

PEDIATRIC NURSE PRACTITIONERS' DEVELOPMENTAL SCREENING
PRACTICES FOR CHILDREN AGES BIRTH TO THREE

by

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To my family and especially to my mom, Bernice Baca. This is for you.

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Jeanne Marie Schulte

ABSTRACT

PEDIATRIC NURSE PRACTITIONERS' DEVELOPMENTAL SCREENING PRACTICES FOR CHILDREN AGES BIRTH TO THREE

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Developmental screening is the process of using a validated screening tool to identify children at risk of delay. Studies have examined the developmental screening practices of pediatric primary care providers. However, no studies to date have explored the pediatric nurse practitioner (PNP) perspective. The specific purpose of this study was to gain information about the developmental screening practices of PNPs. Furthermore, the study explored how perceptions of their knowledge, skills, and attitudes regarding developmental screening may contribute to their screening behaviors. A qualitative grounded theory study was conducted using a purposive sampling of primary care pediatric nurse practitioners who care for young children. Six in-depth interviews were completed using a virtual platform. Strauss and Corbin's (1990, 2008) inductive approach to data analysis was used to code and interpret the data. A substantive theory of *advancing screening competencies for young children's optimal development* emerged from the data supported by six themes related to program and practice knowledge, skills, and attitudes. The themes included (1) developing awareness, (2) integrating connections, (3) taking an active role, (4) creating opportunities, (5) balancing learning expectations,

and (6) understanding role and responsibilities. The PNPs in this study perceived that as they gain developmental screening experience, they continuously develop interrelated knowledge, skills, and attitude attributes, which contribute to advancing competencies and ultimately lead to more effective screening behaviors that support young children's optimal development. The PNPs in this study followed the American Academy of Pediatrics' developmental screening and surveillance guidelines for general and autism screening using standardized screening tools. They identified areas of program improvement related to developmental screening as additional preparation to work with diverse populations and increased opportunities to utilize the entire screening process. The study's PNPs identified current developmental screening facilitators as physicians, parents, and self-directed. They identified screening challenges as time, practice processes, and parents. The nurse practitioner workforce who care for young children is underrepresented in the literature. Additional research is needed to compare screening practices between pediatricians, family medicine physicians, and family and pediatric nurse practitioners to understand their screening practices and continue to improve developmental screening rates for young children.

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LIST OF ABBREVIATIONS

AAFP	American Academy of Family Physicians
AACN	American Association of Colleges of Nursing
AAMC	Association of American Medical Colleges
AANP	American Association of Nurse Practitioners
AAP	American Academy of Pediatrics
ACA	Affordable Care Act
ANCC	American Nurse Credentialing Center
APN	Advanced Practice Nurse
CPNP	Certified Pediatric Nurse Practitioner Primary Care
CRNA	Certified Registered Nurse Anesthetist
DNP	Doctor of Nursing Practice
EI	Early Intervention
FNP	Family Nurse Practitioner
IDEA	Individual with Disabilities Education Act
IEP	Individual Education Plan
IFSP	Individual Family Service Plan
NAPNAP	National Association of Pediatric Nurse Practitioners
NONPF	National Organization of Nurse Practitioner Faculties
NP	Nurse Practitioner
PNCB	Pediatric Nursing Certification Board

LIST OF ABBREVIATIONS—Continued

PNP	Pediatric Nurse Practitioner
PPCNP-BC	Pediatric Primary Care Nurse Practitioner Certification – Board Certified
USPSTF	U.S. Preventative Service Task Force

CHAPTER ONE

INTRODUCTION

Overview

Under Part C of the 2004 Individuals with Disabilities Education Act (IDEA), children aged birth to three who have or are at risk for a developmental delay are eligible for early intervention services. In 2020, almost 440,000 infants and toddlers received early intervention services, representing 3.7% of U.S. children from birth to age three (National Dissemination Center for Children with Disabilities, 2021). Although the percentage of children served is increasing, many young children who have or are at risk for developmental delays may not be receiving early intervention services for which they are eligible. Rosenberg et al. (2008) suggested that up to 13% of the infant and toddler population would benefit from early intervention services. As high-quality intervention is more likely to reduce future learning, behavior, and health issues over the lifespan, which in turn is less costly to society, it is critical to identify eligible children as early as possible (Center on the Developing Child at Harvard University, 2010), improve rates of evaluation completion and service implementation, and prioritize communication between pediatric professionals and parents (Jimenez et al., 2012).

In 2020, the American Academy of Pediatrics (AAP) reaffirmed their previous 2006 policy statement regarding developmental screening, which provided guidance on the use of standardized screenings when a caregiver raises a concern, when surveillance may indicate a potential delay, and at specific intervals on the periodicity schedule (9-, 18-, 24-, and 30- month well-child visits) (Lipkin & Macias, 2020).

However, although screening practices continue to improve (Lipkin & Macias, 2020; Lipkin et al., 2020), screening recommendations are still not being followed by many medical providers (Arunyanart et al., 2012; Rice et al., 2014). Rice et al. (2014) found that only approximately 20% of children receive even one developmental screening and nearly 70% of children between the ages of 9 – 36 months are not screened at all in medical settings. Arunyanart et al. (2012) found that approximately 42% of pediatricians follow the AAP screening guidelines.

The AAP comprehensive health guidelines include 12 well-child visits before age 3. Therefore, physicians and advanced practice nurses (APN) have a unique opportunity during this critical period of growth and development to administer recommended screenings and identify children who may potentially have or be at risk for a developmental delay so they can be further evaluated. The AAP clearly identifies the differences between developmental surveillance (monitoring) and developmental screening (Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020). Developmental surveillance, or monitoring, is part of every well child visit. It is an informal process that includes observing the child, using milestone checklists, eliciting parental concerns, and gathering developmental history and documenting findings. Developmental screening is a formal process in which a standardized screening instrument is administered to identify children who have a greater likelihood of having a developmental delay (Glascoe et al., 2013) and should be referred for further evaluation. Developmental screening is intended to be used at specific recommended intervals during a child's development even when there are no concerns about development, when a parental concern is expressed, or when surveillance indicates further analysis is necessary

(Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020).

Although nurse practitioners are also responsible for following AAP developmental screening guidelines in the same manner as physicians, the research in the area of developmental screening has focused primarily on physician behaviors. One recent study specifically addressed family nurse practitioner screening behaviors (Gellasch, 2019). Few other studies include APNs and these studies either include developmental screening within the broader categories of “well child visit” or “preventative care,” or only include a limited number of APNs in the participant sample (Brady & Neal, 2000; Freed et al., 2010; Melnyk et al., 2010; Norlin et al., 2011; Schonwald et al., 2009; Tanner et al., 2009). The lack of research illustrates that a gap in the literature exists regarding developmental screening behaviors in the APN population, specifically regarding pediatric nurse practitioners. The purpose of this study is to explore the developmental screening behaviors of pediatric nurse practitioners (PNPs). This study is especially timely given the Centers for Disease Control and Prevention’s (CDC) 2022 revised milestones and the 2020 updated AAP practice guidelines reiterating the critical importance of universal developmental surveillance and screening for young children.

Nurse Practitioner Background Information

Nurse practitioners (NP) are licensed health providers who have extensive training and are able to practice independently in a variety of healthcare settings, including, but not limited to hospitals, all types of private primary care and specialty practices, ambulatory centers, and urgent care clinics. An NP must first obtain a Registered Nurse (RN) degree before completing an accredited master’s or post master’s nursing degree and passing a national certification exam. Some NPs complete a doctorate

level degree (DNP). Nurse practitioner programs include advanced training in pharmacology, pathophysiology, physical assessment, and clinical diagnosis. Currently, states individually determine the level of independent practice (full practice, reduced practice, restricted practice) and prescriptive authority for all nurse practitioners (American Association of Nurse Practitioners, 2022b). Twenty-six full practice authority states and two territories allow NPs to practice under the licensure authority of their state board of nursing. This is the practice model recommended by the National Council of the State Boards of Nursing and the National Academy of Medicine. Thirteen states and three territories operate under reduced practice authority in which at least one element of practice or the practice setting is limited, and NPs must maintain a collaborative agreement with a physician provider in order to practice. Eleven states, including Michigan, operate under restricted practice authority, which is the most limiting. Restricted practice prohibits at least one component of NP practice and requires direct supervision by a health provider (American Association of Nurse Practitioners, 2022b).

Regarding pediatric nurse practitioner certification in the United States, the Pediatric Nursing Certification Board (PNCB) and the American Nursing Credentialing Center (ANCC) are the two governing boards. According to PNCB (2021), there were a total of 24,719 certified pediatric nurse practitioners in the United States. Of these PNPs, 20,494 held a Certified Pediatric Nurse Practitioner Primary Care (CPNP-PC) certification, and 4,225 held a Pediatric Primary Care Nurse Practitioner Certification – Board Certification (PPCNP-BC). Pediatric nurse practitioners represent only about 7% of all 270,000 NP certifications. PNP certification continues to be a declining trend in favor of broader family nurse practitioner certification, which allows practice from birth

through adulthood. Nurse practitioners holding the FNP certification instead of the PNP certification have more flexibility to practice in a variety of settings and specialties which may include adult, pediatric only, or mixed-ages patients (National Association of Pediatric Nurse Practitioners, 2019; Pediatric Nursing Certification Board, 2019).

Trends in Primary Care Demand for Physicians and Nurse Practitioners

The demand for primary care services is projected to increase in coming years, due in part to aging, population growth, expanded health insurance coverage, changes in reimbursement, and health workforce availability (U.S. Department of Health and Human Services, 2016). A 2016 report by the National Center for Health Workforce Analysis provided national and regional projections of supply and demand for primary care practitioners (physicians, nurse practitioners, and physician assistants) through 2025. The Health Workforce Simulation Model (HWSM) projected a shortage of 23,640 primary care physicians (13,100 general and family medicine; 12,960 general internal medicine) by 2025. However, small surpluses are expected in the areas of geriatrics (890) and general pediatrics (1,530) due to population demographics that include (1) lower use patterns for geriatricians among aging populations, and (2) lower growth trends in the pediatric population. These numbers are consistent with projections from the Association of American Medical Colleges (AAMC), which estimate 2033 primary care shortages to range from 21,400 to 55,400 physicians (AAMC, 2020).

In contrast to primary care physician shortages, nurse practitioner supplies through 2025 are expected to exceed demand by approximately 42,000 primary care NPs. The projected NP supply aligns with the findings from the 2018 American Association of Nurse Practitioners (AANP) survey. Of the estimated 270,000 licensed NPs in the United

States, approximately 87% of new graduates are certified in a Family NP program. Although nurse practitioners and physician assistants are not intended to replace physicians, studies show that NPs currently manage routine care such as conducting exams, taking medical histories, ordering and interpreting diagnostic studies, developing treatment plans, and providing anticipatory guidance and preventative care (Horrocks et al., 2002; Mundinger, 1994; Rohrer et al., 2013). Therefore, nurse practitioners may be able to not only help alleviate some of the projected primary care shortages by providing routine and preventative health care services to adult populations (Auerbach et al., 2018) but may also potentially contribute to improvement in developmental screening and service implementation rates for the pediatric population.

Early Intervention Background Information

Early Intervention: IDEA Part C

To understand how developmental screening contributes to the identification of developmental delay and results in early intervention service provision, it is also important to provide background information about the laws supporting infants and toddlers with disabilities in the United States. In 1975, Congress passed the Education of All Handicapped Children Act (Public Law 94-142), which today (with revisions and reauthorizations) is called the Individuals with Disabilities Education Act (IDEA). This act ensured all school-aged children with a disability could receive free appropriate public education. Early intervention services for infants and toddlers with disabilities were not included in this legislation and did not become part of the law until 1986, when it was known as Part H (P.L 99-457). With the reauthorization of IDEA in

1997, the infant and toddler component became Part C and remains Part C to the present day. Congress passed this measure in recognition of “an urgent and substantial need

- to enhance the development of infants and toddlers with disabilities, to minimize their potential for developmental delay, and to recognize the significant brain development that occurs during a child’s first 3 years of life;
- to reduce the educational costs to our society, including our Nation’s schools, by minimizing the need for special education and related services after infants and toddlers with disabilities reach school age;
- to maximize the potential for individuals with disabilities to live independently in society;
- to enhance the capacity of families to meet the special needs of their infants and toddlers with disabilities; and
- to enhance the capacity of State and local agencies and service providers to identify, evaluate, and meet the needs of all children, particularly minority, low-income, inner city, and rural children, and infants and toddlers in foster care.”

(U.S. Department of Education Office of Special Education and Rehabilitation Services, Individuals with Disabilities, Section 1431(a), 2019)

The Office of Special Education Programs (OSEP) (2011) published the final changes to the reauthorization of IDEA in 2004 (P.L. 108-446), which includes guidelines regarding (1) family engagement, (2) IFSP development, implementation, and review, (3) child find/evaluations/assessments/eligibility/initial IFSP, (4) transition from Part C to other programs (including services under Part B), and (5) coordination with Head Start/Early

Head Start, early education, and childcare programs (U.S. Department of Education. Office of Special Education, 2011).

Early Intervention Data and Eligibility Requirements

For IDEA Part C, census data are used to determine grant funding for each state and allocations are based on the number of children in the general population aged birth through 2 years in each state. States must meet specific requirements that include (1) assuring availability of services to every eligible infant or toddler, (2) establishing a lead agency to administer the program (3) establishing an Interagency Coordinating Council (ICC) including parents of young children with disabilities to serve as advisors, and (4) establishing a formal plan to implement the early intervention system for the state, such as the public awareness program and the referral system (U.S. Department of Education Office of Special Education, 2016). According to OSEP, children with disabilities are defined as those who

(1) “are experiencing developmental delays, as measured by appropriate diagnostic instruments and procedures, in one or more of the following five areas: cognitive development, physical development, communication development, social or emotional development, or adaptive development; or (2) have a diagnosed physical or mental condition that has a high probability of resulting in developmental delay.” (U.S. Department of Education, 2016)

Since states are able to develop their own definitions of developmental delay and how delay will be measured, child eligibility for services varies from state to state and the proportion of infants and toddlers served also varies. States can also determine whether they will serve “at-risk” infants and toddlers with conditions such as low birth weight, lack of oxygen or respiratory distress at birth, infections, and other factors that may put them at risk for developmental delay if not provided early intervention services.

However, currently only five states (Illinois, Massachusetts, New Hampshire, New Mexico, and West Virginia) service children considered “at risk” for delay. Due to funding challenges, states are continuing to narrow eligibility criteria, which in turn lowers enrollment rates and excludes children who would have otherwise qualified for services (Zero to Three and CLASP, 2017).

Once a child is identified and referred for services, a multidisciplinary team conducts an evaluation. If the child meets eligibility guidelines, the team works with the family through a service coordinator to develop an individual family service plan (IFSP) for the child. The IFSP is a detailed plan of services that includes the types of services the child will receive along with the frequency and intensity of services, and the length that services will be provided. Multidisciplinary team members develop the plan from a strengths-based approach, taking into consideration the unique strengths of the family and the needs of the child and the family. According to the AAP Committee on Children with Disabilities (1999), pediatricians should not only establish clear communication with the team, but “when schools or educational agencies are developing the IEP or IFSP, a pediatrician should serve as a member of the assessment team” (p. 126). Parents are a critical component in the development of the plan and are encouraged to share any concerns and priorities for their child’s care. Services may include physical, speech, and occupational therapy, assistive technologies, psychological and social work services, parent education, counseling, and medical services for diagnostic purposes. As each child’s and family’s needs are unique, each plan is highly individualized (Jung & Grisham-Brown, 2006). When the plan is implemented, early intervention services must

then be provided in natural environments, such as the home, childcare programs, or community locations, to the maximum extent possible (Zero to Three and CLASP, 2017).

Primary Care Providers' Roles and Responsibilities in Early Intervention

The Affordable Care Act (ACA) recognized NPs as primary care providers (PCP) and the Institute of Medicine (now known as the National Academy of Medicine) supports the ability of advanced practice nurses to practice to their fullest potential (Institute of Medicine, 2011). Using these criteria, NPs who function in the role of a PCP and care for children have the same responsibility as a pediatrician or family medicine physician for ensuring appropriate early intervention screening and service is provided for all eligible children within their practice. However, the AAP does not share this view, as evidenced by their 2013 policy statement “Scope of Practice Issues in the Delivery of Pediatric Health Care.”

The AAP statement (2013) acknowledged the importance of non-physician clinicians (physician assistants and nurse practitioners) in pediatric health care delivery, but specifically noted that even with proposed increases in NP education and training, NPs “will not achieve parity with physicians” and “...AAP believes that pediatricians and NPs are not interchangeable in the delivery of pediatric health care” (American Academy of Pediatrics, 2013 p. 1213). The American Academy of Pediatrics also upheld the position that instead of expanding NPs’ full practice authority, NPs should only practice under the supervision of a physician and stated, “the AAP endorses this collaborative and structured relationship and believes this choice reflects both a shared commitment to patient safety and the positive nature of current pediatrician-NP relationships in US health care” (AAP, 2013, p. 1213). This statement creates further ambiguity regarding the

role and responsibilities of the NP within the pediatric practice, as in some states NPs do practice independently from physicians, with full practice authority. Although NPs' roles in early intervention are not well defined, for all practical purposes, NPs are considered to have the same responsibilities as physicians to identify potential delays, refer families to services, and follow-up on evaluation results.

Statement of the Problem

Although physicians' roles and responsibilities within the context of early intervention are well defined (Rose et al., 2014), pediatric nurse practitioner roles are not as clear, and no known studies explore PNP roles in early intervention, specifically regarding developmental screening practices.

Purpose of the Study

The purpose of this study is to explore the developmental screening practices of pediatric nurse practitioners who provide primary care for children from birth through age three and learn about how perceptions of their knowledge, skills, and attitudes regarding developmental screening contribute to their screening behaviors. In-depth interviews were used to gather this information. The four research questions for the study are:

- What are the developmental screening practices of pediatric nurse practitioners?
- How do pediatric nurse practitioners describe their knowledge about developmental screening?
- How do pediatric nurse practitioners describe their skill with developmental screening?

- How do pediatric nurse practitioners describe their attitudes about developmental screening?

Significance of the Study

Given the high number of infants and toddlers who are not being identified for or receiving early intervention services, and the lack of research on nurse practitioners' role in early intervention (specifically related to developmental screening), this study aimed to examine PNP screening practices. This study adds to the knowledge base about (1) PNPs' current developmental screening behaviors in practice and (2) PNPs' perceptions of their knowledge, skills, and attitudes about developmental screening. Findings from this study could be used by organization policy leaders (National Association of Nurse Practitioners [NAPNAP], American Association of Nurse Practitioners [AANP], American Association of Colleges of Nursing [AACN], National Organization of Nurse Practitioner Faculties [NONPF]) and academic institutions in collaboration with licensing boards (PNCB and ANCC) to drive curriculum and continuing education standards related to PNP developmental screening behaviors in practice.

Theoretical Perspective

The primary theoretical grounding for this study originated from experiential learning theory. Experiential learning occurs when an individual is placed in a real-life situation and is able to reflect upon the experience to gain a depth of understanding not previously present. The ability to critically reflect upon the experience is the key component that sets experiential learning apart from other types of learning. According to Schön (1987), in his work on the development of reflective practice in professionals, information gained through traditional, professional preparation is not often beneficial in

real world settings. In experiential settings, unexpected events that force learners to step outside their “zones of mastery” lead to two types of reflection: Reflection *in* action and reflection *on* action. Of course, reflection in action happens in the moment as learners apply what they know to novel situations, which continually increases competency. Reflection on action is the metacognitive process of mentally walking through the steps of a previous encounter to determine what happened, if the actions were appropriate to the situation, and how the past experience will impact future situations. As Schön (1987) pointed out, intentional reflection is the critical component that allows practitioners to continue learning and growing in practice.

