 split" (Interview 5). Similarly, some parents have great difficulty with "buying in" to the idea of EI for their child. One interviewee stated, "I cannot get the parent to buy into the idea that there might be something abnormal regarding their child's development or to actually follow through in any type of intervention, whether or not they buy the idea" (Interview 1).

Another major barrier to referrals was referring later than 2-years causes difficulty with getting toddlers into EI before 3 years of age. Many pediatricians described the difficulty with referring children for evaluations at 30-months of age. Some pediatricians revealed that EI programs suggest not referring them after a certain age. One pediatrician stated, "It is very hard to have not seen them until they are 2 and have less than a year left to be catching this and the fact that the patients' parents are skeptical sometimes. Then we have to wait until the next appointment, which is now too late to get them into early intervention" (Interview 11).

The third barrier identified through the interviews was money. Specifically, pediatricians reported difficulty with the cost of screeners and the low reimbursement rate for developmental screening at well-child visits. One pediatrician said, "I do 9-, 18- and 24-month [ASQs] as a way to try to do a little bit of cost containment because we do charge individually for those" (Interview 2). Another pediatrician said, "A little bit is probably financial as that can always be a

barrier to everything. Unfortunately, it was not much value to me [to do developmental screeners]. It was not something that I was getting reimbursed a lot on" (Interview 4).

The last barrier, which was to be expected, was time. Many pediatricians expressed that time for parents to do the screener and time during the visit to discuss results were both difficulties in the screening process. One pediatrician said, "When I see the older kids I give the parents the option [instead of making it part of the packet] to complete the ASQ [because] it is going to take longer…and if they are just answering it off the top of their head, they are likely wrong" (Interview 7). Another pediatrician expressed the difficulty with the short well-child visit lengths saying, "It is incredibly challenging to be efficient and become a good doctor in a 10 minute time span---you have to hone in pretty quick on where the delays are and where you are going to invest your time because you only have so much time" (Interview 2).

Research Question #4: What Factors Influence Pediatricians' Referral Procedures for Further Evaluation?

Pediatricians' Decision to Send a Referral. The theory was that pediatricians were using the "wait and see" method to see if infants and toddlers will spontaneously catch up to their peers instead of immediately sending referrals for EI. Pediatricians were split between sending a referral right away and using a "wait and see" method before sending the referral. Half of the pediatricians felt that they would rather send the referral to just get the child evaluated instead of waiting. One pediatrician said, "I would rather send the referral and ensure that at least the child will be evaluated by someone with more skill than myself" (Interview 1). The second half of pediatricians felt that the "wait and see" period is necessary. One pediatrician said, "Then from there [description of milestones looked for between ages 2-4] based on all that screening and all kinds of individual questions, I decide if we need to intervene at that point or we can take

a wait and see [approach]" (Interview 2). However, there was also a subset of the "wait and see" group that felt this period can be productive to allow parents to take ownership of their children's development and help facilitate growth with their own children. One pediatrician said, "…Come back in two months for another screener to see if there is progress. I think that has also probably helped parents be more receptive. They are allowed to intervene and now they still need help, as opposed to 9-months later and [they come back and say] well all this time…[we could have been doing something at home]" (Interview 11).

New Theme: Reasons Parents are the Biggest Advocates for Services.

It was expressed throughout many interviews that pediatricians place a lot of emphasis on how the parents feel about development. The interviews described the process that pediatricians look to parents for body language, level of concern, experience and home environment to see if a referral is warranted or if parents do not feel that a referral is necessary at that point. One pediatrician said, "It really goes both ways [parents and screening results]. Usually, I will take all of those into consideration. So if I have a kid who is thriving and parents seem unconcerned, then I will go ahead and say, 'yeah let's keep this on our radar.' I usually add it to their problem list [in the electronic medical record] and next visit we will review the problem list and go over it again to see if there is still a concern" (Interview 9). Another pediatrician said that referrals take place after considering the child as a whole stating, "It is not a black and white thing. It is based on what parents tell me, how reliable I think the parent is, and then what I see in the clinic with the kid" (Interview 5).

Furthermore, pediatricians felt that educating parents about development would also be beneficial. Many pediatricians felt that their suggestions are not heard or many choose to not go through with speech therapy and they cannot reason with them. One pediatrician provided a good

analogy saying, "…It is like obesity management, right? If you got a family that is clearly overweight with a kid that is overweight [you know] they have zero interest in [education or changing behaviors]. I'm not going to waste much more of my time trying to convince you. Sometimes milestones are like that. I have had a few instances where I have felt like I do not feel good waiting on this, but the parent is adamant about it. I mean what am I going to do? I cannot make them" (Interview 9).

Chapter 4: Discussion

This study was designed to gather information about how pediatricians are currently identifying communication delays or disorders during well child visits. Specifically, this study laid the foundation for the EPIS Framework by gathering information through the "Exploration phase" and "Preparation phase" to prepare for future implementation work. This study answered the questions surrounding the need for refined screening protocols and pediatric education. The data in this study also addressed existing barriers and potential facilitators to construct an appropriate implementation process to change existing behaviors of healthcare professionals. The last part of the implementation framework that was addressed through this project is the TDF framework, which included the following domains: knowledge and skills, beliefs about own capabilities, nature of behavior, beliefs about consequences, and goal intention.

Research Question #1: How Does Knowledge Influence Identification and Referral for Communication Delays?

Research question 1 first identified factors in the "Exploration phase" of the EPIS framework to identify if evidence-based practice is appropriate for this population (Aarons, Hurlburt, & Horwitz, 2011). This question also focused on "knowledge and skills" and "beliefs about own capabilities" in the TDF framework (Michie et al., 2005). All of the survey respondents felt confident in the three areas (e.g., identifying communication delays, global delays and referral for communication delays). However, follow-up interviews revealed that pediatricians feel that there is a need for more education. Similarly, pediatricians had a preconceived notion that EI services will stop taking referrals after a child is 2 years and 6 months old. EI goes until 3 years of age and it is better to refer a child for EI so that they child

can transition from EI services to early school age services, IDEA Part B, with a transition team (Dragoo, 2017).

Another interesting thing to note is that pediatricians felt confident in their identification of delays and referrals. Yet, recent literature shows that, at most, two thirds of pediatricians use developmental surveillance, which is the process to identify delays or make the referral. Furthermore, their developmental surveillance sensitivity to identify delays is lower than 54% (Porter et al. 2016; Harai et al., 2018; Sheldrick et al., 2011). Thus, this research study will build on other literature to show that there is a need for education and a need to explore effective ways to identify and refer for communication delays or disorders.

Pediatricians' Current Level of Knowledge and Opinions on Importance of Screening

There is definitely a sense of importance for screening these delays/disorders at well-child visits. Many pediatricians were most agreeable to screening for communication delays. However, pediatricians were still not in agreement with which available screener is the best to use, if any. Thus, this creates disconnect between the importance of screening yet not having the appropriate tools to implement the screening into practice. This disconnect is shown in the literature, which states that only 30% of parents or caregivers reported receiving a developmental screener from a healthcare professional (Harai et al., 2018). Again, this exhibits the need to implement change within the EPIS and TDF frameworks (Aarons, Hurlburt, & Horwitz, 2011; Michie et al., 2005). Moving forward, future implementation plans will address gaining the buy-in from pediatricians to learn more about milestones, making decisions to refer and how to drive the conversation to lead parents to discuss concerns or difficulties at home in order to effectively identify delayed milestones, which also will aid in increasing parent knowledge and at-home monitoring.

Familiarity with Available Developmental Milestone Resources

The "Preparation phase" of the EPIS framework was also addressed in this question. The question aimed to recognize facilitators, which include developmental milestone resources and topics of interest for pediatricians (Aarons, Hurlburt, & Horwitz, 2011). The survey asked about pediatricians' familiarity with currently available resources. In response to the survey question, almost an equal number of pediatricians responded to knowing about the "Healthy Steps" program as not knowing about any of the currently available education programs. There is no literature that addresses how pediatricians use these resources but it is important to recognize that many pediatricians are not aware of them. Thus it is hard to determine if they are or are not implementing them their own practices. In the future, there is a need to focus on how pediatricians can use these programs to educate families and inform clinical decisions. Future studies have the potential to identify how these resources can be used effectively and most efficiently in different environments and with pediatricians of varying experiences and time in the field.

Continuing Medical Education Unit Topics of Interest

In the "Exploration phase" it is important to understand the need and the interest for change. Through the TDF framework, the nature of behavior (E.g., what needs to be changed) is the domain addressed through pediatricians' topics of interest. A majority of pediatricians showed interest in implementing change into their practices. This is a great opportunity for professionals in specific specialties to work on inter-professional collaboration with doctors to implement changes or work on how they can help increase knowledge, familiarity or change the current structure of the workflow. Pediatricians were also interested in EI and referrals. This would, again, be a unique opportunity to begin to bridge the gap between referral sources and

professionals to gain a better understanding of what would work best for each component of the referral to ensure that these children are getting the evaluations that they need. Future research will tackle the need for inter-professional collaboration through using specific professionals to increase knowledge and work together to identify ways to effectively address delays or disorders and make decisions related to referrals. Ideally, working with a team-based approach will aid in greater specificity and sensitivity of identification within this age and population.

Research Question #2: How Do Pediatrician Practices and/or Office Procedures Influence Identification of Communication Delays?

