IMPROVING POSTPARTUM DEPRESSION SCREENING AND REFERRAL IN THE PEDIATRIC SETTING

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ABSTRACT

Samantha Russomagno: Improving Postpartum Depression Screening and Referral in the Pediatric Setting
(Under the direction of Julee Waldrop)

Postpartum depression (PPD) affects up to 20% of American mothers and, if left untreated, can have serious, lifelong effects on women and their children (Earls, 2010). For the latter, PPD can negatively affect behavior, language and cognitive development, and physical health (O'Hara & McCabe, 2013). It is estimated that less than half of PPD cases are even identified—resulting from screening and treatment recommendation discrepancies from major domestic and international organizations (Gjerdingen & Yawn, 2007). Due to their longitudinal relationship with their patients and their patients' families, pediatric providers are uniquely situated to effectively screen mothers for PPD while educating them on symptoms, treatments, and resources (Fernandez y Garcia et al., 2015). Therefore, the American Academy of Pediatrics recommends that pediatric practices screen for PPD at the one-, two-, four-, and six-month well child checks; however, few pediatric practices oblige (Earls, 2010).

Using quality improvement methodologies and the Lewin Change Theory, this project standardized the PPD screening schedule and developed a novel referral algorithm that was concurrently implemented at a rural pediatric clinic in Virginia. The project significantly increased the clinic's screening rate from 33% to 80% ($p<0.001$) and, although not statistically

significant, improved referral rates from 66% to 79%. The referral algorithm was functional for providers and can be replicated by other pediatric practices.

Effective PPD screening can take as little as one minute. This is the first study to study the effectiveness of a referral algorithm and one of only a handful of studies quantifying the effectiveness of standardizing screening schedules in pediatrics. By standardizing PPD screening and implementing a referral algorithm in the ambulatory pediatric setting, more PPD cases can be identified, further evaluated, and treated—ultimately improving maternal and infant health outcomes while demonstrating that the small changes the project represents can be duplicated by pediatric practices in any setting.

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LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
ACOG	American College of Obstetricians and Gynecologists
CPS	Child Protective Services
CPT	Current Procedural Terminology
DNP	Doctor of Nursing Practice
EPDS	Edinburgh Postnatal Depression Scale
PPD	Postpartum Depression
SHP	Sentara Halifax Pediatrics
USPSTF	United States Preventive Services Task Force
WCC	Well Child Check

CHAPTER 1: IMPROVING POSTPARTUM DEPRESSION SCREENING AND REFERRAL IN THE PEDIATRIC SETTING

Postpartum depression (PPD) is one of the most common medical complications during and after pregnancy—affecting up to 25% of mothers (ACOG, 2015; Earls, 2010). It is sometimes used in the literature interchangeably as perinatal depression. PPD refers to minor and major depressive episodes during pregnancy or within the first year postpartum that can have devastating effects on women as well as their partners and children (ACOG, 2015). Rates of PPD vary but have been observed to be up to 20% in American mothers and up to 60% in low-income and teenagers mothers (Earls, 2010). In a given year, up to 12% of pregnant or postpartum women will experience depression and this prevalence is doubled for low-income women (Earls, 2010). However, due to differences in definitions, reporting methods, cultural aspects, and timing of measurement, there have been wider ranges of PPD rates (Glasser et al., 2016).

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2010). However, due to differences in definitions, reporting methods, cultural aspects, and timing of measurement, there have been wider ranges of PPD rates (Glasser et al., 2016).

Problem Description

There is a significant problem with PPD screening and treatment. Every year in America, almost half a million infants are born to mothers with depression—making PPD the most undiagnosed obstetric complication in the country (Earls, 2010). It is estimated that less than half of PPD cases are identified and most women do not actively seek help (Gjerdingen & Yawn, 2007; Glasser et al., 2016; Liberto, 2012; Yogman, 2016).

Importance of PPD in Pediatrics

Depression is highly treatable: prompt PPD recognition and appropriate treatment is imperative to promote maternal and infant outcomes (Liberto, 2012; NIHCM Foundation, 2010). If untreated, PPD can have serious, long-lasting effects on affected women as well as their children. It negatively affects maternal well-being, parenting, and compliance with preventative pediatric services and practices (Fernandez y Garcia et al., 2015). Consequences of PPD include inadequate prenatal care, higher preterm birth rates, low birth weight, preeclampsia, and family dysfunction (Earls, 2010). The relationship between breastfeeding and PPD has been extensively researched is generally conceptualized to be unidirectional, where PPD negatively affects breastfeeding initiation rates and leads to early cessation; furthermore, exclusive breastfeeding and longer breastfeeding durations can serve as protective factors against PPD (Ahn & Corwin, 2015; Borra, Iacovou, & Sevilla, 2015; Dennis & McQueen, 2006; Field, 2009; Figueiredo, Canario, & Field, 2014; Friedman, Rochelson, Fallar, & Mogilner, 2016; Nishioka et al., 2011; Pope & Mazmanian, 2016; Pope, Mazmanian, Bédard, & Sharma, 2016).

PPD further disturbs the mother-infant interaction and bonding due to its ability to compromise sleep, breastfeeding, and adherence to well child checks (WCCs) and vaccine schedules (Friedman et al., 2016; Olin et al., 2016; Pope & Mazmanian, 2016). Maternal depression is also associated with an increased use of acute healthcare services, such as emergency room visits, in children younger than three years of age (Olin et al., 2016). Children of mothers with PPD can have lower cognitive performance and IQ scores, be less creative and interactive, and have more attention deficit or hyperactivity, anxiety, panic, and conduct disorders (Canadian Paediatric Society, 2004; Earls, 2010). Infants are more likely to show impaired social interaction and delays in development if they live in a depressed or neglectful setting (Earls, 2010).

It is, therefore, imperative to promptly identify and treat PPD. The condition directly and indirectly affects the wellbeing of children and is, therefore, pertinent to pediatric providers. Getting at-risk mothers further evaluation and treatment early for PPD can remedy, if not totally prevent, the abovementioned sequelae while fostering the mother-infant relationship and family function.

Current PPD Screening Recommendations and Efforts

Although many countries have mandated PPD screening, major organizations in the United States differ in recommendations in regards to both screening and treatment (Mgonja & Schoening, 2017). The American College of Obstetricians and Gynecologists (ACOG) recommends that clinicians screen mothers at least once during the perinatal period with a validated, standardized tool (ACOG, 2015). The American Academy of Family Physicians (AAFP) has no specific recommendations for PPD screening and the American College of Nurse Midwives supports the universal screening and treatment of and referral for depression in women

as part of routine health care (ACOG, 2015; AHRQ, 2012). Nonetheless, none of the organizations advocate specifically when the screening should be done and which tool should be utilized. PPD screening performed in the hospital after a newborn's birth is often performed too early to make a diagnosis and, although most obstetricians screen for PPD at the six-week postpartum visit, this interaction is usually terminated after the appointment and, thus, follow-up is often inadequate (Liberto, 2012).