It is important to note that experiential learning theories and how they are applied in practice vary somewhat based on the unique perspective of key theorists. For example, Piaget and Inhelder (1973) believed that the transformation of an individual’s experience through the process of accommodation and assimilation leads to the development of new ideas. Dewey (1916, 1938) emphasized the importance of learners’ active participation in the learning process. Vygotsky (1978) connected the social aspect of learning within a group to a learner’s ability to make meaning from their experiences. Knowles (1984) established the adult learner at the center of the learning process, focusing on the characteristics of adult learners as self-directed, self-motivated, and self-efficient. Regardless of the theoretical lens, one could argue that experiential learning, with the focus on active, authentic, hands-on experiences originated from a constructivist theoretical perspective in which learners are constructors of their own knowledge with the ability to make meaning through their individual experiences within the context of social interaction (Vygotsky, 1978).

As such, to develop competent pediatric healthcare providers, they must have multiple and repeated opportunities to experience patient encounters, so they are able to apply and expand knowledge and skills in authentic clinical settings. In relation to pediatric nurse practitioners and early intervention as a whole, PNPs must therefore have opportunities to follow AAP guidelines in practice with real patients including assessing, screening, interpreting results, referring, and following up with evaluation results and service provision. Supporting this premise are the experiential learning theories developed by Rogers (1961), Dewey (1916, 1938), and especially Kolb (1984), whose learning model focused on the importance of integrating experience, perception, metacognition, and reflection to understand behavior (Kolb, 1984; Lisko & O'Dell, 2010).

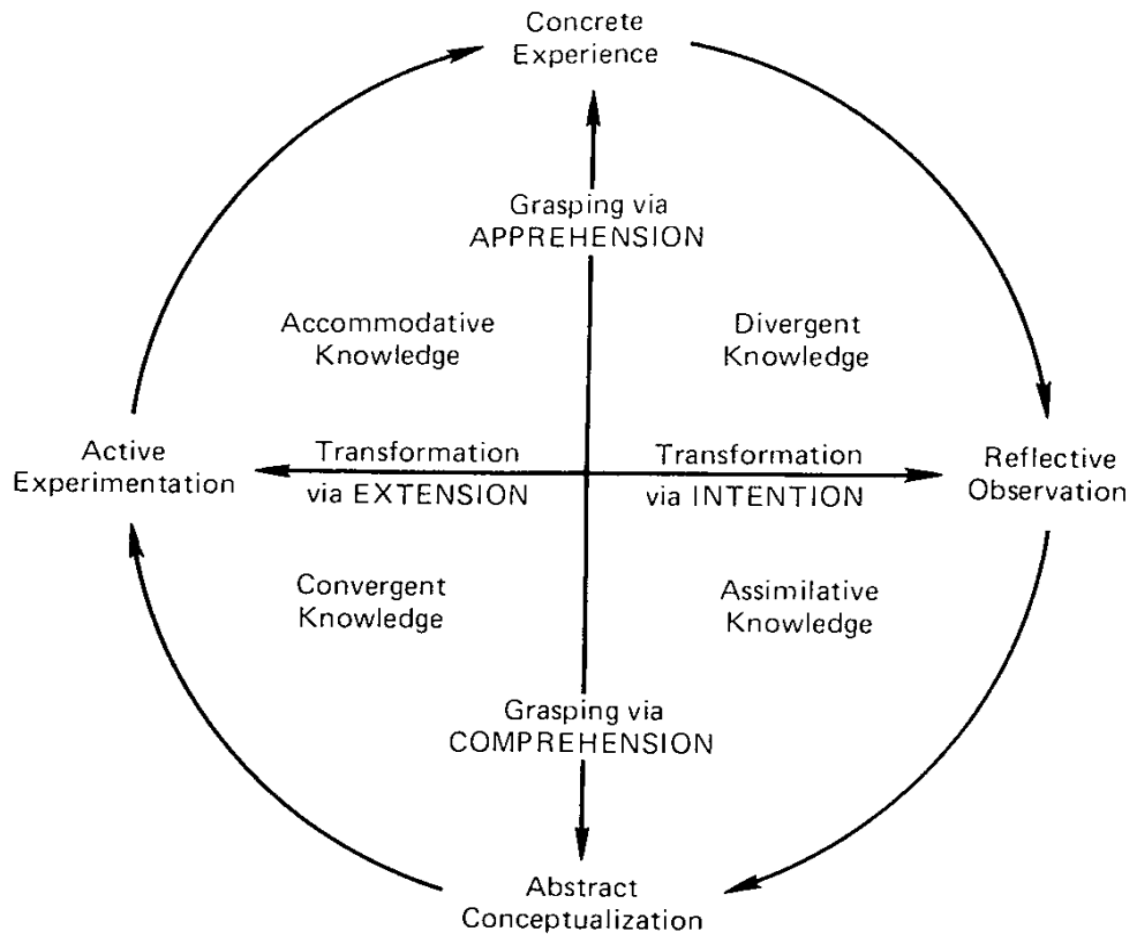
Kolb (1984) described learning as “the process whereby knowledge is created through the transformation of experience” (p. 38). Kolb’s theory is based upon six constructs that support the constructivist view:

- (1) Learning is a process, not an outcome; (2) Learning is driven from experience; (3) Learning requires the learner to resolve conflicts through dialogue; (4) Learning carries a holistic and an integrative view; (5) Learning requires individual interaction with the environment; and (6) Learning creates knowledge. (Kolb, 1984, pp. 25-38)

Kolb’s experiential learning theory (Figure 1) includes four learning styles and a four-stage learning cycle viewed as a continuous process, within which learning can begin at any point. The learning cycle includes a concrete experience, observation and reflection, the formation of abstract concepts about the experience, and testing hypotheses in new situations (Kolb, 1984). Kolb’s model illustrates the cycle of experiential learning as it relates to every learner, as well as an individual’s learning

Figure 1

Kolb's Experiential Learning Model



Note. From *Experiential Learning: Experience as Source of Learning and Development* (2nd ed., p. 42) by D. Kolb, 1984, Prentice-Hall. Copyright 1984 by David A. Kolb. Reprinted with permission.

preference, on a continuum of feeling to thinking (this perception continuum relates to a learner's emotional response and how they think or feel about an experience) and watching to doing (this processing continuum relates to how learners prefer to approach a task) (Kolb, 1984).

Kolb (1984) traced his ideas about learning styles and personality development back to several theorists including John Dewey, Kurt Lewin, and Jean Piaget. He also acknowledged the influences of Carl Jung, Erik Erikson, Carl Rogers, and Abraham Maslow upon his work. Dewey was, however, one of the most important influences on Kolb with regard to reflective thought and action as it relates to experiential learning. Dewey (1925) clearly counseled against taking experiences at face value and advised that in order for experience to be transformational, reflective practice must consider how culture affects personal observation and interpretation of experience:

Experience is already overlaid and saturated with the products of the reflection of past generations and by-gone ages. It is filled with interpretations, classifications, due to sophisticated thought, which have become incorporated into what seems to be fresh naive empirical material. It would take more wisdom than is possessed by the wisest historical scholar to track all of these absorbed borrowings to their original sources. (p. 40)

In other words, it is critical to recognize how assumptions, prejudices, or beliefs can influence present behaviors. Because something has always been done a certain way does not mean it is the most accurate, beneficial, or effective practice. Critical reflective practice reveals past circumstances and contributes to the ability to apply different actions to the present circumstances, thereby affecting behavior. Dewey, like Kolb, also maintained that concepts and meanings that transfer between different situations are created as a result of both mental internalization and the consistent interactions between a

person and their environment. Critical reflection is necessary for transformative learning to occur in an experiential learning context and for competency to be attained over time (Dewey, 1925).

Healthcare providers are assessed within their roles based on competencies related to evidence-based practices. Competency statements describe areas of behavioral performance that are necessary for professionals to be considered competent in a particular role. It is critical to develop and maintain healthcare professionals who have the competencies necessary to continuously improve the quality of the healthcare systems within which they work. Patricia Benner's work (1982, 1984) provides an explanatory framework for understanding nursing practice and nurse competency development.

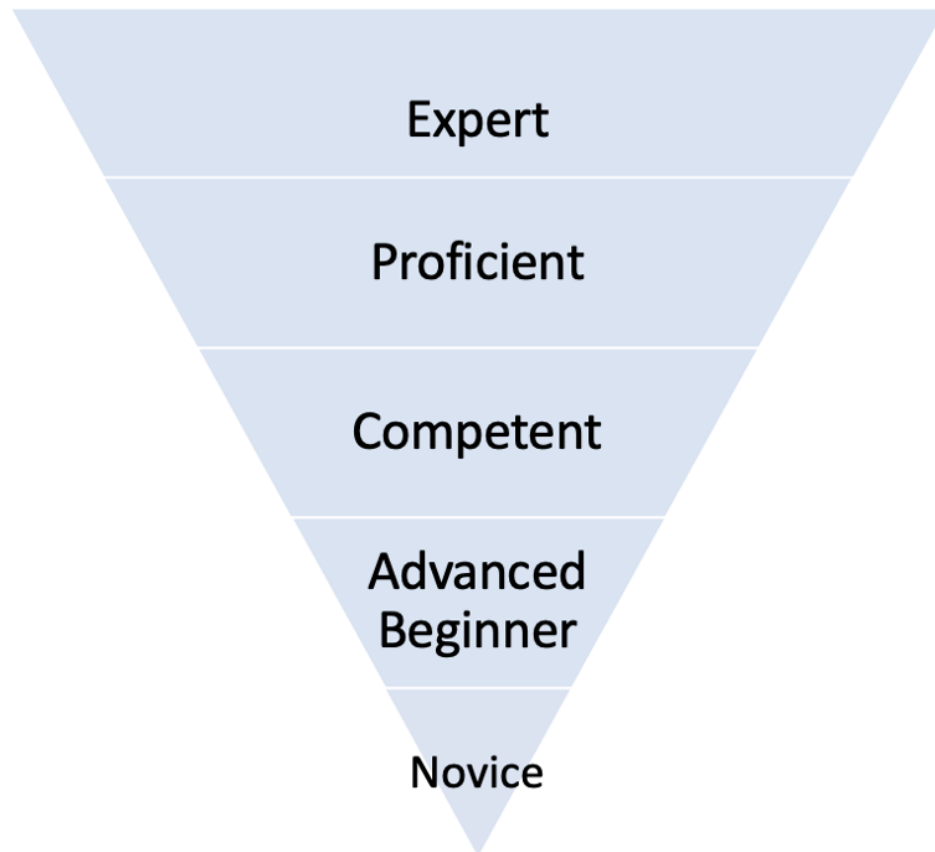
Benner's five stage model was adapted from the Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980) to focus specifically on evaluating nursing skills. It illustrates how as nurses gain experience and skill over time, they progress through the levels including novice, advanced beginner, competent, proficient, and expert (Benner, 1982). Benner's model has become the foundation for nursing students and continuing nursing education.

The National Organization of Nurse Practitioner Faculties (NONPF), in collaboration with the American Association of Colleges of Nursing (AACN), have developed Nurse Practitioner Core Competencies (NP Core Competencies) and population-focused competencies (i.e., Pediatrics). These competencies define essential behaviors of all NPs to ensure they have the knowledge, skills, and attitudes necessary to implement the full scope of practice as a licensed independent clinical practitioner (Keough et al., 2011; NONPF, 2012). The outcomes of this study provide insight about

PNPs' developmental screening behaviors which could contribute to the future development of effective pre-licensure and continuing education programs and training intervention models for all NPs who provide primary care for children from birth to age three.

Figure 2

Benner's Nursing Model



Note. Modified after “From novice to expert” by P. Benner, 1982, *The American Journal of Nursing* 82(3), pp. 402 – 407. Copyright 1982 by Lippincott, Williams & Wilkins.

CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter provides a review of relevant literature and policies related to developmental screening. A comprehensive electronic database search was conducted on PubMed (MEDLINE), the Oakland University OneSearch database, and Journal/Author Name Estimator (JANE) to identify U.S. peer-reviewed studies related to physician and nurse practitioner developmental screening practices from 2000 to 2022. Search terms included developmental surveillance, developmental screening, developmental delay, early intervention, pediatric developmental screening, nurse practitioner developmental screening, nurse developmental screening, and pediatrician developmental screening. Studies excluded from consideration were those with children over the age of five, studies conducted in countries other than the U.S., validation studies of developmental screening tools, and studies with participants other than pediatric health professionals (such as caregivers or educators).

Studies were categorized into three main areas: (1) developmental surveillance and screening guidelines, (2) current developmental screening practices, and (3) importance of developmental screening, identification, and referral practices. Studies within these areas explored pediatric professionals' practice in relation to developmental screening and provided insight into the behaviors that were relevant when exploring pediatric nurse practitioners' knowledge, skills, and attitudes about development screening practices.

Developmental Surveillance and Screening Guidelines

The American Academy of Pediatrics (AAP) is the definitive authority on pediatric care and establishes health care standards, policy statements, advocacy, research, and practice recommendations for all pediatric professionals in the United States. The 2020 AAP Clinical Report (Lipkin & Macias, 2020) revisited the previous 2006 policy statement regarding developmental surveillance and screening and reiterated the recommendation for universal screening, which includes, but is not limited to: (1) developmental surveillance at all well visits, (2) the use of evidence-based screening instruments for developmental delay at 9-, 18-, and 24- to 30- months (even when there are no concerns) or any time a parental concern regarding developmental delay is expressed, and (3) specific autism screening at 18- and 24-month visits (Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020).

The AAP policy statements provide a framework for pediatric professionals to use in the implementation of developmental surveillance and screening that emphasizes “the use of general, standardized, developmental screening tests with strong psychometric properties, including reliability, validity, sensitivity, and specificity” (Lipkin & Macias, 2020, p. 2). Not only did this most recent policy statement reaffirm the algorithm introduced in 2006 that pediatric professionals used to determine how to implement screening at well child visits within their practices, but the policy also revisited guidance regarding specialty referrals and other early intervention services. The AAP 2006 policy statement successfully focused attention on pediatric conditions and disabilities and directly led to initiatives to revise screening guidelines for autism spectrum (ASD) (Johnson & Myers, 2007), attention-deficit/hyperactivity disorder (ADHD) (Wolraich et

al., 2019), as well as behavioral (Weitzman & Wegner, 2015), auditory (American Academy of Pediatrics Joint Committee on Infant Hearing, 2007), and neuromotor (Noritz & Murphy, 2017) conditions.

Figure 3 represents the developmental screening model used in the primary care setting. NAPNAP has identified best practices in developmental screening (Myers, 2014) and endorsed the recommendations of the AAP. NAPNAP's position statement (2011) also affirmed NPs' skill in conducting standardized developmental screenings following the AAP model and algorithm. However, Melnyk et al. (2010) found that PNP students nearing the end of their PNP program had not been provided clinical opportunities to gain the knowledge and skills necessary to conduct effective developmental screenings and follow AAP practice recommendations.

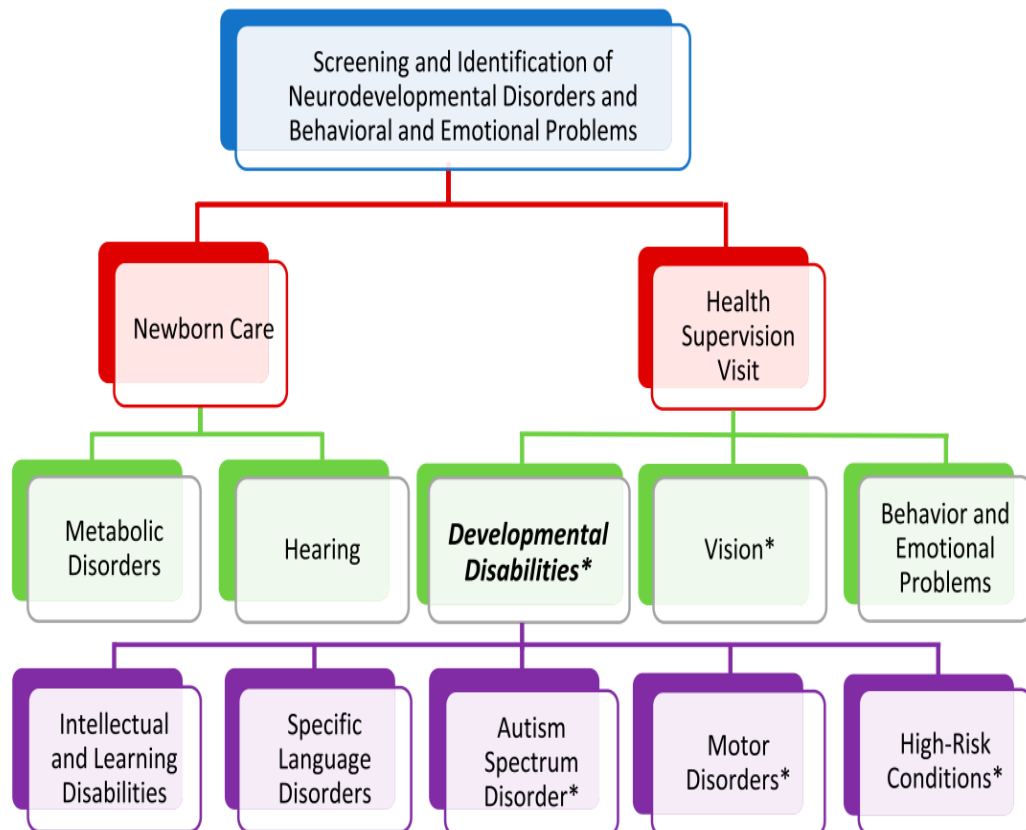
As previously noted, the AAP clearly identifies the differences between developmental surveillance (monitoring) and screening (Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020). Developmental screening is a formal process using a standardized screening instrument to identify children who have a greater likelihood of having a developmental delay (Glascoe et al., 2013) and should potentially be referred for further evaluation. Developmental screening is intended to be used at specific recommended intervals during a child's development, when a parental concern is expressed, or when surveillance indicates further analysis is necessary (Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020).

The AAP does not recommend a specific screening tool, but the *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents* (Hagan et al., 2017) provides recommendations for pediatric professionals regarding the selection of a

general screening instrument to meet individual practice needs. Examples of the more widely used instruments include: Ages and Stages Questionnaire (ASQ-3) (Squires & Bricker, 2009), Parents Evaluation of Developmental Status (PEDS) (Glascoe, 1997), and the Denver Developmental Screening Test II (DDST-II) (Frankenburg & Dodds, 1990).

Figure 3

Developmental Screening Model



Note. From “Promoting Optimal Development: Identifying Infants and Young Children with Developmental Disorders Through Developmental Surveillance and Screening” by P. Lipkin, M. Macias, and Council on Children with Disabilities Section on Developmental and Behavioral Pediatrics, 2020, *Pediatrics*, 145(1), p. 3. Copyright 2020 by the American Academy of Pediatrics. Reprinted with permission.

Figure 4 represents the AAP recommended algorithm for pediatric health professionals to use when screening patients without previously identified developmental risk of delay during well child/health supervision visits. The steps are:

Step 1: Patient arrives for a well child/health supervision visit.

Step 2: Determine if this visit is a 9-, 18-, 24-, or 30-month visit that requires a standardized screening.

Step 3 a-d: Administer the developmental screening test as appropriate.

Step 4: Perform appropriate physical examination and developmental surveillance (including risk factor assessment).

Step 5: Identify if the screening indicates a potential motor concern (if yes, see Step 7).

Step 6: Identify if the screen result is concerning (if yes, see Steps 8 & 9)

Step 7: Perform motor disorder evaluation as indicated by potential motor concern.

Step 8: Perform complete medical evaluation.

Step 9: Perform or refer for developmental evaluation; refer to early intervention or early childhood education.

Steps 10, 11, 12: If surveillance indicates a concern (Step 10) document the concern in the patient's electronic health record (Step 11). Advise an early return visit (Step 12).