This question used the "Exploration phase" of the EPIS framework to gather information about the potential outcomes depending on developmental surveillance strategies and/or standardized screening procedures (Aarons, Hurlburt, & Horwitz, 2011). Similarly, the "nature of behavior" in the TDF framework is framed through this question (Michie, et al., 2005).

Developmental Screening Measures

Similar to previous research, it was found that pediatricians had the most experience with the ASQ (Radecki et al., 2011). The next two measures that pediatricians had experience with included DDST-II and PEDS, which is about half of the respondents. DDST-II is also a tool that was reported that it is used as often as ASQ (Radecki et al., 2011). However, PEDS is not as popular of a tool but is shown to be a good test for busy office practices (Hamilton, 2006). Currently, a little over half of pediatricians reported using ASQ and the other half reported using another method or their own screening method. However, we know that pediatricians own screening measure is not as effective at identifying children with delays (Sheldrick et al., 2011). Similarly, many pediatricians explained during following-up visits that screeners are used to guide the conversation with parents. If pediatricians used their own measure it is possible that

they are not asking the appropriate questions or priming the parent to give the appropriate description of their children's abilities. With this in mind, it may also be why pediatricians feel that parents do not provide an accurate picture of their children's abilities but it could actually be because pediatricians are not asking the appropriate leading questions. Future research aims to identify the effectiveness this dialogue and conversation during well-child visits with and without a standardized screening measure.

A quarter of the pediatricians responded that the Modified Checklist for Autism in Toddlers (MCHAT) was their primary screener used in their clinical setting. The MCHAT is a screening measure that has been used in primary care settings for a few years now to screen for ASD (Robins, 2008). This test does cover a variety of developmental domains, which may be why pediatricians relied on this assessment for screening development, in general. Future research will explore how the pediatricians are using each measure and if they are using it to identify other developmental delays for referral aside from ASD.

As described in the qualitative analyses the pediatricians who do not use screeners feel that their own screener was adequate and they can accomplish the same thing. Their own screener varied from questions in their head that were equivalent to developmental surveillance or screening questions that were pre-loaded on the electronic medical record systems. Research shows that there is less sensitivity when pediatricians use developmental surveillance on its' own (E.g., their own screening procedures) versus using a formal screening measure with developmental surveillance (Sheldrick et al., 2011). Thus, pediatricians are less likely to identify the children who need the referral for further evaluation. This is an idea that needs to be disseminated to pediatricians that their own method does not work as well as a standardized screening method. Furthermore, developmental surveillance (E.g., using their own method) has

not yet been studied to address what this looks like for different pediatricians during well-child visits. Future research can focus on documenting what developmental surveillance looks like during a well-child visit and how it differs across pediatricians. This is important when moving forward with future implementation research to address buy-in and to quantify and/or qualify how pediatricians do their own screening.

In regard to the ASQ, pediatricians felt that ASQ is the easiest to administer and leads to a constructive conversation with parents. Again, the literature does show that many pediatricians like the simplicity of implementation at well-child visits (Valleley, et al., 2014). However, the qualitative data showed that the ASQ can still be lengthy at times and some of the questions are hard for parents to understand. Thus, there may still be a need to produce a more efficient screening measure. Future research will investigate the difficulties with the ASQ, since that is currently most used screening measure, and which questions need to be changed or eliminated to make the measure more efficient and effective for use in pediatric primary care settings.

Current Screening Procedures

When identifying the "nature of behavior" within the TDF framework, it is important to understand how pediatricians view their own roles in order to frame implementation around their "nature of behavior" (Michie et al., 2005). The survey results revealed that pediatricians view themselves as the most important role in screening and referrals and are actively evaluating at every well-child visit through developmental surveillance. About three quarters of pediatricians are interested in inter-professional collaboration to better their screening. This collaboration would potentially help bridge the professional gap to help pediatricians increase their knowledge and resources about specific developmental domains. This would not only help their own screening but also to help teach the parents about development and identify early signs of delay

or disorder. The idea that pediatricians are interested in inter-professional collaboration is novel and could lead to exploration of education opportunities that can be done by specific specialties to help with the identification process in the future. Similarly, it shows that pediatricians know that they can enhance their practice by collaborating with other professionals. This knowledge will help with implementation of new procedures and changing healthcare professionals' actions (Michie et al., 2005).

Parents' Role in the Screening Process

This part of the survey aimed to address the "beliefs about owns capabilities" in the TDF framework to better understand whose role it is to address concerns, identify delays and make the decision to refer (Michie et al., 2005). We know that developmental surveillance includes parent concern, parent interview, pediatricians' observations during well-child visits, and formal checklists (Harai et al., 2018). The survey results showed that parent concern is the most important part of developmental surveillance and formal checklists are the least important part. However, pediatricians also expressed in follow-up interviews that they believe parents do not have the knowledge to accurately report concerns. Thus, there seems to be a conflict as to pediatricians' putting emphasis on the parents' concerns but not believing they have the appropriate knowledge to accurately gauge their children's development. The conflict between these beliefs shows a major disconnect between pediatricians and parents.

Parents are even less likely than pediatricians to have any formal training related to communication development and service delivery options. Even if a parent has concerns, they may be reluctant to ask pediatricians about concerns (Glascoe, 1999). Likewise, many parents are unaware of their entitlement to EI services effective by Part C of IDEA (Paul & Roth, 2011). Similarly, if pediatricians are not leading the conversation about communication development,

parents may be reluctant to initiate conversation because of the power dynamic in previous patient-professional interactions and the cultural stigma that parents should not be overanxious about children's development (AAP, 2001; Dirks et al., 1994; Nimmon & Hayes, 2016). Prior studies have focused on pediatricians/service professionals only or parents only (Minkovitz et al., 2003; Jimenez, et al., 2012; Silverstein et al., 2005). Future research will explore the complexity of this cyclical relationship and how to improve communication and understanding with both parties. Addressing parents' education and understanding of development seems to be just as important as addressing pediatricians within this context.

Opinions on AAP Recommendations

During the "Exploration phase" and gathering information about the "nature of behavior," the research question explored if pediatricians follow all the AAP recommendations for screening and/or are choosing certain ages to screen that fit the practice, which may be why the identification rates before early school age are currently low (Bates et al., 2014). Results showed that about 6 out of every 10 pediatricians are potentially screening at the recommended AAP ages, if you assume the 24-month visit is replacing the 30-month visit. Similarly, most pediatricians (E.g., 8 out of 10) are screening at 18 months of age. Not many pediatricians are screening at 30 or 36-months of age. This is higher than the analysis that showed only 30.4% of parents or caregivers received a parent-completed developmental screener between the ages of 9-months and 36-months well-child visits (Harai et al., 2018). Furthermore, this number is much higher than the survey that showed only 17.8% of pediatricians are compliant with AAP recommendations (Arunyanart et al., 2012). It is possible that this is a higher number because more pediatricians are recognizing the benefits of screening in order to refer a child for early intervention services. Thus, this is improvement for pediatricians screening rates according to

this sample size. Furthermore, pediatricians are screening the most at 18-months of age. AAP recommends that pediatricians screen for developmental milestones and ASD at 18-months of age. It is possible that pediatricians are considering their ASD screener as a communication screener as well during this visit, which contributed to the high response rate for screening for communication delays at the 18-month visit.

The interviews also showed that there are some pediatric practices that do not offer 30-month well-child visit because insurance will not cover this visit anymore. This is something to explore further as many pediatricians expressed that it is "too late" because the child has aged out of EI services. Thus, there is an unexplored gap between 3-5 years of age before a child enters kindergarten that pediatricians do not know where to send for evaluation. Future research will aim to identify how to solve the problem that many pediatricians vocalized about the difficulty of not getting a child into EI services and not knowing how to navigate the early school age services to educate parents on how to get services before kindergarten.

Another point to note is that many pediatricians believe that they follow the AAP recommendations for screening. A majority of pediatricians agreed with AAP recommendations on developmental screener (82% Very much agree or agree). However, only 65-67% reported that they do formal developmental screening at the recommended AAP ages, 9 and 24 months, and even less screen at 30. Thus, pediatricians' perception of agreement for AAP recommendations and follow through are not comparable. Future research will explore the perceptions versus actions of pediatricians within practice and why these two factors are not complementary.

Research Question #3: Which Factors Impact Pediatricians' Abilities to Implement Formal Screening Procedures into their Practices?

Research question 3 concentrated on the "Preparation phase" of the EPIS framework to identify barriers that pediatricians face and what facilitators are currently working well in practice (Aarons, Hurlburt, & Horwitz, 2011). This also recognized "beliefs and consequences" and "goal intention (E.g., what to aim for) within the TDF domains (Michie et al., 2005). The barriers discussed in the literature include 1) lack of direction (i.e., no gold standard screener), 2) lack of time due to comfortableness or knowledge, 3) lack of knowledge with referral, and 4) personal perceptions that a formal screener is not needed to identify delays (Devito et al., 2012; Pierce, Courchesne, & Bacon, 2016; Miller et al., 2011; Devito et al., 2012; Pinto-Martin et al., 2005; Halfon, Stevens, Larson & Olson, 2011; Barton, Matheiu, & Fein, 2012). Pediatricians reported that limited resources and time during well-child checks to implement screeners are their biggest barriers. It is important to recognize that pediatricians had their own thoughts and opinions about what worked well or what did not work when describing developmental screening processes. It was evident that barriers are individualized to specific pediatricians or specific practice settings (E.g., private versus hospital, size of practice, geographic location, etc.). Many pediatricians agreed on which factors were not barriers including: knowledge, comfort with screener, uncertainty with referral and lack of gold standard screener. However, pediatricians varied in their response to which was the biggest barrier. Some pediatricians felt that a major barrier is educational resources available to them. Most felt that time is still a major problem. Some pediatricians discussed that reimbursement was an issue. Many also felt that a significant barrier includes parents. Thus, this question inadvertently uncovered another subject, which is that barriers may be subject to specific practices rather than universal across all pediatricians. Thus, this mindset will guide how to implement new protocols into practice and tailor the protocols to different types of practices or sizes of the practices.

