Doctor of Nursing Practice Project

entitled

Breastfeeding: An Evidence-Based Intervention for Neonatal Abstinence Syndrome.

by

Holly A. Myers

Submitted as partial fulfillment of the requirements for the
Doctor of Nursing Practice Degree

Susan Batten, PhD, RN
Doctoral Project, Chair

Tracy Brewer, DNP, RNC-OB, CLC
Doctoral Project, Committee Member

Larissa Barclay, DNP, NP-C, PMHNP-BC, CWCN
Doctoral Project, Committee Member

The University of Toledo and Wright State University

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An Abstract of
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Opioid drug use during pregnancy is a national and local emergent concern. The state of Ohio has experienced a dramatic increase in neonates born with neonatal abstinence syndrome (NAS). NAS occurs after the neonate is born and no longer receives a supply of opioids from the mother. NAS occurs in approximately 55 to 94 percent of neonates exposed to opioids in utero and if left untreated can become life threatening. Nationally, an estimated $1.5 billion is spent annually for NAS treatment equating to $53,400 per infant hospitalized. Non-pharmacological supportive care measures such as breastfeeding can aid in managing NAS symptoms. The purpose of the evidence based practice improvement project (EBPIP) was to provide continuing education (CE) for maternal newborn care staff in Erie County Ohio on the national standards of care and recommended practice guidelines that encourage and support opioid dependent postpartum women in medication assisted treatment (MAT) programs to breastfeed their neonates. The goal of the project is to foster maternal decision making to breastfeed as a means to decrease the occurrence of NAS symptoms, decrease the need for pharmacological interventions, and decrease the length of stay (LOS) in an acute care hospital setting for affected neonates. The Model for Evidence-Based Practice Change was used to guide project implementation. The CE program titled Breastfeeding’s Role in Neonatal Abstinence Syndrome was presented to maternal newborn care staff (N=133) of Erie County Ohio. The program provided education on NAS and
the national standards and guidelines for breastfeeding and maternal substance use. A comparison of the pre and post questionnaire demonstrated gains in staff knowledge and comfort level regarding the implementation of breastfeeding guidelines for opioid dependent women in MAT. The use of standardized evidence-based guidelines ensures nonpharmacological treatments (such as breastfeeding) are supported for the neonate born to opioid dependent mothers who are participating in an MAT program.
Acknowledgements

I would like to express my deepest gratitude and appreciation to all those who inspired, guided, and encouraged me to complete this project. The skills and knowledge which I have gained throughout this process has been an invaluable component in my future career development. I would especially like to thank Dr. Susan Batten from The University of Toledo, the chairman of my committee. I attribute my success to Dr. Batten’s constant encouragement and immense effort to stimulate me to be outstanding.

Thank you so much to Dr. Tracy Brewer from Wright State University. Her wisdom, knowledge, and commitment to evidence-based practice (EBP) has been an inspiration and motivation to me. You have been encouraging, kind, and most of all instrumental in translating my EBP vision into reality. And to Dr. Larissa Barclay from The University of Toledo, who was willing to serve on my committee. Thank you for your insightful comments and encouragement.

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I would also like to thank Linda Ricci, Connie Dagg, Patty Martin, and the entire healthcare team from Erie County who participated in this evidence-based project to make a difference in the lives of those most affected by the opioid epidemic.
# Table of Contents

Abstract ........................................................................................................................................... iii  

Acknowledgements ......................................................................................................................... v  

Table of Content ............................................................................................................................. vi  

List of Tables ....................................................................................................................................... x  

Introduction and Overview of the Problem .................................................................................... 1  

Purpose and Goals .......................................................................................................................... 4  

    PICOT Statement ......................................................................................................................... 4  

Evidence-Based Practice Model Guiding Project ............................................................................. 6  

Step 1 of the Model: Assess the Need for Change in Practice ....................................................... 7  

    Identify the Problem ................................................................................................................... 7  

    Collection of Internal and External Data ................................................................................... 7  

    Link Between Intervention and Outcome .................................................................................. 9  

    Gather Stakeholders .................................................................................................................. 9  

Step 2 of the Model: Locate the Best Evidence ............................................................................. 11  

    Literature Review ..................................................................................................................... 11  

    Inclusion and Exclusion .......................................................................................................... 12  

Step 3 of the Model: Critically Analyze the Evidence .................................................................... 12  

    Appraisal and Synthesis .......................................................................................................... 12  

        Hierarchy of Evidence ......................................................................................................... 13  

        Quality of Evidence Scale .................................................................................................. 13  

        AGREE II Tool ..................................................................................................................... 14  

        Breastfeeding and NAS ....................................................................................................... 16
Summary of the Evidence ................................................................. 19
Implications for Practice ................................................................. 20
Step 4 of the Model: Design the Practice Change ................................. 23
  Define the Proposed Change ............................................................ 23
  Description of the Intervention ....................................................... 24
    Practice Guideline ......................................................................... 24
    Education ....................................................................................... 25
    Timeline for Implementation ......................................................... 26
    IRB Review Process ....................................................................... 27
    Human Subject Protection ............................................................... 27
  Method of Outcomes Measured ....................................................... 29
    Staff Knowledge and Comfort ....................................................... 29
    NAS Score .................................................................................... 30
    Treatment ..................................................................................... 31
    LOS ............................................................................................... 31
  Data Collection ................................................................................ 31
Step 5 of the Model: Implement and Evaluate Practice Change ............... 33
  Implementation Process .................................................................... 33
  Evaluation of Implementation ........................................................... 34
  Data Analysis .................................................................................. 34
  Project Results ................................................................................ 35
    CE Program Participant Demographics ............................................ 35
    Assessment of Pre and Post Questionnaire ........................................ 35
Appendix F. Databases Searched and Data Abstraction..........................74
Appendix G. Rapid Critical Appraisal Question Form.............................75
Appendix H. JHNEBP Evidence Level and Quality Guide..........................76
Appendix I. Synthesis and Recommendations Tool..................................79
Appendix J. Critical Appraisal and Evaluation.........................................81
Appendix K. Synthesis Table ..................................................................102
Appendix L. CE Flyer ..........................................................................103
Appendix M. CE Pre-Questionnaire .........................................................104
Appendix N. CE Power Point Presentation ..............................................105
Appendix O. CE Certificate of Completion ..............................................109
Appendix P. CE End of Program Evaluation ............................................110
Appendix R. CE Post-Questionnaire .........................................................114
Appendix S. University of Toledo IRB Approval Letter.............................115
Appendix T. FRMC Waiver/Alteration of Individual HIPPA Authorization....117
Appendix U. Finnegan Abstinence Scoring Tool .......................................118
Appendix V. CE End of Program Evaluation Summary ............................120
Appendix W. Costs .............................................................................126
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Identified Stakeholders</td>
<td>10</td>
</tr>
<tr>
<td>Table 2</td>
<td>Strength of Recommendation</td>
<td>21</td>
</tr>
<tr>
<td>Table 3</td>
<td>Planning for Implementation</td>
<td>28</td>
</tr>
<tr>
<td>Table 4</td>
<td>Data Collection Process and Tools</td>
<td>32</td>
</tr>
<tr>
<td>Table 5</td>
<td>Demographic Characteristics for CE Program Participants</td>
<td>36</td>
</tr>
<tr>
<td>Table 6</td>
<td>Knowledge Questionnaire Conclusions for Question 1 Combined Scores</td>
<td>37</td>
</tr>
<tr>
<td>Table 7</td>
<td>Knowledge Questionnaire Conclusions for Question 1 Separated Scores</td>
<td>38</td>
</tr>
<tr>
<td>Table 8</td>
<td>Knowledge Questionnaire Conclusions for Question 2 Combined Scores</td>
<td>38</td>
</tr>
<tr>
<td>Table 9</td>
<td>Knowledge Questionnaire Conclusions for Question 2 Separated Scores</td>
<td>39</td>
</tr>
<tr>
<td>Table 10</td>
<td>Knowledge Questionnaire Conclusions for Question 3 Combined Scores</td>
<td>39</td>
</tr>
<tr>
<td>Table 11</td>
<td>Knowledge Questionnaire Conclusions for Question 3 Separated Scores</td>
<td>40</td>
</tr>
<tr>
<td>Table 12</td>
<td>Knowledge Questionnaire Conclusions for Question 4 Combined Scores</td>
<td>41</td>
</tr>
<tr>
<td>Table 13</td>
<td>Knowledge Questionnaire Conclusions for Question 4 Separated Scores</td>
<td>42</td>
</tr>
<tr>
<td>Table 14</td>
<td>Comfort Level Rating Combined</td>
<td>43</td>
</tr>
<tr>
<td>Table 15</td>
<td>Comfort Level Rating Inpatient</td>
<td>43</td>
</tr>
<tr>
<td>Table 16</td>
<td>Comfort Level Rating Outpatient</td>
<td>44</td>
</tr>
<tr>
<td>Table 17</td>
<td>Summary of Maternal Demographics</td>
<td>47</td>
</tr>
<tr>
<td>Table 18</td>
<td>Summary of NAS Scores</td>
<td>48</td>
</tr>
<tr>
<td>Table 19</td>
<td>Summary of NAS Treatments</td>
<td>49</td>
</tr>
<tr>
<td>Table 20</td>
<td>Summary of NAS Length of Hospitalization</td>
<td>50</td>
</tr>
</tbody>
</table>
Introduction and Overview of the Problem