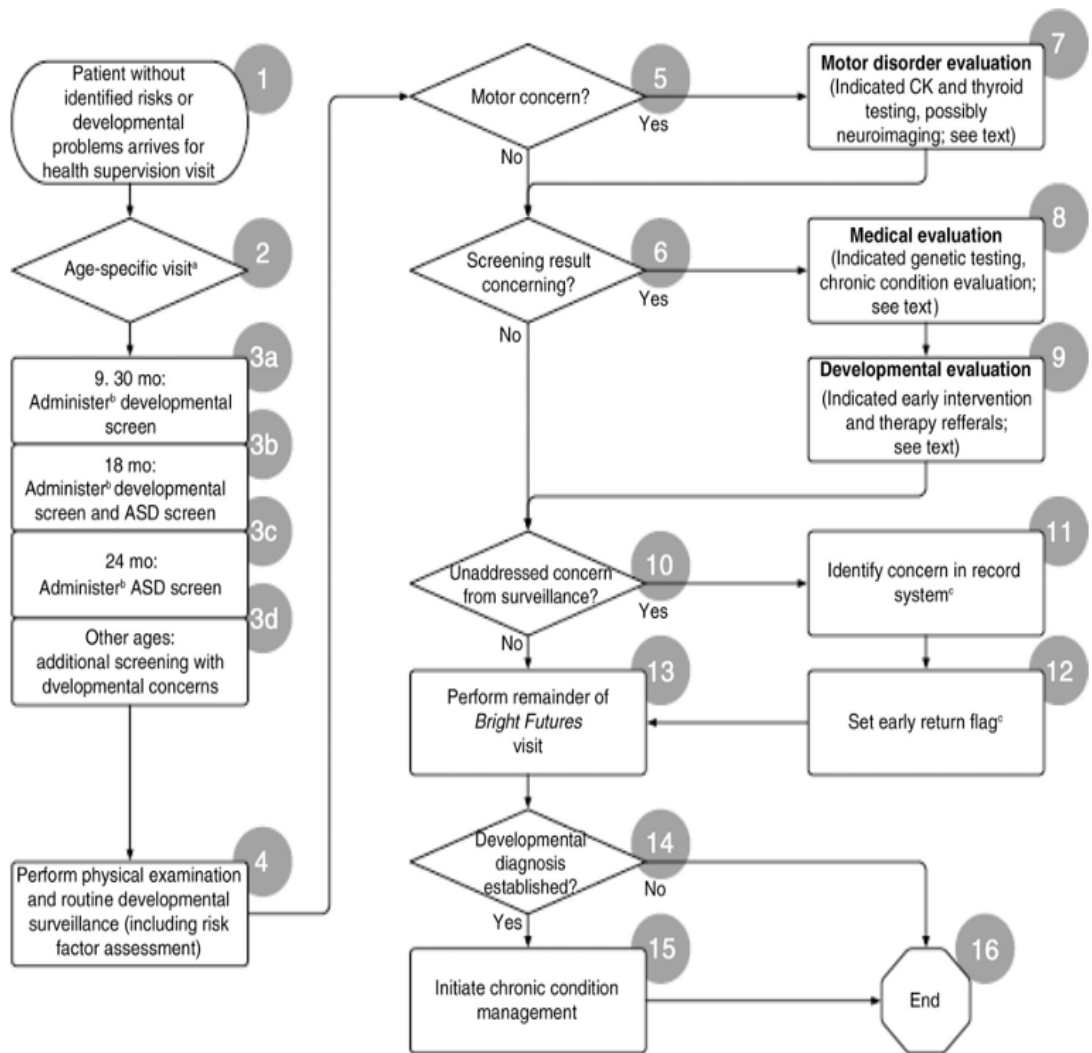
Step 13: Perform remainder of *Bright Futures* health supervision visit.

Steps 14 and 15: If a developmental diagnosis is established (Step 14), initiate chronic condition management (Step 15).

Step 16: Conclude visit. (Lipkin & Macias, 2020, p. 4)

Figure 4

Developmental Screening Algorithm



Note. From “Promoting Optimal Development: Identifying Infants and Young Children with Developmental Disorders Through Developmental Surveillance and Screening” by P. Lipkin, M. Macias, and Council on Children with Disabilities Section on Developmental and Behavioral Pediatrics, 2020, *Pediatrics*, 145(1), p. 4. Copyright 2020 by the American Academy of Pediatrics. Reprinted with permission.

Developmental surveillance is different from screening in that it is informal and includes completing a developmental history, noting and exploring any changes to previous history, eliciting parent's observations of their child and any concerns, observing the child throughout the visit, and bidirectional communication with other early childhood professionals (childcare, early learning programs, and home visiting programs) regarding new developments or concerns (Council on Children with Disabilities et al., 2006; Lipkin & Macias, 2020). Developmental surveillance is a continuous monitoring process involving clinical judgment. It is intended to be implemented at every visit to support the identification of children who may be at increased risk for developmental delays. Milestone lists are often embedded into the electronic health record to help guide the visit, but since they are uncited, unvalidated, and based on clinical opinion of typical development, milestones used in isolation are not quality indicators of when additional assessment may be warranted. Studies continue to indicate that surveillance alone is not effective in detecting children at risk for developmental delays or disabilities and should not be used as a stand-alone practice (Bagnato et al., 2008; Council on Children with Disabilities, 2006; Guevara et al., 2013). To ensure the most effective outcomes, developmental surveillance and screening should be used together to identify potential developmental delays (Mackrides & Ryherd, 2011; Thomas et al., 2012).

Current Developmental Screening Practices

Although developmental monitoring and screening may be performed by a variety of healthcare and education professionals (in collaboration with parents and caregivers), physicians are the primary source for developmental screening and referral to early

intervention services (Radecki et al., 2011). Over the last 10 years, developmental screening rates have improved, due in a large part to concentrated efforts within AAP (Hirai et al., 2018; Hix-Small et al., 2007). According to “Trends in Pediatricians’ Developmental Screening: 2002-2016” (Lipkin et al., 2020), pediatricians’ reported use of standardized developmental screening tools tripled from 21% in 2002 to 63% in 2016, and referral of at-risk patients to early intervention rose from 41% in 2002 to 59% in 2016. Several studies provide examples of successful integration of developmental screening into practice settings (Earls et al., 2009; Hix-Small et al., 2007; Malik et al., 2014; Schonwald et al., 2009). Yet other studies continue to indicate that in practice, AAP screening recommendations are still not being followed by many pediatric medical providers due in part to implementation challenges such as time, office staff, reimbursement, and screening confidence (Barger et al., 2018; Gellasch, 2016; Hirai et al., 2018; King et al., 2010; Morelli et al., 2014; Radecki, 2011; Rice et al., 2014; Rydz, 2005; Sand et al., 2005).

Mackrides et al. (2011), Weitzman et al. (2015), and Radecki et al. (2011) all found that approximately 50% of pediatricians reported consistent use of a standardized developmental screening instrument in practice. The 2018-2019 National Survey of Children’s Health indicated that 63.6% of parents with children between the ages of 9 and 35 months indicated a developmental screening had not been completed for their child in the previous year, equating to a national population estimate of approximately 5.5 million children. For children in Michigan, 70.7% of parents indicated their child had not received a developmental screening, which is higher than the national average (Child and Adolescent Health Measurement Initiative, 2019). The percentage of children not

receiving general developmental screenings at both the national and state level is concerning due to the critical importance of early detection and intervention.

Importance of Developmental Screening, Identification, and Referral Practices

Early detection and intervention during the time of rapid brain development can minimize disabilities and delays and provide an increased opportunity for children with disabilities to have better outcomes than children for whom services are delayed (Anderson et al., 2003; Hebbeler et al., 2007; Shonkoff & Hauser-Cram, 1987). As evidenced in *From Neurons to Neighborhoods: The Science of Early Childhood Development* (Shonkoff & Phillips, 2000):

Compensating for missed opportunities, such as the failure to detect early difficulties or the lack of exposure to environments rich in language, often requires extensive intervention, if not heroic efforts, later in life. Early pathways...establish either a sturdy or fragile stage on which subsequent development is constructed. (p. 384)

In order for children to receive early intervention services, they must first be identified, referred, and evaluated. When a potential delay is identified, a timely medical evaluation and referral to early intervention is warranted. However, referral and evaluation processes among providers are inconsistent and it is often difficult to accurately track referrals and evaluations to ensure that services are received (Guevara et al., 2013; King et al., 2010; Sices et al., 2004; Talmi et al., 2014). Parents of children who receive EI services typically share developmental concerns with their pediatric provider many months before a referral is made. For example, Bailey et al. (2004) noted that children on average are referred to EI at approximately 13 months and receive services at approximately 16 months. For ASD specifically, studies show that parents often note developmental concerns by 18 months (Zwaigenbaum et al., 2013; Zwaigenbaum et al., 2015) yet the

average age ASD is diagnosed is between ages 4-7 years (Maenner et al., 2020; Oswald et al., 2017; Sheldrick et al., 2017). Often the referral delay is correlated to a desire to see if potential developmental concerns will improve with time (Sices et al., 2009) or to pediatric providers who prefer to complete independent testing (Bailey et al., 2004) before making a formal referral. As the brain is rapidly developing from birth to age three, delays such as these can result in lost months of services during a critical time in a child's development and may negatively affect the potential to reduce a developmental disability or delay (Anderson et al., 2003; Oono et al., 2013; Rose et al., 2014; Zwaigenbaum et al., 2015). Findings from this research along with related studies about precepting medical and NP students and training healthcare providers (Berry et al., 2014; Drayton-Brooks et al., 2017; Giddens et al., 2014; Kusnoor & Stelljes, 2016; Meurer et al., 2022; Roberts et al., 2020) suggest that additional program and professional development experiences may improve perceptions about developmental screening knowledge and skills. Perceptions about screening competency can positively affect providers' attitudes about the process and ultimately lead to improved screening behaviors.

CHAPTER THREE

METHODS

Research Approach

The aim of this study was to gain an understanding of the birth to three developmental screening practices of pediatric nurse practitioners in primary care settings. This study was conducted using a qualitative design and a grounded theory methodology (Corbin & Strauss, 1990; Creswell, 2013; Strauss & Corbin, 2008) to gain an understanding of PNP's developmental screening practices.

In a grounded theory approach, the researcher “derives a general, abstract theory of a process, action, or interaction grounded in the views of the participants” (Creswell, 2009, p. 30). Three prevalent grounded theory approaches include Glaser and Strauss (1967), Strauss and Corbin (1990, 1994), and Charmaz (2014). Several differences are apparent between the approaches, including the role of the researcher and the researcher's use of prior knowledge, development of the research questions, the process for coding data and data analysis, and the development of theory (Charmaz, 2014; Glaser & Strauss, 1967; Hall et al., 2013; Rieger, 2019; Strauss & Corbin, 1990). Although all three approaches were explored and considered, Strauss and Corbin's (1990) and Corbin and Strauss' (2008) systematic and step-by-step process to conducting grounded theory research seemed the most appropriate for the purpose of this study and for a doctoral dissertation researcher. As previously noted, data were collected through in-depth interviews (Crotty, 1998).

Researcher Role

As part of the process of reflexivity, it is important for a researcher to determine their position in relation to the research and how their background and viewpoints could potentially influence the research. Herod (1999) noted that when research includes individual interviews,

both interviewer and interviewee participate in knowledge creation and, consequently, although the ‘outsider’ and the ‘insider’ may shape this process in different ways, it makes little sense to assume that one version of this knowledge is necessarily ‘truer’ in some absolute and ‘objective’ sense. (p. 314)

In conducting this study, the concept of insider or outsider was not viewed as a dichotomy with two fixed points, but as a continuum in which the endpoints are fluid. The researcher does not have experience as a medical provider and has not worked in a primary care medical practice in any capacity. The researcher has experience in early childhood and medical education, working with family medicine nurse practitioners, and personal experience regarding physician clinical practices. Therefore, the study was approached more so as an outsider with only basic knowledge and no pre-conceived ideas about pediatric nurse practitioners’ behaviors surrounding developmental screening practices.

Participants

This study included a purposive sample of PNPs in Michigan who care for children from birth to three years of age and conduct well child visits in an outpatient, primary care setting. According to Patton, (2002) a purposive sampling method is an effective way for the researcher to include participants who can provide the in-depth information necessary to gain understanding about the phenomenon being explored. In

Michigan, as there are only estimated to be approximately 300 licensed primary care PNP's (and significantly fewer PNP's practicing within a primary care setting in which well-child visits are conducted) purposeful sampling was the most effective method to identify participants from this very limited population. Additional details are provided about the study participants in Chapter 4.

Recruitment of Participants

Institutional Review Board (IRB) approval was obtained in September of 2021 (Appendix A). The Michigan Chapter of NAPNAP was contacted to request permission to place a recruitment post (Appendix B) on the NAPNAP Facebook forum. The NAPNAP Facebook platform was selected because the study's geographical focus is primary pediatric nurse practitioners in the state of Michigan. The post included the IRB approved recruitment advertisement about the study and included a Google Form survey (Appendix C) link to complete contact information (name, email, practice zip code(s), license, and degree obtained) to indicate interest in study participation. However, due to the increased pediatric cases of COVID-19 and the approval of pediatric COVID-19 vaccines during the recruitment time, the Michigan Chapter of NAPNAP denied the request and noted that all member contact research requests would be suspended indefinitely due to the immense burden on all pediatric APNs in the fall and winter of 2021-2022. Upon receiving this decision, and in consideration of the increasing COVID-19 infection rates in the pediatric population during this timeline, a multi-pronged approach was used to recruit participants from other sources for the study.

First, the Michigan Council of Nurse Practitioners (MICNP) was contacted to request member contact information. The request for member contact information was

declined. However, MICNP offered to post the recruitment ad in the electronic newsletter sent to all members. The ad was posted in the October and November 2021 newsletters. Second, the nursing education departments at three Michigan universities offering the PNP or DNP program were contacted to request alumni member contacts. All universities declined to provide alumni contact information but instead offered to post the recruitment ad to program faculty with the request to share the ad with PNP contacts and program alumni. One university sent the recruitment to their PNP faculty one time, per their guidelines. An email response was received that confirmed the advertisement was distributed. For the other two PNP programs, confirmation could not be obtained that the advertisement was distributed due to lack of response to multiple follow-up email and phone contact attempts. Third, recruitment efforts were conducted through LinkedIn. The Premium version of LinkedIn allows subscribers to direct message up to 15 members per month with whom they would otherwise have to send a connection request and wait for the request to be accepted. A search was conducted for PNPs practicing in Michigan in potential primary care settings and 15 direct recruitment posts were sent. Several NP related groups were joined on LinkedIn (Advanced Practice: Physician Assistant, Nurse Practitioner, Clinical Nurse Specialist, CRNA, Midwife; Physician Assistant and Nurse Practitioner Network; Nurse Practitioners Research; and The Pediatric Nursing Network) and recruitment advertisements were posted on the group pages. Finally, snowball sampling was used as a recruitment strategy to identify other potential participants for this study. Patton (2002) noted that asking those who are familiar with a population, such as pediatric nurse practitioners, to identify others who have knowledge about a specific area of expertise can often yield additional participants, thus the snowball gets larger and

increases the participant pool. This strategy was used in two ways: (1) a request was included in the recruitment advertisement for each potential participant to share the link with other known PNPs who may be interested in participating in the study, and (2) the final question asked in each interview was to gain permission to send a follow-up email regarding potential study participants. One week after each interview, the participants were contacted through email and asked if they knew any other potential participants and if they would be willing to share their contact information or forward the request to other potential participants. The original recruitment advertisement was included in the body of the email.

Throughout the recruitment time period, when a completed Google Form was received each prospective participant was emailed with the approved information sheet, the participation request, and a request for dates and times the participant would be available for the interview. The request for participation included a \$30 Amazon gift card incentive that was sent electronically within 24 hours after the interview was complete.

Setting and Data Collection

The one-on-one interviews were conducted in an online video conferencing format using a Health Insurance Portability and Accountability Act (HIPAA) compliant platform. Interviews were audio and video recorded through Zoom (Zoom Video Communications, Inc., 2020), which is a HIPPA compliant platform. Each Zoom interview included a separate video and audio transcript file, which were saved on a professional cloud storage account that is password protected and only accessible by the researcher. An audio recorder was used to record each interview to protect against data loss in the event of an unanticipated file error or other malfunction. The data recorder was

kept in a secure locked drawer to which only the researcher had access. After transcripts were completed, all audio and video digital content stored on the recorder and in the Zoom cloud platform were permanently and completely deleted.

Semi-structured interviews were conducted with six participants and ranged from 20 minutes and 57 minutes in length. Semi-structured interviews provided a framework for the researcher to develop questions to guide the interview and obtain standardized information across the participant group while allowing for flexible probing questions based on a participant's response. Questions were logically grouped to explore the participant's program experiences and current practice. A list of questions and the research questions to which they are related helped frame the interview (Appendix D). Prior to commencing the study, a medical professional with experience in developmental screening reviewed the questions and provided revision feedback, which was applied to the interview guide. Before the end of each interview, an opportunity was provided for each participant to revisit any of the questions and revise or add additional information.

Participant Protection and Data Management

Participants were informed through the consent form that participation in the study was voluntary and refusal to participate at any time held no penalty or consequence. Participants were also informed prior to and after the interview that participation was voluntary and they may withdraw permission at any time with no penalty or consequence. Participant information was kept strictly confidential. Participant names and demographic information were de-identified by changing all names to pseudonyms and assigning a numerical value to each survey and corresponding transcript. One master transcript key was created. This document was retained in a digital

encrypted file on a local hard drive to which only the researcher has the password. Participants were informed that data collected during this study may be used for additional research. Participant risks were minimal and there were no costs associated with participating in this study other than the time for the interview. Participants did not receive any direct benefits from participating in the study other than helping to add understanding of PNP developmental screening competencies and behaviors to the research base.

As mentioned previously, all interviews were audio and video recorded. Each file was stored on a password protected, secure cloud platform. The text format of each compatible audio transcript was downloaded to a password protected computer. Each recording was played, and the compatible audio transcript was edited for accuracy. Any personal information was deleted to ensure confidentiality of the identity of the study participants, practice locations, and names of PNP programs, schools, or clinical practices. The transcripts were uploaded to a spreadsheet where they were manually sorted and coded. All electronically stored data were backed up and saved on a secure, password protected hard drive as well as to a secure, password protected server. The researcher was the only person with access to the hard drive and server.

Data Analysis

Data analysis is the systematic way researchers analyze the data they have collected during the course of their study. The researcher makes decisions about how to represent the data in correlation to the theoretical perspective of their study and in alignment with rigorous standards of data analysis. Qualitative researchers, such as Glaser and Strauss (1967), Strauss and Corbin (1990), and Charmaz (2006) apply

grounded theory analysis in their work. Grounded theory data analysis includes the processes of coding, categorizing, and creating memos to represent the inductive and interpretive characteristics of qualitative research.

Charmaz (2006) noted that “coding is the pivotal link between collecting data and developing an emergent theory to explain these data” (p. 46). Coding allows the researcher to reveal what is happening in the data and to determine what it means. Using the constant comparative method (in which data collection and analysis is simultaneous) allows for the analyzed data to be applied in subsequent interviews, which could yield more relevant outcomes (Engward, 2013).

This study used the Strauss and Corbin (1990, 2008) approach to analyze data specifically open, axial, and selective coding. Following Strauss and Corbin’s (1990) process, coding was conducted in interrelated stages after each interview using a constant comparison method and data analysis was ongoing throughout the study. When new data was added, previous data was revisited to ask additional questions and determine new connections as more complex associations emerged with increasing understanding of the data. Regarding coding processes, the first level of open coding identified the most relevant concepts from the text excerpts. The goal was to generate as many relevant ideas as possible and group them together to then create categories and subcategories (Corbin & Strauss, 2008). The second level of axial coding included relating categories to subcategories and developing further categories as necessary to support relationships revealed by the data. This stage of the data analysis required decisions to be made about the significance of initial codes and their importance to the research questions and contribution to the data analysis. Multiple reviews and immersion in the data guided data

reduction at this level. The final level of selective coding is “the process by which all categories are unified around a ‘core’ category and categories that need further explication are filled-in with descriptive detail” (Strauss & Corbin, 1990, p. 14). The coding process began after the first interview and continued in an iterative approach to inform the data collection methods and the data analysis (Corbin & Strauss, 2008).