No Most Efficient and Effective Screener Available

It is clear from pediatricians' reports and responses in the survey that there is a need for a "true standard" screening tool. This is another barrier that would be considered within the "Preparation phase" of the EPIS framework before intervention of new procedures. Many pediatricians in the text reported that they feel they need one tool that is the best option. They feel that they do not like the tools that are currently available due to the length or complexity of the questions. This was a point brought up by many of the pediatricians during follow-up interviews. Each pediatrician had the same feelings about the screener, that they could use a different one, but the reasons for a gold standard screener varied. Some reasons pediatricians provided include length, complexity of questions, difficulty of questions, unrelated questions and limited language translations. This is identical to what is discussed in the literature that there is a lack of validity of screening tools and thus, no current screening measure available that is deemed the "gold standard" (Ben-Sasson, Habib, & Tirosh, 2014; Glascoe et al., 2007; Fessenden, 2013), Barton Matheiu & Fein, 2012; Morelli et al., 2014). Some pediatricians may not be screening because they did not feel that there is a good screening tool. If a "true standard" screening tool was available that pediatricians felt was a good tool, then pediatricians would be more likely to prioritize implementing this screener into their practice. Future research will be able to focus solely on the different screening options to see how they can be adapted for specific populations or potentially create a new one that address the difficulties that pediatricians currently face with existing screeners.

Another barrier pediatricians faced was vague or undefined in-office procedures. Similarly, the lack of resources or staff to help handle the results, referrals, follow-ups and questions that families have about the process resulted in difficulty with referrals. This is another

factor to be considered in the limitations of undefined and vague procedures, which can make the process more time consuming for pediatricians (Mehl & Thomson, 1998). Detailed office procedures were deemed necessary for pediatricians so that all families get the appropriate screener at the right visit. Furthermore, detailed office procedures were necessary to cut down on time. Detailed procedures defined each person's role in the office who gives the parent the form, who scores the screener and who submits the referral then the screener will be given to each family. Thus, when each person knew their own role the family can fill out the form right away, if applicable, and the form was completed and reviewed by the pediatrician before the pediatrician walks into the room with the family. This cut down on time helped pediatrician to use the full time in the visit to guide the conversation in the necessary direction to talk about the concerns and/or delays.

The first facilitator described was that pediatricians had a procedure in place and were comfortable with that particular screener, which were ASQ and/or MCHAT. If pediatricians were not in agreement with the office procedures then it was described that pediatricians did not agree with needing a standard screening measure. Pediatricians decided that the MCHAT was enough or they would use their own screening questions in their head or in their electronic medical record systems. Thus, it seemed that pediatricians did not feel that they were overwhelmed with the choices for screeners but would rather have one that is better overall that can be used by everyone. From follow-up interviews, it is believed that an ideal screener would consist of 2 to 3 major questions in each domain for milestones at each age. The parents can easily understand the questions and complete the form quickly. This form would be able to lead the discussion during the well-child visit to tailor the dialogue toward any concerns or difficulties

that the child is having in relation to developmental milestones. Thus, the short well-child visit

can be used efficiently and effectively for both the pediatrician and the parent.

Pediatricians' Perceptions of Screening

Low Insurance Reimbursement Rates. Pediatricians felt that insurance reimbursements

were not adequate for the time spent on screeners. Thus, the time versus cost benefit was not

practical for pediatrician to spend a lot of time focused on screeners. Many families only see

pediatricians for 10-20 minutes during well-child visits and only a small percentage spend more

than 20 minutes with a doctor (Halfon, Stevens, Larson & Olson, 2011). This is a short time

frame to fit in all of the topics that pediatricians wish to cover. If insurance reimbursements are

low it does not motivate the pediatrician to complete extra procedures or expect their patients to

fill out more paperwork. This is a difficult subject that has to be addressed at the state and federal

levels through lobbying and future translational research. Until then, pediatricians have to find a

way to efficiently use their time. A short, easy to understand screener may be most beneficial for

pediatricians to implement to continue to get the small reimbursement without taking up too

much of their own time or their patients' time.

Pediatricians' Perceived Barriers of EI Services. Through the follow-up interviews, it

was clear that pediatricians struggle with the age range of EI and being able to identify a

suspected communication delay and refer at the appropriate age for EI. The themes that arose

from the interview data showed that many pediatricians were having difficulty with the 18-

month and 24-month screeners because it does not give much time for referral to EI services. For

example, if a parent discussed a concern with the pediatrician at 24-months then the pediatrician

has to make the call for a referral at that visit. The pediatrician has no option to wait for a follow-

up well-child visit unless they schedule one outside of the routine visits. This has been a problem

for a number of pediatricians to refer for EI due to the age limit of 3 years and many pediatric

practices only doing 3 visits in the one and a half years leading up to 3 (E.g., 18-month, 24-

month, 36-month). Thus, one reason that pediatricians may not be referring as often is not

because they are not knowledgeable about EI services but potentially because of the timing of

well-child checks and when EI services time out. There is no literature that addresses the age

limitations of EI services. One solution is to start implementing a 12-month screener to close the

barrier between 9-month and 18-month assessments. Additionally, there is a need to better

educate pediatricians on where to send children between EI and early school age, which would

be children between the ages of 3- and 5-years-old. By addressing this gap and increasing

understanding, pediatricians will then be able to inform parents where to send their children for

further evaluations and potential services. Future research can address this difficulty at a

translational research level through the use of EPIS and TDF frameworks (Rubio et al., 2010).

By addressing the need for change through translational research, policies can then be addressed

and changed at a national level if the age-range and/or protocols are not constructive in the

current state.

Limited Time During Visits and Resources

Time during a well-child visit has been discussed in the literature including difficulty

with time during the workweek and time during an actual well-child visit (Adair, 2010; Halfon,

Stevens, Larson & Olson, 2011). After speaking with the follow-up participants, it is definitely a

consideration that a detailed plan and everyone in the office knowing the protocol is imperative

for smooth implementation of a formal screener. Similarly, pediatricians thought that it would be

helpful for parents to complete the screener prior to the visit. Some suggestions included

accessing the EMR system and using technology for parents to complete forms ahead of time

and for the system to score the tests quickly. A handful of pediatricians reported that they feel the time for the visit and to fill out/score the screener is tight. Putting the test in an online system and/or having the test filled out ahead of time by the parent makes the screening process more efficient and discussions during well-child visits more productive. Thus, exploring how to make this feasible is something that will be addressed in future implementation phase work.

The limited resources available to pediatricians were an issue that has not yet been addressed thoroughly in the literature. There are many resources available (E.g., Healthy Steps, Birth to 5: Watch me Thrive, etc.) but there is no research that looks at how pediatricians are disseminating the information to patients and families or how pediatricians are using free handouts and websites. Future research will aim to address the difficulty of implementing screeners and educating parents with lack of resources that are available to help pediatricians learn about this process and improve their current knowledge and/or procedures.

New Theme: Parent Contribution, or Lack Thereof, to Screening Process

The biggest barrier by far was different factors of parent contribution to the screening process. First, pediatricians felt that parents' responses to screener questions are inconsistent. Specifically, pediatricians shared that parents are sometimes wrong in their responses, either over reporting or under reporting. It was reported that parents' responses might have changed by the time they get to the well-child visit if they fill it out too early. Also, it was reported that responses might be inaccurate if they are rushed in the waiting room and fill it out quickly without actually understanding and thinking about the question. Similarly, pediatricians felt that there is a barrier with parents' responses to the questions asked by pediatricians during well-child visits. In particular, pediatricians expressed that parents may not have seen a child do a certain movement or task so have little information to contribute when pediatricians are exploring

developmental milestones during the visit. This could also be due to the previous patient-professional interactions and the power dynamic that have previously been found in the literature (Dirks et al., 1994; Nimmon & Hayes, 2016). Another barrier with parents included parents' understanding of typical child development. Pediatricians felt that parents do not have a true understanding of child development and what milestones are supposed to be achieved at each age. Studies have shown that there is a need for parents to increase their knowledge of developmental milestones and attention to development (Lockwood et al., 2015; Zand et al., 2015; Bornstein et al., 2010). Similarly, parents are typically misinformed about typical child development. A few pediatricians brought up the same point about parents telling them that certain delays are "typical" for that family (E.g., well his brother didn't talk till 3 or his cousin also didn't talk till 4, etc.). Thus, pediatricians felt that this is a barrier when parents perceive a delay as "normal". Lastly, pediatricians felt that there is disconnect between identified delays and getting parent buy-in to further evaluation. Pediatricians expressed that some parents' refuse recommended services and would rather take a "wait and see" approach and hope that their children "catch up" to their peers. However, several pediatricians also seemed to take a "wait and see" approach to give parents the opportunity to try new strategies at home to facilitate development and create buy-in when the child is still delayed at the next well-child visit. This type of language and approach is shown to not be the precise type of language needed for parents of children who do have delays or ASD to understand how to help their own children progress forward (Mcknight, O'Malley-Keighran, & Carroll, 2016).