Pediatric PPD screening. The American Academy of Pediatrics (AAP) encourages pediatric practices to screen mothers for PPD and to use community resources for referrals and treatment while supporting the mother-child relationship at the one-, two-, four-, and six-month WCCs—peak times for PPD to occur (Earls, 2010). The AAP endorses the use of the Edinburgh Postnatal Depression Scale (EPDS) or the Patient Health Questionnaire-2 (PHQ-2) (Earls, 2010; Wood, 2011). A positive screen on the EPDS or the PHQ-2 indicates PPD risk only and, thus, requires further referral and evaluation before a PPD diagnosis could be made (Wood, 2011). It was reported in 2008 that 70% of pediatricians never screened for PPD and even fewer refer for treatment (Lieferman, Dauber, Heisler, & Paulson, 2008). Despite the AAP's recommendation, in 2013, only 44% of pediatricians were inquiring about or screening for PPD (Yogman, 2016).

Local Problem

Risk factors for PPD include first-time, very young, or older motherhood, financial or employment problems, isolation, a lack of social support, having an infant with special needs or one that is difficult to console, previous anxiety or depression, and a family history of mental illness or depression (APA, 2017). The site of this project's implementation, Sentara Halifax Pediatrics (SHP) in South Boston, Virginia, is a rural ambulatory pediatric clinic that serves patients up to twenty-one years of age and a predominantly rural population. The median

household income in South Boston is $31,238 and it is estimated that 28.5% and 13.9% of South Boston residents are living in poverty and are uninsured, respectively (US Census Bureau, 2015). In 2016, 55% of SHP's patients were insured through Medicaid (S. Kirkhart, Personal Communication, April 10, 2017).

SHP's PPD screening practices are not based on current recommendations. Their efforts are applied inconsistently and responses to screening vary. Nonetheless, the clinic's nurse practitioner estimates that, when the EPDS is administered, one out of seven mothers are identified as at-risk for PPD. Although SHP's estimated PPD-risk prevalence of 14.3% is consistent with national PPD rates, their unstandardized screening practices are suboptimal.

Purpose of Project

The primary purpose of this DNP Project is to improve PPD screening rates and appropriate referrals at a rural pediatric primary care clinic.

Review of the Evidence

Databases PubMed, CINAHL, and Scopus were searched using the search phrase "postpartum depression and screening and pediatric". Results were limited to publishing date in the last five years and human species. The databases yielded 44, 21, and 23 results, respectively. Article titles and abstracts were reviewed for relevancy. Articles addressing PPD screening in the emergency department, in the community, or in the hospital were excluded. Furthermore, articles that simply reviewed characteristics of PPD, reviewed paternal depression in the postnatal period, or did not address PPD screening in the pediatric setting were excluded.

After duplicates were removed, twelve articles remained between the three database searches and were reviewed in full. Reference lists of the remaining articles were reviewed and

twenty-nine additional articles were identified for a total of forty-one articles were used for background as evidence to support this proposal.

Why Screen in the Pediatric Primary Care Setting

Due to their longitudinal relationship with their patients and their families, pediatric providers are uniquely situated to effectively screen their patients' mothers for PPD while educating them on symptoms, treatments, and available resources (Byatt, Biebel, Friedman, Debordes-Jackson, & Ziedonis, 2013; Farr, Denk, Dahms, & Dietz, 2014; Fernandez y Garcia et al., 2015; Liberto, 2012; Meadows-Oliver, 2012). During the first year of an infant's life, mothers interact with pediatric nurses and providers more than any other provider. There are at least eight recommended pediatrician visits in the first two years of an infant's life, which situates pediatric providers to effectively screen their patients' mothers for PPD (Meadows-Oliver, 2012). This repeated interaction fosters a continuous and trusting relationship, which enables these providers to refer positive PPD screens while supporting the mother-infant relationship. Furthermore, since the rates of PPD have been observed to be up to 60% in pregnant and parenting teenagers, pediatric providers may be better suited to identify these cases, which may be prevalent among their teenage parents (Earls, 2010).

Current Efforts

Despite this, in the pediatric setting, the experience of screening mothers is limited and existing studies lack statistical rigor and power as opposed to the randomized control trials used by the United States Preventive Services Task Force (USPSTF) to develop screening recommendations in adult settings (Feinberg, Smith, Morales, Claussen, & Smith, 2006). Although it is unknown how many outpatient pediatric practices in the United States are screening for PPD, the concept is gaining ground. Recent studies, from quality improvement

projects to randomized controlled trials, have published results on implementing a standardized screening protocol in the ambulatory pediatric setting. Existing studies support the feasibility and benefits of screening for PPD in the pediatric setting, demonstrate a positive correlation between PPD screening and identifying risk, and support screening for PPD through the first year of an infant's life; furthermore, the studies that have been the most successful include systematic protocols for parental assistance and referral (Carroll, Biondich, Anand, Dugan, & Downs, 2013; Chaudron, Szilagyi, Kitzman, Wadkins, & Conwell, 2004; Feinberg et al., 2006; Olson et al., 2005).

Motivating mothers to seek care. A recent randomized control trial aimed to motivate mothers with positive PPD screens in a pediatric clinic to seek further assessment and care (Fernandez y Garcia et al., 2015). Mothers in the intervention group "Motivating Our Mothers (MOM)", were more likely to contact resources than mothers in the control group. Although the difference was not statistically significant, post-visit surveys demonstrated that "MOM" mothers (mean score 5.22; 95% CI, 4.76 to 5.68) had a significantly higher (provider data to support this statement) intent to contact resources compared to control mothers (mean score 4.00; 95% CI, 3.46 to 4.55) ($P = .009$) and were more likely to contact mental health providers ($P = .05$) (Fernandez y Garcia et al., 2015). Although the sample size of this study was small, the study was designed as a pilot and initial test—not as a means of estimating a definitive effect. Furthermore, the study had potential for inadvertent cross-contamination of interventions for the "MOM" and control group by delivering research assistants. The research assistants' motivational interviewing with the "MOM" mothers could also have impacted outcomes, as their interaction was longer than that between them and the control mothers. Despite limitations, this study demonstrated promising evidence that pediatric-specific messages can motivate mothers

with depressive symptoms to seek care for them while reducing stigma associated with seeking care from mental health practitioners.

Referral systems. Carroll et al. (2013) found that automating PPD screening in a pediatric clinic using a clinical decision support system significantly increased the identification of suspected maternal depression. When questions were directly asked to mothers, there was a dramatic increase in detection and their study doubled referrals for mothers with suspected depression; furthermore, printed materials for physicians to use during the screening—inclusive of educational and referral forms—resulted in significantly more referrals for PPD assistance (Carroll et al., 2013). The referral form was thought to have made providers more comfortable in their decision making to refer mothers.