After each interview the researcher reflected on the interview through the process of memo writing. Per Corbin and Strauss, (2008) each memo included a title, date, and number for ease of cross reference to the corresponding transcript. The memos included impressions about each participant’s experience and the researcher’s reactions, as well as questions or comments about pre-existing ideas in relation to a participant’s responses. As the interviews progressed, the researcher noted comparisons between memos. Comparing memos helped to guide subsequent interviews and ensure relevant information was uncovered and explored in depth throughout the data gathering process.

Open Coding Process

According to Strauss and Corbin (1990) open coding is “the analytic process through which concepts are identified and their properties and dimensions are discovered” (p. 101). Open coding was a recursive process completed after carefully reviewing each transcript and manually highlighting sections of text pertinent to the question. Text excerpts were transferred to a spreadsheet to keep the data organized. The questions were divided into three-tab groups related to developmental screening (1) in the pediatric nurse practitioner program (2) in current practice, and (3) specific challenges, facilitators, and suggested improvements for current screening education and practice. The researcher chose to use in vivo coding to preserve the authentic voices and

terminology of the participants in as many instances as possible. In some cases, it was determined that the meaning of the initial in vivo code was not clear, and a descriptive code was used to capture the intent of the participant's meaning. From this first cycle, in vivo codes became the initial codes for each tab group, with an initial yield of 218 total codes. An example of open coding is shown in Table 1.

After each transcript was initially coded and reviewed, additional memos were created to guide probing questions for the next interview. This approach provided the opportunity to ask similar foundational questions of all participants but gain additional in-depth insights into evolving questions throughout the data gathering process. For example, after reviewing the transcript and completing the initial coding for the first interview, several areas for additional questioning were noted and applied in subsequent interviews. This process was continued through the last interview. An example of a transcript memo is shown in Table 2.

Open codes on each tab were examined for similar characteristics and grouped together. Codes were sub-grouped according to concepts, which then were condensed and combined. Throughout this process, codes were continually compared between all participants to ensure accurate groupings. Codes were then confirmed against the transcripts to ensure accuracy and realigned as needed to reflect meaningful groupings of similar concepts. This process yielded 135 final open codes.

Table 1*Example of Open Coding*

Participant	Transcript Sample	Open Codes
P1	Again, I <u>wouldn't say I'm an expert</u> but I'm <u>able to interpret the scoring</u> and make sure I <u>follow up with more in-depth questioning</u> with the parent to determine whether there is an area that may be a true concern or if it is <u>something I need to watch carefully</u> on the next visit. Again, I don't feel as though I'm an expert, but I would rate my <u>skill level as fairly high</u> . I am <u>confident in sharing the results with parents</u> and <u>listening to their concerns</u> as well	Wouldn't say I'm an expert • -able to interpret the scoring • -follow up with more in-depth questioning • -something I need to watch carefully Skill level as fairly high Confident in sharing the results with parents Listening to their concerns
P3	It's good. I feel like it's pretty easy and self explanatory. I've been doing it for a number of years, so I feel like I <u>know how to use the instruments correctly</u> and so I feel <u>pretty confident using them</u> .	Know how to use the instruments correctly Pretty confident using them
P5	My <u>skill is pretty good</u> using the instruments I'm <u>able to score them accurately</u> but, more importantly, I think the underlying <u>conversation with the parent</u> is what reveals a lot more detail about those behavior items on those checklists.	Skill is pretty good Able to score them accurately Conversation with the parent

Table 2*Example of Transcript Memo*

Question	Response	Memo
How do you use your electronic health record for developmental screening or surveillance in your practice?	It really supports what we're doing and helps us see any concerns that were previously brought up within a visit. So the EHR provides some standard developmental questions and is kind of like a guide, I guess, that we are able to use as a springboard for discussing typical child development and give anticipatory guidance. It's so we don't miss anything important.	I should have asked more about the organization of the EHR and how the DS are accessed within the chart Also wish I would have asked more about how PNPs use the milestones in the EMR to guide the conversation EHR is a guide/framework *Need to ask about EHR and how it is structured to include the DS
Do you see patients independently or how does that work?	I see patients independently yes. She signs off on all of my charts and I will often ask her questions or ask her for input. However, day to day I am fairly independent.	The PNP sees patients independently, but the physician signs off on her charts. To me this indicates a supervisory relationship even though the PNP does not view it that way. *Need to be sure to explore PNP's perceptions about their relationship with the practice physicians

Note. EHR – electronic health record

Axial Coding Process

Strauss and Corbin (1990) describe axial coding as “the process of relating categories to their subcategories termed ‘axial’ because coding occurs around the axis of a category, linking categories at the level of properties and dimensions” (p. 123). Subcategories were aligned to a focal category and answered such questions as “when, where, why, who, how, and with what consequences” (Strauss & Corbin, 1990, p. 125) in relation to the category.

To begin the axial coding process, the data was reviewed in each code group and each question and corresponding codes were printed out on paper. A 4’ x 8’ white board was used to manually sort each question into categories (Appendix E). The sorting process provided the ability to group similar and dis-similar data by reviewing the categories and determining the properties and characteristics comprising each category. Forty-six categories initially emerged from the data.

Through examining the relationships between and among the categories it was discovered that data could be grouped into practice and program categories. Furthermore, some PNP program responses were distinctly either pre-clinical or clinical in nature. For the purpose of this study pre-clinical and clinical data were analyzed together and grouped as program data. Participant responses were categorized into program and practice phases aligned to knowledge, skills, and attitudes. At the end of this coding phase, central ideas and metaphors to capture the “bigger picture” ideas from the PNP responses were determined. These ideas were refined during selective coding.

Selective Coding Process

The selective coding phase is “the process of integration and refining the theory” (Strauss & Corbin, 1990, p. 143). The core category emerged during this phase and all categories and sub-categories were built around it, showing the relationships among and between the data. One critical realization at this point in the analysis was for the researcher to understand that the data was to be interpreted in a narrative format that not just synthesized, but completely conceptualized the meaning of all participants.

According to Strauss and Corbin (1998):

Concepts that reach the status of a category are abstractions; they represent not one individual’s or group’s story but rather the stories of many persons or groups reduced into, and represented by, several highly conceptualized terms. Although no longer the specific data of an individual, group, or organization, categories are derived by comparing data from each case; therefore, they should, in a general sense, have relevance for, and be applicable to, all cases in the study. (p. 145)

Instead of thinking about participants individually, this understanding provided an opportunity to think about the participants as a whole and view the data in its abstract form, thus allowing the complete story of PNPs’ perceptions about their developmental screening learning experiences and current practices to unfold.

Trustworthiness

According to Lincoln and Guba, (1985) naturalist researchers can use certain techniques to establish trustworthiness including credibility, transferability, dependability, and confirmability. This research was conducted in an ethical manner (Creswell, 2013) beginning with the researcher’s dissertation proposal presentation, which resulted in suggested modifications to the study based on dissertation committee feedback. After IRB exempt approval was granted, recruitment and data collection began

using an iterative, constant comparison method of data analysis.

Regarding credibility, Kolb's Experiential Learning Model (1984) and Benner's Novice to Expert Theory (1984) were for this study selected to explain the developmental screening behaviors of PNPs. The researcher believed these specific theoretical frameworks offered important insights into the phenomenon of developmental screening that would not be revealed using only one theory to interpret the data, constituting theory triangulation. Regarding person triangulation, although the group of participants were all PNPs, their differing degrees (MSN vs DNP) and practice configurations helped to maximize the data perspectives that contributed to understanding developmental screening behaviors in this participant group. Dependability and confirmability were established using a detailed audit trail including extensive memos about how the data were collected, how the categories were determined, and how decisions were made about data analysis throughout the study. A reflexive journal was used to note thoughts related to interpreted data as well as biases and assumptions that arose throughout the study in order to be able to review and set aside any biases or assumptions (Merriam, 2009). In this study, transferability was established through reporting the rich, thick, and detailed descriptions provided by participants in order to make the evidence of transferability to other groups or situations possible (Lincoln & Guba, 1985; Merriam, 2009).

CHAPTER FOUR

RESULTS

The purpose of this qualitative grounded theory study was to explore the developmental screening practices of pediatric nurse practitioners for children ages birth through three. Chapter 4 discusses the findings of this study in which currently practicing pediatric nurse practitioners' perceptions of their knowledge, skills, and attitudes related to developmental screening were revealed through individual interviews. This chapter includes an overview of the study, a description of the participant sample, and findings. The information presented in this chapter originated from responses to the interview questions. Data from this chapter provide evidence to support the research questions for this study.

Overview of the Study

The data collection process began following Institutional Review Board (IRB) approval. The PNP's responses to the semi-structured questions were digitally recorded, transcribed, and analyzed. The main research question for this study was:

- What are the developmental screening practices of pediatric nurse practitioners?

The following supporting questions were used to guide the interviews and support the exploration of participants' experiences related to their developmental screening practices:

- How do pediatric nurse practitioners describe their knowledge about developmental screening?

- How do pediatric nurse practitioners describe their skill with developmental screening?
- How do pediatric nurse practitioners describe their attitudes about developmental screening?

Six emergent themes together with a substantive theory of advancing screening competencies to support young children's optimal development became the major findings of the study, which are described in detail here. The core category *advancing screening competencies to support young children's optimal development* framed the narrative for PNPs' development of knowledge, skills, and attitudes toward developmental screening competency. This development followed a traditional time continuum according to Benner's Novice to Expert Theory situated within the context of Kolb's Experiential Learning Cycle, in which experiences are central to the learning process. PNPs' experiences beginning in their PNP program through their current practice play a critical role in the progression of developmental screening competencies. To examine this progression, findings were organized by themes and sub-themes in the program and practice phases. Each of the themes are described and supported with descriptors from the participants to tell the story of PNPs' developmental screening practices with children from birth to three.

Description of the Participants

Purposive sampling was used to conduct the study. The sampling frame was non-random and all participants met the inclusion criteria for this study, which included currently practicing primary care PNPs who conduct developmental screening as part of well child visits for children ages birth to three. The exact

number of licensed pediatric nurse practitioners in Michigan is unknown; however, an estimate can be determined by using available data. According to the 2021 Survey of Michigan Nurses, there were 9,856 nurse practitioners in Michigan. AANP estimates that about 3.2% of all NPs are primary care certified and .07% are acute care certified (AANP, 2020). Therefore, although exact numbers are unknown, it can be estimated there are approximately 300 primary care licensed PNPs in Michigan. It is also unknown how many PNPs in Michigan practice in primary care or practice in a pediatric specialty area such as cardiology, neurology, rheumatology, etc. As a result of the low number of potential participants and the challenges of recruiting during the COVID-19 pandemic, purposive sampling for this study only yielded six participants (Table 3), although extensive recruitment methods were employed as discussed in detail in Chapter 3.

According to the *Survey of Michigan Nurses: Employment Results 2021* (Michigan Public Health Institute, 2021), white (92.1%) females (90.30%) dominate the RN/APRN nursing profession, which was reflected in the participant group for this study as a majority identified as white and all identified as female. Of the six participants, five identified as White or Caucasian, of which three did not specify their ethnicity, and two identified as non-Hispanic. One identified their race and ethnicity as Black/African American. The participants' ages ranged between 41 and 59 years. The reported range of years in practice as a PNP was three to 15 years. Regarding educational background, two participants held a Doctor of Nursing Practice (DNP) degree and four held a Master of Science in Nursing (MSN) degree.

Table 3*Participant Demographics*

Participant	Age	Years in Practice	Practice Description
P1	41	3.5	Large primary care practice
P2	55	3	Urban and rural patient demographic
P3	46	8	Urban and suburban
P4	59	15	Suburban and rural
P5	48	10	Suburban practice
P6	46	11	Urban practice setting

All but one participant obtained their degree from a Michigan pediatric nurse practitioner program. All participants were employed at the time of the interview in private practices and two participants were also part time nurse educators.

Interestingly, one participant worked four part time jobs including per diem for two private practice locations, at an urgent care clinic (on weekends), and at a university as a nurse educator at night. Participants worked in a range of practice configurations with physicians as follows:

- 6 family medicine physicians, 1 pediatrician, 1 PNP
- 1 pediatrician, 2 NP, 1 PNP
- 3 pediatricians, 1 PNP
- 2 pediatricians, 1 NP, 1 PNP
- 2 pediatricians, 1 PNP

- 1 pediatrician, 1 NP, 1 PNP & 2 pediatricians, 2 FNP, 1 PNP

Regarding background information related to the PNP education, it is important to note that nurse practitioner students are graduate level learners, very often with years of clinical experience in various healthcare settings (hospitals, private practices, school and community clinics, etc.). To be admitted to an NP program, students are required to hold a Bachelor of Science in Nursing (BSN) and have registered nurse (RN) licensure. Many PNP students are entering their program from a place of pediatric clinical experience as a registered nurse. However, it is inaccurate to assume all PNP students may have previous experience working with pediatric populations as this is not a requirement to enter a PNP program. In fact, unless a PNP student had previously worked in a pediatric, primary care office setting, they likely have not had any direct experience with developmental screening. According to AANP, “Graduate NP education builds upon the foundational knowledge obtained in undergraduate BSN- registered nurse education. During graduate school, NPs gain the advanced clinical knowledge and skills to diagnose, manage and prescribe medications and other treatments for patients” (AANP, 2022a, para. 3). The participants for this study were not specifically asked about pediatric developmental screening experience prior to becoming a PNP. However, during the course of the interviews three participants shared information about previous pediatric work experience. One participant, who had not had primary care experience said:

A lot of my background was in the hospital, it was acute care, right and it wasn't more so clinic based like when primary care, I was, you know that was a little bit of a transition for me was you know going in, you know into an office daily instead of going, you know, like to the hospital, but it was like learning how to assess and ask questions you know of you know, parents and you know just observing the child what they can do, and you know, incorporating that.

Another participant responded similarly to a question about her previous pediatric job, “You know I worked in the PICU first for some years, and we didn’t do those kinds of screenings, but in my job that I’ve been working in now we do them all the time.” A final participant noted, “I was a pediatric nurse for about six years before I finished my degree and started working in a primary care practice. [Previously] I was in inpatient care.”

This information was helpful to understand that some study participants had little prior knowledge of developmental screening before entering their PNP program. Consequently, regarding developmental screening competencies situated in Benner’s Novice to Expert framework, study participants were at different levels depending on their previous and current experiences.

The Substantive Theory of Advancing Screening Competencies to Support Young Children’s Optimal Development

This research produced a substantive theory about advancing screening competencies to support optimal development. According to Glaser and Strauss (1967):

Theory generation doesn't require lots of cases. One case could be used to generate conceptual categories and a few more cases used to confirm the indication. (The researcher's) job is not to provide a perfect description of an area, but to develop a theory that accounts for much of the relevant behavior. (p. 30)

Unlike a formal theory that is broad and often complex, substantive theories are meant to explain a phenomenon of interest within a specific context. These substantive theories are “constructed to express a unique, unifying idea about a phenomenon that answers previously unanswered questions and provides new insights into the nature of the phenomenon” (Walker & Avant, 2011, p. 193). In this research study, the phenomenon of interest was PNP’s developmental screening practices for children ages birth to three.

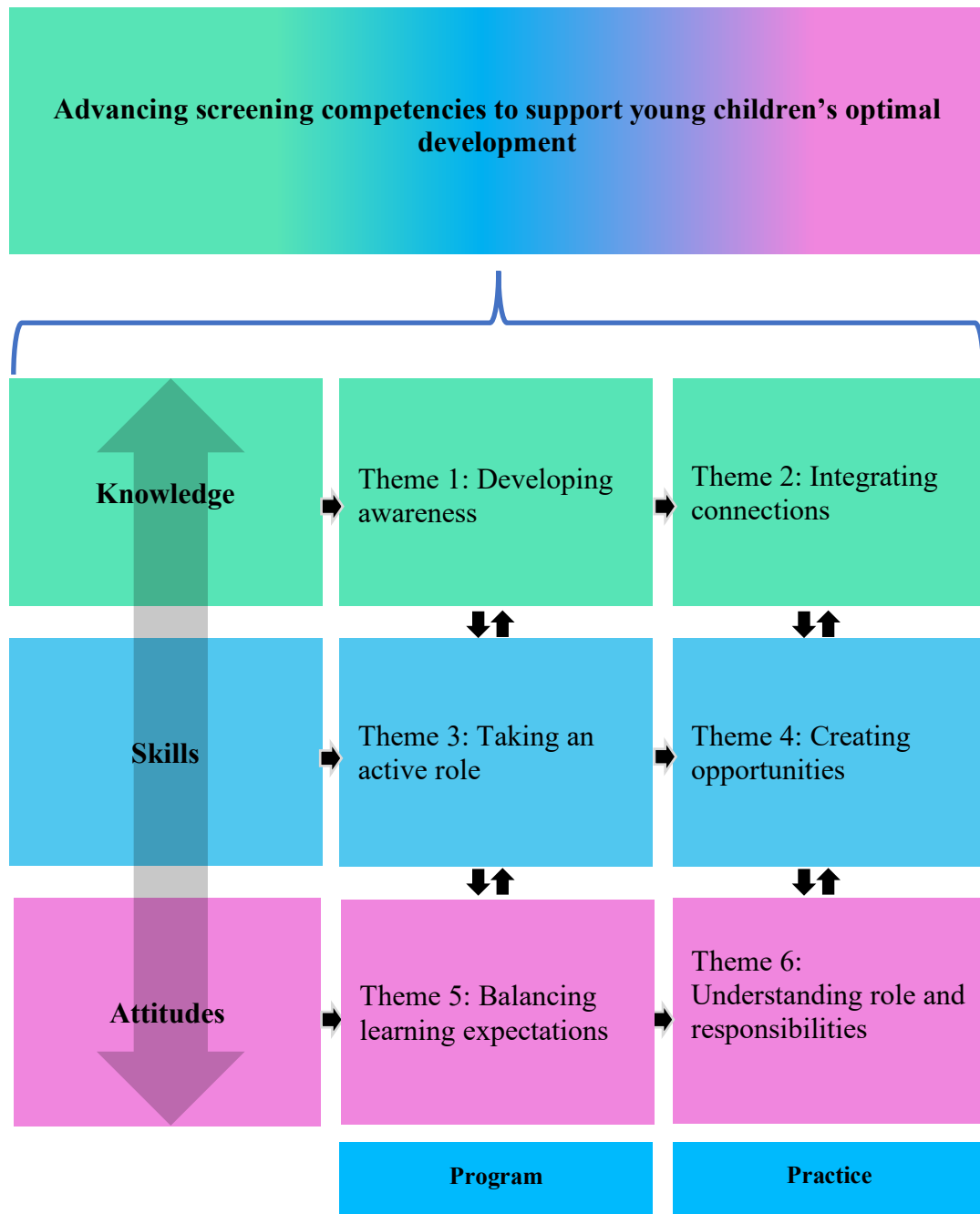
The overview of the theory is shown in Figure 5. PNPs' perceptions of their knowledge, skills, and attitudes developed during the program and practice phases of their experiences are represented by vertical arrows. Although knowledge, skills, and attitudes developed within each phase, they also developed cumulatively across each phase, represented by horizontal arrows. All knowledge, skills, and attitudes contributed to *advancing screening competencies to support young children's optimal development* between, across, and within each phase, represented by the bracket to the overarching category. The themes included (1) developing awareness, (2) integrating connections, (3) taking an active role, (4) creating opportunities, (5) balancing learning expectations, and (6) understanding role and responsibilities. As PNPs gain developmental screening experience through their program and practice phases, they continually develop interrelated knowledge, skills, and attitude attributes, which contribute to advancing competencies and ultimately lead to more effective screening behaviors that support optimal development. The themes in relation to the theory are described through the findings below.