This barrier is important when thinking about well-child visits as a whole. It is important to note that well-child visit and identifications of delays or disorders is not one persons' responsibility. It is clear that this is a cyclical process between parents and pediatricians. Future

research aims to focus on both sides to create a way for parents to be knowledgeable about development and empowered to address concerns. Furthermore, educating parents will help them to understand a delay versus a difference and be informed when reporting current milestones or abilities of their children. Correspondingly, educating pediatricians at the same time with available resources or ways to navigate well-child visits and screeners will help direct the conversation to bring out the important topics for each patient and his or her parents/caregivers. Educating parents to steer the direction in this way will capitalize the short amount of time during well-child visits to make screening more effective. Overall, it is important to understand the cyclical nature of this relationship and interaction during well-child visits when moving forward with future research.

Research Question #4: What Factors Influence Pediatricians' Referral Procedures for Further Evaluation?

This question tackled the "Exploration phase" of the EPIS framework. Specifically, this question considered the emergent needs of patients (Aarons, Hurlburt, & Horwitz, 2011). This question also dealt with the "nature of behavior" and "belief of consequences" within the TDF framework (Michie et al., 2005). It was found that pediatricians are comfortable with referring when they suspect developmental or communication delays. However, about half referred right away or half waited for 3-months to see if there was any improvement. The "wait and see" approach typically takes place between the 18-month and 24-month visits. If there is a suspected delay at 18-months, several pediatricians expressed that they will do a 3-month follow-up phone call or visit at 21-months of age. If there is no improvement in 3 months then the child will be referred for further evaluation at that time. There is little research to understand how pediatricians are making decisions for referral. Pediatricians' decisions to refer has not been

researched at length. Thus, it is unclear when pediatricians feel that the child needs further evaluation and what factors determine this decision. Future research will focus on what informs pediatricians' decisions to refer for further evaluations and at which ages the factors in the decision change, if any. This inconsistency is similar to previous research, which shows that screening results are not consistent with referrals (Marks, Glascoe, & Macias, 2011).

Pediatricians' Decision to Refer

Pediatricians felt moderately to very familiar with EI, referral to EI and qualifications for EI. They also indicated that they know how to find EI services in their location. Some pediatricians were even able to list the name of their EI programs (E.g., Sooner Start, Michigan Early On, Babynet, Babies Can't Wait). This showed that pediatricians are familiar with the EI service. This is consistent with previous literature that describes pediatric residency directors currently feel that pediatricians have the "most important" role in Child Find (Edwards, 2018). Another thing to note is that pediatricians considered the time that EI toddlers age out as a barrier to referral for EI services. Pediatricians felt that many of them have to refer by 24-months of age so if they are just screening for communication at 24-months and they want to "wait and see" then the child loses the opportunity for EI. Thus, it may not be that pediatricians are not familiar with the services, as indicated by the survey results, but more that the timing of well-child visits, the process that it takes to get a child enrolled in EI, and the time that a child ages out are all factors that go into the decision to refer for further evaluation or not. Similarly, if the parent is hesitant about receiving services, this also plays a role in the delay of a referral for EI. Thus, future research will focus on all of the factors that drive referrals and how pediatricians can change their protocol to complement the EI services timeline and enhance their use of referrals for further evaluation.

Finally, there was a split in responses between pediatricians who refer right away and pediatricians who use a "wait and see" period before sending the referral. What was revealed through follow-up interviews was pediatricians' "wait and see" mindset was not the traditional "wait and see" process. In the past, pediatricians waited to refer a child to see if the child will spontaneously catch up with their peers (Mcknight et al., 2016). The mindset behind this period was that child development is versatile. Thus, some children may be slower to develop than others but still within the normal range of development. In this study, follow-up interviews revealed that the "wait and see" period is more of a productive approach to allow parents to take ownership of their children's development and help facilitate their communication growth. What was the most revealing is that pediatricians want to give parents the opportunity to take ownership of their children's development but showed that they do not feel parents are a facilitator to identification of delays or disorders. Thus, it seems that this mindset is disconnected when it comes to giving parents the opportunity to change how things are done at home but not trusting the parent to evaluate their children's development appropriately. Again, this shows the need to address the cyclical nature of the parent and pediatrician relationship in regard to well-child visits, identification of delays or disorders, and referral for services. Future research aims to identify and understand this process between parents and pediatricians during this well-child visit period.

Limitations

It is important to note that the sample of pediatricians was small in this study and did not span all 50 states. This project was voluntary, which may have skewed the participant selection. It is possible that the pediatricians who chose to participate felt particularly strongly about this topic. However, the sample was split in half with residents who completed their residency before

2006 and after 2006, which was the year that the AAP developmental screening recommendations were released (American Academy of Pediatrics Screening Recommendations, 2006). About half of the pediatricians in the sample practice in urban areas and a quarter practice in rural and suburban areas so the geographic location was not split equally. The recruitment for this project was done through AAP and cold calling so it is suspected that many of these pediatricians are AAP members, which may have impacted the results. Due to time limitation, the researcher closed the recruitment with a small number of respondents. Thus, this small sample size may have impacted the results of the study. In future studies, the researcher will aim to get a higher number of respondents and participants across a range of geographical locations for surveys and follow-up interviews.

Conclusion

In conclusion, pediatricians are currently screening for communication delays and disorders in a variety of ways. There are still no blanket recommendations as to how the pediatricians should screen and at which ages. Pediatricians feel confident in screening but feel that they could use more education, which was evident when many pediatricians responded that they are not aware of the available educational resources. This provides a good opportunity for experts in other fields to create educational opportunities for pediatricians to better understand how to use screeners to navigate parent-pediatrician conversations during short well-child visits.

Currently, most pediatricians are screening using the ASQ. A majority of pediatricians screen at 18-months of age and a little over half of the respondents said that they are screening at 9-month, 18-month and 24-month visits. Thus, future research will focus on implementing protocols that will help to engage pediatricians in a screening practice that can be used at all well-child visits. Nearly all pediatricians view themselves as the most important component to

screening measures. Therefore, when addressing consistent screening practices it is important to address pediatricians' barriers to screening. The biggest barriers that pediatricians face include limited resources and time constraints during well-child visits. Both of these can be addressed in future research through educational opportunities and/or implementing efficient, timesaving screening procedures. Likewise, pediatricians feel that parents can be critical barriers to referring children for EI services due to a variety of factors. Thus, it is imperative in the future to consider this process cyclical in nature and understand that parents play just as important a role in identification as pediatricians. Future research will focus on pediatricians and parents together to define a screening and referral process that will aid in increasing referral for EI evaluations for suspected communication delays or disorders. This will, in turn, aid in enhancing screening procedures and increasing EI to promote school-readiness in children with communication delays or disorders.

References

Accreditation Council for Graduate Medical Education. ACGME Common Program

   Requirements, 2017. Retrieved from https://www.acgme.org/Portals/0/

   PFAssets/ProgramRequirements/CPRs_2017-07-01.pdf.

Adair, R., Perrin, E., Hubbard, C., & Savageau, J. A. (2010). Practice parameters and financial

   factors impacting developmental-behavioral pediatrics. Journal of Developmental

   Behavioral Pediatrics, 31, 477-484.

American Academy of Pediatrics (2018). AAP Schedule of well-child care visits: The benefits of

   well-child visits. 26 October, 2018. https://www.healthychildren.org/English/family-

   life/health-management/Pages/Well-Child-Care-A-Check-Up-for-Success.aspx.

American Academy of Pediatrics: Caring for your baby and young child: Birth to age 5 (2009).

   A Pediatrician's Training. 12 November, 2009. https://www.healthychildren.org/

   English/ages-stages/prenatal/decisions-to- make/Pages/A-Pediatricians-Training.aspx.

American Academy of Pediatrics Policy Statement (2006). Identifying infants and young

   children with developmental disorders in the medical home: An algorithm for

   developmental surveillance and screening. Pediatrics, 118, (1), 405-420.

American Board of Pediatrics: Admission Requirements (2019). Retrieved from

   https://www.abp.org/become-certified/general-pediatrics/admission-requirements

Arunyanart, W. et al. (2012). Developmental and autism screening: A survey across six states.

   Infants & Young Children, 25(3), 175-187.

Baio et al. (2018). Prevalence of Autism Spectrum Disorder among children aged 8 years-

   Autism and developmental disabilities monitoring network, 11 sites, United States 2014.

   Surveillance Summaries, 67(6), 1-23.

Baker, R., Camosso-Stefinovic, J., Gillies, C., Shaw, E.J., Cheater, F., Flottorp, S., Robertson, N., Wesing, M., Fiander, M., Eccles, M.P., et al. (2015). Tailored interventions to address determinants of practice. Cochrane Database System Review, 4(4), 1-117).

Barton, M., Dumont-Matheiu, T., & Fein, D. (2012). Screening young children in Autism Spectrum Disorders in primary practice. Journal of Autism and Developmental Disorders, 42(6), 1165-1174.

Bates, B. R., Graham, D., Striley, K., Patterson, S., Arora, A., & Hamel-Lambert, J. (2014). Examining antecedents of caregivers' access to early childhood developmental screening: Implications for campaigns promoting use of services in Appalachian Ohio. *Child Health Promotion, 15*(3), 413-421.