Feinberg et al. (2006) also had success with PPD screening in the pediatric setting using a protocol and detection and management system they developed. Their system prompted pediatric providers to screen for PPD, standardized clinical practice, and offered decision support while assisting in free care integration. Their "4A" approach—ask, assess, advise, and arrange—is a promising strategy and facilitates pediatric providers into an active role for detecting PPD (Feinberg et al., 2006).

Although Carroll et al.'s 2013 study demonstrated a lower prevalence of mothers suspected of having depression than that of the country and its results are limited in their generalizability, their large sample size and the randomized nature of the study are strengths. Their decision system, admittedly with its benefits and flaws, did not require providers to respond to its referral prompt and, therefore, more referrals may have occurred than are documented. Their system was made on an open-source platform with a goal of making it available to other pediatric clinics.

Screening through twelve months. A recent quality improvement project screened mothers with the EPDS at all WCCs over the course of nine-weeks at a private, faith-based, Midwest primary care clinic (Mgonja & Schoening, 2017). There were a plethora of limitations, inclusive of a small sample size secondary to a short duration of implementation. Coupled with the specific population setting in which the project performed, its results have limited generalizability. However, the project's finding that well-child age correlated highly with resulting EPDS scores ($R = 0.88$) supports PPD screening up to the twelve month WCC—as diagnostic standards allow the onset of PPD to extend up to twelve months after delivery (AHRQ, 2012).

Barriers to PPD Screening in the Pediatric Setting

Parental concerns. In a recent study on women's perspectives on PPD screening performed in the pediatric setting, several participants believed that pediatric providers were to attend to the well-being of their child, not that of the mother (Byatt et al., 2013). Some mothers also did not believe that these providers had the time or motivation to address the state of their mental health. Furthermore, there were concerns about stigma and losing parental rights: participants expressed concern that if they were to disclose depression symptoms and were defensive about their mental health concerns, worried that those administering the depression screen would notify child protective services (CPS) (Byatt et al., 2013).

Additionally, mothers perceived pediatric providers as lacking training in adequately addressing and referring them for PPD and minimizing the difficult transition to parenthood (Byatt et al., 2013). Brown & Wissow (2008) found that if mothers do not trust their infant's providers to be thorough and empathetic, they are going to be less likely to verbalize depressive symptoms and anhedonia thoughts, if present. Additionally, this study found mothers reported

higher satisfaction with their infant's provider if their own stress was discussed during infant visits (Brown & Wissow, 2008).

Provider concerns. Some of the biggest challenges to consistently screening for PPD in the pediatric setting include a lack of time, training, and referral sources (Fernandez y Garcia et al., 2015; Glasser et al., 2016; Meadows-Oliver, 2012). In ambulatory care, the schedules of pediatric providers tend to be fully booked with a mixture of WCCs and sick visits. WCCs are largely focused on ensuring that infants are meeting physical and developmental milestones, which takes up most of the allotted appointment time. In one study, 91% of surveyed pediatricians felt that a lack of time was the most common barrier to discussing maternal depressive symptoms during a WCC (Henegan, Morton, & DeLeone, 2006). One respondent was quoted saying, "We have 15 minutes for a visit…you can sense that there is something going on with the mom, but you've got three other patients waiting…so you put it off until the next visit" (Heneghan et al., 2006, p. 336). Due to the presence of children and other disruptions, almost 40% of pediatricians surveyed by Heneghan et al. (2007) stated that they believed a pediatric visit was not the best setting to discuss the emotional wellbeing of the mother. Many providers, already pressed for time, have difficulty finding time to incorporate additional screening into their appointments.

Pediatric provider ownership of the problem is another major barrier to integrating PPD screening seamlessly into infant WCCs. Pediatric providers are largely trained in and focused on caring for children only and often view mothers in the context of the child as a patient (Glasser et al., 2016). Although pediatric providers may be best suited to screen for PPD, many pediatricians are not prepared for this responsibility as for, in the absence of specific instructions, many depend on an imprecise general impression of their patients' mothers to gauge depression risk

(Carroll et al., 2013). Similar to rates found in Olson et al.'s study in 2002, in Park et al.'s 2007 study, only 59% of pediatricians believed that they should be responsible for identifying PPD. Furthermore, as with any sensitive issue, some pediatric clinicians may oppose screening for PPD due to personal uncertainty with their responses upon detecting risk (Carroll et al., 2013).

There is contradictory information in the literature in regards to if practicing pediatric providers believe that it is their responsibility to identify PPD. Most studies have shown that pediatric providers do feel that it is their responsibility to inquire about or recognize PPD but with nonverbal observational cues in lieu of a screening tool. Heneghan et al. (2007) found that pediatricians believed it was appropriate to ask the mothers of their infant patients about their wellbeing but preferred to observe for cues of distress instead of formally inquiring about depressive symptoms. Even almost ten years later, just under two thirds of pediatrician respondents in Glasser et al.'s (2016) study were willing to screen for PPD using a questionnaire. It appears that the awareness of PPD has significantly increased among pediatric providers. Nonetheless, it has yet to be generally accepted among these providers as a condition on which they must be vigilantly detecting to improve the wellbeing of their infant patients.

Reimbursement. Being reimbursed for PPD screening has also been identified as a barrier to its universal implementation in the pediatric ambulatory setting (Olin et al., 2016). However, this is now possible and should be included in billing and coding (Mgonja & Schoening, 2017). The Current Procedural Terminology (CPT) code 99420 is recommended for EPDS screening as it is now recognized that the EPDS is a measure for risk in the infant's environment (Earls, 2010). It is advised that the International Statistical Classification of Diseases and Related Health Problems, 10th edition (ICD-10) code Z13.89 be used as well (Mgonja & Schoening, 2017).

Healthcare Costs

Although the specific costs of maternal depression are unknown, it is estimated that PPD is responsible for $26 billion in direct medical expenses every year (NBGH, 2011). Furthermore, since depressed mothers are at a higher risk of costly complications such as preeclampsia and preterm birth, studies have estimated that the total cost of not treating a depressed mother and her child is $22,647 (Earls, 2010; Diaz & Chase, 2010). The sequelae of PPD on offspring are also costly—as they can have developmental delays and behavioral disorders, all of which incur high medical costs for appropriate treatment and therapies (Earls, 2010).

By standardizing PPD screening and streamlining prompt referral for additional evaluation and treatment in the pediatric setting, more cases can be identified and treated. Although this practice change may initially increase health care costs due to additional referrals and appointments for affected women, it will ultimately significantly reduce costs by reducing, if not totally prevent, expensive sequelae for both the affected mother and her offspring.

Recommendations

The literature frequents a core group of interventions to improve PPD screening efforts in the pediatric setting. Additional training for providers, implementing referral protocols, and normalizing PPD appear to be the most impactful (Byatt et al., 2013; Head et al., 2008; Glasser et al., 2016; Meadows-Oliver, 2012).