Developmental Screening Knowledge Themes

The research question related to developmental screening knowledge was: How do pediatric nurse practitioners describe their knowledge about developmental screening? The themes emerged from the data about developmental screening knowledge perceptions during program and practice phases, respectively. Themes included *developing awareness* and *integrating connections*.

Figure 5

Advancing Screening Competencies to Support Young Children's Optimal Development Model



Sub-themes for *developing awareness* included typical and atypical development, developmental screening tools and purposes, and developmental screening guidelines. Sub-themes for *integrating connections* included continuous learning and reflecting on knowledge.

Theme 1: Developing Awareness

The first main theme, *developing awareness* emerged from responses to the following questions: What did you learn about developmental screening during your program? and What did you learn about developmental screening instruments in your program? If participants only discussed knowledge related to clinical program experiences, they were prompted to share information about developmental screening knowledge in the pre-clinical phase of their program as well. Several participants initially responded by discussing assessments related to physical measurements (height, weight, head circumference) or mentioned learning about screeners other than general developmental screenings (i.e., lead, maternal depression, oral health, etc.). For these participants, a follow up question was asked related specifically to screening for general development. The researcher intentionally did not mention standardized screening tools by name or provide leading information, such as “AAP recommended developmental screenings” or “milestones” that might influence the participants’ responses. Most participants’ recollections of developmental screening from their program included knowledge about typical and atypical development, general information about developmental screening tools and purposes, and developmental screening guidelines. Regarding child development, one participant said:

I had one or two class lectures about different screenings and child development, how children develop, and we talked about normal child development and abnormal child development, things that you would look for when assessing child development that don't fall within the normal range.

This participant's comment, "things that you would look for when assessing child development that don't fall within the normal range," reflected a developing awareness of what her future role would be in assessing child development as a PNP instead of as an RN.

In relation to developmental screening instruments introduced in their program, participants recalled the names of the following tools: "Ages and Stages," "M-CHAT," "Denver," and "PEDS." Several participants recalled screening instruments, but not by name, mentioning "the autism screening" and "there were others, but I can't remember the names."

One participant discussed the importance of understanding the connection between the items on the developmental screening instruments and developmental milestones, "We also were exposed to a variety of different screening instruments so that we could see what the items looked like and with general development how they related to developmental milestones and such."

Another participant specifically recalled administering and scoring a screening during her pre-clinical program phase as part of a project requirement, which contributed to her developing awareness of screening. The patients mentioned in her response were not clinical patients, but people known to the participant who were recruited to be "patients" for the purpose of the project:

The Denver developmental tool, I remember in one class, we had to actually find a patient within a certain age range and then another patient and a different age

range and go through and do the actual testing with them, that was not a clinical class I remember that being like from the growth and development one.

Although most participants could recall seeing or discussing at least one or two specific screening instruments such as ASQ or M-CHAT, some participants noted a general lack of exposure to screening during their program: “I don't recall that we really had any specific instruments that we used” and “I really didn't start using those screenings until I was working, and I used Ages and Stages, at that point.”

In the program courses, developmental screening information was mainly introduced through various learning modalities including simulated screening, presentation and discussion, and resource exploration. Responses associated with these modalities included comments such as: “We had one or two class lectures about different screenings,” “We had a presentation,” “We were provided with an example,” and “We discussed all different types of development and screenings.” One participant noted her experience with a screening resource:

We spent a lot of time on Bright Futures, which I thought was extremely helpful because this instructor actually walked us through the areas on that website that she felt would be most valuable to us in our clinical and practice.

This participant's comment about the instructor walking them through the website to point out the most beneficial areas for future practice illustrates the participant's developing awareness of knowledge that will be needed in her PNP role. Another participant had an “extremely beneficial experience” in a program class:

In that class we had video clips and that instructor was able to show us how those specific behaviors related to some of those red flags for potential autism, and how those correlated specifically to milestones. I felt that that was an extremely beneficial experience to develop my understanding of early detection and diagnosis for services and referral, as well as for different types of interventions children may receive, such as ABA.

The participant recognized the valuable knowledge she gained from the learning experience connecting observable behaviors to milestones and potential concerns.

In sum, participants were able to recall general to some specific information regarding general developmental screening and screening instruments from their program. Some participants recalled learning experiences related to assessing child development, introduction to developmental screening instruments, and recommended screening guidelines. Others did not have a strong recollection of specific developmental screening curriculum or instruments. Although PNPs learned about specific instruments through various modalities and were introduced to resources (such as Bright Futures), a majority of participants recalled that they had gained most of their screening instrument knowledge in clinical experience or in practice. Therefore, during this program phase, PNPs are developing awareness of the foundational knowledge about developmental screening that they will need to apply in their PNP role.

Theme 2: Integrating Connections

The next knowledge theme, *integrating connections* emerged from responses to the following questions: What knowledge from your PNP program transferred to developmental screening in your current practice? What instruments do you currently use? How would you describe your level of knowledge with your current screening instruments? The way that *integrating connections* is understood is through the concepts of continuous learning and reflecting on knowledge.

In general, participants rated their knowledge of the screening instruments they currently use as “good” and then included additional information to elaborate on the

response. One participant said, “I think my level of knowledge is good. Although I always feel like I could learn more.” This participant’s sentiments were echoed by others who made connections between developmental screening and thinking about their own knowledge and continuous learning.

Another participant discussed her knowledge of the previous and current versions of a screening instrument: “I have quite a good knowledge. I’ve used ASQ and M-CHAT for many years and, although they have some revised versions, for the most part the items are very similar the same as they always have been.” Another participant noted she had a “good deal” of knowledge about the screening content and purpose, but also acknowledged that the instrument specifics would be something she would need to review:

I mean going back to knowledge level, I would say, I have a good deal of knowledge about what the screenings are, however, if you would get into a conversation about the sensitivity and specificity of the screenings themselves, I really would have to look that up to be quite honest.

The following participant synthesized her screening and child development knowledge to make the following connection: “Those screenings actually confirm what I’m thinking about that child's development.”

One participant stated she had a “good” knowledge base regarding screenings. In her explanation, she identified each component that comprised her knowledge base, which included content, scoring, scoring interpretation, observation, and parent input. Finally, to wrap up her response she connected all the components by confirming her understanding of the screening content and relationship to the developmental milestones:

I feel like I have a good knowledge base for those [screenings]. I understand what domains or areas they're measuring and how to score them correctly and what

those scores mean in terms of development for that child and looking at other things that may be associated with those developmental milestones; [I] look at what the child is doing in the office and what the parent is telling me the child able to do at home as well. So, I feel like I have a pretty good understanding of the screening instrument and how each question relates to the milestones as well.

The following participant noted that the conversations with physicians and parents about child development were the most important knowledge components that transferred from her program to practice. In addition, she expressed gratitude that her clinical experiences provided a foundational knowledge that she was able to apply in her final clinical and in practice. This participant had also noted that she was hired into her current position directly from her last clinical rotation:

Well in our current practice the knowledge of developmental screening from my program transferred I think the conversations about typical development transferred to practice, and I was very fortunate that my last clinical rotation, which is where I currently work so in essence, everything that I have learned in my program all those experiences with other clinicals gave me a basic knowledge that I could apply in my final clinical rotation and then now in practice.

Other participants discussed the importance of transferring knowledge to practice about learning how to “do” the screenings and their purpose, “I think just knowing how screenings were done and the basics of what those screenings were for transferred to practice, my practice now, but I didn't learn how to do the screenings until I started practicing on my own.” Several other participants also noted that like this participant, they did not have the opportunity to fully apply developmental screening knowledge and skills until they were in practice.

The following participant identified the screening knowledge that transferred to practice as, “Learning how to assess and ask questions [of] parents and you know just observing the child what they can do, and you know, incorporating that...” Then she

reflected on the meaning of those separate components and made the connection that “It's sort of like layering up all the things that you're assessing.” This response captured the essence of the theme *integrating connections*, which was demonstrated within the participants' stories through the sub-themes continuous learning and reflecting on knowledge.

Developmental Screening Skills Themes

Before presenting findings related to PNP program skills, it is important to provide some background information about PNP clinical placements. During the clinical component of the program, PNP students are required to complete precepted experiences at various clinical sites for a specific number of hours (dependent on the program). Clinical preceptors work with PNP students and provide them with support and feedback as well as providing performance information to faculty, who are responsible for final grades. The objective of clinicals is for the PNP student to be able to apply and expand foundational knowledge and develop skills with patient encounters in various settings.

Each clinical placement is unique, and students may have very different experiences depending on a myriad of factors, some of which include the practice configuration, preceptor experience, attitude, and approach, and PNP student competence, confidence, and motivation. Although PNPs may initially begin clinicals by shadowing their preceptors, the expectation is for the PNP student to take on more and more responsibility as knowledge and skills develop. Optimally, the preceptor will act as a teacher, mentor, and guide, continually assessing the NP student and determining appropriate experiential learning opportunities for them based on the continuous assessment of their knowledge, ability, and comfort level. For example, a preceptor may

prefer an NP student shadow them for a number of patient encounters before they will have the NP student begin taking initial histories and presenting cases to them. In later clinical placements, NPs may have the opportunity to take the lead in encounters with the preceptor providing support and guidance as necessary. Although NPs are responsible for driving their own learning during clinicals, the quality of the NP student's experience depends not only on their own motivation and desire to take an active role, but the opportunities the preceptor provides them. Consequently, it is important to consider that the participants' responses about the clinical phase of applying developmental screening skills in practice are related not only to the types of experiences provided but also to the levels of expertise and experience of the PNP's preceptors within the clinical settings. Clinicians with more precepting experience and training are likely to provide a higher quality experience for PNP students. In all cases, regardless of the types and quality of experiences provided, participants recalled driving their own learning through actively gleaning knowledge and applying that knowledge to develop skills throughout their clinical placements.

The research question related to developmental screening skills was: How do pediatric nurse practitioners describe their skills with developmental screening? The program and practice themes revealed through the data include *taking an active role* and *creating opportunities*. Sub-themes included descriptors related to developing skills from physicians, parents, and self-directed learning sources.

Theme 3: Taking an Active Role

The theme *taking an active role* emerged from the relevant parts of the responses to the following questions: Could you talk about your developmental screening

experience with patients and families during your PNP program? and What screening skills in your PNP program transferred to screening skills in your current practice? The clinical phase of the PNP program was extremely impactful to the participants and they recalled taking an active role in their own skills development and learning, whether it was developing observation skills, initiating discussions with physicians or parents, or seeking out additional learning opportunities. Participants advanced their developmental screening skills in clinicals from three main sources (1) physicians (2) parents, and (3) self-directed learning.

Physicians

Physicians were the most frequently mentioned influence related to learning about developmental screening skills in clinicals. PNPs learned about screening skill development from physicians through direct observation and mentorship.

Observation. Learning through observation is a critical skill and observing how physicians practice allowed PNP students to gain insight into parent communication related to child development and screening, referral discussions, and follow-ups to evaluations. Regarding skill development through physician observation, one participant reflected on multiple insights gained from observation experiences:

Many times, I was able to observe the interactions between the pediatrician or NP and the parent when they talked about the screenings, which was quite helpful, especially the resources they provided parents who had concerns and in the way they talked to them. They were always positive and reassured parents they were supporting their child's development with what, with what they were already doing. It was very positive even when there were some concerns.

This participant not only benefited from insights about the content of the conversation between the physician and parent, but the child development resources provided to the

parent and, most importantly, the way in which the physician communicated with the parent. The participant noted that, “It was very positive even when there were some concerns.” However, the most critical component of this observation was the participant’s recognition of the physician’s strengths-based approach to engaging the parent through affirmation of their parenting skills by reassuring them they were supporting their child’s development with what they were already doing. This is an important insight that the participant likely incorporated into her own practice.

Another participant discussed the value of observing a referral conversation between the physician and parent: “The pediatrician I was placed with was talking to a parent about some concerning items on the MCHAT that they had been watching and were now going to refer, so that interaction was very valuable.”

Still another participant described how observing the physician’s approach to screening affected her learning experience:

Seeing a pediatrician in practice who also felt very strongly about making sure any potential delay is caught in a timely manner so that intervention, so that the referral, and then the subsequent intervention could be provided to that family, I think, was the most valuable part of what I learned in my program about developmental screening.

In the participant’s response, it is clear she not only recognized the value of observing the physician’s screening and referral processes, but she clearly aligned herself with practitioners who hold a strong belief about the importance of identifying delays. In addition, she pointed out the importance of identifying a potential delay in a “timely manner,” which conveyed her underlying knowledge of brain development and need to promptly move the process of identification, evaluation, and service provision forward.

One participant recalled the importance of observing each physician, but also discussed observations about screening processes within practice environments:

Looking at how each office approached developmental screening and the referral process, I was able to get a sense of what I wanted to do and didn't want to do when I was in practice. That experience was very helpful to my understanding of what I felt would be most beneficial for my patients.

This participant is taking an active role in observing and evaluating different practice approaches to developmental screening and considering the most effective approaches for her future patients.

Mentorship. Another way PNPs learned about screening skill development was through physician mentorship. For the purpose of this program skills section, unlike formal mentorship programs, the term “mentorship” or “mentor” refers to the informal relationship between a clinician preceptor and a learner. Participants’ perceptions of mentorship included physicians who provided learning opportunities related to case discussion and clinical reasoning as well as consistent feedback so PNP students could gain insight into medical decision making and management of care in relation to developmental screening.

One participant expressed the importance of the discussions with her preceptor by stating, “One physician was very good about making time for conversations surrounding typical development. He took the time to talk about, you know, what he observed which helped me learn about what was normal and what wasn’t.”

In this brief example, the participant mentioned three very important insights into her overall clinical experience. First, she noted twice that the physician took time to speak with her about child development, suggesting there were minimal conversations

surrounding child development in her other clinical placements. In addition, she noted that she had this discussion experience with “one” physician, which indicates this experience was unique compared to other clinicals. Finally, this participant noted that the physician verbally expressed his own thought processes related to his observations, which provided a unique opportunity for the participant to understand how an expert analyzes patient observations.

Another participant elaborated on the value of observing physician conversations related to the art of communication with parents:

I always liked to be with different mentors because you can see their style. Maybe like how do you phrase this or how do you ask things in a delicate way or you know being sensitive of things. You know so like a lot of role modeling. What I had always wanted to know is like, how do you do that? You know... this is what we should do, but how do you *do* it. You know and what's eloquent ways of doing that, like what is the art of getting that question answered?

This participant is a nurse educator, and her identification of physician modeling and reflective practice align with components of effective experiential learning.

Parents

Parents were also an important source of screening skill development for PNP students during clinicals. Participants recalled developing rapport with families and discussing initial parental concerns based on screening items/milestones as two aspects of the clinical experience that were highly valued. One participant described the type of information that was gained by talking with parents:

I learned how to ask deeper questions more than you know, are they just crawling sitting up, but you know looking if they're transferring objects between hands or... Also, incorporating things you know with the speech and the behaviors that you know they may or may not be exhibiting.

This participant recognized that the development of her own questioning strategy and communication skills affected the quality of the information she was able to elicit from the parent. She also realized that she needed to gather information from both her perspective and from the parent's perspective, integrating not only the observations and interpretation of the child's behaviors in that moment, but information the parent was communicating about the child's behaviors that she could not observe in that setting.

Another participant noted the importance of having the opportunity to initially communicate with parents before the physician. This participant was able to take an active role in developing her questioning techniques to gain skill in communicating with parents about screening items:

I was the first one in the room to take a preliminary history and gather information before the pediatrician or NP came in. In that sense, I was able to have conversations with parents about those screening items. Those preliminary conversations, I feel like I came away with a sense of how important it is to develop a questioning technique that provides you with the information that you need in order to assess development and allowed you as a clinician to understand if there was a misunderstanding about an item."

Other significant responses related to taking an active role in developmental screening included comments such as "discussing screening items with parents," "seeing how parents interact with their children," and "making connections with families, getting to know about their concerns."

Self-directed Learning

Participants noted their own self-directed learning and reflective practices were a critical part of learning about developmental screening during the clinical phase.

Participants applied knowledge of child development to advance their assessment skills within a variety of clinical placements. Some of these experiences included initial history

taking (developing questioning techniques to gain pertinent information), discussing parent concerns based on the screening instrument, and presenting case information to the physician.

One participant reflected about how she used her knowledge to guide her critical thinking and decision making:

Having that knowledge about what I was looking for and the questions that I needed to ask, in order to get the information to assess whether that item, whether what that parent was telling me added to the information gathering so I could determine whether that is something that needed to be looked at more in depth, or if it was something that was fine and we didn't need to go into depth about it. That's where I think the knowledge and skills were applied.

Within this response, she also identified the concept of filtering information to determine which information was pertinent to the concern and which information was unrelated, illustrating how her skills were evolving.

Other significant responses related to self-directed learning included comments such as “bridging communication between parents and physician,” “analyzing my own learning needs,” and “reflecting on experiences.”

Theme 4: Creating Opportunities

The theme *creating opportunities* was revealed after analyzing responses to the following questions: How would you describe your skill level using your current screening instruments? In your current practice setting, how do you assess child development? Can you describe what happens when you or a parent have a developmental concern about a child from 0 - 3? How do you use surveillance versus screening?

For PNPs, the practice skills phase is vastly different than the program clinical skills phase. When PNPs are in practice, they have graduated from their program and are functioning independently within the scope of their practice. In Michigan, which is a restrictive practice state, NPs can only practice under a physician through a collaborative practice agreement (CPA). Participants were asked about the collaborative practice agreement and all of them described it similarly as “what the expectations are for working in that practice” with few details. In actuality, the CPA has specific requirements and details related to care services provided by the NP within their scope of practice. According to the National Council of State Boards of Nursing (NCSBN) (2018) a CPA in Michigan must:

- Be in writing and include the effective date of delegation and review dates
- Be maintained by the NP at their primary practice
- Be made available to MDHHS upon their request
- Detail the process for communication, decision making, and availability between the NP and physician, and include an emergency plan
- Not include an act, task or function that the NP or physician is not qualified to perform based on his/her education, training or experience
- Not include an act, task, or function that is not within the scope of the NP’s or physician’s licensure
- Include a protocol for designating an alternative physician for consultation when the collaborating physician is not available
- Describe the duties and responsibilities of the practitioner and physician based on education, training, and experience

- Include a provision that allows the practitioner or physician to terminate the agreement, and
- Be signed by the NP and the physician. (NCSBN, 2018)

In the practice setting, NPs are expected to function independently within their scope of practice for their patient care assignment. PNPs in this skills phase are creating opportunities for advancing their own learning about themselves, their patients, and their practice. The sources for creating opportunities were similar to those in the program phase: physicians, parents, and self-directed. However, PNPs in the practice phase are now independent practitioners and their experiences and perspectives are different from the program phase. To get a sense of PNPs' daily practices, participants were asked: Do you see patients independently? Describe the relationship with your supervising physician and the input you receive regarding patient care.

All participants confirmed that they practiced, for the most part, independently within their current employment setting and PNPs and physicians shared patients in most settings. Oversight varied for participants and ranged from no direct input to as-needed support for complex cases, consultation, and required chart review. One participant stated, "I see patients independently. She signs off on all of my charts. I often ask her for her questions or ask her for input, [but] day to day I am fairly independent." Another had a similar response, "I see patients on my own independently, one of the pediatricians will randomly review charts just to make sure that everything's taken care of."

In contrast to the previous participants, other participants did not have direct or consistent physician input. One participant who worked per diem for a local pediatrician indicated that she practiced independently with the following practice configuration:

And I was independent in the office with two medical assistants and then two staff at the front desk in the office, and we would have a social worker that was part of a grant program just once a week, so if I happened to be there on that day, that she was practicing and calling people. You know that would be another person, but I would be there alone by myself.