According to the National Survey on Drug Use and Health (NSDUH), 27 million Americans used an illicit drug in the past 30 days (Center for Behavioral Health Statistics and Quality, 2015). Within this population, 90% of drug dependent women are of childbearing age. The most commonly used illicit drugs consist of marijuana, nonmedical use of prescription opioid pain relievers, tranquilizers, stimulants, cocaine, hallucinogens, inhalants, heroin, and sedatives (Center for Behavioral Health Statistics and Quality, 2015).

Opioid abuse is at epidemic levels. An estimated two million Americans have a prescription opioid dependence and 467,000 Americans have a heroin dependence (Wachman et al., 2015). The most commonly used opiates include heroin, methadone, buprenorphine, and nonmedical use of legally or illegally obtained prescription opiates such as oxycodone (Center for Behavioral Health Statistics and Quality, 2015). Reports of nonmedical use of prescription opioids and heroin during pregnancy range from 4.4% to 14% (Center for Behavioral Statistics and Quality, 2015).

Research suggests that opioid use during pregnancy poses many risks for the mother as well as the fetus. Maternal risks with opioid use include chronic medical conditions, pregnancy complications, increased healthcare costs, and legal consequences such as criminal prosecution (The American College of Obstetricians and Gynecologists [ACOG] 2012; Whilteman et al., 2014). Fetal risks of maternal opioid use during pregnancy include intrauterine growth restriction (IUGR), intrauterine fetal demise, intraventricular hemorrhage, hyperactivity, preterm delivery, neonatal infections, low birth weight, feeding disorders, and neonatal abstinence syndrome (NAS) (Gopman, 2014; McQueen & Murphy-Oikonen, 2016).
The increased use of opioid drugs during pregnancy has resulted in an increase incidence of NAS reported as approximately 3.4 per 1000 live births in the United States (U.S.) (Lee, Hulman, Musci, & Stang, 2015). The incidence of NAS in Ohio, where this project took place, was approximately 155 per 10,000 live births in 2016 (Ohio Department of Health [ODH], 2016). After the neonate is born and is no longer receiving an addictive substance from the mother, NAS symptoms may manifest. NAS occurs in approximately 55 to 94% of neonates exposed to opioids in utero and if left untreated can become life threatening (Lee, Hulman, Musci, & Stang, 2015; Young, Hager, & Spurlock, 2015). NAS involves multiple body systems and is characterized by respiratory depression, irritability, high-pitch cry, seizures, tremors, increased muscle tone, frequent yawning and sneezing, poor feedings, vomiting, sweating, nasal congestion, and temperature instability (Kelly, Knoppert, Roukema, Rieder, & Koren, 2015; Lee, Hulman, Musci, & Stang, 2015). NAS can be difficult to identify and treat due to the varying symptoms and the involvement of multiple systems. Nearly 50 to 80% of affected neonates require pharmacological treatment for NAS (Bagley, Wachman, Holland, & Brogly, 2014). Neonates with NAS may experience serious life-long medical complications and have an increased risk of sudden infant death syndrome (SIDS) (Pritham, 2013).

The financial burden associated with caring for neonates with NAS is high because pharmacological and nonpharmacological treatment can result in prolonged hospital stays in neonatal intensive care and special care units. An estimated $1.5 billion is spent annually in the U.S., equating to $53,400 per infant hospitalized for withdrawal treatment versus $2,750 for a healthy newborn delivered at term. (Backes et al., 2012; Gopman, 2014; Patrick, Davis, Lehman, & Cooper, 2015). The reported rate of NAS in Ohio increased from 14 per 10,000 live births in 2004 to 155 per 10,000 live births in 2016 (Ohio Department of Health [ODH], 2016). In Ohio,
the average LOS for treating neonates experiencing NAS was between 14 and 20 days, equating to over $70 million dollars in costs (Massatti et al., 2013). Likewise, NAS is a significant financial burden for our healthcare systems and society throughout the U. S.

Management of NAS symptoms should include both pharmacological and non-pharmacological supportive care measures. Pharmacological support targets the management of NAS symptoms. For opioid withdrawal, morphine is the medication of choice (Kocherlakota, 2014); the use of methadone and buprenorphine during opioid replacement weaning are additional options (McQueen & Murphy-Oikonen, 2016).

Non-pharmacological low risk supportive care measures are recommended for neonates at risk for NAS regardless of the need for pharmacologic treatments (Casper & Arbour, 2014). Recommended measures focus on nutrition and sensory support such as swaddling, decreased exposure to lights and sound, clustering of care, and breastfeeding (Bagley, Wachman, Holland, & Brogley, 2014). Breastfeeding is acknowledged as the best method of feeding the neonate through at least the first year of life and is thought to reduce the occurrence and the severity of NAS (Demirci, Bogen, & Klionsky, 2015). The American Academy of Pediatrics (AAP) (2012) recommends breastmilk as the ideal source for neonatal nutrition because breastmilk supports growth and neurological development.

The evidence-based practice (EBP) process was used to facilitate education for maternal newborn care staff on national standards of care and recommended practice guidelines that encourage and support breastfeeding for mothers enrolled in medication assisted treatment (MAT) programs whose neonates are at risk for NAS.
**Purpose and Goals**

The purpose of this EBP improvement project was to provide continuing education (CE) for maternal newborn care staff in Erie County Ohio on the national standards of care and recommended practice guidelines that encourage and support opioid dependent women in MAT programs to breastfeed their neonates. The goal of the project is to foster maternal decision making to breastfeed as a means to decrease the occurrence of NAS symptoms, decrease the need for pharmacological interventions, and decrease the length of stay (LOS) in an acute care hospital setting for affected neonates.

**PICOT Statement.** A clinical question utilizing the PICOT format was formed to evaluate the benefit of an educational intervention that focuses on breastfeeding of neonates born to opioid dependent woman who are currently in a MAT program. The PICOT format is a systematic approach that guides the development of a clinical question to explore the effectiveness of clinical interventions in practice. The PICOT acronym represents specific aspects of the clinical question: P encompasses the population or characteristics of the group of interest; I refers to the intervention or treatment that the population will be given; C is the comparison of interest; O signifies the outcomes intended to be examined to determine the effectiveness of the intervention; lastly, T describes the duration or timing of data collection (Boswell & Cannon, 2017; Melnyk & Fineout-Overholt, 2015)

The PICOT question of interest was: Among neonates born to opioid dependent postpartum women in a MAT program (P), how does breastfeeding the neonate (I) compared to not breastfeeding the neonate (C) affect the neonatal abstinence syndrome score and subsequent need for treatment (O) at 48 hours old and 72 hours old (T)?
For the purpose of this paper, the significant concepts of the PICOT question of interest are defined as the following:

**Breastfed.** Mother/child act of milk transference (Academy of Breastfeeding Medicine [ABM], 2015). The skin-to-skin and close contact of neonate to the mother during the breastfeeding process is thought to aid in decreasing NAS (O’Connor, Collett, Alto, & O’Brien, 2013). Milk transference directly from the breast to the neonate as well as milk transferred from the breast to a bottle then to the neonate are the methods of breastfeeding in this project.