Training. Nurses, advanced practice nurses, physician assistants, and pediatricians alike should be educated on the knowledge and skills for detecting PPD in order to improve comfort with depression screening (Meadows-Oliver, 2012). These educational experiences should occur both in the classroom and in the clinical setting. Fortunately, current residents have reported fewer barriers to dealing with maternal depression than did pediatricians that have been

practicing for five or more years (Head et al., 2008). This is encouraging and hopefully reflective of the increasing awareness of emphasizing mental health issues as part of the holistic approach to health care.

Referral protocols. If PPD screening is to become a standard in the pediatric setting, it will be vital for pediatric providers to know their available resources to which they can refer at-risk mothers. Said resources will inevitably vary depending on the location of the pediatric practice and the health insurance status of the infant's mothers. Nonetheless, as medical homes, these practices can establish a system to identify community resources to which they can refer mothers with positive screens (Glasser et al., 2016).

As with any sensitive issue, some pediatric clinicians oppose screening for PPD due to personal uncertainty with their responses upon detecting risk (Carroll et al., 2013). A referral protocol that illustrates how providers should handle positive screens will reduce this apprehension (Carroll et al., 2013). This will be crucial to support the mother-infant relationship while protecting infant patients from the potential sequelae of PPD.

Normalizing PPD. As previously mentioned, many mothers worry about the stigma associated with verbalizing and confirming depression symptoms and possible consequences, such as being reported to CPS (Byatt et al., 2013). Normalizing and increasing awareness of PPD is the best solution to combating any existing stigma. The pediatrician-mother relationship needs to be leveraged to assuage fears of judgment and stigma (Byatt et al., 2013). It will be absolutely imperative that pediatric providers normalize these feelings to vulnerable mothers by reassuring them that many mothers experience depressive symptoms following the birth of a new child and that a referral to CPS will only be placed if parental behavior indicated infant abuse or neglect or was putting the infant at risk.

Theory

Kurt Lewin's Change Theory, also referred to as the 3-Step Model, serves as a simple and staged blueprint to implementing and sustaining clinical practice changes that can guide this DNP project (Lewin, 1947). The theory was originally rooted in social psychology but has been applied to and used in nursing for decades (Burnes, 2004; Shirley, 2013). The theory can be predictive and explanatory—as it is knowledge confirming and building, respectively; furthermore, since it presents a staged model for change, it is also descriptive (Butts & Rich, 2015). Lewin viewed change not as an event but as a process with a dynamic balance of forces moving in opposing directions: driving forces promote change whereas restraining forces oppose it (Hellriegel & Slocum, 1976; Lewin, 1935; Lewin, 1939). Using a force field model, Lewin depicts how change should occur in three steps (Lewin, 1947).

The first step, unfreezing, is the act of destabilizing and discarding or unlearning old behaviors or acts; secondly, the moving stage enables individuals to move to more acceptable behaviors; and, with refreezing, the third stage, a new quasi-stationary state of equilibrium returns as change is embedded and stabilized (Shirley, 2013). The final step also focuses on sustainability, which is dependent on many factors—such as individual, leadership, political, financial, and cultural (Lewin, 1947; McGarry, Cashin, & Fowler, 2012). The stages are often referred to as sequential anchors in Lewin's works and have served as a way of understanding how behaviors of health professionals can become accepted and sustained (Lewin, 1935; Manchester et al., 2014).

The simplistic and staged nature of the Lewin's theory allows for a pervasive application in this DNP project. In order to effectively and efficiently change attitudes and habits towards PPD screening in the outpatient pediatric setting, it will be imperative to go through all of

Lewin's stages (Hellriegel & Slocum, 1976; Lewin, 1947). To sustain practice changes implemented by the project, the concluding stage, refreezing, will be vital.

Methods

Design

This DNP project employed a quality improvement design aimed at improving PPD screening rates and referral in the outpatient pediatric setting. As aforesaid, SHP's screening efforts do not align with current recommendations and best practice. This DNP project was designed to standardize PPD screening at SHP by administering the EPDS at the first newborn, two-week, one-month, two-month, four-month, and six-month WCC at the clinic. Furthermore, a PPD referral and follow-up protocol and referral/resource guide was developed and implemented concurrently to ensure that at-risk mothers were appropriately referred.

Setting and Population

This project took place at SHP, a rural outpatient pediatric clinic in southern Virginia. As mentioned above, the town's median household income is $31,238, over 28% of residents live in poverty, and almost 14% of residents do not have health insurance (US Census Bureau, 2015). The clinic currently employs three full-time providers—two pediatricians and one pediatric nurse practitioner—and one part-time pediatrician. On average, the clinic sees two to six newborns weekly and the providers each schedule fourteen to twenty-six patients daily. Per the AAP guidelines, the clinic schedules their pediatric patients for routine well visits through their eighteenth birthday. During the first year of life, well visits are scheduled within the first week after birth, at two weeks, one month, two months, four months, six months, nine months and one year.

Furthermore, SHP serves a relatively large number of teenage mothers (S. Kirkhart, Personal Communication, January 8, 2017). Being that PPD rates have been observed to be as high as 60% in low-income and teenage mothers, it is imperative that both PPD screening and referral for appropriate treatment at SHP is evidence-based and consistent (Earls, 2010).

Measurements

During and after project implementation, data was collected and analyzed using chart reviews to determine the aforementioned measureable outcomes. Before the project implementation a hand chart review was conducted (Appendix A) and after the EHR was adapted for the intervention, an EHR report was run on the charts of each newborn, two-week, one-month, two-month, four-month, and six-month WCC to determine the number of infants who were screened and their score on the EPDS as well as whether or not a referral was indicated and whether or not is was completed (Appendix B). The use of the EPDS is practical in the outpatient setting as it requires a low reading level, is the shortest validated screening instrument available specifically designed for the postpartum period, has the highest reliability (0.87) and validity (0.88), and, over time, is sensitive to depression changes (Mgonja & Schoening, 2017) (Figure 1).

Implementation Procedures

Prior to the project's commencement, the DNP student worked with the manager of SHP's EHR to add options to facilitate data collection. An EPDS section was inserted into the History of Present Illness (HPI) section of the EHR. Under said section, the following were created: "N" and "Y" boxes for clinic nurses to check to indicate if they did or did not administer the EPDS; an "EPDS Not Administered due to" with a drop down menu consisting of Mother refusal, Mother not present, Provider refusal, and Other for nurses and/or providers to specify; a

score box for clinic providers to document EPDS scores; a “Referred to” section with a drop down menu consisting of OB/GYN, Psych, Counseling, and Other for providers to document referral plans in accordance with the referral protocol; and a “Not Referred due to” section with a drop down menu consisting of Mother refusal, Provider refusal, Not indicated, or Other for providers to document why screened mothers were not referred.

Phase one – education and preparation. To initiate change, the present situation, or ‘the status quo’, requires destabilizing (Lewin, 1943). The first step of this DNP project required unfreezing of old behaviors, habits, and attitudes towards PPD screening while involving and collaborating with project stakeholders. During this phase, the process for PPD screening and referral protocol was developed and baseline data was collected.