When asked follow-up questions about how patients are assigned to her in the practice and how she communicated with the supervising physician, the participant said:

I don't have like my own patient load where they would call up and ask for me and see me, it was random. Nobody followed, like the diabetics or you know the GI kids you know it was random... And you know he was available via telephone if we should need anything."

Another participant described her experience as similarly independent as well:

I see patients independently. Typically, when I go in, I get my roster of patients. I work through those for the day. If I have any questions I can ask the other pediatricians there if I have any concerns or anything, but I don't think that they you know..., we talk about patients, sometimes, if I have questions but it's not like they look through my charts or they have to sign off or anything like that, as far as I know."

In sum, PNPs consistently referred to "seeing patients independently" as assuming full responsibility for care and management, including developmental screening, referral, and follow-up. Physician input and consultation occurred on an as-needed basis as required by the physician or initiated by the PNP.

With the understanding that PNPs typically practice independently, the following section explores the theme *creating opportunities* and how parents, physicians, and self-directed learning contributed to advancing skill development related to developmental screening during the practice phase. To reiterate, responses to the following questions are presented here: How would you describe your skill level using your current screening instruments? In your current practice setting, how do you assess child development? Can

you describe what happens when you or a parent have a developmental concern about a child from 0 - 3? How do you use surveillance versus screening?

PNPs created opportunities to advance their screening skills through interactions with parents, physicians, and through their own reflective practices. Overall, participants rated their screening skills as “good” to “high” and the general consensus about skills was summed up by one participant who said: “I wouldn't say that I am an expert. I am able to use them [screening instruments] competently.” This sentiment reflected the mindset of study participants who seek continuous learning throughout their careers. In addition to rating their skills as good to high, most participants also qualified the rating with a statement correlating to a specific component of screening, such as scoring or sharing results with parents.

The following participant noted her skills in using the instruments, sharing the results, and the importance of communicating with parents to ensure they understand the findings, “I understand what I’m doing when I’m using them and how to share the results, information [about] the findings from those tools with parents in an effective manner so they understand.” She continued discussing components of her clinical reasoning, including how she connected the instrument scores with the information gained through specific questioning to contribute to the management plan for the patient:

I’m able to interpret the scoring and make sure I follow up with more in-depth questioning with the parent so I can determine whether there is an area that may be a true concern or if it is something I need to watch carefully on the next visit.

Another participant discussed her skill using the instrument and sharing any concerns with parents. She specifically mentioned that she is comfortable with the

screening processes, which suggests comfort may develop as a result of or in conjunction with perceived skill:

I feel like I have a good level of skill... using those instruments and relaying that information to parents and if I have a concern I bring that up so I'm, I feel like I'm comfortable using those I think my skills are pretty good.

Here she expressed the mindset of most participants of screening and development as “a continuous learning process:”

I guess I'm always looking to continually improve my knowledge and what I know about how to relate items to what I'm seeing or what a parent is seeing with behavior. It's always a continuous learning process that you always learn something new every single time you complete a screening.

To recap, participants' perceptions of their developmental screening skills in practice ranged from good (4 participants) to high (2 participants). They felt comfortable with the screening process including applying their knowledge and skills about child development to patient management, instrument scoring, and communication with parents.

Parents

In the skills practice phase, PNPs' main source for creating opportunities for advancing screening skills development was through parent interactions. PNPs assessed child development in practice by synthesizing information from parent input, the historical record, and their own judgment. Participants discussed their screening processes, which frequently mentioned asking parents about any concerns they may have first. One participant stated, “I like to you know talk and see what concerns are and ask questions first. And then get into a little bit more of the physical assessment and then ask

more specific questions or follow up questions.” Other participants discussed how they have the parent take more of the lead in the encounter. One participant stated:

We start off by asking the parent if they have any developmental concerns and go from there. Then we share the results of any screening and follow the parents lead with regard to what they would like to talk about or what how they would like to lead the interview.

Another participant noted the importance of the conversation with parents about the screening items related to child behaviors.

I think the underlying conversation with the parent is what reveals a lot more detail about those behavior items on those checklists, and that is the important catalyst for determining how the conversation will go about those screenings. Her response revealed a deep understanding that subtle behavioral details are often only uncovered with expert questioning and active listening. Less experienced clinicians may miss opportunities to gather this level of information from parents or be unaware they are even missing it.

When participants were asked about how they used surveillance versus screening to assess child development, the following responses related to participants creating opportunities to develop their skills through parent interactions. All responses reflected the importance of listening to parents, applying knowledge and skills to gain pertinent information, and applying knowledge and skills about child development to inform decision-making for each patient. One participant discussed how she approaches development assessment at the well-child visit:

By asking parents, what are new things that your kids are able to do. It's very helpful those items are very helpful to open that conversation because parents always like to talk about what new things, their kids are doing. By listening to their, by listening to them talk about their children, again, it opens that conversation and allows me to ask more pointed questions to gain more understanding of exactly what they're talking about. It gives me a better

understanding of what they're seeing at home versus what I'm seeing in a clinical setting.

This participant revealed that by asking the parent what their child is doing that is new, she is engaging the parent and building rapport immediately upon entering the room. She also described the critical importance of active listening in order to be able to ask specific questions and gain details about child behavior at home, which may be very different from behavior displayed in the clinic setting.

Another participant reiterated the importance of listening to parents and her role in applying her skills to support parents in understanding their own child's development:

You rely on your skills because the parents might not have identified something and they might see something or that you can further explore, comment you know, but I believe, like listening to the parents, but also, you know just like hearing out what their story is and not rushing them through anything but you know because they want to tell you about their baby and stuff and what they're doing, and they want to make sure everything's okay, or should I be worried about this.

All of the experiences interacting with parents created continuous opportunities for participants to practice patient and family centered care, which AAP identifies as an approach to care that is “based on the understanding that the family is the child's primary source of strength and support. Further, this approach to care recognizes that the perspectives and information provided by families, children, and young adults are important in clinical decision making” (Committee on Hospital Care & Institute for Patient and Family Centered Care, 2012, para. 1).

Physicians

Participants identified physicians as another source for creating opportunities to support their skills advancement in the practice phase. Unlike the program phase during

which participants recalled physician observation as the primary method for skills advancement, in the practice phase it was collaboration. Participants did not consider the physicians with whom they work as “supervising physicians,” but as collaborators and consultants. Physicians collaborated with PNPs by being present and available, answering questions, providing advice, and promoting a sense of partnership and equality in the practice.

Participants indicated that they initiated the consultation with physicians. One participant stated, “If it's something that I think is a concern I bring it to their attention and we'll talk about the case together.” Another participant responded similarly, “If I need to ask questions or collaborate with the other pediatrician that's on that day, then I do so.”

One participant shared the type of input she received: “They answer any questions that I might have. They help me determine management plans, if necessary, if it's something that's a little more complex or like I said, if I have questions they'll always answer my questions.”

This participant discussed the instances in which she requests consultation or support with patient care and management:

They're available and I consult with them as necessary. If it's if I have any questions or if it's a difficult case and I need to refer out or if we need to admit someone to the hospital, we have a protocol in place that I make sure that they know what I'm doing with those patients but, for the most part, I see patients independently and the supervising physician provides consultation as necessary.

Another participant explained her perspective about the unique collaborative relationship and how the nature of this relationship contributed to her feelings of equality:

We work closely together... a unique partnership. It's more of a partnership instead of a pediatric practice where that person is above me. She really values my input, she has a lot of expertise and knowledge and we work together as a team.

This participant responded similarly regarding the collaborative relationship:

We work together as partners, I don't feel as though they're supervising physicians necessarily. I feel as though they're available. They work different days of the week and I work full time there. We have a really solid working partnership. It's a give and take. I'm able to ask any questions, I would like consult with them on any questions that I might have. They're always available.

The common goal among PNPs and physicians is quality patient care, which is supported through trusting and respectful collaboration. Most participants expressed satisfaction with their present collaborative practice and created opportunities to advance their skills through consultation with physicians in this practice phase.

Self-directed

Participants identified their own self-reflective practices as a source for creating opportunities to support their own developmental skills advancement. In the program phase, PNPs are developing screening skills within a very limited scope and they do not have the opportunity to make decisions about patient care. In the practice phase, PNPs function independently and are responsible for managing all aspects of care for their patients. Participants described screening with terms such as “standard,” “validated,” “researched” and “confirm what I’m thinking about that child’s development.”

Surveillance was described as “observing,” “what your gut is telling you,” and “assessing what that child is doing.”

One participant acknowledged the importance of her skills, “You rely on your skills because the parents might not have identified something.” Another participant

reflected upon how she has developed her skills through experience, “That was one thing is like developing a technique, you know whether you're talking and going through things.”

Participants shared how they used surveillance and screening to assess child development. The following responses related to participants creating opportunities to reflect upon their practice. One participant noted:

Surveillance is gathering that information anecdotally from the parent and your own observations using what you know and what your gut is telling you about where that child is at based on what you know about that child and family, as well as what you know about child development as a whole. And then the screening instruments often validate concerns you or a parent may have, and they also provide a way for you to cross check what is measured across the continuum of child development.

This insight reflected not only the primary differences between screening and surveillance, but how the participant applied her underlying clinical reasoning skills. She considered the integration of her knowledge and skills related to multiple decision-making factors including child development, family considerations, parent concerns and how she would use screening to confirm those concerns. She then continued by reflecting on the connections between screening items and their relationship to behavior and how her skill in identifying those connections informed the conversation with the parent. In addition, she noted how documenting findings provided a way to ensure those concerns were not overlooked in subsequent appointments:

So those items are extremely important for making sure that you are reviewing every behavior that could possibly be a red flag and helps you get a baseline for where you're going to go with that conversation, and also for where you're going to go in the next appointment, so you have something you've documented and you know where you're going to look in order to gain that information to have that conversation with the parents.

Similarly, another participant described how screening and surveillance skills contributed to informed decision-making:

As I mentioned before surveillance is when I'm observing in comparison to what milestones that child is supposed to be reaching. So if I, for example, see a child who is 24 months and is not walking without falling over or they're not able to use their fingers to pick things up for those specific tasks I'm looking at where that child at and observing and also looking at maybe what the screenings in the past have shown, is a concern. I'm also looking at the trajectory of development. Some children are a little behind developmentally but they often catch up without any intervention or a lot of intervention. So there's surveillance, basically, is the observation and understanding what you're seeing and how to interpret that in terms of development, whereas screening our screening items are really a more researched way of making sure that you are really assessing the development. In terms of those items and then with the scoring to make sure that you're not missing anything from your observations. So that's how I look at surveillance compared to screening.

The following participant reflected upon interpreting a developmental screening score in relation to her knowledge and skills about child development:

When we have a concern it provides information for us to determine whether we proceed with watchful waiting if it's only one domain that is showing a potential delay or a little lag. And what's nice about the ASQ, is that there are suggestions so we can provide activities for parents to work on, if a child is showing perhaps one area of potential concern.

She verbalized her decision-making process when presented with a patient who scored low in "only one domain" and her rationale for "watchful waiting." Watchful waiting is a common practice that persists despite its negative impact on early identification and optimal intervention outcomes. Serving young children as early as possible when the brain is developing provides the best opportunity for positive outcomes.

Finally, one participant noted her process for preparing for a well-child visit by considering the previous notes or concerns so she can intentionally begin the conversation:

When they come in, I have looked in the chart to see where they're at if there are any previous concerns and where to start that conversation with the parents. When they come in, usually if it's a time that they have a developmental screening that's a nice starting place, well that way I can bring up any concerns that I might have during that time.

Developmental Screening Attitudes Themes

The research question related to developmental screening attitudes was: How do pediatric nurse practitioners describe their attitudes about developmental screening? The two themes that emerged from the data about developmental screening attitude perceptions during program and practice phases included *balancing learning expectations* and *understanding role and responsibilities*. Sub-themes for *balancing learning expectations* included positive experiences and potential improvements. Sub-themes for *understanding role and responsibilities* included facilitators and challenges.

Attitudes are often strong predictors of behavior, and both internal and external factors can affect attitudes. It was clear from participants' responses that diverse attitudes toward program experiences existed, which may have influenced current developmental screening behaviors in practice.

Theme 5: Balancing Learning Expectations

The theme *balancing learning expectations* emerged in response to the following questions: What would you have liked to learn about developmental screening in your PNP program that was not included in the curriculum? What do you wish you would have had the opportunity to do/apply during your PNP program related to developmental screening? Is there anything you would like to add about developmental screening experiences while you were in your PNP program?

Prior to reporting findings related to program attitudes, it is important to provide some background information related to NP program configurations. NP program courses and configurations vary based on the particular program attended, and whether they obtained the MSN or DNP degree. Typically, MSN programs are two years if attended full time and they are structured with didactic core courses and beginning clinical skills development in the first year followed by more advanced clinical experiences the second year. DNP programs follow a similar structure and are typically completed in three to four years with more advanced clinical placements and courses in research and leadership. Program requirements differ by school, but most have a minimum standard of 500 hours of supervised clinical experience for the MSN degree and additional hours for the DNP degree. Although NP residencies (which are similar to medical school graduate residencies but for a shorter duration) are becoming more popular for NPs, these residencies are not funded through the federal government and are not currently a requirement for NPs to practice (NONPF, 2012).

When reflecting on the program phase, participants recalled they were motivated to learn as much as possible about many pediatric topics, including child development and developmental screening. Participants believed their programs provided essential developmental screening knowledge and skills' experiences, as noted by the following statement: "It gave us the basics of what we needed to know at that point." However, participants had anticipated more independent experiences with parents and patients than what occurred during their clinical placements, and they had difficulty balancing their learning expectations with the limited opportunities they were provided. They shared a mix of both positive program experiences and suggestions for improvements. The

improvement suggestions stem from participants' beliefs that they had not been provided enough experience to advance their developmental screening knowledge and skills during their program.

Factors contributing to positive experiences included the perception that all experiences had some merit, professional mentorship was important to learning, and personal planning and preparation contributed to a successful experience. One participant conveyed, "I always like to be with different mentors because you can see their style."

Another mentioned her connection to the NPs on staff during clinical placements:

I think all of the experiences were valuable. In some cases, when I was paired with an NP within each of those settings that was very helpful because I knew that that was the go-to person that I could ask any silly questions or I wasn't bothering them if I was asking them questions because they knew that I was learning.

This participant reflected on her readiness to ask questions of a fellow NP because the NP knew she was "learning." This statement suggested that in other placements this participant was more reluctant to ask questions of non-NP professionals due to worry about interrupting the workflow and due to a potential negative perception of the participant as a competent professional if she asked questions.

One participant discussed her own preparation as a source of positive program experience: "I spent hours and days just investing in myself to feel comfortable."

Factors that would have led to program improvement included better preparation to work with diverse populations, increased screening knowledge in pre-clinicals, and increased screening application in clinicals.

One participant reflected on the lack of program experience with diverse populations and the potential benefits of observing physician conversations with diverse populations:

You know there's a lot of diversity that I guess I didn't anticipate and again more of that role modeling and prep like always like always good how to script things or how to phrase it just to get you started so you're a little bit more comfortable.

Other participants conveyed the desire to have learned more about the screening instruments, processes for early intervention, and alignment of screening items with child development milestones over time. One participant stated:

I wish that perhaps we had more knowledge about how to apply developmental screenings and I guess the differences between the screenings so that when we were in clinicals we can have a better understanding of how they were used to assess development, specifically, for example we saw an example of several different screenings in my PNP program but we never had the opportunity to see the continuum of those assessments or screenings and how, for example, they changed with each developmental stage of the child.

The same participant also reflected:

The other thing I think is that I wish we had a better understanding of what exactly happens after you have to refer a child and what that follow up looks like because I never got to see that until I was in my final clinical where I currently work.

Participants identified gaps in both program knowledge and skills that negatively affected their ability to gain a complete understanding of the entire screening and early intervention process. These gaps indicated a potential need for program review to ensure specific developmental screening curriculum objectives were being met during the PNP program. Further examples of experiences that participants felt would have positively affected their learning experiences included more physician contact, greater willingness to have PNP students at clinical sites, and more transparency about clinical logistics. One

participant conveyed her frustration about expectations and logistics for clinical placements:

I would add that I also wish the expectations for what we were expected to do in each clinical were more up front and provided to us at the beginning of each rotation. Very often, I wasted a lot of time at the beginning of each clinical figuring out who to go to and ask questions for which things and how they like things done and how I could be of the most help.

Participants also shared suggested improvements regarding clinical learning environments and physician contact, “Some offices are not very open to having students in their office setting and there's not a lot of contact with the physician—it's more so with the other NPs or the other nurses that are in that office.”

Several participants expressed their disappointment with the lack of opportunity to apply their newly learned knowledge of screening to lead child development conversations with parents. One participant stated:

Also to have the opportunity to have those conversations with parents about those screenings; how to address any concerns that they might have how to be able to talk to them learn to talk to them about their child's development and things that they can do to help support their child's development at home.

Another noted:

To discuss with parents what those results meant just so that we could develop the vocabulary and skills, the communication skills that would help guide further discussion. That would have been helpful.

Additional examples included, “It would have been nice if we would have been able to actually do the scoring and have the discussion with the parents about the screening results” and “I never had the opportunity to have that conversation with parents about referral, whose child may have a delay.”

However, when reflecting further about learning experiences in their program, some participants revisited and revised their responses. They concluded that given their own developmental level and lack of experience at the time they were in their PNP program, they would *not* have benefited from more developmental screening content or application. One participant stated:

If we would have had some actual experience with those in our clinicals or in our program but honestly, the curriculum there's just so much to learn in the curriculum and it is a lot about disease processes and clinical care management I'm not sure if it really would have stuck anyway, because I feel like a lot of what we learned about we didn't really understand why it was important until we started seeing our own patients.

Another participant retrospectively acknowledged, "Sometimes you know you don't know what you don't know. You know there's just like a lot of knowledge that comes just through practicing."

In sum, participants recalled the need for balancing learning expectations about the type, quality, and consistency of developmental screening experiences they were provided during their PNP program. While most felt as though they would have benefited from independent developmental screening opportunities, several also retrospectively recognized that they had not attained the level of experience necessary to lead conversations about screening results, concerns, and referrals at that time in their own screening skills development.

Theme 6: Understanding Role and Responsibilities

The theme *understanding role and responsibilities* emerged after analyzing responses to the questions: What are the challenges of conducting developmental screening in your practice? What factors facilitate developmental screening in your

practice? What changes, if any, would you suggest to improve developmental screening in your practice?

The following information creates context for exploring the practice attitude findings and frames the theme *understanding role and responsibilities*. To gain a sense of developmental screening attitudes at the participants' current practices, the question was asked: How important do others in your clinical setting believe it is to follow the AAP universal screening recommendations? All participants' responses reflected the idea that following recommended practices was expected in their practices. Responses included, "We need to do this," "It is an expectation," "They expect us to follow those," "Everybody just does it," "It's just something that you do. It's not even a question, you just do it," and finally, "I don't understand the question. We follow all the AAP guidelines."

Some participants mentioned that screening attitudes and expectations have changed for the better over time and continue to improve. One participant noted:

I mean it's just it's the expectation I wouldn't say it was like that before, but I do feel like over the last maybe five or ten years or so there's definitely been a change in the expectation. Before it was kind of hit or miss but now it's standard and it's just something that you do. It's not even a question you just you do it.

The participant was asked the follow-up question: You said there was a change in expectation. Why do you think that happened or what happened that caused that change? She stated, "The conversation about autism and screening for autism it seems became more important during that time so maybe that had something to do with pushing the screenings for kids under three."

Another participant mentioned her perception of the differences in screening attitudes between the pediatric and family medicine professionals in her practice:

Family medicine physicians do not always follow the same screening guidelines for all their patients that we do. And we try to make sure that we extend our expertise and knowledge to other providers in the office. I think it has improved some since when I started.