Baylor College of Medicine Education: MD Program Curriculum (2019). Retrieved from https://www.bcm.edu/education/schools/medical-school/md-program/student-handbook/academic-program/curriculum

Birth to 5: Watch me Thrive (2014, March 1). U.S. Department of Health and Human Services. U.S. Department of Education. Retrieved from https://www.acf.hhs.gov/sites/default/files/ecd/pcp_screening_guide_march2014.pdf

Bornstein, M. H., Cote, L. R., Haynes, O. M., Hahn, C. S., & Park, Y. (2010). Parenting knowledge: Experiential and sociodemographic factors in European American mothers of young children. *Developmental Psychology, 46*, 1677-1693.

Bowling, A. (1997). *Research Methods in Health*. Buckingham: Open University Press.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

CDC Milestone Tracker App (2018). Center for Disease Control and Prevention: Learn the

Signs, Act Early. Atlanta, GA. 19 June, 2018. https://www.cdc.gov/ncbddd/actearly/

milestones-app.html.

CDC's Act Early Initiative (2018, June 19). Retrieved from

https://www.cdc.gov/ncbddd/actearly/about-initiative.html

Crais, E. et al., (2014). Pediatric healthcare professionals' views on autism spectrum disorder

screening at 12-18 months. Journal of Autism and Developmental Disorders, 44, 2311-

2328.

Devito, G.A., Manning, L., McLean, P., Valeras, A. (2012). Implementing developmental

screeing recommendations in a family medicine residency training program: Barriers,

solutions and recommendations for practice [Supplemental 2]. Archives of Disease in

Childhood, 97, pp A495. doi: 10.1136/archdischild-2012-302724.1750.

Dillman, D.A., Smyth, J.D., & Christian, L.M. (2014). Internet, phone, mail, and mixed-mode

surveys: The tailored design method. John Wiley & Sons Inc, Hoboken, NJ.

Dirks N, Eley G, Ortner S (eds): Culture/Power/History: A Reader in Contemporary Social

Theory. Princeton, NJ, Princeton University Press, 1994, 585–608.

Dragoo, K.E. (2017). The individuals with disabilities education act (IDEA), part B: Key

statutory and regulatory provisions. Congressional Research Service,

https://fas.org/sgp/crs/misc/R41833.pdf.

Edwards, N.M. (2018). The role of mentors in early intervention referrals: Overlooked views of

pediatric residency training directors. Maternal and Child Health Journals, 22, 745-752.

Eysenbach, G. (2004). Improving the quality of web surveys: The checklist for reporting results

of internet E-surveys (CHERRIES). Journal of Medical Internet Research, 6(3), e34.

Fessenden, V.M. (2013). Comparison of the Pervasive Developmental Disorders Screening Test and Modified Checklist for Autism in Toddlers: Which is the better predictor of autism in toddlers? (Doctoral dissertation). Retrieved from Proquest. (3590135)

Glascoe F.P. (1999). Parents' concerns about children's development: prescreening technique or screening test? *Pediatrics*, 522–528.

Glascoe, F. P. (2003). Parents' evaluation of developmental status: How well do parents' concerns identify children with behavioral and emotional problems? *Clinical Pediatrics*, 42(2), 133-139.

Glascoe, F.P. (2015). Evidence-based early detection of developmental-behavioral problems in primary care: What to expect and how to do it. Journal of Pediatric Health Care, 29(1), 46-53.

Guevara J., et al. (2013). Effectiveness of developmental screening in an urban setting. Pediatrics, 131(1), 30-37.

Guralnick, M. J. (1998). Effectiveness of early intervention for vulnerable children: A developmental perspective. *American Journal on Mental Retardation, 102,* 319–345.

Hagan, J.F., Shaw, J.S., & Duncan, P.M. (2017). Bright futures: Guidelines for health supervision of infants, children and adolescents. American Academy of Pediatrics.

Halfon N, Olson L, Inkelas M, et al. (2002). Summary statistics from the National Survey of Early Childhood Health, *Vital Health Statitstics,15*(3):1–27.

Hamilton, S. (2006). Screening for developmental delay: Reliable, easy-to-use tools. Journal of Family Practice, 55(5), 415-422.

Harvard Medical School: MD Program, 2019. Retrieved from https://meded.hms.harvard.edu/md-program

HealthySteps (2017). Zero to Three. Washington, D.C. Retrieved from

https://www.healthysteps.org/.

HealthySteps: Frequently Asked Questions (2017). Retrieved from

https://www.healthysteps.org/article/preview/5118ad75-b1d0-4755-a66e-

c08234054188#12

HealthySteps: HealthySteps Tiered Model and Core Component Definitions (2017). Retrieved

from https://www.healthysteps.org/article/healthysteps-core-components-definitions-6#6

Hess, L. J., Dohrman, K., & Huneck, B. (1997). Communication begins at birth: Are infants at-

risk for delays identified early enough? *Infant-Toddler Intervention, 7*(2), 111-122.

Hirai, A.H., Kogan, M.D., Kandasamy, V., Reuland, C., & Bethell, C. (2018). Prevalance and

variation of developmental screening and surveillance in early childhood. JAMA

Pediatrics, 172(9), 857-866.

Hix-Small, H. (2007). Developmental screening in practice: Using parent report within pediatric

practice to detect infant and toddler developmental delays. (Doctoral dissertation).

Retrieved from ProQuest (3259280).

Isaacs, J. B. (2008). Impacts of early childhood programs (Research Brief No. 5). Washington,

DC: Brookings Institution.

Jimenez, M. E., Barg, F. K., Guevara, J. P., Gerdes, M., & Fiks, A. G. (2012). Barriers to

evaluation for early intervention services: Parent and early intervention employee

perspectives. *Academic Pediatrics, 12*(6), 551-557.

Learn the Signs, Act Early (2004). Center for Disease Control and Prevention. Atlanta, GA.

https://www.cdc.gov/ncbddd/actearly/index.html.

Leon, A., Holiker, S., Pepe, J. (2015). The importance of the first 5 years: Pediatrician identification of developmental delays and other related concerns. Journal of Social Service Research, 41(4), 425-444.

Lockwood, D., Linda, S., Angel, R., Childress, R., Olson, L. (2015). The influence of the maternal infant health outreach program on child development: Through the eyes of moms and home visitors. Marshall University. ProQuest Dissertations and Theses. ISBN: 978-1-339-07275-3.

MacLaughlin, S., Gillespie, L., Parlakian, R. (2017, March). Using pediatric visits to support children and families: Ten positive outcomes from HealthySteps. *Zero to Three,* pp 46-52.

Macy, M. (2012). The evidence behind developmental screening instruments. Infants and Young Children, 25(1), 19-61.

Marks, K., Glascoe, F.P., & Macias, M. (2011). Enhancing the algorithm for developmental-behavioral surveillance and screening in children 0 to 5 years. Clinical Pediatrics, 50(9), 853-868.

McCarthy, C. (2017, November 14) New app helps parents track and encourage their child's development. *Harvard Health Publishing*. Retrieved from https://www.health.harvard.edu/blog/app-helps-track-developmental-milestones-2017111412718

Mcknight, L.M., O'Malley-Keighran, M., & Carroll, Clare (2016). "Just wait then and see what he does": A speech act analysis of healthcare professionals' interaction coaching with parents of children with autism spectrum disorders. *International Journal of Language & Communication Disorders, 51*(6), 757-768.

McLaughlin, M.A. (2011). Speech and language delay in children. American Family Physician, 83(10), 1183-1188.

Mehl, A. L., & Thomson, V. (1998). Newborn hearing screening: The great omission. *Pediatrics, 101*(1), 1-6.

Miller, J.S., Gabrielsen, T., Villalobos, M., Alleman, R., Wahmhoff, N., Carbone, P.S., Segura, B. (2011). The each child study: Systematic screening Autism Spectrum Disorders in a pediatric setting. Pediatrics, 127(5), 866-871.

Minkovitz, C. S., Strobino, D., Hughart, N., Scharfstein, D., Hou, W., Miller, T., Bishai, D., & Guyer, B. (2003). Developmental specialists in pediatric practices: Perspectives of clinicians and staff. *Ambulatory Pediatrics, 3*(6), 295-303.

Moore, C., Zamora, I., Petal Gera, M., & Williams, M. (2017). Developmental screening and referrals: Assessing the influence of provider specialty, training, and interagency communication. Clinical Pediatrics, 56(11), 1040-1047.

Morelli, D.L., Pati, S., Butler, A., Blum, N.J., Gerdes, M., Pinto-Martin, J., & Guevara, J.P. (2014). Challenges to implementation of developmental screening in urban primary care: A mixed methods study. BioMedCentral Pediatrics, 14(16), 1-11.

Nimmon, L. & Stenfors-Hayes, T. (2016). The "handling" of power in the physician-patient encounter: Perceptions from experienced physicians. *BMC Medical Education, 16*(114), 1-9.

Paul, D., & Roth, F. P. (2011). Guiding principles and clinical applications for speech-language pathology practice in early intervention. *Language, Speech, and Hearing Services in Schools, 42*, 320-330.

Periodicity Schedule: Bright Futures/AAP Recommendations for Preventive Pediatric Health Care (2017, April). Retrieved from www.aap.org/periodicityschedule

Pierce, K., et al. (2011). Detecting, studying and treating autism early: The one-year well-baby check-up approach. The Journal of Pediatrics, 159(3), 458-465.