The DNP student, as aforesaid, met with the EHR's manager and the clinic’s nurse practitioner to establish the EHRs variations to ensure that the project’s required documentation changes were fluid for staff. The student separately met with all of the stakeholders at the clinic, inclusive of the manager, providers, nurses, and administrative staff, to foster engagement, support, and collaboration and commence education. The meetings reviewed the project’s goals and changes, staff roles within the project, the EPDS and scoring, the development of the referral protocol and resources, and the documentation requirements within the EHR.

A separate meeting occurred with the providers of the clinic to confirm feasible, local resources in order to develop the PPD referral algorithm based on EPDS scores (Appendix C) (Beeber et al., 2016). As a refresher, the EPDS was reviewed with providers. Upon the completion of the protocol and referral algorithm, copies were shared will all SHP staff members. During implementation, copies of local resources were made available for nurses and providers to administer to mothers with positive screens during the referral process.

Phase two – screening process. To move towards more acceptable clinical practice, the second stage of the project focused on implementing change and collecting data. After the completion of phase one, the screening protocol was implemented at SHP for four months—from September 11, 2017 to January 11, 2018. At the appropriate WCCs, the clinic's administrative staff distributed the EPDS upon appointment check-in. The nurses rooming patients verified the EPDS distribution and appropriately documented such in the EHR. The nurses were responsible for documenting the reason as to why the EPDS was not distributed, such as if the mother did not accompany the infant to their WCC. SHP providers scored and document mothers' scores in their infant's EHR. Providers appropriately referred mothers for additional evaluation and/or treatment based on their score and documented such in addition to reasons for no referral, when applicable.

This practice change implementation reflects movement towards best practice for the practice in comparison to SHP's current inconsistent PPD screening efforts. Planned change can be difficult due to the complexity of the forces concerned; therefore, using trial and error, the moving stage takes all of the forces at work into account and identifies and evaluates all available options (Burnes, 2004). As the project's implementation progresses in the movement stage, clinic attitudes and resistance toward the practice change are anticipated to become more favorable and decline, respectively (Manchester et al., 2014).

Monitoring the progress of the project's implementation and identifying strengths, weaknesses, and barriers was also part of the second phase. The DNP student checked in weekly with administrative staff, nurses, and providers and was seldom met with complaints or concerns. Clinic nurses and providers supported the change and did not verbalize any complications with the project; however, during implementation, the only project apprehension brought to the

attention of the DNP student was missing screening opportunities due to patient mothers not being present at appointments—an anticipated issue.

Phase three – evaluation. The final phase focused on the project's evaluation. Upon phase two's completion, outcome data was collected and results on PPD screening rates and rates of appropriate referral were determined and analyzed and compared to those collected prior to the practice change.

The final stage, or refreezing per Lewin, seeks stabilization to a new quasi-stationary equilibrium to ensure that new behaviors and practices are safe from regression (Burnes, 2004). Upon evaluation completion, the project results will subsequently be reported to the clinic in hopes of developing a plan for the project's indefinite adaptation and sustainability. The new proposed practice must be relatively congruent with those that are originally in place or disconfirmation can result (Burnes, 2004). Fortunately, since SHP already employs the EPDS, the project is anticipated to endure a relatively smooth transition and, by simplifying documentation in the EHR, implementation and sustainability.

Results

Demographics

Over the course of the four-month implementation period, there were 414 newborn, two-week, one-month, two-month, four-month, and six-month WCCs at the clinic. At those visits, the EPDS was administered 84% of the time (n=350). Seven percent of the visits (n=29) did not have the EPDS administered for a myriad of reasons: mother was not present (n=18), mother refusal (n=9), and other/documentation blank (n=2). There were an additional thirty-five visits where documentation of the EPDS administration was left blank which infers that the EPDS was not administered without a reason.

Of the 414 appointments, 72 were newborn, 63 were two-week, 69 were one-month, 75 were two-month, 74 were four-month, and 61 were six-month WCCs (Figure 2). Positive screens per visit reason varied from 7% to 12%, with two-month WCCs having the most positive screens (n=9) and newborn WCCs having the least (n=5).

Screening Rates

Using chi-square, as variables are all dichotomous, screening and appropriate referral rates were determined and compared. Prior to the project's implementation, baseline data demonstrated a 33% PPD screening rate employing the EPDS at SHP. After the project's institution, the clinic's screening rate increased to 80% ($p<0.001$) (Figure 3). Documented reasons that the EPDS was not administered were largely because the mother was not present (67%) at the appointment and, less frequently because the mother refused screening (30%).

Appropriate Referral Rates

Baseline data demonstrated that 66% of at-risk mothers were appropriately referred before the project's inception; however, after the project's implementation, 79% of mothers with positive screens were appropriately referred (Figure 2). Mothers were referred most frequently to psychiatry/counseling (61%, n=16) and to their obstetrician/gynecologist (38%, n=10). Documented reasons mothers with positive screens were not referred for further evaluation and treatment included: already receiving help (31%), already had a list of counselors (7.7%), and maternal refusal (7.7%).

Figure 1: *Edinburgh Postnatal Depression Scale*

Edinburgh Postnatal Depression Scale[1] (EPDS)

Name: _____ Address: _____

Your Date of Birth: _____ _____

Baby's Date of Birth: _____ Phone: _____

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:
- □ Yes, all the time
- ☒ Yes, most of the time
- □ No, not very often
- □ No, not at all

This would mean: "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

In the past 7 days:

1. I have been able to laugh and see the funny side of things
   - □ As much as I always could
   - □ Not quite so much now
   - □ Definitely not so much now
   - □ Not at all

2. I have looked forward with enjoyment to things
   - □ As much as I ever did
   - □ Rather less than I used to
   - □ Definitely less than I used to
   - □ Hardly at all

*3. I have blamed myself unnecessarily when things went wrong
   - □ Yes, most of the time
   - □ Yes, some of the time
   - □ Not very often
   - □ No, never

4. I have been anxious or worried for no good reason
   - □ No, not at all
   - □ Hardly ever
   - □ Yes, sometimes
   - □ Yes, very often

*5 I have felt scared or panicky for no very good reason
   - □ Yes, quite a lot
   - □ Yes, sometimes
   - □ No, not much
   - □ No, not at all

*6. Things have been getting on top of me
   - □ Yes, most of the time I haven't been able to cope at all
   - □ Yes, sometimes I haven't been coping as well as usual
   - □ No, most of the time I have coped quite well
   - □ No, I have been coping as well as ever

*7 I have been so unhappy that I have had difficulty sleeping
   - □ Yes, most of the time
   - □ Yes, sometimes
   - □ Not very often
   - □ No, not at all

*8 I have felt sad or miserable
   - □ Yes, most of the time
   - □ Yes, quite often
   - □ Not very often
   - □ No, not at all