Participant responses reflected the continuous increase in awareness and importance of early detection and intervention for young children. To that end, participants in practice are developing a strong understanding of their professional role and responsibilities to young children and their families for supporting their optimal development. Participants discussed the factors they believe facilitate and challenge their ability to conduct universal screening according to the AAP recommendations.

Facilitators

Participants felt the four main factors that supported their ability to follow screening guidelines included the practice environment, the electronic health record, parents, and self-preparation.

Practice Environment. The practice environment included attitudes and support from the office and professional staff. The office staff prepared paperwork, updated screenings into the electronic health record, and ensured PNPs had the necessary information to complete the screening during the appointment. One respondent stated:

I think it's helpful that our office staff is able to make sure that those are completed and included in the chart so that I don't have to hunt them down and find out where they're at from the last visit and then also I feel like in our practice everything is ready to go when the parents come in that is very helpful in my opinion.

Another participant noted:

They do a wonderful job they scan all of the screenings with the scoring right into the charts and they do a very good job at ensuring that those are in there on time for the next well child visit.

In some offices the professional staff (nurses, medical assistants, etc.) facilitated the screening process by discussing initial concerns with parents and providing additional information to parents regarding referrals. One participant discussed how the professional staff supported her screening efforts:

It's a coordinated effort in our practice and the MAs help out with guiding you know [they] help out with making sure that those screenings are put in the chart and that they're completed, and they go over any of the items with the parents that are incomplete before we get them, which is very helpful. And we're very fortunate to have the two MAs that we have because they just make sure everything's in place and ready to go for us when we you know get into the room.

Participants also noted that the pediatricians' attitudes about the importance of developmental screening facilitated developmental screening in their practice. One participant stated:

The pediatricians I work with also are very much aware of the importance of developmental screenings, so I think that that mindset and attitude is what helps make sure that we are, you know, supporting families in this way. To ensure that all the guidelines are being followed and that we're doing the best that we can possibly do for their families to support their children's growth and development.

Another participant discussed how the pediatrician's personal experience with autism positively influenced her perception of her role and responsibilities to patients and families regarding the screening and early intervention process:

The pediatrician I was placed with had a younger brother who was on the spectrum and those conversations and that knowledge and that expediency and urgency to make sure that a potential delay is not missed was something that I learned from her, and I value greatly because she was able to explain, and you know we often talked about her experiences as an older sister with the younger brother. And the impact on their family and the impact on her as a sibling, and so the value of her story is that it, I believe it makes me much more aware of my role in ensuring that parents are provided with the

information that they need to make really good decisions about their child's development and I will do everything I can to support that and make sure that if there is a potential delay that that child is in the system and is able to be evaluated and get the services that they that would benefit them, you know with the least delay possible.

Electronic Health Record. Participants felt the EHR supported them and helped ensure they did not miss any developmental components. One participant commented about the benefit of reviewing previous screening information in the EHR:

Having that information right in the chart is very helpful and being able to look back at those screenings to make sure that the child is on track, typical development, any concerns. I think that that's helpful and helps facilitate you know helps facilitate that in our in our practice.

Another participant explained how she relied on the EHR to guide her encounters:

For each well child visit the information in the chart helps guide that visit to provide the medical education and knowledge and information regarding all the types of pediatric health assessments including immunizations and patient education, and screenings for other diseases and disorders so, especially during well child visits I really rely on the information in that chart in order to make sure that it is a comprehensive encounter.

Parents. Parents were also mentioned as facilitators to screening practices. One participant acknowledged parents' role in the screening process: "Well, I think that parents facilitate developmental screening. They want their children to grow and be healthy and so they are their child's biggest advocate in terms of making sure those screenings are done."

Other participants noted that parent attitude about a concern often contributed to their own approach to the conversation surrounding a screening or potential delay. One participant stated, "Parent attitude regarding a potential delay is really key to how I choose to approach the conversation." Another participant expressed, "You know you always have parents that don't see the same things that you do, and if a parent brings up a

concern, they're usually a lot more willing to be referred and follow through with the evaluation.”

The following participant recognized parents’ feelings and reflected on her role to help parents navigate the early intervention process:

It's very, very important to have that evaluation completed so that we can intervene early. as we know, early intervention increases success for that child in closing any of those gaps and it just it really helps the family once those services are in place so that they can feel like they have a little more control over the situation. It's a big process it's often very scary for them, and my goal is to help them in any way I can.

Self-preparation. Self-preparation also contributed to facilitating screening processes and helping participants understand their screening role and responsibilities. Participants self-prepared for developmental screening encounters through the patient’s record and concern review prior to entering the clinic room, effective use of their time, and the use of office paperwork to guide the encounter. One participant noted, “I always make sure when entering the room that the concerns are identified prior to entering the room, so I can make the most use of that time with those with that parent and child.” Another participant mentioned the importance of having her paperwork organized prior to each encounter:

I think it was you know, having making sure that the right paperwork was in the stack for the parents and you know that was a big help having that there, because if that was all there, then I wouldn't have to look for something that might be missing out of the packet. And then I can follow along almost you know, like a checklist of things like in my mind like going through my sequence of how I want to you know talk about things, and you know not miss something. So, I would say, you know the checklist or having papers there.

Challenges

Although participants identified several screening facilitators, many challenges were also described. Participants felt the main factors that inhibited their ability to follow screening guidelines included time, practice processes, and parents.

Time. Lack of time was the overwhelming challenge expressed by participants. Participants felt they needed more time to discuss concerns with parents. One participant explained, “Time is challenging, especially when there are developmental concerns because it takes a long time to answer questions from parents especially when they're concerned about their child's development.” This participant also noted the challenge of managing time in the clinical room due to the developmental stage of the child. She added, “Also, the toddler years when toddlers are very active in the clinical room it's difficult to have a conversation, and so that takes additional time.” Further, she recognized this specific period of time related to the Covid-19 pandemic as challenging due to increased parental concerns about speech delays. She stated, “Also, the pandemic has made things a lot harder. Parents often think kids are behind because of a lack of communication during the pandemic and that has been the challenge, most recently.”

Another participant expressed her frustration with the lack of time to address screening items, “There never seems to be enough time to discuss in detail, some of those items and we often have to have another appointment time if parents want to go into further detail. Which is frustrating.”

One participant discussed her supportive role and responsibility to provide adequate time for parents to process information before making any decisions:

A lot of times there are many emotions that come with, with a concern about a developmental delay and especially with a possible autism diagnosis and so you never want to rush a parent and it's just very important to make sure that that parent has feels like they have the time and the space with you to discuss everything that's on their minds, so that you can then get to the point that you can open that discussion for further evaluation and talking about resources and other things that may be available to them, but they need time to process what you're telling them so that they can determine what they'd like to do.

Regarding allotted appointment times, some participants felt obligated to make time for additional siblings when they did not have an appointment for a well-child visit. One participant recognized her responsibility for taking advantage of the situation and providing patient care in the moment:

So the challenges I always felt rushed for time because, especially if they you know they're there they bring in one child and let's say they bring another child with them and they'll say like 'Oh, you know so and so hasn't had this you know, do you want to do a well child visit for them, while you're here?'

She also noted how she took personal responsibility for improving her efficiency:

But the timeline you know, never increased you know because they still had people booked up. Right, you know, but now, this is how like I would get to be behind, and that was one of the things that I always was constantly working on was my time management.

Practice Processes. Practice processes also contributed to screening challenges.

One participant discussed how the office would “fit in” add-on patients to ensure they were seen while they were there and described how this affected her ability to provide efficient care:

You know if I normally have a one sick child appointment and now you add on two siblings with well visits, you know you just increase my time in that room, you know potentially 30 minutes. And you know, then somebody else would be waiting and I have somebody come and knock at the door, you know, so I always felt rushed and other people didn't want to wait, you know the proper thing would have been have them scheduled and come back in but you're not going to get them to come back in so that's why the persons doing the schedule would just add them in then and so your caseload will just start growing exponentially by add-ons.

Another participant conveyed her concerns with the office processes in relation to evaluation documentation and her ability to provide the most effective care for patients:

I think that sometimes things fall through the cracks because we're relying on the office staff to make sure that that information is received, so you know, there have been a couple times that I've referred a patient for further evaluation and then, at the next visit it wasn't in, there were no results in the record and the parent was like yeah I took I took my child to be evaluated here like you told us to and then it's just kind of a waste of time on our part when we can't discuss the results at that visit. So I really wish that there would be better communication I guess between or a process in place to make sure that everything is followed up in a timely manner, and that that information is there before the next time we see that child, so that we can make the best use of the time with the parent to address those issues.

Another practice challenge was related to paper versions of screening instruments used in the practices. All participants noted that their practices used hard copies of screenings, such as ASQ and M-CHAT, and not the digital versions which can be completed by parents at home or in the office using a computer, tablet, or smart phone. One participant questioned the continued use of the paper copy format, but stated it was “not her place” to comment on the choice of screening type or format used in the practice:

I actually asked this question when I was first hired because it is something that I feel should be something they can do from home or on an iPad or something when they come in and I'm not sure why we haven't gone to an online format. Maybe because of the cost... that is really not my, you know, not my place to have input about that.

Participants noted that the office staff mailed the screenings to parents ahead of time to be completed at home and brought to the well child visit or the forms were completed in the waiting room. One participant conveyed information about the return rate and procedure if the parent did not arrive with the completed screenings:

I would say about 75% of parents and bring the forms back with them and the ones that don't the LPN will do those questions with them and read them and fill it out in the waiting room before the appointment, which is not the best. It takes a lot of time.

Another participant discussed the process in her office. She stated, "Of all the people that I saw we had like 98, 99 percent compliance with that. Parents fill out a paper copy. It's usually in the waiting room when they fill it out as far as I know."

Paper copies were scanned into the EHR by office staff. One participant mentioned challenges related to keeping up with scanning hard copies into the patient record:

Our office staff scans them into each chart so that, when we go and open the health record at the next visit, they should be there and be available but we're so busy sometimes between a well child visit and a sick visit that they may need to do a catch-up screening, it may not be in the chart just because we're so busy right now.

Another participant expressed her frustration over the office process related to developmental screening and her lack of EHR access:

If I wanted to know anything I'd have to go to the front asked him to pull up the chart and it's like where was my sheet, you know that I saw them two weeks ago. And then I could see my handwritten notes in there, you know, but it was scanned in right into this thing. I didn't like it. Doctors didn't want to invest in having the other providers with the computer or even having a kiosk there or a laptop and doing training on it. It's like you guys can keep doing what you're doing.

Parents. Parents were recognized as a facilitating factor to screening, but they also presented challenges to effective screening practices in several ways as well. One participant echoed the sentiments of several other participants recognizing that often parents are the source of the "wait and see" delay for early intervention evaluations and services:

I think is a challenge in that sometimes parents are in denial and it's really difficult to get them to have their child further evaluated it's almost like they think that they think that by having further evaluation that it's actually going to make the developmental delay true when they very much want to take a wait and see approach and they think that their child will grow out of it.

Another participant expressed her concern about early intervention delays due to parent hesitation or denial, “It is frustrating because you know that the earlier the child can be evaluated the sooner they can receive services, so delaying isn’t in their best interest.”

Parents also compared siblings, which created another type of “wait and see” delay for intervention services. One participant shared an example of parental developmental comparison between siblings and their justification for declining further evaluation:

Sometimes when you notice a concern that a parent doesn't notice or doesn't think is a concern, for example, you know you might have, I can think of one little boy who at almost two he had a very, very limited vocabulary expressive vocabulary and the parent said well none of my children and none of my other children talked very well when they were young either.

To summarize practice attitudes, participants’ responses represented their attitudes about facilitators and challenges to developmental screening in their current practices. Facilitators included the practice environment, the electronic health record, parents, and self-preparation. Challenges included time, practice processes, and parents. These factors contributed to participants’ understanding of their role and responsibilities as a PNP for advancing their own developmental screening competencies and supporting children’s optimal development.

CHAPTER FIVE

DISCUSSION

Introduction

Successful developmental screening practices depend on the competencies of the professionals conducting the screenings, which evolve and develop over time from acquired knowledge, skills, and attitudes. Although many types of early childhood professionals conduct developmental screenings, the majority of AAP recommended screenings for the birth to three population are completed by medical professionals in the primary care setting, which usually means either a family medicine or pediatric medical practice. Physicians are not the only medical professionals conducting screenings within the primary care medical setting. Nurse practitioners also have responsibility for providing complete patient care and following recommended guidelines, including developmental screening for young children. However, few studies related to developmental screening practices of nurse practitioners have been represented in the literature and no known studies of pediatric nurse practitioners specifically related to developmental screening behaviors were discovered during the literature review.

The overall purpose of this study was to add to the body of knowledge about PNP's screening practices for children from birth to three. The specific purpose of this study was to gain information about the developmental screening practices of pediatric nurse practitioners who provide primary care for children from birth through age three and explore how perceptions of their knowledge, skills, and attitudes regarding

developmental screening contribute to their screening behaviors. The research questions for this study included:

- What are the developmental screening practices of pediatric nurse practitioners?
- How do pediatric nurse practitioners describe their knowledge about developmental screening?
- How do pediatric nurse practitioners describe their skill with developmental screening?
- How do pediatric nurse practitioners describe their attitudes about developmental screening?

Six emergent themes supported the substantive theory of *advancing screening competencies to support young children's optimal development* and included (1) developing awareness, (2) integrating connections, (3) taking an active role, (4) creating opportunities, (5) balancing learning expectations, and (6) understanding role and responsibilities. This chapter presents the significant conclusions about developmental screening behaviors in relation to the literature, implications for nurse practitioner education and professional practice, study limitations, and recommendations for further research.

Returning to the Literature

Theme 1: Developing Awareness

The first theme, developing awareness, emerged from participants' responses about their perceptions of developmental screening knowledge gained during their PNP program. Most participants recalled having learning experiences in one or two classes and in their clinical rotations related to assessing child development, introduction to

developmental screening instruments, and recommended screening guidelines. Others did not have a strong recollection of specific developmental screening curriculum or general development screening tools. Although participants learned about specific tools such as the ASQ and M-CHAT through various learning modalities and were introduced to screening resources (such as Bright Futures) during their pre-clinical courses, most participants recalled very limited screening instrument knowledge from their program experience. Most participants stated they did not gain significant knowledge about general developmental screening instruments, guidelines, or practices until they started practicing on their own. This finding supports the few studies that found NP students needed more knowledge and skills development during their program to prepare them to conduct effective developmental assessment (Brady & Neal, 2000; Crowley & Magee, 2003; Melnyk et al., 2010).

Theme 2: Integrating Connections

The second theme, integrating connections, emerged from participants' responses about perceptions of their current developmental screening knowledge. Participants described their screening instrument knowledge as "good," and most frequently mentioned the ASQ and M-CHAT as the instruments about which they had the most knowledge. Participants' responses reflected knowledge related to the current screening tools they use in practice, including instrument content, scoring procedures, scoring interpretation, communicating with parents, and next steps. This finding conflicts with related research indicating healthcare providers had low self-perceptions of development screening instrument knowledge (Ford et al., 2017; Gellasch, 2016; Thompson et al., 2010; Wong et al., 2013). Participants all indicated they followed the AAP

developmental screening recommendations outlined in the AAP Clinical Report (Lipkin & Macias, 2020). This finding conflicts with the related literature that suggests many pediatric medical professionals are still not following AAP guidelines (Barger et al., 2018; Gellasch, 2016; Hirai et al., 2018; King et al., 2010; Meurer et al., 2022; Morelli et al., 2014; Radecki, 2011; Rice et al., 2014; Sand et al., 2005). However, this finding could be due to sample bias as PNP participants in this study may have had a greater interest in developmental screening than other PNPs who did not participate.

Theme 3: Taking an Active Role

The third theme, taking an active role, emerged from participants' responses about perceptions of their developmental screening skills during their PNP program. Although actual developmental screening opportunities were limited during clinical placements, participants recalled taking an active role in their own learning to gain as many skills as possible. Most participants discussed advancing their developmental screening skills through physician/NP observation and mentorship, parent communication, and self-directed experiences during their PNP education. These findings are supported by the related literature surrounding NP student clinical experiences including preceptors and mentoring, NP student attitudes, and socialization into the NP role (Berry et al., 2014; Drayton-Brooks et al., 2017; Giddens et al., 2014; Kusnoor & Stelljes, 2016; Meurer et al., 2022; Roberts et al., 2020).

Theme 4: Creating Opportunities

The fourth theme, creating opportunities, emerged from participants' responses about perceptions of their current developmental screening skills. Participants created opportunities to advance their screening skills in practice through interactions with

parents, physicians, and through their own reflective practices. Participants described their screening skills as “good” to “high” including comments related to scoring, discussing concerns and communicating results with parents, and providing referrals for further evaluation. This finding conflicts within the related literature which indicates many providers are not comfortable or confident sharing concerning results and early intervention processes with parents (Jimenez, 2012; Moore et al., 2017). Several participants described communicating with parents about a concern with a gentle, reassuring, and patient approach. However, the literature related to effective communication and shared decision making with parents regarding a potential delay is inconsistent. For example, one study by Sices et al. (2009) found that parents indeed needed time, space, and reassurance to process the information about a delay, which is the approach taken by participants in this study. Yet Jimenez et al. (2012) found that parents often mistook the provider’s “reassuring” message as an indication that they did not need to follow up with an evaluation, which could help to explain low follow through rates and EI service receipt. Participants in this study may also be inadvertently delaying prompt evaluation by using a similar communication approach.

Theme 5: Balancing Learning Expectations

The fifth theme, balancing learning expectations, emerged from participants’ responses about perceptions of their attitude during their PNP program. Most participants recalled the need for balancing learning expectations about the type, quality, and consistency of developmental screening experiences they were provided during their PNP program. While many participants expressed satisfaction with the basic developmental screening curriculum in their program, they also felt frustration with limited opportunities

to apply their knowledge to skill development during clinicals. They felt they would have benefited from independent developmental screening opportunities with families, although several participants also retrospectively recognized that they had not attained the level of experience necessary to lead conversations about screening results, concerns, and referrals at that time in their own screening skills development. This finding supports the literature which found NP students could benefit from additional experiences to develop knowledge and skills during their program to prepare them to conduct developmental screening upon graduation (Brady & Neal, 2000; Crowley & Magee, 2003; Melnyk et al., 2010).

Theme 6: Understanding Role and Responsibilities

The sixth theme, understanding role and responsibilities, emerged from participants' responses about perceptions of their current practice attitudes related to developmental screening. PNP participants understood their professional role and responsibilities to young children and their families to support their optimal development and believed several factors facilitated and challenged their ability to conduct universal screening according to the AAP recommendations. Participants noted that the practice environment, the electronic health record, parents, and self-preparation supported their developmental screening responsibilities within their role, while time, practice processes, and parents challenged it. This finding supports literature identifying similar attitudes related to barriers and facilitators of developmental screening in practice (Earls et al., 2009; Gellasch, 2019; Honingfeld & McKay, 2006; Jimenez et al., 2012; Meurer et al., 2022; Moore et al., 2018; Morelli et al., 2014; Sices et al., 2004; Talmi et al., 2014).

Implications for PNP Education

Findings from this study have implications for primary care PNP education. Participants acknowledged their program provided fundamental learning experiences related to developmental screening and they were able to advance their knowledge and skills in a limited capacity through experiences with physicians, parents, and their own self-directed learning. PNPs transferred the knowledge and skills gained through their program to their current practice behaviors. However, participants strongly felt that they had not gained enough knowledge about child development and developmental screening processes in their pre-clinical courses, and they did not have enough application opportunities in their clinical placements to be able to develop adequate developmental screening skills. Participants did not fully understand the entire screening process (administering and documenting the screening, delivering results, providing appropriate referral, evaluation follow-up and progress monitoring) until they began practicing in their primary care PNP role.