**Dependence.** An adaptive physiological state that occurs with regular drug use and results in a withdrawal syndrome when drug use is stopped; often occurs with tolerance (National Institute on Drug Abuse [NIDA], 2007).

**Neonatal Abstinence Syndrome (NAS).** Substance withdrawal in newborns delivered to women dependent on addictive substances during gestation (Young, Hager, & Spurlock, 2015).

**Neonate.** A newborn infant through the first 28 days of life (Durham & Chapman, 2014).

**Opioid.** A compound or drug that binds to receptors in the central nervous system causing an analgesic and narcotic effect (The American Heritage Medical dictionary, n.d.). The opioid class consists of prescription medications and synthetically made narcotic analgesics including heroin, methadone, suboxone (buprenorphine and naloxone), hydrocodone, oxycodone, morphine, codeine, and buprenorphine. Opioids cross the placental barrier to the fetus and can lead to neonatal withdrawal symptoms after delivery (Kelly, Knoppert, Roukema, Rieder, & Koren, 2015).

**Methadone hydrochloride.** A synthetic opioid agonist that blocks the euphoric effects of opioid analgesics such as heroin, morphine, fentanyl, and codeine; it also reduces withdrawal symptoms in people addicted to narcotic drugs. A maintenance dose is provided to meet the
opioid craving; however, methadone itself can become addictive. Methadone is secreted in breastmilk, amniotic fluid, saliva, and crosses the placenta to the fetus. MAT is provided in a structured clinic setting that meets federal guidelines for dispensing methadone (Roxane Laboratories, Inc., 2006). Methadone is also utilized as an opioid replacement for NAS (McQueen & Murphy-Oikonen, 2016).

**Buprenorphine.** A long acting partial opioid agonist that provides similar actions as opioid analgesics and can become addictive. Unlike methadone, buprenorphine can be offered in healthcare provider office setting. Buprenorphine use during pregnancy carries less risk for NAS, therefore buprenorphine is becoming a preferred treatment (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016). Buprenorphine can also be utilized as an opioid replacement to manage NAS (McQueen & Murphy-Oikonen, 2016).

**Medication assisted treatment (MAT) program.** Treatment program that combines medications and behavioral therapy to treat substance abuse (SAMHSA, 2016).

**Evidence-Based Practice Model Guiding Project**

The Rosswurm and Larrabee (2009) updated version of the Model for Evidence-Based Practice Change was selected to guide project implementation for this evidence-based project. The revised name highlights that the process of evidence-based practice is an ongoing process for planned changes in interprofessional practice. The model consists of six steps: 1) assessing the need for change in practice; 2) locating the best evidence; 3) critically analyzing the evidence; 4) design a practice change; 5) implementing and evaluating the change in practice; and lastly 6) integrating and maintaining the change in practice (Larrabee, 2009).

The Model of Evidence Based Practice Change was used to guide the author’s proposed scholarly project to evaluate the benefit of feeding methods of neonates born to opioid dependent
women in the development and treatment of NAS. This EBP model was selected with the understanding that a conceptual model will assist in identifying the essentials needed for change in the current practice, which lacks breastfeeding recommendations or guidelines for neonates of opioid dependent women in the authors’ community hospital setting. Furthermore, the Model of Evidence Based Practice Change is a valuable tool for guiding the proposed implementation because it provides an interprofessional approach to evidence-based delivery of healthcare in a variety of settings including education and acute-care facilities.

This model is logical in progression starting with assessing a need for change and ending with assimilation of the evidence-based protocol. The model allows for easy transition and flow through, yet the steps can easily be reassessed and modified accordingly.

**Step 1 of the Model: Assess the Need for Change in Practice**

**Identify the Problem**

Identification of the problem as discussed in the *Introduction and Overview of the Problem, and Purpose and Goals* sections of this paper clarifies the need for implementation of a breastfeeding protocol with mothers enrolled in MAT programs whose neonates are at risk for NAS. Staff education on the breastfeeding protocols aids in the staff’s ability to foster maternal decision making to breastfeed.

**Collection of Internal and External Data**

The setting for implementation of this EBP project was The Center for Women and Newborns at Firelands Regional Medical Center (CWNFRMC), a community hospital obstetrical unit in Sandusky, Ohio; The Erie County Health Department; Family Health Services of Erie County; and Northern Ohio Medical Specialists (NOMS) Obstetrics & Gynecology in Sandusky, Ohio. See Appendix A-D for agency permission forms.
A group of six physicians provide obstetrical services to the patient population of Erie County. One of the six physicians is designated as a certified buprenorphine prescriber through the Drug Enforcement Administration (DEA) to identify and treat opioid dependent women prenatally, at delivery, and postnatally. Obstetrical services, including treatment with buprenorphine for opioid addiction during pregnancy, can be obtained at the Erie County Health Department or at the identified obstetrician’s private office in Sandusky, Ohio. The physician who is a certified buprenorphine prescriber also serves as the obstetrical provider for the Erie County Health Department. Women insured through Medicaid or Medicare are required to begin prenatal care at the Erie County Health Department and transition their care to identified obstetrician’s office at 35 weeks gestation (A. McPeek, personal communication, February 2017). The requirement of beginning care at the health department is due to insurance billing and reimbursement procedures.

A total of 731 live births occurred at CWNFRMC in 2016; of the 731 live births, approximately 15 neonates experienced NAS. The LOS in 2016 for assessment and treatment of NAS ranged from seven days to three weeks. The average LOS stay for a healthy neonate is two days, the average LOS for a neonate needing NAS management is seven to 14 days (A. McPeek, personal communication, November 2016). If the projected birth rate for 2017 remains consistent with 2016, there will be approximately 700 births at FRMC. Healthcare providers anticipate NAS rates to double in 2017. To date four neonates have required treatment for NAS compared with one baby at this same point in 2016 (A. McPeek, personal communication, February 2017).
**Link Between Intervention and Outcome**

Breastfeeding is thought to reduce the occurrence and the severity of NAS (Demirci, Bogen, & Klionsky, 2015). The American Academy of Pediatrics (AAP) (2012) recommends breastfeeding as a standard for feeding and nutrition due to the medical and neurodevelopmental advantages. Breastfeeding is acknowledged as the best method of feeding the neonate through at least the first year of life (Demirci, Bogen, & Klionsky, 2015). Through use of the evidence-based practice (EBP) process, staff education on breastfeeding used as a low risk intervention with neonates predisposed to NAS was explored. The primary outcomes measured included a five item questionnaire pretest and posttest to assess maternal newborn care staffs pre-existing knowledge and retention of breastfeeding guidelines for opioid dependent women in MAT. The FRMC Drug-Dependent practice guideline on breastfeeding is located in Appendix E. The secondary outcomes measured were NAS scores, treatments needed by the neonates with NAS, and the neonates’ LOS in the hospital.

**Gather Stakeholders**

The stakeholders involved in implementation of this EBP project are provided in Table 1. The stakeholders’ involvement in the proposed project ranged from providing pre-delivery counseling and breastfeeding education, breastfeeding support at the hospital, to post discharge support.
Table 1.