*9 I have been so unhappy that I have been crying
   - □ Yes, most of the time
   - □ Yes, quite often
   - □ Only occasionally
   - □ No, never

*10 The thought of harming myself has occurred to me
   - □ Yes, quite often
   - □ Sometimes
   - □ Hardly ever
   - □ Never

Administered/Reviewed by _____ Date _____

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

[2]Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

Figure 2: *Screening Results per Visit Reason*

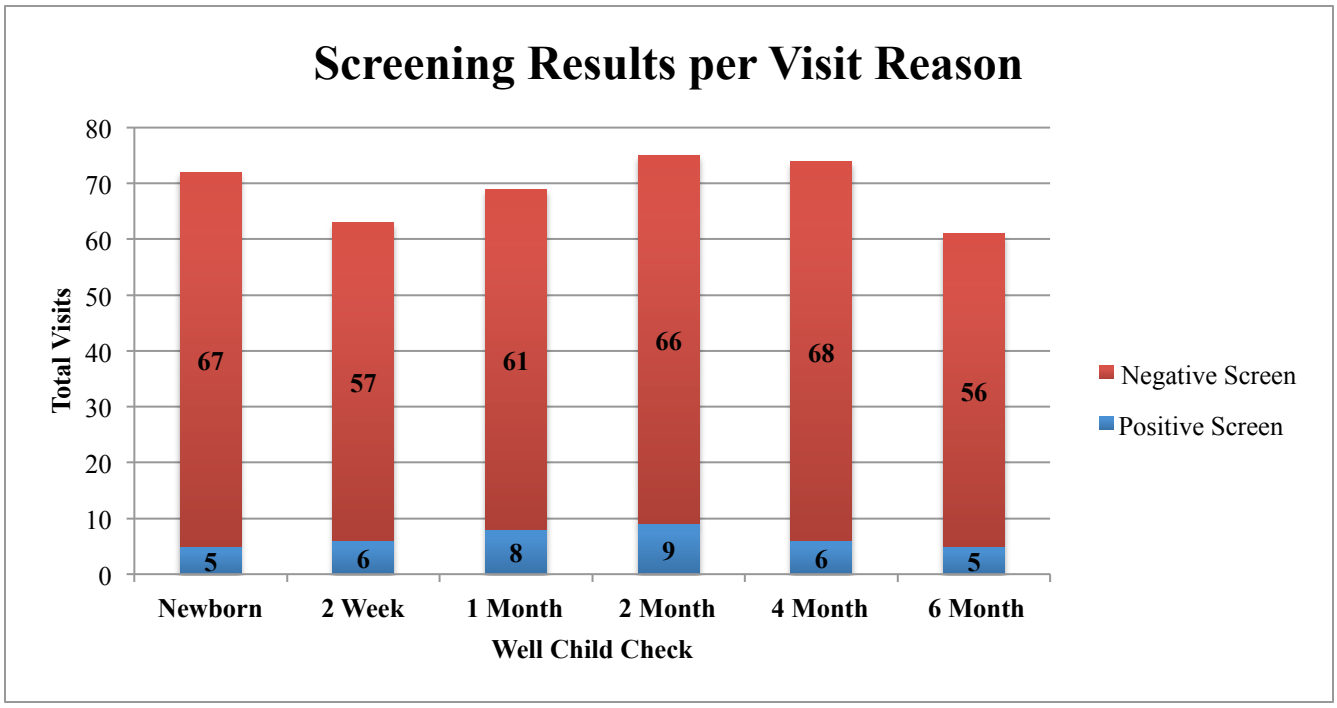
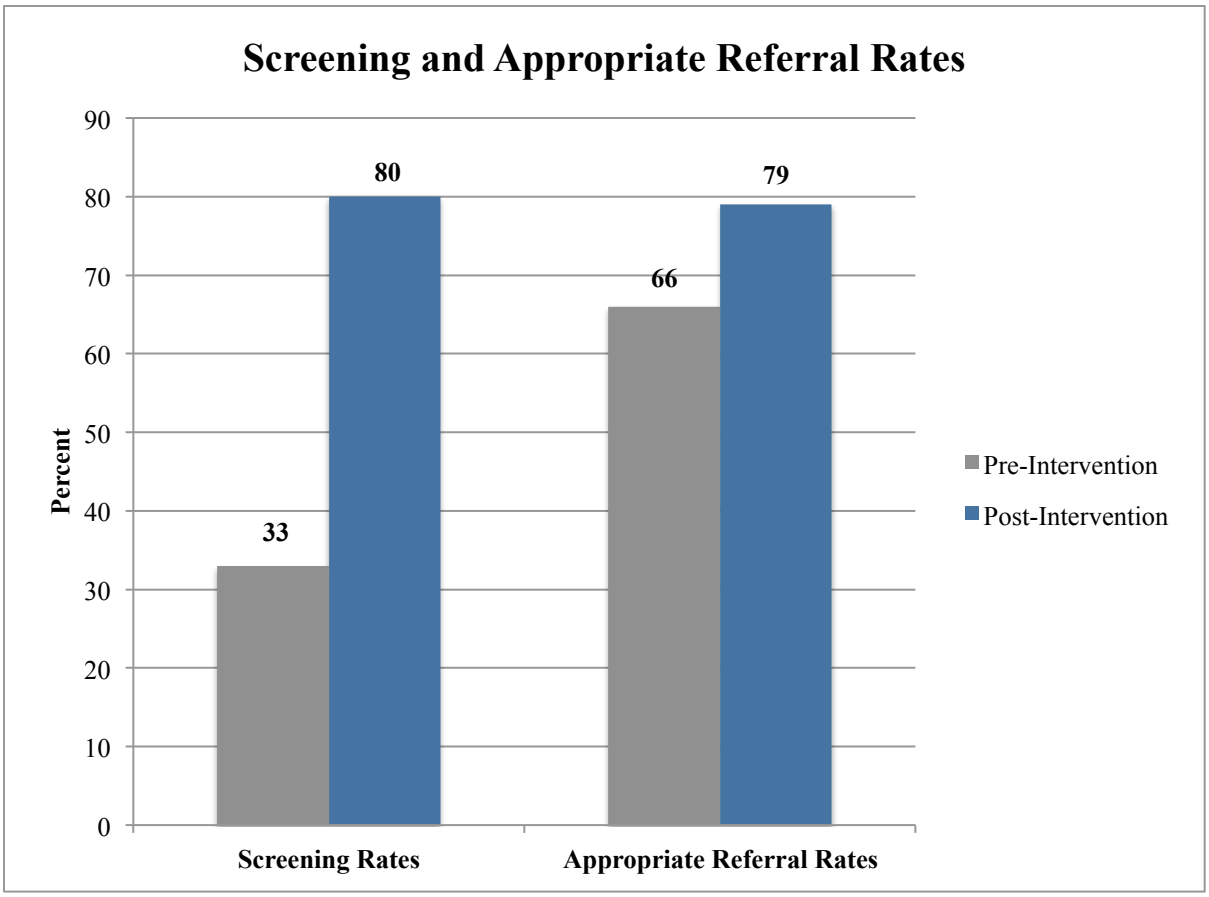


Figure 3: *Screening and Appropriate Referral Rates*



Discussion

This is one of only a handful of studies quantifying the effectiveness of standardizing PPD screening schedules in the pediatric setting and it is the first to study the effectiveness of implementing a referral algorithm. The latter proved to be functional for providers and, due to its simplicity, could be replicated and adapted by other pediatric practices in rural settings where resources may be limited to more city settings where referral resources may be more abundant.