When reflecting upon their program, participants shared improvement suggestions for both pre-clinical and clinical learning experiences. Pre-clinical suggestions included better preparation to work with diverse populations and more in-depth clinical reasoning opportunities that help make connections between child development milestones, child observations, and screening instrument items. Clinical placement suggestions included increased experiences with screening application (scoring and interpretation), parent communication about concerns, and referral and evaluation processes, and follow-up. More physician contact, willingness to have PNP students at clinic sites, and transparency about expectations prior to beginning each clinical placement were also identified as

areas for program improvement. This data suggests a need for PNP programs to review pre-clinical curricula and clinical placements, intentionally scaffold developmental screening experiences for students, and provide developmentally appropriate learning experiences for students as they progress through the program, thereby strengthening developmental screening knowledge and skills and setting students up for success in their PNP role.

Implications for PNP Practice

Regarding PNP practice, it was encouraging that all PNP participants in this small study were familiar with the AAP developmental screening recommendations and confirmed they followed the recommendations for universal screening with validated screening instruments and surveillance. Despite studies that show many providers are still not following AAP screening guidelines, this outcome illustrates the many national, state, and local efforts toward improving awareness of early detection are impacting individual practices. Universal application of the AAP guidelines is the first step toward ensuring eligible children are identified and receive the EI services to which they are legally entitled. There are several important implications to be considered as a result of this study including continuous improvements related to interprofessional and multidisciplinary collaboration between early childhood programs, early childhood service providers, and the concept of a medical home all working together to coordinate developmental screening efforts; improving screening implementation processes for practices; and most importantly, agreement and support for universal developmental screening practices for all children ages 0-3.

Collaborative Practice

Participants cited influences that advanced their screening competencies toward optimal development for children including professional relationships with physicians within their practices. The importance of physician and PNP collaboration surrounding developmental screening practices and mutual accountability for patient care cannot be overstated. Bridges' (2014) working definition of NP-MD collaboration is as follows:

Collaboration is defined within the context of NP-MD collaborative practice as an interaction in which both individuals work as a team in a collegial relationship in an environment where there is mutual trust and respect and open communication. It is an interaction in which both individuals share knowledge and clinical expertise, decision making, and problem solving. In addition, it is an interaction in which both parties consult when needed to meet the shared goals of achieving excellent patient care and improved patient outcomes. (Bridges, 2014, p. 408)

Participants' descriptions of positive collaborative relationships with physicians supports the evolving co-management model and could potentially reduce physician workload and burn out, improve patient care quality, and lead to increased access to care, which in the case of pediatrics includes effective screening practices and access to EI services for young children (Norful et al., 2018).

Screening Implementation Challenges

Another implication of this study involves examining the challenges to PNPs' ability to implement screening as intended. Time, practice processes, and parents were identified as challenges, with time being the most consistently mentioned concern. Interestingly, time was interrelated to both practice processes and parents. Participants identified lack of time with regard to not having enough time allotted within the practice schedule for a well child visit to fully discuss the parent concerns. Participants also mentioned practice policies of adding additional siblings to an already in-progress

appointment in order to “fit them in” because they were there and “may not return for the next visit.” In addition, participants noted inefficiencies in practice processes related to integration of the hard copy screenings and EHR tool. Custom, modified screenings and milestones were included in some EHR templates that participants used, which are not validated versions of the screening tool and are to be used for surveillance purposes only.

None of the participant practices in this study used online versions of the full screening tools that are available for purchase that integrate with the major EHR systems. Instead, completed screenings were scanned into the EHR record by office personnel. Busy practices that get behind on scanning screenings and other developmental related documents into the EHR are contributing to an already complex process for providers to be able to effectively track screenings, referrals, and evaluations.

When allotted screening time is ineffective due to office processes, as noted by many participants in this study, practices must consider changes that include all personnel to determine strategies to improve the processes and positively impact the quality of patient care (King et al., 2010). For all practices, consideration of purchasing online versions of the screening tools that could be completed by parents at home or on a tablet or kiosk upon arrival that are immediately available to providers in the EHR is needed. The value in the time saved for parents, PNPs, and office personnel and the benefit to all involved, especially the patients in terms of quality of care, far outweighs the cost.

AAP and AAFP Screening Recommendations

The final and most important implication from this study is not related to a finding but to a different screening recommendation other than AAP that must be discussed. AAP is considered the definitive expert on pediatric care. Pediatricians and

PNPs follow AAP guidelines and recommendations regarding developmental screening practices. In addition to developmental surveillance at every visit, AAP recommends three general developmental screenings using a standardized tool at 9-, 18-, and 24- or 30-months and an autism screening using a standardized tool at 18- and 24- months.

Family medicine physicians follow American Academy of Family Physicians (AAFP) guidelines, which are aligned to U.S. Preventative Service Task Force (USPSTF) recommendations. The USPSTF is:

an independent, volunteer panel of national experts in prevention and evidence-based medicine. It evaluates evidence and makes recommendations about preventive services, such as screening, counseling, and preventive medications. The charge to USPSTF is to apply rigorous analysis to the best available evidence, and to make recommendations on preventive services to primary care clinicians for adults and children with no signs or symptoms. (Fein, 2016, p. 573)

Although many family medicine physicians and family nurse practitioners follow the AAP screening recommendations, others may not be doing so. The AAFP article, *Developmental Delay: When and How to Screen* (Vitrikas et al., 2017) details the most updated screening and surveillance guidelines related specifically to autism and communication delay in asymptomatic children. They have not issued a statement on general developmental screening. An excerpt of the article is as follows:

The U.S. Preventive Services Task Force (USPSTF) specifically addresses screening for autism and speech and language delays, but it does not address broader developmental screening. Its recommendations state that there is insufficient evidence to assess the balance of benefits and harms of screening for autism and speech and language delays in asymptomatic children younger than five years. The American Academy of Family Physicians affirms both of the task force's recommendations. The USPSTF did not find adequate evidence to support surveillance (i.e., active monitoring for concerns and identification of risk based on history and physical examination) by primary care physicians to identify whether further evaluation for speech and language delays and disorders is warranted, nor were there sufficient data that children who screen positive for autism or communication disorders in the primary care setting will benefit from

interventions. There is also some difficulty in distinguishing speech disorders from delays with available screening tools. (Vitrikas et al., 2017, p. 36-37)

The AAP President, Dr. Dreyer, responded to the USPSTF statement with the following:

... strong evidence already exists on the benefit of formal screening using standardized tools. This type of screening can identify children with significant developmental and behavioral challenges early, when they may benefit most from intervention, as well as those with other developmental difficulties. For screening to be effective, by design it must be applied to all children — not only those who exhibit overt symptoms, or those an individual clinician judges would benefit. (Albano & Noritz, 2016, para. 9)

Although the task force emphasized that the finding should not be interpreted as a recommendation against screening, some providers may indeed be interpreting it as such, which would partially explain the inability to reach higher screening rates in the birth to three population. This researcher is unaware of any studies that explore differences in providers' beliefs about following AAP or AAFP screening recommendations or providers' beliefs about the potential of harm of false positive screening outcomes to patients or families, which may influence the willingness to screen and refer for further evaluation.

Implications for the Early Childhood Field

Although physicians are the main source of developmental screening and referral for young children, early childhood programs are also an important source for developmental screenings. In this study, PNPs did not mention early childhood programs or services, such as Early On or home visiting programs, when sharing information about their developmental screening experiences. As 'time' was the most frequently mentioned barrier to administering screening in the medical setting, coordinating services with early childhood professionals should be a primary consideration for medical practices.

Study Limitations

This study has several limitations. A purposive sampling method was used, which provided PNP participants who could share detailed, in-depth information about developmental screening for the birth to three population. It is possible that the PNPs who responded to the recruitment ad may have a greater interest and willingness to share their experiences about developmental screening than other PNPs.

A significant limitation to this study included participant recruitment due to COVID-19. Although recruitment efforts were extensive, the approval of pediatric COVID-19 vaccine during the recruitment timeframe and the resulting NAPNAP moratorium on research participation requests hindered the ability to reach the target participant population. In addition, the number of Michigan PNPs practicing in pediatric primary care (as opposed to specialty care) is unknown but anticipated to be significantly less the estimated total of 300 PNPs across the state. Therefore, this study only included the responses of six participants, which was less than the nine to 12 participants originally anticipated.

The design study included semi-structured interviews, which relied on recollection of developmental screening education experiences from participants' PNP program. As a result, recall bias may have affected participants' ability to provide completely accurate information about their program experiences.

Future Research

This study provided insight into developmental screening behaviors of PNPs for children ages zero to three. Additional research to compare developmental screening

behaviors of FNPs and PNPs would provide important information to gain understanding about similarities and differences between the nurse practitioner specialties.

Collaboration is foundational to NP-MD practice and future research could address interprofessional NP-MD collaboration effects on developmental screening, referral, and evaluation outcomes. This research could be used in the development of interprofessional education curriculum for medical and nurse practitioner students.

Due to the differences between AAFP and AAP positions on screening, national research related to PNP, FNP, family medicine physician, and pediatrician screening rates, beliefs about screening recommendations, and beliefs about the potential harm of false positive screening outcomes to patients or families would be of great interest to the medical and nursing fields.

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APPENDIX A
IRB APPROVAL

Appendix A: IRB Approval

Information Sheet for Exempt Survey Research

Pediatric Nurse Practitioners' Developmental Screening Practices for Children Ages Birth Through Three

Introduction

You are being asked to be in a research study that is being done by Jeanne Baca Schulte, under the direction of Julie Ricks- Doneen, Associate Professor, Department of Human Development and Child Studies the faculty advisor for this project.

Your decision to participate in this study is voluntary. You can choose to stop your participation at any time or skip any part of the study if you are not comfortable. Your decision will not affect your present or future relationship with Oakland University, the researcher, the Department of Human Development and Child Studies, or your professional practice.

What is the purpose of this study?

The purpose of this research study is to explore the current developmental screening practices of pediatric nurse practitioners (PNPs) who care for children from birth to 3 years of age.

Who can participate in this study?

You are being asked to participate in the study because you are a primary care pediatric nurse practitioner.

Where will this study take place?

This study will take place remotely at a time and place that you choose.

What do I have to do?

You will be asked to review this information sheet giving the researcher permission to interview you.

- The one-hour interview will be conducted remotely on Zoom, which is a Health Insurance Portability and Accountability Act (HIPPA) compliant platform. You will need to use a computer, tablet, or smartphone with Internet access. The device you use will need to have a microphone. A camera is optional.
- Recordings will be stored on the researchers' Oakland University issued password protected computer. Recordings will be transcribed by the researcher. The researcher will de-identify data before entering into a spreadsheet for analysis.
- Any personal information that could identify participants will be removed or changed before files are shared or published. The spreadsheet will be stored in a secured folder on an Oakland University issued, password protected computer.

How long will I be in the study?

Participation in this study will not require extra time beyond the one-hour interview included in the research study.

Are there any risks to me?

For this study, the potential risks that we know about are described below. By taking part in this study, you may feel some anxiety about providing information about your developmental screening practices. However, we will only use the information to better understand your perceptions about developmental screening.

There may be a risk that someone who is not part of this research may accidentally see your personal information. We will try to make sure that this does not happen by keeping your research records as confidential as possible. When the results of this research are published or presented at conferences, no information will be included that personally identifies you.

To minimize the risk of a breach of confidentiality, your name will be removed from all documents, that is, it will be de-identified. Audio and video recordings will be used for transcription purposes only and the recordings and transcripts will be permanently deleted at the conclusion of the study.

There may also be risks involved from taking part in this study that we do not know about at this time.

Are there any benefits to me?

Although there may be no direct benefits to you, the results of this study may benefit the early childhood and medical fields by contributing to the knowledge base related to developmental screening practices.

Will I receive anything for participating?

For taking part in this study, you will receive a \$30 Amazon gift card after the interview is complete.

What if I want to stop participating in this study?

If you want to stop participating in this study, you should contact the researcher.

Who do I contact if I have questions about this study?

Jeanne Baca Schulte schulte@oakland.edu 810-441-8115

Faculty Advisor: Julie Ricks-Doneen, ricksdon@oakland.edu 248-370-4168

For questions regarding your rights as a participant in human subject research, you may contact the Oakland University Institutional Review Board, 248-370-4898.

FOR IRB USE ONLY

This form was approved by the Oakland University Institutional Review Board on 09/29/2021 under Cayuse # 2022-82.

APPENDIX B
PARTICIPATION REQUEST

Appendix B: Participation Request

RESEARCH RECRUITMENT EMAIL LETTER

Dear NP Association,

My name is Jeanne Baca Schulte, and I am a PhD candidate at Oakland University. I am currently working on my dissertation research study, under the direction of Julie Ricks-Doneen, Associate Professor, Department of Human Development and Child Studies, the faculty advisor for this project.

My research study is titled *Pediatric Nurse Practitioners' Developmental Screening Practices in Children Ages Birth Through Three*, which will explore the current developmental screening practices of pediatric nurse practitioners (PNPs) who care for children from birth to 3 years of age.

I would like to post a recruitment ad (below) on your Facebook page and/or in your newsletter for interested participants. Any information you can provide about the process for gaining permission to do so would be greatly appreciated.

I look forward to your response through this email schulte@oakland.edu or by phone 810-441-8115.

Sincerely,

Jeanne Baca Schulte

RESEARCH RECRUITMENT SCRIPT/ADVERTISEMENT

Are you a pediatric nurse practitioner? If so, please consider participating in a research study on developmental screening!

My name is Jeanne Baca Schulte, and I am a PhD candidate at Oakland University. I am currently working on my dissertation research study, under the direction of Julie Ricks-Noneen, Associate Professor, Department of Human Development and Child Studies, the faculty advisor for this project.

My research study is titled *Pediatric Nurse Practitioners' Developmental Screening Practices in Children Ages Birth Through Three*, which will explore the current developmental screening practices of pediatric nurse practitioners (PNPs) who care for children from birth to 3 years of age.

I am recruiting individuals who are pediatric nurse practitioners working in a primary care setting to participate in a 30 – 60 minute remote interview on Zoom. You will need to use a computer, tablet, or smartphone with Internet access and a microphone. A camera is optional.

Your participation in this study is voluntary. After the interview is complete, you will be emailed a \$30 Amazon gift card as a token of my appreciation.

If you are interested in participating, here is a link to a brief survey [PNP Research Interest Survey](#)

I will contact you by email to provide additional information about the study.

If you have any questions concerning the research study. Please contact me at Schulte@oakland.edu or at 810-441-8115.

APPENDIX C
DEMOGRAPHIC SURVEY

Appendix C: Demographic Survey

PNP Research Interest Survey

Thank you for your interest in participating in my dissertation research study titled "Pediatric Nurse Practitioners' Developmental Screening Practices in Children Ages Birth Through Three."

After receiving your response, I will contact you by email to provide additional information about the study.

*Items with an asterisk are required.

Email *

Valid email

This form is collecting emails. [Change settings](#)

Name

*

Short answer text

Please indicate your PNP certification (i.e. CPNP-PC, PPCNP-BC) *

Short answer text

Do you currently practice in a primary care setting that includes well child visits?

☐ Yes

☐ No

In which zip code(s) do you practice as a PNP? (If more than one location, please list all zip codes) *

Short answer text

APPENDIX D
INTERVIEW GUIDE

Appendix D: Interview Guide

Questions	Research Questions
The first few questions are demographic data: • Age • Ethnicity • Gender • Years in practice	Demographic Data
I'd like to start with some questions about your PNP program • What PNP program did you attend? • Please describe what you learned about developmental screening during your program. ○ What did you learn about developmental screening <i>instruments</i> in your program? • Could you talk about your developmental screening experience with patients and families during your PNP program? • What knowledge from your PNP program transferred to developmental screening in your current practice? • What screening skills in your PNP program transferred to screening skills in your current practice? • What do you wish you would have had the opportunity to do/apply during your PNP program related to developmental screening? • What would you have liked to learn about developmental screening in your PNP program that was not included in the curriculum? • Is there anything else you would like to add about developmental screening experiences while you were in your PNP program?	How do pediatric nurse practitioners describe their knowledge about developmental screening? How do pediatric nurse practitioners describe their skill with developmental screening?

The next questions are about your current practice. - Describe the current practice in which you work. - Collaborative practice agreement - Independent patients? - Input from supervising physician(s) - Number of physicians in practice - Number of patients 0 to 3 typically seen in a day or week	What are pediatric nurse practitioners' perceptions of their practice environment?
In your current practice setting, how do you assess child development? - AAP practice recommendations (9, 18, 24/30 months) - What instruments do you currently use? - How would you describe your level of knowledge with your current screening instruments? - How would you describe your skill level using your current screening instruments? - How do you use surveillance versus screening? - How do you use the EHR for developmental screening or surveillance in your practice?	How do pediatric nurse practitioners describe their knowledge about developmental screening? How do pediatric nurse practitioners describe their skill with developmental screening?
Can you describe what happens when you or a parent have a developmental concern about a child from 0 - 3? - Early On? - Parent attitude? - Evaluation & follow up from Early On? - Participation in IFSP?	How do pediatric nurse practitioners describe their skill with developmental screening? How do pediatric nurse practitioners describe their attitudes about developmental screening?
The following questions are about how the screening instruments are administered in your practice. - Is the screening instrument paper or digital? - When do parents receive the screening instrument? (prior to appointment, in waiting room, etc.) - What is the percentage of parents you estimate who complete the screening instrument? - For regular screening - For autism screening	What are pediatric nurse practitioners' perceptions of their practice environment?

• What is your procedure if the parent does not complete the screening instrument/s? • What is your procedure if a well child visit is missed in which a screening is supposed to be completed (example - do you do the screening at the next well child visit or wait for the next scheduled screening)? • Is there anything you would like to add about how the developmental screening instruments are administered in your practice?	
The next questions are about screening instruments other than the ones currently used in your practice. (Self-reported knowledge and skill using other screening tools) • Where did you learn about screening instruments other than those you currently use (school, on the job)? • How would you describe your level of knowledge of screening instruments other than those you currently use? • How would you describe your skill level using screening instruments other than those you currently use?	How do pediatric nurse practitioners describe their knowledge about developmental screening? How do pediatric nurse practitioners describe their skill with developmental screening?

The following few questions are related to developmental screening implementation in your practice. What are the challenges of conducting developmental screening in your practice?	How do pediatric nurse practitioners describe their skill with developmental screening? How do pediatric nurse practitioners describe their attitudes about developmental screening?
What factors facilitate developmental screening in your practice?	How do pediatric nurse practitioners describe their skill with developmental screening? How do pediatric nurse practitioners describe their attitudes about developmental screening?
What changes, if any, would you suggest to improve developmental screening in your practice?	How do pediatric nurse practitioners describe their skill with developmental screening? How do pediatric nurse practitioners describe their attitudes about developmental screening?
How important do others in your clinical setting believe it is to follow AAP practice recommendations?	How do pediatric nurse practitioners describe their attitudes about developmental screening?
Do you have anything else you would like to add about developmental screening or any questions you would like to revisit?	*knowledge/skills/attitude dependent on response

APPENDIX E
MANUAL DATA ANALYSIS



APPENDIX F
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Article Title	Promoting Optimal Development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening.	Publication Type	e-Journal
		Start Page	e20193449
		Issue	1
		Volume	145
		URL	http://www.pediatrics.org
Author/Editor	American Academy of Pediatrics.		
Date	01/01/1948		
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Publication Title	Pediatrics	Rightsholder	American Academy of Pediatrics - Journals
Article Title	Promoting Optimal Development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening.	Publication Type	e-Journal
		Start Page	e20193449
		Issue	1
		Volume	145
		URL	http://www.pediatrics.org
Author/Editor	American Academy of Pediatrics.		
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Title	Pediatric Nurse Practitioners' Developmental Screening Practices in Children Ages 0-3	Institution name	Oakland University
		Expected presentation date	2022-06-30
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