*Identified Stakeholders*

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Rational for Involvement</th>
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<tr>
<td>Director The Center for Women &amp; Newborns</td>
<td>Approve the practice change within the department. Allocate staff for training.</td>
</tr>
<tr>
<td>Lactation Nurse Consultants (IBCLC)</td>
<td>Provide education and resources to mothers that support breastfeeding.</td>
</tr>
<tr>
<td>Obstetrical Staff Nurses</td>
<td>Provide postpartum care and education on breastfeeding. Support mothers with breastfeeding. Score neonates for NAS using Finnegan Assessment Tool.</td>
</tr>
<tr>
<td>Pediatric Hospitalists</td>
<td>Care for neonates experiencing NAS.</td>
</tr>
<tr>
<td>OB/GYN Physicians</td>
<td>Identify and provide counseling to antepartum patients regarding breastfeeding during buprenorphine treatment.</td>
</tr>
<tr>
<td>Family Health Physicians</td>
<td>Provide post-delivery prescription of buprenorphine treatments and support of breastfeeding.</td>
</tr>
<tr>
<td>Outpatient staff Nurses</td>
<td>Provide postpartum care and education on breastfeeding. Support mothers with breastfeeding after discharge.</td>
</tr>
<tr>
<td>Obstetrical Nurse Educators</td>
<td>Educate staff about breastfeeding recommendations. Monitor compliance with policies for breastfeeding.</td>
</tr>
<tr>
<td>Quality Control Director</td>
<td>Approve practice change. Monitor patient outcomes.</td>
</tr>
<tr>
<td>Case Manager</td>
<td>Organize and facilitate discharge planning. Aid in providing support to mothers and family.</td>
</tr>
<tr>
<td>Mothers</td>
<td>Decision maker for breastfeeding. Source of breastmilk for neonates with NAS.</td>
</tr>
<tr>
<td>Family</td>
<td>Provide emotional and social support for mother who breastfeeds.</td>
</tr>
<tr>
<td>Health Department- Peer Counselor</td>
<td>Support breastfeeding efforts after discharge from hospital. Confidant for women when neonate has NAS.</td>
</tr>
<tr>
<td>La Leche League Leader &amp; Group</td>
<td>Support breastfeeding efforts after discharge from the hospital. Source of information and encouragement.</td>
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Step 2 of the Model: Locate the Best Evidence

Literature Review

A literature review was completed to identify high quality articles to answer the proposed PICOT question: Among neonates born to opioid dependent postpartum women in a MAT program (P), how does breastfeeding the neonate (I) compared to not breastfeeding the neonate (C) affect the neonatal abstinence syndrome score and subsequent need for treatment (O) at 48 hours old and 72 hours old (T)?

The literature search was based on terms associated with the PICOT question in order to procure data to address the clinical issue and to begin critical appraisal of the research articles. The literature search incorporated the Cumulative Index to Nursing and Allied Health Literature (CINAHL Plus), Academic Search Complete, The United States National Library of Medicine (PubMed), and the National Guideline Clearinghouse (NGC) databases.

CINAHL Plus was searched with Boolean connectors using the combinations of breastfeed* AND neonatal abstinence syndrome AND opioid* with publication dates from 2006-2016. This search yielded 18 results. Academic Search Complete was searched with Boolean connectors using the combinations of breastfeeding AND neonatal abstinence syndrome AND opioid with publication dates from 2006-2016. This search yielded 23 results. PubMed was searched with the MeSH terms of ("neonatal abstinence syndrome" [MeSH Terms] OR ("neonatal" [All Fields] AND "abstinence" [All Fields] AND "syndrome" [All Fields]) OR "neonatal abstinence syndrome" [All Fields]) AND ("breast feeding" [MeSH Terms] OR ("breast" [All Fields] AND "feeding" [All Fields]) OR "breast feeding" [All Fields] OR "breastfeeding" [All Fields]). This search yielded 57 results. The National Guideline Clearinghouse (NGC) was searched with the terms breastfeeding and opioid. This search yielded
two relevant guidelines, the most current and relevant documents are “Guidelines for the identification and management of substance use and substance use disorders in pregnancy” and “Academy of Breastfeeding Medicine (ABM)clinical protocol #21: Guidelines for breastfeeding and substance use or substance use disorder, revised 2015”. The data abstraction process is provided in Appendix F.

**Inclusion and Exclusion**

Inclusion and exclusion criteria for the characteristics of the studies searched included English language, scholarly articles from academic journals, and publication dates 2006-2016. Rationale for the inclusion and exclusion criteria was to decrease the number of articles retrieved to those in the English language only, in academic journals within the specified time frame of ten years. This search strategy increased the probability of procuring consistent and reproducible outcomes. Further exclusion of articles occurred after initial review when the abstracts did not relate to or answer the PICOT question.

A total of nine research articles and two guidelines were determined to include pertinent data related to the PICOT question. Articles selected included the following study types: five cohort studies, a non-randomized clinical control trial, a descriptive study, and two systematic reviews.

**Step 3 of the Model: Critically Analyze the Evidence**

**Appraisal and Synthesis**

Appraisal and synthesis of the literature is an important step in the EBP process. Critically appraising research to weigh the strengths, limitations, and value to practice guides decision-making and creates the largest impact on patient outcomes (Melnyk & Fineout-Overholt, 2015). The rapid critical appraisal process is one way to determine the worth of
research literature to practice and includes examining validity, reliability, and applicability of the findings. Each individual article was critically appraised and information placed into evaluation tables. An example of a rapid critical appraisal question form is provided in Appendix G. Three clinically significant themes emerged through the process of critical appraisal: the effects of breastfeeding as a non-pharmacological intervention on overall NAS scores, the neonates’ hospital LOS, and subsequent need for pharmacological treatments to reduce NAS signs and symptoms (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogly, 2014; Dryden, Young, Hepburn, & Mactier, 2008; Isemann, Meinzen-Derr, & Akinbi, 2011; Jansson et al., 2008; MacMullen, Dulsk, & Blobaum, 2014; McQueen, Murphy-Oikonen, Gerlach, & Montelpare, 2011; Pritham, Paul, & Hayes, 2012; Welle-Strand et al., 2013).

Equality of Evidence. The Johns Hopkins Nursing Evidence-based Practice Rating Scale was utilized for assigning the level of evidence rating to the selected articles, interventions and treatment methods. The Johns Hopkins Nursing Evidence-Based Practice Model tools (JHNEBP) were utilized in identifying the evidence level (©The Johns Hopkins Hospital/Johns Hopkins University, Dearholt & Dang, 2012) and quality. The JHNEBP Evidence Level and Quality Guide is provided in Appendix H. Each article is analyzed based on the conceptual framework, purpose, design, method, sample, setting, variables studied, measurement, data analysis, findings, and final worth to practice. After appraisal the article is given a numerical rating from Level I to Level V to designate the likeliness to provide an effective intervention. The higher the ranking (Level I), the more probable an intervention will produce the same outcome in a similar population (Melnyk & Fineout-Overholt, 2015).

Quality of Evidence Scale. The JHNEBP Model tools were utilized to designate a quality rating for each individual research study. Quality ratings range from high quality (A) to
low quality or major flaws (C). High quality (A) articles are noted to be consistent; have
generalizable results; have an adequate sample size; sufficient control; definitive conclusions;
consistent recommendations based from comprehensive literature reviews that included thorough
references to scientific evidence (©The Johns Hopkins Hospital/Johns Hopkins University,
Dearholt & Dang, 2012). The JHNEBP Quality Rating Guide is provided in Appendix H.

Finally, synthesis and an overall recommendation was completed using JHNEBP
Synthesis and Recommendations tool (©The Johns Hopkins Hospital/Johns Hopkins University,
Dearholt & Dang, 2012). Each article’s quality rating of A or B is entered into the JHNNEBP
tool to identify the overall strength of the evidence. The final synthesis is then identified based
on a rating system of strong and compelling evidence, good and consistent evidence, good but
conflicting evidence, or little or no evidence. Each rating provides direction for application of
the evidence. The JHNEBP Synthesis and Recommendations tool is provided in Appendix I.
The article critical appraisal and evaluation tables are provided in Appendix J.

**AGREE II Tool.** To assess the quality of clinical practice guidelines, the AGREE II tool
was used. The AGREE II instrument assesses the consistency and transparency in which a
clinical practice guideline is developed and the applicability of the guideline to clinical practice.
The tool has the reviewer assess six areas: scope and purpose, stakeholder involvement, rigor of
development, clarity of presentation, applicability, and editorial independence (Brouwers et al.,
2010). Items are rated on a seven point Likert scale with 1 being “strongly disagree” to 7 being
“strongly agree”. Upon completing the AGREE II instrument, the appraiser makes a final
judgment of the quality of the clinical practice guideline.

EBP clinical practice guidelines are detailed recommendations for practice combined for
a review of the best evidence on a specific clinical topic (Melnyk & Fineout-Overholt, 2015).
Two guideline summaries were selected for appraisal using the AGREE II tool. The main objective of the Guideline summary published by the NGC was to provide advice to healthcare providers on identifying and managing women with substance abuse. Additionally, the NGC guideline includes recommendations to enable pregnant women to make healthy decisions regarding substances within the context of their pregnancy and postpartum breastfeeding (World Health Organization [WHO], 2014). The NGC guideline offers a broader recommendation that encompasses multiple aspects of maternal substance use during pregnancy and then subsequent recommendations for the neonate after delivery. The NGC guideline received a quality rating of seven on the AGREE II tool. The author of this paper is focused on the breastfeeding component of the guideline.