Pierce, K., Courchesne, E., & Bacon, E. (2016). To screen or not to screen universally for Autism is not the question: Why the task force got it wrong. Journal of Pediatrics, 176, 182-194.

Pinto-Martin, J. A., Dunkle, M., Earls, M., Fliedner, D., & Landes, C. (2005). Developmental stages of developmental screening: Steps to implementation of a successful program. American Journal of Public Health, 95(11), 1928-1932.

Porter, S.A., Qureshi, R.B., Caldwell, B.W., Echevarria, M.W., Dubbs, W.W., Sullivan, M.W. (2016). Developmental surveillance and screening practices by pediatric primary care providers: Implications for early intervention professionals. Infants & Young Children, 29(2), 91-101.

Radecki, L., Sand-Loud, N., O'Connor, K., Sharp, S., & Olson, L. (2011). Trends in the use of standardized tools for developmental screening in early childhood: 2002-2009. Pediatrics, 128(1), 14-19.

Robins, D.L. (2008). Screening for autism disorders in primary care settings. *Autism, 12*(5), 537-556.

Robins, D., Casagrande, K., Barton, M., Chen, C., Dumont-Mathieu, T., & Fein, D. (2014). Validation of the Modified Checklist for Autism in Toddlers, Revised with Follow-up (M-CHAT-R/F). Pediatrics, 133(1), 37-45.

Rosenberg S.A., Zhang D., & Robinson C.C. (2008). Prevalence of developmental delays and participation in early intervention services for young children. *Pediatrics, 121*(6), e1503-e1509.

Rubio, D.M., Schoenbaum, E.E., Lee, L.S., Schteignart, D.E., Marantz, P.R., Anderson, K.E., Platt, L.D., Baez, A., & Esposito, K. (2010). Defining translational research: Implications for training. *Academic Medicine, 85*(3), 470-475.

Sackett, D. et al. (2000). Evidence-Based Medicine: How to Practice and Teach EBM, 2nd Edition. Churchill Livingstone, Edinburgh.

Scheffler, F., Vogel, D., Astern, R., Burgess, J., Conneally, T., & Salerno, K. (2007). Screening for communication and cognitive disorders in infants and toddlers, Pediatric Nursing, 33(6), 473-480.

Screening Time (2017). Screening time: Tuning into the needs of families. American Academy of Pediatrics. Retrieved from https://screeningtime.org/star-center/

Sheldrick, R. & Garfinkel, D. (2017). Is a postive developmental-behavioral screening score sufficient to justify referral? A review of evidence and theory. Academic Pediatrics, 17(5), 464-470.

Sheldrick et al., (2016). A system dynamics model of clinical decision thresholds for the detection of developmental-behavioral disorders. Implementation Science, 11(1), 156-170.

Sheldrick, R. C., Merchant, S., & Perrin E. C. (2011). Identification of developmental-behavioral problems in primary care: A systematic review. Pediatrics, 128(2), 356-363.

Sices L, Feudtner C, McLaughlin J, Drotar D, & Williams M. (2003) How do primary care physicians identify young children with developmental delays? A National Survey. Pediatrics, 24, 409-427.

Silverstein, M., Sand, N., Glascoe, F. P., Gupta, V. B., Tonniges, T. P., & O'Connor, K. G. (2006). Pediatrician practices regarding referral to early intervention services: Is an established diagnosis important? *Ambulatory Pediatrics, 6*(2), 105-110.

Special Education Guide: The Steps in Early Intervention (IDEA Part C) (2019). Retrieved from https://www.specialeducationguide.com/early-intervention/steps-in-early-intervention-idea-part-c/

Siu, A. L. (2015). Screening for speech and language delay and disorders in children aged 5 years or younger: US preventive services task force recommendation statement. *Pediatrics, 136*(2), 474-481.

United States Preventive Services Task Force (2015). Recommendation statement: Autism Spectrum Disorder in young children: Screening. <https://www.uspreventiveservicestask force.org/Page/Document/RecommendationStatementFinal/autism-spectrum-disorder-in-young-children-screening>.

University of Pittsburgh School of Medicine: Office of Medical Education: Curriculum Overview. (2019, March 20). Retrieved from http://www.omed.pitt.edu/curriculum/

U.S. News: Best Pediatrics Programs (2019). Retrieved from https://www.usnews.com/best-graduate-schools/top-medical-schools/pediatrics-rankings

Valleley, R., Evans, J., O'Dell, S., & Allen K. (2014). Developmental screening in rural primary care: Real-world application. Clinical Pediatrics, 53(9), 900-905.

Vanderbilt School of Medicine: MD Curriculum (2019). Retrieved from

      https://medschool.vanderbilt.edu/ume/academic-program/md-curriculum/

Waltz, T.J., Powell, B.J., Fernandez, M.E., Abadie, B., & Damschroder, L.J. (2019). Choosing

      implementation strategies to address contextual barriers: Diversity in recommendations

      and future directions. Implementation Science, 14(42), 1-15.

Wiggins, L., Piazza, V., & Robins, D. (2014). Comparison of a broad-based screen versus

      disorder-specific screen in detecting young children with an autism spectrum disorder.

      Autism, 18(2), 76-84.

Williams, A.A., Cormack, C.L., Chike-Harris, K., Durham, C.O., Fowler, T.O., & Jensen, E.A.

      (2015). Pediatric developmental screenings: A primary care approach. The Nurse

      Practitioner, 40(4), 34-39.

Zwaigenbaum, L. et al. (2015). Early screening of autism spectrum disorder: Recommendations

      for practice and research. Pediatrics, 136(Supplement 1), S41-S59.

Appendix A: Online Survey for Pediatricians

Screening for Communication Delays in Pediatric Practice

Start of Block: Default Question Block

Developmental Screening Measures in Pediatric Practices
SURVEY

KEY INFORMATION
The purpose of this project is improve how pediatricians are capturing infants' and toddlers' communication delay, in particular, how to identify delay within the developmental screening that is currently being implemented in practices. The overall goal of this project is to better understand early identification of developmental delays at well-child visits and referrals for services by pediatricians in the birth to 5-year populations generally and specifically as it relates to communication delays and disorders. Your participation in this project is completely voluntary.

SURVEY DATA COLLECTION
Your participation in this study will take 15-20 minutes. You will be asked to:
1. Complete the consent form (5 minutes)
2. Complete the survey (10-15 minutes)
3. (OPTIONAL) Sign up to complete a follow-up phone interview, which will take an additional 15-20 minutes.
   a. This option will be presented at the end of the survey

There are no risks or discomforts when completing the survey. Possible benefits of completing this survey include understanding current recommendations from American Academy of Pediatrics for developmental screening during well-child visits. Furthermore, this survey may lead to participants exploring and/or thinking about their own procedures to learn more about formal developmental screening measures that are available and recommended by American Academy of Pediatrics.

Your alternative to participating in this research study is not to participate.

DETAILED INFORMATION

INTRODUCTION
The Department of Speech-Language-Hearing: Sciences and Disorders at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

PURPOSE OF THE STUDY
We are conducting this study to better understand pediatricians' experiences, their early identification practices, their views on their own roles and their protocols for referrals for services for developmental delays in general and specifically as it relates to communication delays and disorders to address the gap in using formal screening measures to identify early

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developmental delays, specifically communication delays. This will entail your completion of an online survey. Your participation is expected to take about 20-25 minutes to complete. The content of the survey should cause no more discomfort than you would experience in your everyday life.

Though participation may not benefit you directly, we believe that the information obtained from this study will help us gain a better understanding of how current American Academy of Pediatrics recommendations for screening during well-child visits are being implemented and how formal measures are being used in the field. Your participation is solicited, although strictly voluntary. Your name will not be associated in any way with the research findings. Your identifiable information will not be shared unless (a) it is required by law or university policy, or (b) you give written permission.

RISKS
There are no risks anticipated when participating in this research study.

PAYMENT TO PARTICIPANTS
This is a voluntary study and participants will not be paid for their participation.

PARTICIPANT CONFIDENTIALITY
Your name will not be associated in any publication or presentation with the information collected about you or with the research findings from this study. Instead, the researcher(s) will use a study number or a pseudonym rather than your name. Your identifiable information will not be shared unless (a) it is required by law or university policy, or (b) you give written permission.

PRIVATE INFORMATION (DATA)
Your identifiable information may be removed from the data collected during this project, and the de-identified data will be used for future research without additional consent from you.

REFUSAL TO SIGN CONSENT AND AUTHORIZATION
You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, you cannot participate in this study.

CANCELLING THIS CONSENT AND AUTHORIZATION
You may withdraw your consent to participate in this survey at any time. You also have the right to cancel your permission to use and disclose further information collected about you, in writing, at any time, by sending your written request to:

Krista Voelmle
Attn: Dr. Holly Storkel
1000 Sunnyside Ave
3001 Dole Center
University of Kansas
Lawrence, KS 66045

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If you cancel permission to use your information, the researchers will stop collecting additional information about you. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

QUESTIONS ABOUT PARTICIPATION
If you would like additional information concerning this study before or after it is completed, please feel free to contact us by phone or mail.

PARTICIPANT CERTIFICATION:
Completion of the survey indicates your willingness to take part in this study and that you are at least 18 years old. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429 or write the Human Research Protection Program (HRPP), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7568, or email irb@ku.edu.