Clinical Significance

Pediatric providers can capture mothers at risk for PPD, as reflected in the 47% increase in screening ($p<0.001$) the project demonstrated. Although the increase in rates of appropriate referrals was not statistically significant, it is reflective of much clinical significance: referring more mothers for further evaluation and treatment of possible PPD, regardless of the percentage, is a clinical win. This facilitates the identification of and, in turn, the treatment of PPD. Even if mothers do not follow through with the recommended referral, the conversation of their documented increased risk for PPD is had between the mother and pediatric provider when, prior to the project's implementation, chances of this being available were nearly fifty percent less. Increasing education and awareness, although not the project's goal, is an unanticipated but welcomed result of the project.

Comparison to Current Efforts

Reducing stigma and motivating mothers. Normalizing PPD and raising awareness is the first step in augmenting identification and, overtime, reducing rates. Most women suffering from PPD generally do not seek help and those that are younger, non-White, and less educated—who comprise many of the mothers of SHP patients—are even less likely to seek help (Liberto, 2012). Due to a lack of knowledge and perceived stigma, PPD is significantly undertreated

(Werner, Miller, Osborne, Kuzava, & Monk, 2015). Many mothers experiencing depressive symptoms are hesitant to disclose such due to the social stigma surrounding depression, the idea that depression indicates a failure in transitioning to motherhood, or the fear that being candid about their PPD symptoms would warrant a CPS report from their child's provider—which was not a reality in this study (Byatt et al., 2013; Corrigan, Kwasky, & Groh, 2015; Liberto, 2012; McCarthy & McMahon, 2008). The perceived stigma, preventing mothers from embracing and participating in this project, was expected as a confounding variable in this study. However, mothers were generally receptive to screening: only nine mothers refused screening out of the sample size of 414.

Due to the standardization of PPD screening, this study enabled participating providers to talk about PPD with their patients' mothers on a frequent basis—normalizing depressive feelings. Furthermore, the use of the referral algorithm helped providers leverage their relationships with their patients' mothers to motivate them to seek additional evaluation and treatment when necessary. Being able to explain to at-risk mothers that the next step—whether it is referral to their obstetrician, primary care provider, or an emergency service—is evidence based gave confidence and justification to the providers and mothers, respectively, in an otherwise delicate situation.

Referral systems. Establishing a referral system to complement standardizing PPD screening is necessary and endorsed in both adult and pediatric settings (Earls, 2010; Siu & USPSTF, 2016). The US Preventive Services Task Force recommends that if screening is to be performed, there must be adequate systems in place to which positive screens can be referred for necessary care (Siu & USPSTF, 2016). As aforesaid, pediatric providers can provide guidance, support, referrals, and follow-up to support the maternal-infant relationship (Earls, 2010).

Having a protocol to follow when screens are positive can objectify a very sensitive issue—empowering pediatric providers to make evidence-based decisions when they otherwise may feel inexperienced or be apprehensive due to personal uncertainty with their responses to positive screens (Carroll et al., 2013).

Pediatric providers must keep in mind that by standardizing screening and referral, they are serving the needs of their patients and their patients' families by protecting them both from the potential sequelae of PPD. The task may, at first, appear to be daunting but can be incredibly rewarding and important. In an already hectic and robust clinical setting, the replicable referral algorithm and clinic location-specific resources guide based on the model developed by Waldrop, Ledford, Perry, & Beeber (2017) and put forth by this study simplified the transition for pediatric providers and highlighted the epitome of their practice—caring for children and their loved ones.

Screening through twelve months. Although the onset of PPD can be diagnosed up to twelve months after delivery, this study did not standardize screening through the twelve-month WCC (AHRQ, 2012). A decision was made with stakeholders to begin standardizing screening through the six month WCC to determine processes and feasibility with a decision to extend screening to be made at a later date based on internal and external evidence. This would have, however, been feasible using the current implementation methods. Further research on the efficacy and efficiency of screening for PPD through the twelve-month WCC would be complementary to current, but scarce, existing literature on the matter.

Barriers in the pediatric setting. As mentioned above, the study anticipated both provider and maternal pushback to the implementation. Nonetheless, although the literature is decorated with provider concerns for streamlining PPD screening into their daily practice, the

providers at SHP embraced this quality improvement project. A lack of time and training is often the excuse providers frequent; nonetheless, the use of the EPDS, already employed at SHP, warranted no additional training for staff (Fernandez y Garcia et al., 2015; Glasser et al., 2016; Meadows-Oliver, 2012). Although the EPDS was being administered more frequently at SHP due to the project, providers were already used to reviewing it with mothers. The simplistic referral algorithm and resource guide further abridged the screening's daily incorporation.

Contrary to the literature, SHP providers swiftly owned the problem and acknowledged and prioritized the importance of standardizing screening at their clinic—making the additional few seconds to minutes reviewing the EPDS with mothers and subsequent steps, as necessary, worthwhile. Furthermore, reimbursement fears did not discourage SHP from embracing the project as screening had already been performed and coded for appropriately (S. Kirkhart, Personal Communication, February 18, 2018).

Practice Implications

Having a well-developed resource list to complement the referral algorithm is vital its success in pediatrics (Waldrop et al., 2017). Standardizing screening for any condition, disease, or illness certainly presents ethical considerations: what does a provider do when a patient is documented as at-risk? It can be argued that it is unethical for providers to ignore potential depression among their patients if they are going to screen for it (Sheehan & McGee, 2013). Resources and options for further evaluation and treatment must be available. Although establishing a detailed resource list for mothers of all health care insurance statuses can initially be intimidating for pediatric providers, it empowers both staff and participating mothers by giving them access to local emergency and non-emergency services to facilitate further evaluation and treatment (Waldrop et al., 2017). By having an established algorithm directing

their screening responses, providers will be more confident when referring at-risk mothers and mothers can find solace knowing the referring actions of their child's provider is evidence based.

Limitations

The received EHR report on the aforementioned WCCs did not indicate the visit reason—such as newborn WCC or 4 month WCC—but did list the patient's date of birth and the encounter date of the appointment; therefore, during data analysis, by looking at those two statistics, the visit reason was deduced. This, however, could have skewed the results breaking down the sample size by visit reason and could have not captured patients that may have fallen behind on their examination schedules. For example, although a patient may have been born in September, their visit in January may not be their assumed four-month WCC but possibly their two-month WCC.