Within the NGC guideline, it is recommended that women in opioid maintenance treatment should be encouraged to breastfeed; a protocol needs to be in place for identifying, assessing, and intervening for neonates exposed to opioids through non-pharmacological and pharmacological methods (WHO, 2014). Moreover, the strength of the recommendations cited in this guideline are strong despite a low quality of evidence, due to the benefits of avoiding NAS in neonates outweighing any potential harms.

The second guideline selected was developed in part by the Academy of Breastfeeding Medicine (ABM), to provide guidelines for the evaluation and management of women with substance use who intend to breastfeed their neonate (Reece-Stremtan, Marinelli, & ABM 2015). Recommendations conclude that women receiving methadone or buprenorphine maintenance should be encouraged to breastfeed. The benefits of breastfeeding outweigh the risks of the neonate receiving low levels of methadone or buprenorphine. The quality of the recommendations cited in this guideline is based on good evidence supporting the recommended
use in a well-designed controlled trial without randomization, a multiple time series with intervention, and opinions of respected authorities based on descriptive studies and case reports (Reece-Stremtan, Marinelli, & ABM, 2015). Based on the AGREE II tool a quality rating assigned was six.

**Breastfeeding and NAS.** A systematic review is a rigorous and comprehensive review of the evidence on a clinical topic yielding the strongest level of evidence, level I (Melnyk & Fineout-Overholt, 2015). The systematic review used in the evaluation of the best nursing practices examined the results of a total of nine studies. These studies included non-randomized clinical trials, cohort studies, retrospective chart reviews, guidelines, and case series. The selected studies met the criteria of focusing on nursing interventions for NAS; international, and less than ten years old (MacMullen, Dulska, & Blobaum, 2014). Results identified in this review demonstrate breastfeeding when the mother is receiving medication-assisted opioid treatment has the potential to decrease the severity of NAS. This decrease impacts needing pharmacological treatments for the neonate.

Bagley, Wachman, Holland, and Brogley (2014) conducted a systematic review examining NAS assessment tools, nonpharmacological interventions, and pharmacologic treatment of opioid exposed infants. Seven studies were included in this systematic review. For the purpose of this research, only the infant feeding methods were evaluated. Evidence suggests a decreased need for pharmacological treatment of NAS with breastfeeding (OR=0.36 (CI 0.18-0.71); 0.55 (CI 0.34-0.88); 23.1% vs. 30%; 50% vs. 77%; 53% vs. 80 %). The decrease in NAS score with breastfeeding was a mean NAS score of 4.9 (SD 2.9) vs. 6.5 (SD 3.7) vs. 6.9 (SD 4.2); 8.83 (SD 3.56) vs. 9.65 (SD 2.58). Finally, a decrease in LOS with breastfeeding was
noted, with mean days 17=4.7 (SD 14.9) vs. 19.1 (SD 15); -3.3 (SE 1.7); 28.6 (SD 19.1) vs. 46.7 (SD 26.3).

A non-randomized clinical control trial provides a level III in the hierarchy of evidence. The non-randomized clinical control trial evaluated concentrations of methadone in breastmilk of breastfeeding women. This trial also evaluated the concentrations of methadone in maternal and infant plasma of those breastfeeding with a matched group of formula feeding women infant pairs.

Sixteen mother infant pairs, enrolled in a comprehensive substance abuse treatment program, were included in the study (Jansson et al., 2008). Concentrations of methadone in the breastmilk were low (range: 21-464 ng/mL) and not related to the maternal dose range of: 50-105 mg/day (Jansson et al., 2008). Concentrations of methadone in the maternal plasma were the same in the experimental and control groups. Infant plasma methadone levels were low (range: 2.2-8.1 ng/mL) in both groups. Infants in the breastfeeding group needed decreased pharmacological treatment for NAS than the formula feeding group (Jansson et al., 2008). The findings aid in “understanding of the transfer of methadone to infants via breast milk” (Jansson et al., 2008) and demonstrates that breastfeeding transfer of methadone to the neonate is insignificant. The risk of methadone transfer is outweighed by the benefits of breastfeeding.

Five cohort studies provide level III evidence, investigating the progression of a disease process or treatment processes (Melnyk & Fineout-Overholt, 2015). Dryden, Young, Hepburn, and Mactier (2009) studied 444 infants born to women in a methadone treatment program. The authors reported that 45.5% of the infants required pharmacological treatment for NAS and that breastfeeding reduced the odds of requiring treatment OR 0.55 (95% CI 0.34-0.88). Hence,
Breastfeeding is beneficial in reducing the incidence of NAS in infants born to women in methadone treatment.

Isemann, Meinzen-Derr, & Akinbi (2011) conducted a retrospective cohort study with 128 infants born to women receiving methadone treatment during pregnancy who received pharmacotherapy treatment for NAS. The authors noted that breast milk ingestion was correlated with shorter length of hospitalization (median 12.5 [3 to 51] vs. 18.5 [9 to 43] days, \( P=0.01 \)) and percentage of breast milk ingested was independently associated with length of hospitalization (\( \beta=-0.03, P=0.02 \) for every 10% increase in proportion of breast milk intake).

A retrospective cohort study by McQueen, Murphy-Oikonen, Gerlack, & Montelpare (2011) examined 28 infants with NAS who were exposed to methadone in utero. The infant feeding method was divided into breastfed, formula fed, or a combination breast and formula feeding. Mean NAS scores were lower in the breastfed group (\( M=4.9, SD=2.9 \)) than the combination group (\( M=6.5, SD=3.7 \)) and the formula fed group (\( M=6.9, SD=4.2 \)). The breastfed group also had a lower magnitude score indicating a lower severity of symptoms associated with NAS. The authors concluded that breastfeeding decreases NAS; the severity, the duration, and intensity of NAS; and NAS symptoms.

A national Norwegian cohort study by Welle-Strand et al. (2013) examined the rate and length of breastfeeding of neonates whose mothers were in an opioid maintenance treatment program. This study focused on the impact of breastfeeding on the incidence and duration of NAS. The conclusions were that neonates who breastfed had a significantly lower incidence and shorter duration of required pharmacological treatment for NAS (53% vs. 80%).

The final cohort study was conducted by Abdel-Latif et al. (2006). The aim of the study was to assess the effects of breastmilk on the severity and outcomes of NAS. A total of 190...
mother and neonate pairs participated; 105 neonates were fed formula and 85 were fed breastmilk. Abdel-Latif et al. (2006) reported that mean NAS scores were significantly lower in the breastmilk fed group. There was also less pharmacological treatment for NAS and shorter length of hospitalization in the breastmilk fed group.

Lastly, a descriptive study by Pritham, Paul, and Hayes (2012) was included in the review of literature. A descriptive study is considered level V evidence, summarizing data from human experiences (Melnyk & Fineout-Overholt, 2015). This retrospective study examined opioid treatment during pregnancy and the effect on neonatal outcomes such as length of stay due to NAS. One hundred and fifty-two newborn and mother pairs were placed into methadone exposed (n=136) or buprenorphine exposed (n=16) groups. Newborns exposed to methadone had longer length of hospitalization than the buprenorphine exposed newborns. Feeding method was included as a variable in the study with length of stay shorter in the breastfed group than the formula fed groups.

Summary of the Evidence

Supporting evidence from numerous research articles and guidelines demonstrate the positive effects and role of breastfeeding in management of NAS among neonates born to opioid dependent women. Findings from the research literature suggest a substantial reduction in the incidence and severity of NAS with breastfeeding (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogly, 2014; MacMullen, Dulsk, & Blobaum, 2014; McQueen, Murphy-Oikonen, Gerlach, & Montelpare, 2011). There is significant reduction in the need for pharmacological treatment of NAS with breastfeeding (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogly, 2014; Dryden, Young, Hepburn, & Mactier, 2008; Jansson et al., 2008; MacMullen, Dulsk, & Blobaum, 2014; Welle-Strand et al., 2013). Finally, there was a significant reduction
in the LOS required for breastfed neonates with NAS (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogly, 2014; Isemann, Meinzen-Derr, & Akinbi, 2011; Pritham, Paul, & Hayes, 2012). Table 2 reflects synthesis of findings in the literature and the strength of recommendations for making a practice change based on the overall body of research evidence. A final synthesis table providing an overview of the discussed studies is provided in Appendix K.