I agree to take part in this study as a research participant. By choosing the option to participate, I will be directed to the survey, which indicates that I affirm that I am at least 18 years old and that I have received a copy of this Consent and Authorization form.

Sincerely,

Krista Voelmle, MA CCC-SLP
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Q1 This survey is for pediatricians ONLY. This survey is intended to find out about Pediatricians' role in identification of communication delays/disorders and referral to early intervention services with infants and toddlers. Specifically, your knowledge about communication milestones and your thoughts/knowledge on early intervention services and any prior experience with developmental delay or communication screeners and referring infants and toddlers to early intervention programs or speech-language pathologists. This survey will cover three topics. First, this survey will ask about your current use of screeners (if any) and your thoughts about the current American Academy of Pediatrics recommendations. Second, this

survey will ask for you to provide your opinions on barriers of implementing screeners into your practice during well-child visits. Third, this survey will explore your experience with the referral process for early intervention, your thoughts on your role in referring patients and your reasons for initiating referrals. For the purpose of this survey we are specifically interested in your individual perceptions and how you view yourself in this role. We also want your opinion about what part you play in existing protocols that exist for infants and toddlers with communication concerns. Completion of the survey indicates your willingness to take part in this study and that you are at least 18 years old. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429 or write the Human Research Protection Program (HRPP), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7568, or email irb@ku.edu. I agree to take part in this study as a research participant. By choosing the option to participate, I will be directed to the survey, which indicates that I affirm that I am at least 18 years old and that I have received a copy of this Consent and Authorization form.

○ Yes, I read the consent, and I DO wish to participate in this study. Direct me to the survey

○ No, I read the consent, and I DO NOT wish to participate in this study.

- -

Q2 Are you currently practicing as a pediatrician?

○ Yes

○ No

Q3 What percentage of your caseload are infants/toddlers ages birth to 3-years-old?

○ Less than 25%

○ 25-50%

○ 50-75%

○ More than 75%

○ I am not currently seeing young children on my caseload.

- -

Q4 What is your degree?

☐ MD

☐ PhD

☐ DoD

☐ Other (Please Specify) _____

☐ I prefer not to answer

Q5 What is the type of your practice?

○ Pediatric department within a teaching hospital

○ Pediatric department within a non-teaching hospital

○ Pediatric private practice with LESS THAN OR EQUAL TO 5 pediatricians

○ Pediatric private practice group with 6 OR MORE pediatricians

○ Other (Please Specify) _____

○ Family medicine department within a teaching hospital

○ Family medicine department within a non-teaching hospital

○ Family medicine private practice group with LESS THAN OR EQUAL TO 5 pediatricians (not including family medicine practitioners)

○ Family medicine private practice group with 6 OR MORE pediatricians (not including family medicine practitioners)

○ I prefer not to answer

Q6 Where do you practice?

☐ Rural area (E.g., small city or town)

☐ Urban area (E.g., large city)

☐ Suburban area (E.g., city or town right outside large city)

☐ I prefer not to answer

Q7 How would you BEST describe the socioeconomic status (SES) of your patients?

☐ Upper class-Elite

☐ Upper middle class

☐ Lower middle class

☐ Working class

☐ Poor

☐ Other (Please specify) _____

☐ I prefer not to answer

Q8 On average, how many well-child visits do you conduct A WEEK for children that are birth to 5-years old?

○ 0-10 visits

○ 11-20 visits

○ 21-30 visits

○ More than 31 visits

○ I prefer not to answer

Q9 How long have you been practicing? (Check one, ROUND TO THE NEAREST YEAR)

○ 0-5 years

○ 6-10 years

○ 11-15 years

○ 16-20 years

○ More than 20 years

○ I prefer not to answer

Q10 What year did you complete your residency?

_____

End of Block: Demographic Information

Start of Block: Current Knowledge

Q11 How confident are you in your ability to

	Not at all confident	Slightly less confident	Confident	Moderately confident	Very confident	I prefer not to answer
Identify communication delays	○	○	○	○	○	○
Identify global delays	○	○	○	○	○	○
Refer for communication delays	○	○	○	○	○	○

CURRENT KNOWLEDGE
This section aims to gather information on how you are currently learning about communication milestones in infants and toddlers.

Q12 Are you familiar with any of the following educational programs? (Check all that apply)

☐ Learn the Signs, Act Early

☐ Healthy Steps (Zero to Three)

☐ Birth to 5: Watch me Thrive

☐ Milestone Tracker App

☐ None of these

☐ I prefer not to answer

Q13 What Continuing Medical Education Units topics would you be interested in attending/completing? (Check all that apply)

☐ Developmental milestones

☐ Autism

☐ Early intervention and referrals for services

☐ Identifying communication delays/disorders

☐ Identifying developmental delays

☐ Implementing changes into your practice (E.g., new screening procedures or referral procedures)

☐ Other (Please specify) _____

☐ I prefer not to answer

End of Block: Current Knowledge

CURRENT SCREENING: Experience, Practices, Thoughts, Views, and Opinions
This section aims to explore how you are currently screening your patients who are infants and toddlers for communication delays, developmental delays and Autism Spectrum Disorders during their scheduled well-child visits.

Q14 Which, if any, screening measures have you had ANY experience with?
(Check all that apply)

☐ Ages & Stages Questionnaire (ASQ)

☐ Denver Developmental Screen Test (DDST-II)

☐ Communication and Social Behavioral Scale-Developmental Profile (CSBS-DP)

☐ Parents Evaluation of Developmental Status (PEDS)

☐ Parents Evaluation of Developmental Status-Developmental Milestones (PEDS-DM)

☐ Survey of Wellbeing Young Child (SWYC)

☐ Other (Please Specify) _____

☐ I don't currently implement a formal screening measure

☐ I prefer not to answer

Q15 Which, if any, screening measures do you CURRENTLY implement into your practice?
(Check all that apply)

☐ Ages & Stages Questionnaire (ASQ)

☐ Denver Developmental Screen Test (DDST-II)

☐ Communication and Social Behavioral Scale-Developmental Profile (CSBS-DP)

☐ Parents Evaluation of Developmental Status (PEDS)

☐ Parents Evaluation of Developmental Status-Developmental Milestones (PEDS-DM)

☐ Survey of Wellbeing Young Child (SWYC)

☐ Other (Please Specify) _____

☐ I don't have experience with formal screening measure

☐ I prefer not to answer

Q16 At which well-child visit, if any, do you FORMALLY assess/screen children for communication delays (E.g., using a standardized screening measure similar to ASQ, CSBS, PEDS, etc.)? Check ALL visits that apply.

☐ Before the 6 month visit

☐ 6 month visit

☐ 9 month visit

☐ 12 month visit

☐ 15 month visit

☐ 18 month visit

☐ 24 month visit

☐ 30 month visit

☐ 36 month visit or after

☐ We do not formally assess/screen children at well-child visits

☐ I prefer not to answer

Q17 Developmental surveillance is the process that focuses on informally monitoring developmental milestones at well-child visits in lieu of standardized screening. Which strategies are most important for successful developmental surveillance?
Rank the choices in order of 1-4 from most important (1) to least important (4)
_____ Parent concern
_____ Formal checklist
_____ Parent interview
_____ Observation during well-child visit

Q18 Following a positive screen, who talks to parents about next steps? Answer "yes" or "no" according to which of the following protocols you have in place in your practice.

	Yes	No	I prefer not to answer
The nurses talk to parents about available resources and Early Intervention programs	○	○	○
I talk to parents about available resources and Early Intervention programs	○	○	○
I submit the referral for further evaluation	○	○	○
The nurses submit the referral for further evaluation	○	○	○
I provide the number for referrals to parents to reach out for further evaluations	○	○	○
We have an in-house staff member who handles all referrals	○	○	○

Q19 One of the American Academy of Pediatrics recommendations for screening focuses on Autism Spectrum Disorder, which recommends that healthcare professionals should implement formal Autism Spectrum Disorder screening at 18 and 24-month well-child visits.

	Very strictly	Strictly	Somewhat strictly	Not very strictly	Not at all	I prefer not to answer
How strictly do you FOLLOW these American Academy of Pediatrics' recommendations for screening?	○	○	○	○	○	○

Q20 In 2006, the American Academy of Pediatrics produced recommendations, which stated that healthcare professionals should implement formal developmental screening of infants and toddlers at 9-month, 18-month and 30-months well-child visits.

	Very much agree	Agree	Undecided	Somewhat agree	Not at all	I prefer not to answer
How much do you AGREE with the American Academy of Pediatrics' recommendations for developmental screening?	○	○	○	○	○	○

End of Block: Current Screening: Experience, Practices, Thoughts, Views and Opinions

Start of Block: Barriers to Screening

BARRIERS TO SCREENING
This section explore the factors that stop you from implementing formal screeners regularly or changing the way you are currently screening to align with the recommendations proposed by the American Academy of Pediatrics. Specifically, this section asks about what barriers you face in "real world" situations that make it hard for you to follow AAP recommendations in the way that they are proposed.

Q21 Are the following factors barriers to implementation of screening with a formal screening measure (E.g., ASQ, CSBS, SWBYC, MCHAT, etc)?