Although the sample size is robust and inclusive during the implementation period, the study results are from only one setting—therefore limiting their generalizability. However, the transferability of the process to other similar settings adapted to the local context is high and the potential for similar results is also high.

Areas for Future Exploration

Additional research on the outcomes of mothers who were referred for further evaluation—whether they did or did not access the recommended referral services—is certainly needed. Long-term data on whether the standardization of PPD screening and referral in the pediatric setting is in fact successful in reducing EPDS scores overtime would also be valuable. Furthermore, the financial incentives of standardizing PPD screening and referral in the pediatric setting should be further researched. Additional screening not only increases the amount of identified positive screens and, in turn, referrals, but, if billed correctly, it is bound to increase

reimbursements for practicing pediatric establishments. In this instance, other Sentara health care system providers—namely obstetricians, gynecologists, psychiatrists, and family medicine providers—should benefit from new patient visits, which would translate to additional revenue for the health care system.

Conclusion

The American Congress of Obstetricians and Gynecologists suggests that Healthy People 2020 target increasing the proportion of postpartum women who received PPD screening and referral—reflective of PPD's continued widespread prevalence (NIHCM Foundation, 2010). Whereas the harmful effects PPD can have on mothers and their children can last for years, effective PPD screening can take as little as one minute (Meadows-Oliver, 2012). When presented as a routine part of provided health care, screening for PPD can be successful. By initiating a standardized PPD screening schedule and implementing a referral and follow-up algorithm along with a referral/resource guide in the outpatient pediatric setting, more PPD cases can be identified, further evaluated, and guided to appropriate care. In turn, maternal and infant health outcomes should improve.

The ultimate goal of the project is to get SHP to implement and sustain the novel PPD screening schedule and referral and follow-up protocol for all of the clinic infants indefinitely. This practice change has great potential to improve maternal and infant outcomes while supporting and facilitating the mother-infant relationship; furthermore, this low-budget, feasible DNP project will improve population health and the patient health care experience while significantly reducing health care costs over time. To sustain changes, the clinic will need to monitor for positive feedback from their patients' mothers and be steadfast in standardizing their screening efforts. This proposed practice change at SHP is certain to be a win-win for mothers,

children, and providers. Adjusting screening schedules based on recommendations in the literature and normalizing PPD will be imperative precursors to standardizing PPD screening in the outpatient pediatric setting across the country.

APPENDIX A: BASELINE HAND CHART REVIEW

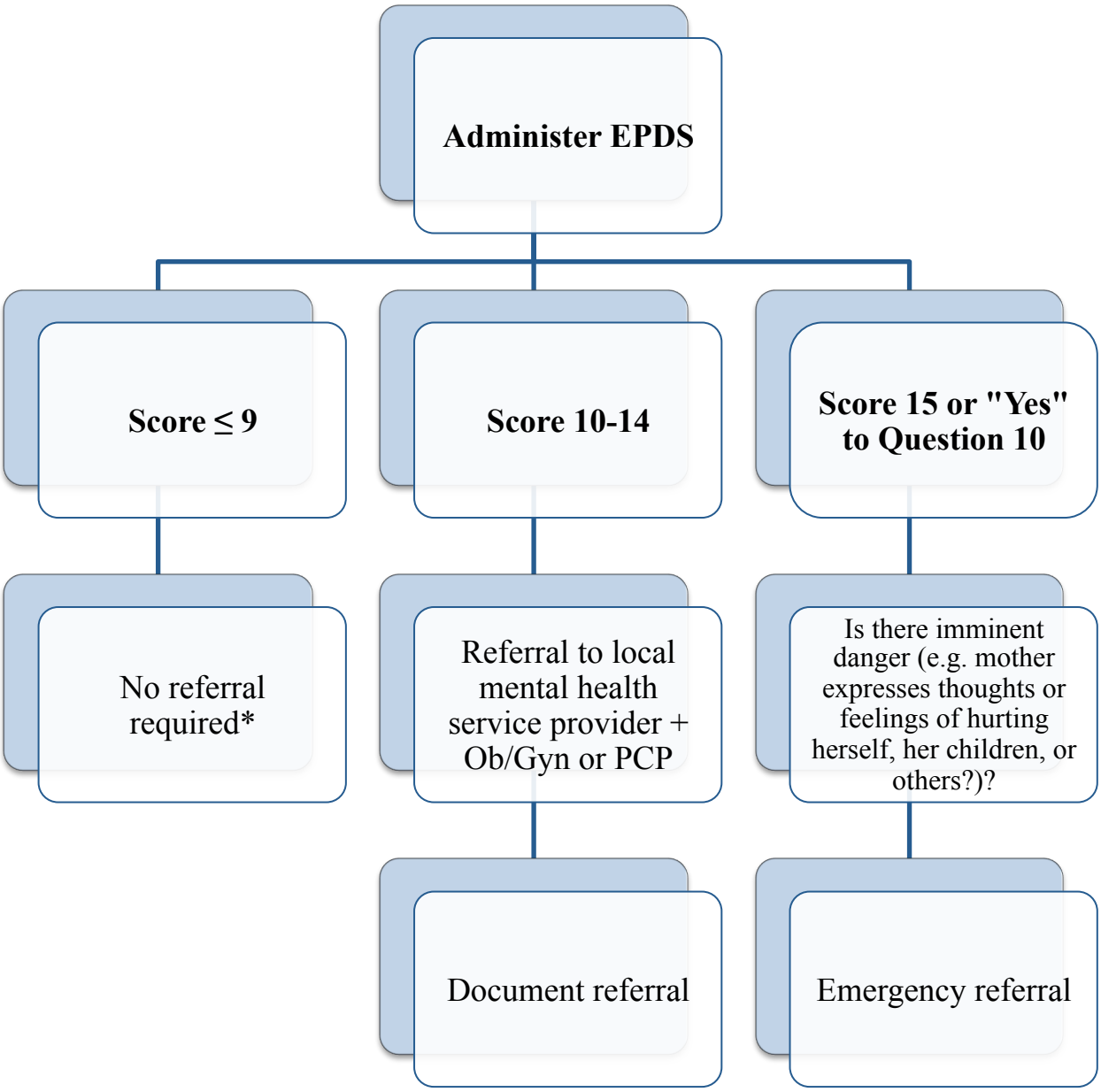
Date	X-Month Well Child Check	Screening Performed? (Yes or No)	EPDS Score	Referral Recommendation Documented? (Yes or No)

APPENDIX B: POST-IMPLEMENTATION EHR REPORT

Birth Date	Encounter Date	EPDS Administered	EPDS Not Administered	EPDS Not Administered Due To	EPDS Score	EPDS Referred To	EPDS Not Referred

APPENDIX C: POSTPARTUM DEPRESSION REFERRAL ALGORITHM

Using the Edinburgh Postnatal Depression Scale (EPDS)



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