**Implications for Practice**

Breastfeeding is a recommended non-pharmacological treatment and preferred feeding method for managing NAS in neonates born to opioid dependent postpartum women in MAT programs (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogly, 2014; MacMullen, Dulsk, & Blobaum, 2014; McQueen, Murphy-Oikonen, Gerlach, & Montelpare, 2011).

Guideline summaries published by the NGC and ABM provide clinical expertise for the following recommendations and considerations for breastfeeding and substance use:

- An individualized prenatal plan that incorporates breastfeeding should be developed with the woman prior to delivery and discharge (Reece-Stremtan, Marinelli, & ABM, 2015).
  - Evaluation should include:
    - plans for substance abuse treatment postpartum
    - medical and psychiatric status
    - infant NAS status
    - support systems

  “Mothers who are stable on opioid maintenance treatment with either methadone or buprenorphine should be encouraged to breastfeed unless the risks clearly outweigh the benefits” (WHO, 2014, p. 8).
Table 2.

*Strength of Recommendation*

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strength of Evidence for Recommendation</th>
<th>References in Support of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BF as a NPTX and preferred feeding method for managing NAS in neonates born to OD PP women in treatment (methadone, buprenorphine, etc.)</td>
<td>Strong</td>
<td>Abdel-Latif et al., Bagley, Wachman, Holland, &amp; Brogley, Dryden, Young, Hepburn, &amp; Mactier, Jansson et al., Isemmann, Meinzen-Derr, &amp; Akinbi, MacMullen, Dulsk, &amp; Blobaum, McQueen, Murphy-Oikonen, Gerlack, &amp; Monteplare, Pritham, Paul, &amp; Hayes, Reece-Stremtan, Marinelli, &amp; The Academy of Breastfeeding Medicine, Welle-Strand et al., World Health Organization (WHO).</td>
</tr>
<tr>
<td>2. An individualized PP plan should be developed with the woman to prepare for BF prior to delivery and discharge.</td>
<td>Strong</td>
<td>Reece-Stremtan, Marinelli, &amp; The Academy of Breastfeeding Medicine, World Health Organization (WHO).</td>
</tr>
<tr>
<td>3. Mothers who are stable on OMT with either methadone or buprenorphine should be encouraged to BF unless the risks clearly outweigh the benefits.</td>
<td>Strong</td>
<td>Reece-Stremtan, Marinelli, &amp; The Academy of Breastfeeding Medicine, World Health Organization (WHO).</td>
</tr>
<tr>
<td>4. Methadone or buprenorphine maintained women should be encouraged to BF regardless of the TX dose.</td>
<td>Strong</td>
<td>Reece-Stremtan, Marinelli, &amp; The Academy of Breastfeeding Medicine, Jansson et al., World Health Organization (WHO).</td>
</tr>
</tbody>
</table>
5. Protocol to recognize, assess, monitor, and intervene using both NP and PH TX for neonates with NAS.

6. If relapse to illegal drug use should occur BF should be stopped.

7. All staff that are engaged with care of neonates born to mothers in MAT are educated on the clinical guidelines for breastfeeding as a recommended standard of care as a non-pharmacological treatment and preferred feeding method for managing NAS.

BF= breastfeeding; NP= nonpharmacological; TX= treatment; NAS= neonatal abstinence syndrome; OD= opioid dependent; PP= postpartum; OMT= opioid maintenance treatment; PH= pharmacological; TX= treatments; NAS= neonatal abstinence syndrome; MAT= medication-assisted treatment.
• When stopping breastfeeding, weaning should be done gradually to reduce the risk of the neonate or infant developing withdrawal.

A protocol needs to be used to recognize, assess, monitor, and intervene using both nonpharmacological and pharmacological treatments for neonates with NAS (WHO, 2014).

• Using a valid and reliable assessment instrument, all infants need to be assessed within two hours after birth and then every four hours until discharge.

• Infants exposed to opioids should be hospitalized for a minimum of four to seven days for monitoring.

• If relapse to illegal drug use should occur, breastfeeding should be stopped (Reece-Stremtan, Marinelli, & ABM, 2015).

For breastfeeding to be successful the mother must be committed to the process. Patient preferences and values must be considered and included in the recommendations for breastfeeding. It is essential that pregnant women in MAT programs have a comprehensive evaluation for readiness to breastfeed and receive appropriate education prior to delivery.

Breastmilk is the ideal nutrition for neonates (Demirci, Bogen, & Klionsky, 2015) as it provides numerous protective effects and advantages for the neonate. Breastfeeding can provide multiple benefits for the mother as well, since it promotes maternal bonding through close contact, increased maternal role confidence, and may help to reduce illicit substance use (Demirci, Bogen, & Klionsky, 2015).

Step 4 of the Model: Design the Practice Change

Define the Proposed Change

Designing the practice change is a critical step in an EBP improvement project. National clinical guidelines have established breastfeeding as a recommended standard of care as a non-
pharmacological treatment and preferred feeding method for managing NAS in neonates born to opioid dependent women (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogley, 2014; MacMullen, Dulsk, & Blobaum, 2014; McQueen, Murphy-Oikonen, Gerlach, & Montelpare, 2011). Despite the published clinical guidelines, healthcare provider’s knowledge and personal comfort in recommending breastfeeding as a non-pharmacological treatment option in the management of NAS was lacking in the proposed project setting.

Therefore, the proposed change for this project was implementation of structured education and training for maternal newborn care staff in Erie County Ohio so that they will encourage and support opioid dependent postpartum women in MAT to breastfeed their neonates. The project leader identified the stakeholders designated in step one of the model. The unit director, physicians, office managers, and Health Commissioner were approached regarding staff education and training. Letters of approval were obtained from each of the stakeholders’ organization for facilitation of the program.

Description of the Intervention

Practice Guideline. The first phase in project implementation was development of a practice guideline on breastfeeding for opioid dependent postpartum women utilizing the national standards and practice guidelines. The practice guideline included identifying the need to support opioid dependent postpartum women in MAT programs to breastfeed; non-pharmacological treatments (swaddling, decrease stimuli environment, etc.) for all NAS neonates; and a revised pharmacological treatment plan based on the calculated Finnegan Score. The practice guideline entitled *Breastfeeding Guidelines for Drug-Dependent Women* completed the FRMC policy approval process through the FRMCs Policy Committee and was endorsed by the Physician Policy Committee.
**Education.** After the practice guidelines received final approval, staff who have direct contact with opioid dependent women in MAT programs in Erie County were provided with a continuing education (CE) program titled *Breastfeeding’s Role in Neonatal Abstinence Syndrome.* The CE program was designed to provide education to maternal newborn care staff on national standards of care and recommended practices guidelines that encourage and support opioid dependent postpartum women in MAT programs to breastfeed their neonates. Education on the national standards of care and recommended practice guidelines was provided to staff by the project leader. The target population was inpatient obstetric staff nurses (including lactation nurses), community based obstetrics and gynecology (OB/GYN) staff nurses and physicians, and lactation nurse and peer mentors in Erie County Ohio. Appendix L is the flyer advertising the program distributed to the target population.

The CE participants completed a five item questionnaire to assess pre-existing knowledge of breastfeeding guidelines for opioid dependent women in MAT. Participants completed the paper-pencil pre-questionnaire survey anonymously and submitted the document in a provided envelope. The pre-questionnaire survey is provided in Appendix M.

The thirty minute CE program was developed by the project leader based on the newest national standards and guidelines for breastfeeding and maternal substance use. The objectives of the program consisted of 1) describe neonatal abstinence syndrome (NAS), 2) discuss breastfeeding in the reduction of NAS symptoms, decrease in pharmacological treatments, and reduction of hospital length of stay, 3) define the evidence based practice guidelines of breastfeeding for managing NAS, 4) review the Finnegan Scoring Tool and NAS treatment, and 5) describe and demonstrate how to use scripting to encourage breastfeeding in the MAT population. The power point presented as part of the CE is provided in Appendix N. Each
participant received 0.5 contact hours from Firelands Regional Medical Center, an Ohio Nurses Association approved provider of continuing nursing education. The CE certificate of completion is provided in Appendix O. An end of program evaluation was completed as required by the Ohio Nurses Association, in order to provide the contact hour to program participants. The end of program evaluation is provided in Appendix P. A booklet titled *Neonatal Abstinence Syndrome: A Guide for Families* was distributed to all participants as an educational tool to support breastfeeding. The booklet was developed and provided free of charge to the public from the Ohio Perinatal Quality Collaborative funded by the Ohio Department of Medicaid. The *Neonatal Abstinence Syndrome: A Guide for Families* booklet is provided in Appendix Q.