	A major barrier	A moderate barrier	A slight barrier	Not a barrier	I prefer not to answer
Time to learn (specifically, not enough time to learn new procedures)	○	○	○	○	○
Resources (E.g., more staff is needed to handle screening and referrals)	○	○	○	○	○
Knowledge (I do not have the experience or knowledge I need to confidently implement screeners)	○	○	○	○	○
Comfort with screener (I do not feel comfortable with implementing screeners)	○	○	○	○	○
Uncertainty with referral (I do not feel comfortable screening because I am uncertain with what to do or where to refer after a positive screener)	○	○	○	○	○
Lack of gold standard screener (I would be more willing to implement screeners if there was one screener that was proven to be better than others)	○	○	○	○	○
Time to implement (specifically, not enough time before, during, or after the appointment to implement and score the screener)	○	○	○	○	○

Q22 How strongly do you agree with the following statements?

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree	I prefer not to answer
Implementing formal screening measures to identify COMMUNICATION DELAYS is important.	○	○	○	○	○	○	○	○
Implementing formal screening measures to identify DEVELOPMENTAL DELAYS is important.	○	○	○	○	○	○	○	○
Implementing formal screening measures to identify AUTISM SPECTRUM DISORDER is important.	○	○	○	○	○	○	○	○

Q23 What factors help, or would help, to implement screening into your practice for all well-child visits?

_____

Q24 Aside from time, what is the biggest barrier that you face when implementing screeners into well-child visits?

_____

Start of Block: Referral Processes

REFERRAL PROCESSES
This section aims to understand WHEN and HOW you are referring children with suspected communication delays. This section also focuses on your thoughts, feelings and opinions on the importance of interprofessional collaboration and/or continuing education opportunities to improve screening practices and identification of communication delays and/or disorders.

Scenario #1 A 24-month old male comes in with his caregivers for a 24-month well-child visit. During the visit, the caregivers express that the child only says a few words (E.g., less than 10) and they feel like the child is not "listening to directions" at home like his older siblings did at his age. The child is meeting all other developmental milestones at every other well-child visit except for his listening and expressive communication at this visit. This is the first time caregivers expressed this concern. Answer the following questions according to this scenario.

Q25 What approach would you take for this child following the visit?

○ Wait and see/monitor at next well-child visit

○ Schedule a follow-up visit BEFORE next scheduled well-child visit

○ Refer for further evaluation to a specialist

○ Refer to Early Intervention services

○ Ask the parent what he or she wants to do and then proceed according to answer

○ Depends on other factors (E.g., screening results, social, at-risk, family factors, medical history, etc.) Please specify: _____

○ I prefer not to answer

Q26 If you chose to refer, who would do the referral?

○ Myself

○ Another professional/staff member (E.g., nurse, nurse practitioner, etc.)

○ An on-staff referral specialist

○ The family will set up the appointment themselves for further evaluation

○ Other (Please specify) _____

○ I prefer not to answer

Scenario #2 An 18-month old female comes in for her 18-month well-child visit. During the visit, the caregiver fills out the developmental milestones screening measure, which shows that the child is delayed in various developmental milestones across domains including: communication, social-behavioral, and gross/fine motor. This is the second time that the caregivers expressed concern. Answer the following questions according to this scenario.

Q27 What approach would you take for this child following the visit?

○ Wait and see/monitor at next well-child visit

○ Schedule a follow-up visit BEFORE next scheduled well-child visit

○ Refer for further evaluation to a specialist

○ Refer to Early Intervention services

○ Ask the parent what he or she wants to do and then proceed according to answer

○ Depends on other factors (E.g., screening results, social, at-risk, family factors, medical history, etc.) Please specify: _____

○ I prefer not to answer

Q28 If you chose to refer, who would do the referral?

○ Myself

○ Another professional/staff member (E.g., nurse, nurse practitioner, etc.)

○ An on-staff referral specialist

○ The family will set up the appointment themselves for further evaluation

○ Other (Please specify) _____

○ I prefer not to answer

Page Break

Q29 What services does Early Intervention provide? (Check all that apply)

☐ Speech-Language Therapy

☐ Occupational therapy

☐ Physical therapy

☐ Psychological services

☐ Family education services

☐ Early childhood education services

☐ Other (Please Specify) _____

☐ I don't know

Q30 How familiar are you with the following:

	Extremely familiar	Very familiar	Moderately familiar	Slightly familiar	Not familiar at all	I prefer not to answer
Birth to 3 Early Intervention services	○	○	○	○	○	○
Referral procedures for Birth to 3 Early Intervention services	○	○	○	○	○	○
Qualifications for Birth to 3 Early Intervention services	○	○	○	○	○	○

Q31 Do you know where to go to find information about Early Intervention services in your area?

○ Yes

○ No

○ I prefer not to answer

Q32 If yes, please describe

_____

Q33 How interested are you in inter-professional collaboration to better your current screening/referral processes?

○ Very interested

○ Interested

○ No preference

○ Somewhat interested

○ Not at all interested

○ I prefer not to answer

Page Break

Q34 Are you interested in participating in a follow-up phone interview? It will take about 10-15 minutes of your time to talk with the primary investigator on this project.

○ Yes

○ No

Q35 If yes, please provide the following information below:

Q36 Your email _____

Q37 Your phone number_____

Q38 Best time of day to schedule a phone call?

☐ Morning

☐ Afternoon

☐ Evening

End of Block: Referral Processes

Appendix B: Questions According to Variables

Variable 1: Current Knowledge

Confidence
- How confident are you in your ability to identify communication delays?
- How confident are you in your ability to identify global delays?
- How confident are you in your ability to refer for communication delays?

Education Programs
- Are you familiar with the following resources?
- E.g., CDC Milestone Tracker App, Learn the signs, Act early, HealthySteps

Continuing Medical Education Unit Topics
- What CMEUs would you take time to attend/complete?
- E.g., Developmental milestones, screening, Autism, early identification, practice changes, depends on the format (E.g., online, in-person, etc.)

Variable 2: Current Screening Practice

Screening Practice
- What, if any, screening measures have you had ANY experience with?
  - MC: ASQ, Denver, PEDS, other.
- What, if any, screening measures do you CURRENTLY implement in your practice?
  - MC: ASQ, Denver, PEDS, other.
- At what well-child visit do you use formal assessment?
- For developmental surveillance, what do you rely on? (RANK ORDER)
  - Parent concern, informal checklist, parent interview, observation

Pediatricians' Role
- What is your role when talking to parents about next steps of the screener?
- Nurses talk about available resources, I talk about available resources, I describe EI programs, I submit the referral for further evaluation, I provide the number to parents to reach out for further evaluation

Thoughts & Opinions
- Are you familiar with the AAP 2006 Guidelines "XXX"
- How strictly do you follow the AAP recommendations for screening for ASD?
- How much do you agree with AAP recommendations for screening for DD?

Variable 3: Barriers to Screening

Thoughts on major barriers

- Are the following factors barriers to implementation of screening with a formal screening measure?
  - E.g., time to learn, resources, knowledge, comfort with screener, uncertainty with referral, lack of gold standard screener, time to implement

Importance

- How strongly do you agree with the following statements
- Implementating formal screening measures to identify...
  - 1. communication delays is important.
  - 2. developmental delays is important.
  - 3. Autism Spectrum Disorder is imporant.

Barriers & Solutions

- What factors help, or would help, to implement screening int your practice for all well-child visits?
- Aside from time, what is the biggest barrier that you face when implementing screeners into well-child visits?

Variable 4: Pediatricians' Referral Processes

Decisions to Refer

- Two scenarios presented
  - What approach would you take for this child following the visit?
  - Who would do the referral?

Knowledge of Early Intervention Services

- What services does Early Intervention provide?
- How familiar are you with the following...
  - 1. Birth to 3 Early Intervention Services
  - 2. Referral procedures for Birth to 3 Early Intervention services
  - 3. Qualifications for Birth to 3 Early Intervention Services.
- Do you know where to go to find information about Early Intervention services in your area?
  - If yes, please describe.

Interest in Inter-Professional Collaboration

- How interested are you in inter-professional collaboration to better your current screening/referral processes?

Appendix C: Semi-Structured Phone Interview Guide

Thank you again for agreeing to participate in this interview. As we discussed before, we're audio-taping this interview and will be transcribing it. We will not put your name on the transcript and we will not use your name in conjunction with any quotes we may use. We are very interested in finding out about Pediatricians' role in identification of communication delays/disorders and referral to early intervention services with infants and toddlers. Specifically, your knowledge about communication milestones and your thoughts/knowledge on early intervention services and any prior experience referring infants and toddlers to these programs. For the purpose of this interview we are specifically interested in your individual perceptions and how you feel those in this community view you in this role. We also want your opinion about what part you play in existing protocols that exist for infants and toddlers with communication concerns.

If you want to tell them what the long-term goal is…
Our overall goal is to use the information gathered from these interviews to create an intervention plan for other pediatricians to help disseminate the information and need for early identification of communication delays in infants and toddlers. First we will start with your thoughts in general about early identification of communication delays during well-child visits. Then we will direct questions to more specific questions about your experience and your role in early identification of communication delays and referrals to early intervention services with infants and toddlers.

1. How are you currently screening for communication delays?

    a. When do you start to assess communication with infants and toddlers?

    b. What screener do you feel most comfortable with using?

    c. What delay do you feel most comfortable identifying?

2. Are you familiar with the AAP screening recommendations?

    a. Do you think these are feasible? Do you agree with these recommendations?

    b. What would you change or want to advise AAP to change about these

    recommendations?

3. What's the biggest barrier you face when implementing screening procedures or

    implementing new procedures into your practice in general?

4. How do you determine a child needs to be referred?

    a. What do you feel your role is in the referral process?