Thirty days following the program, CE participants completed the same five item questionnaire as a post program evaluation to measure retention of information from the CE program and to identify areas warranting improvement. The anonymous post-questionnaire survey was emailed to the program participants via an online survey software program. The post-questionnaire survey is provided in Appendix R.

After successful education to the targeted maternal newborn care staff in Erie County, the practice guideline on breastfeeding guidelines for opioid dependent postpartum women was implemented on June 1st, 2017 at CWNFRMC. The practice guideline was published and made available on that day for access by all hospital staff within the community hospital Intranet under the obstetrical specific nursing policy and procedures link.

**Timeline for Implementation.** Implementation of the EBP improvement project was May 2017. Adherence to new standards and guidelines was evaluated throughout the project implementation phase, May 2017 through October 2017. The timeline for planning of
implementation was guided by The Model for Evidence-Based Change and is provided in Table 3.

**IRB Review Process.** The Institutional Review Board (IRB) committee at FRMC was consulted and determined this project as a service enhancement EBP/quality improvement project, and therefore was determined as exempt status. The FRMC Agency permission form noting project approval and exemption is found in Appendix A. The University of Toledo IRB approved the implementation of this project prior to initiation of the CE program.

The process entailed using the IRB exempt template to provide a detailed description of the proposed project. Site permission was established prior to project initiation from FRMC, Erie County Health Department, Family Health Services of Erie County, and NOMS Obstetrics & Gynecology. The letter of approval from The University of Toledo IRB is located in Appendix S.

**Human Subject Protection.** Protection of human subjects is very important because drug dependent women and neonates with NAS are considered a vulnerable population. There were minimal risks to the participants in this project; loss of privacy and confidentiality was one identified risk. CE participants completed a paper-pencil anonymous questionnaire and submitted the document into a provided envelope at the end of the program. CE participants were emailed an online survey link to the same questionnaire 30 days after the program which were submitted anonymously.

The Vice President of Legal Services and the Corporate Compliance officer at FRMC was consulted regarding access and use of Protected Health Information (PHI). A Waiver/Alteration of Individual HIPPA Authorization was granted prior to project initiation. The FRMC Waiver/Alteration of Individual HIPPA Authorization letter is found in Appendix T.
Table 3.

Planning for Implementation

<table>
<thead>
<tr>
<th>Planning for Implementation</th>
<th>Timeline</th>
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<tbody>
<tr>
<td><strong>Step 1: Assess the need for change in practice:</strong></td>
<td></td>
</tr>
<tr>
<td>Identify problem: Increase in infants experiencing neonatal abstinence syndrome due to opioid use by mothers. PICOT question developed.</td>
<td>August 2015</td>
</tr>
<tr>
<td>Collect internal data about current practice and compare external data with internal data.</td>
<td>March 2016</td>
</tr>
<tr>
<td>Link problem, interventions, and outcomes.</td>
<td>September-October 2015</td>
</tr>
<tr>
<td>Include stakeholders.</td>
<td>March 2016</td>
</tr>
<tr>
<td><strong>Step 2: Locate the best evidence.</strong></td>
<td></td>
</tr>
<tr>
<td>Identify types and sources of evidence.</td>
<td>March 2016</td>
</tr>
<tr>
<td>Review research concepts.</td>
<td>March 2016</td>
</tr>
<tr>
<td>Plan the search.</td>
<td>March 2016</td>
</tr>
<tr>
<td>Conduct the search.</td>
<td>March 2016</td>
</tr>
<tr>
<td><strong>Step 3: Critically analyze the evidence.</strong></td>
<td></td>
</tr>
<tr>
<td>Critically appraise and weigh the evidence.</td>
<td>February 2017</td>
</tr>
<tr>
<td>Synthesize the best evidence.</td>
<td>February 2017</td>
</tr>
<tr>
<td>Assess feasibility, benefits, and risks of new practice.</td>
<td>March 2017</td>
</tr>
<tr>
<td><strong>Step 4: Design practice change.</strong></td>
<td></td>
</tr>
<tr>
<td>Define proposed change. Defend proposal. IRB application</td>
<td>March-May 2017</td>
</tr>
<tr>
<td>Identify needed resources.</td>
<td>October 2016</td>
</tr>
<tr>
<td>Design the evaluation of the pilot.</td>
<td>November 2016</td>
</tr>
<tr>
<td>Design the implementation plan.</td>
<td>October 2016</td>
</tr>
<tr>
<td>Create staff education modules for supporting breastfeeding in opioid dependent postpartum women</td>
<td>December 2016</td>
</tr>
<tr>
<td><strong>Step 5: Implement and evaluate change in practice.</strong></td>
<td></td>
</tr>
<tr>
<td>Implement evidence based practice change.</td>
<td>June 2017</td>
</tr>
<tr>
<td>Evaluate processes, outcomes, and costs.</td>
<td>August 2017</td>
</tr>
<tr>
<td>Develop conclusions and recommendations.</td>
<td>November 2017</td>
</tr>
<tr>
<td><strong>Step 6: Integrate and maintain change in practice.</strong></td>
<td></td>
</tr>
<tr>
<td>Communicate outcomes to stakeholders.</td>
<td>July 2017</td>
</tr>
<tr>
<td>Integrate into standards of practice.</td>
<td>November 2017</td>
</tr>
<tr>
<td>Monitor process and outcomes periodically.</td>
<td>July-August 2017</td>
</tr>
<tr>
<td>Final defense of project and Graduation</td>
<td>November-December 2017</td>
</tr>
</tbody>
</table>
Protection of patient privacy and confidentiality was assured through use of unique assigned recording identifiers during data collection from maternal newborn electronic health records (EHR). The identifiers that were used were N001, N002, N003, etc. The EHR’s were archived on a secure intranet server and data collection was conducted in a private and secure location provided by Firelands Regional Medical Center (FRMC). De-identified data was recorded using an Excel® spreadsheet. Outcomes were analyzed and reported as aggregate data. All accumulated information was stored in a locked file cabinet within the FRMC Director of Quality office. The student investigator was the only individual to have access to the data and codes.

**Method of Outcomes Measured**

Evaluation of the outcome measures are an essential step in an EBP project. This project’s primary outcome evaluation measures included staff knowledge and comfort level regarding breastfeeding guidelines for opioid dependent women in MAT. The secondary outcomes measured were NAS scores, pharmacological treatments needed by the neonates with NAS, and the neonates’ LOS in the hospital.

**Staff Knowledge and Comfort.** The outcome variable of staff knowledge and comfort was calculated using a pre and post program questionnaire. Each program participant’s knowledge was measured pre and post implementation of the CE program. The questionnaire is comprised of five questions. The first four questions ask specific questions designed to evaluate a person’s understanding of basic knowledge of NAS. Question 1 asked if a woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed. Question 2 asked if a woman who is on a high treatment (methadone or buprenorphine) dosage should not be permitted to breastfeed. Question 3 asked if a woman should relapse to illegal
drug use, when should she stop breastfeeding. Question 4 asked what symptoms a neonate exposed to opioid during a pregnancy is at risk for developing. The fifth question was a personal comfort scale in recommending breastfeeding in the MAT population. Participants to rate their comfort level in recommending breastfeeding in the MAT population by making an “X” on a 10 centimeter line. Program participants were also asked to identify demographics of work location (inpatient or outpatient) and gender (female or male). The questionnaire was given prior to the start of the CE program and then 30 days following the CE program. The questionnaire was reviewed for accuracy of content by the project leader and two maternal child experts.

Program participants completed a CE program evaluation following the education session. The evaluation provided each participant questions to reflect on the CE program. Questions included as a result of the presentation were: what concepts will you take back to your practice setting; was the information presented clearly; were teaching methods effective; was the presentation without bias; general comments; and future program requests.

The secondary outcome measures of NAS scores, pharmacological treatments needed by the neonates with NAS, and the neonates’ LOS in the hospital as well as demographic data from neonates identified as being assessed for NAS were extracted from maternal newborn EHR’s at FRMC.

**NAS Score.** Assessment of NAS is essential for calculating the severity of NAS signs and symptoms and guiding subsequent treatment. Several different instruments are available for evaluation of NAS. The Finnegan Scoring System and The Lipsitz Scoring Tool are the most commonly used instruments that identify the severity of withdrawal (WHO, 2014). Both NAS assessment tools have documented reliability (Orlando, 2014). The Finnegan’s Neonatal Abstinence Scoring Tool (FNAST) is the tool currently used at CWNFRMC. The FNAST is a
comprehensive scoring system that measures the most common signs and symptoms associated with opioid exposure in neonates. The tool includes 21 assessment items that examine for disturbances of the central nervous system, as well as metabolic, vasomotor, respiratory, and gastrointestinal systems. The FNAST is completed every three to four hours and guides subsequent non-pharmacologic and pharmacological treatment regimens (Orlando, 2014).

Essential to using the FNAST is developing inter-rater reliability or consistency. In order to develop consistency, the users need to be trained by an expert rater. Prior to project implementation, healthcare providers attended a CE program in 2016 by an expert rater which included the science behind the etiology of NAS symptoms and how to complete an assessment of neonates with NAS (D’Apolito & Finnegan, 2010). The FNAST tool and guidelines from scoring can be viewed in Appendix U.

**Treatment.** Evaluating non-pharmacological and pharmacological treatments included the type of treatment needed, the number of times the neonate needed treatment, and the total number of treatment needed for NAS management throughout hospitalization.

**LOS.** Neonate length of hospitalization was evaluated using data in the patient EHR.

**Data Collection**

A retrospective chart review was used to extrapolate data from the neonatal EHR. Data abstracted from neonatal EHR included: Neonatal Abstinence Scores from the FNAST; infant feeding method; length of hospitalization for treatment of NAS; amount of pharmacological treatment needed for NAS; maternal age; gravida and parity of the mother; method of delivery; illicit drug type, amount, and frequency used during pregnancy; marital status, race, type of treatments received during pregnancy (methadone or buprenorphine), and attendance in childbirth preparation and lactation education classes. The data collection process and tools are
presented in Table 4. SPSS 24® Statistical Analysis Program was utilized to generate descriptive statistics and analyze data with consultation from a University of Toledo statistician.

Table 4.

*Data Collection Process and Tools*

<table>
<thead>
<tr>
<th>Evaluation Component</th>
<th>Measurement Approach</th>
</tr>
</thead>
</table>
| Staff knowledge                             | • Pre and post-test knowledge (30 days post education).  
|                                             | • Attendance of CE presentation.                                                                                                                      |
| Neonatal Abstinence Score (NAS)             | • Inter-rater reliability through inter-observer reliability agreement chart (for staff completing the Finnegan Scoring Tool).  
|                                             | • EHR review May through October 2017.                                                                                                               |
| Infant sneezing, yawning, and feeding method and amount | • Part of Finnegan Neonatal Abstinence Scoring system.  
|                                             | • How infant is feeding (breast, breastmilk through bottle, formula, or combination).  
|                                             | • How often infant is feeding.  
|                                             | • How infant will be fed after discharged home.  
|                                             | • EHR review May through October 2017.                                                                                                               |
| Length of hospitalization for infant        | • EHR review May through October 2017.                                                                                                               |
| Treatment for NAS                           | • Type, number of times treatment needed, amount of treatment for NAS scores.  
|                                             | • EHR review May through October 2017.                                                                                                               |
| Number of women reported using illicit drugs or having a positive drug screen at delivery | • Age, G/P, method of delivery, type of illicit drug, amount and frequency of use during pregnancy, marital status, race, childbirth preparation class attendance, lactation education.  
| Number of women in treatment programs receiving treatment for opioid dependency at delivery | • EHR review May through October 2017.                                                                                                               |
|                                             | • Age, G/P, method of delivery, type of illicit drug amount and frequency of use during pregnancy, treatment received during pregnancy (methadone, buprenorphine, or other), marital status, race, childbirth preparation class attendance, lactation education.  
|                                             | • EHR review May through October 2017.                                                                                                               |
Step 5 of Model: Implement and Evaluate Practice Change

Implementation Process

Implementation of the project was based upon receiving IRB approval from FRMC, University of Toledo, and permission from The Erie County Health Department, Family Health Services of Erie County, and NOMS Obstetrics & Gynecology. Development, approval, and implementation of a new practice guideline on breastfeeding guidelines for opioid dependent postpartum women was completed on June 1st, 2017 at CWNFRMC.

The CE program was provided to the four participating agencies over a three-week period in May 2017. The CE programs were held at predetermined dates and times based on each participating agency’s needs. The program was presented at each of the participating agency’s sites lasting the designated 30 minutes. A total of 133 individuals attended the CE program. Participants completed the five item questionnaire prior to the project leader’s introduction and presentation. The questionnaires were placed in an envelope by each participant. At the end of each presentation, the project leader answered questions raised by the program participants. After all questions were answered, program participants completed the end of program evaluation and received a CE certificate of completion.

Thirty days following the program, CE participants completed the same five item questionnaire. The post-education questionnaire was emailed to the program participants via an anonymous online survey software program. Up to three reminder emails were sent through the online survey software program to encourage survey completion. The post-education questionnaire was available to the program participants for a total of two weeks via the anonymous online survey software program.
After the practice guidelines and staff education was completed, pre-implementation and post-implementation retrospective chart reviews for neonates identified as being assessed for NAS during 2016 through October 2017 were completed. The post-implementation retrospective chart review data was compared and analyzed to data from a pre-implementation retrospective chart review from 2016 through October 2017. Outcome measures of NAS scores, pharmacological treatments needed by the neonates with NAS, and the neonates’ LOS in the hospital as well as demographic data were extracted from maternal newborn EHR’s at FRMC.

Evaluation of Implementation

Data Analysis. Descriptive statistics were used to analyze the outcome data collected. Data collected were entered into SPSS 24® Statistical Analysis Program. A pretest and posttest design was employed to identify the overall effectiveness of the education provided on knowledge gained and personal attitude changes. The education was provided in the same manner for each participating agency. All groups were given the pre and post questionnaire survey.

The demographic data from CE program participants was analyzed using the SPSS 24® descriptive analysis to create frequency tables in regards to gender and work location (inpatient or outpatient) of each program participant. The pre and post questionnaire survey questions one, two, three, and four were examined using the chi-square test for independence and question five was examined using the Mann-Whitney $U$ test. A significance level of $p < 0.05$ was utilized. A chi-square test for independence is used to examine relationships between groups (Polit & Beck, 2012). A Mann-Whitney $U$ test is a non-parametric test used to examine if two sample means are equal (Polit & Beck, 2012).
The demographic data from maternal newborn EHR’s were analyzed using the SPSS 24® descriptive analysis to create frequency tables in regards to the NAS scores from the FNAST; infant feeding method; length of hospitalization for treatment of NAS; amount of pharmacological treatment needed for NAS; maternal age; gravida and parity of the mother; method of delivery; illicit drug type, amount, and frequency used during pregnancy, marital status, race, type of treatments received during pregnancy (methadone or buprenorphine), and attendance in childbirth preparation and lactation education classes. One-way analysis of variance (ANOVA) was utilized to determine statistical significant difference between feeding method, length of hospitalization, NAS scores, and amount of pharmacological treatment needed for NAS. An ANOVA was used to test for differences between group means (Polit & Beck, 2012).

**Project Results**

**CE Program Participant Demographics.** Demographic data of CE program participants is summarized in Table 5. The combined sample of participants receiving education for all four settings consisted of 133 participants of which 91% \((n=121)\) were female and 9% \((n=12)\) were male. The majority of participants worked primarily in the outpatient setting \((n=100, 75.2\%)\). Demographic of CE participants is shown in Table 5.

**Assessment of Pre and Post Questionnaire.** The knowledge of program participants was tested using a 5-question questionnaire pre and post implementation. The first four questions were a true or false or multiple choice selection designed to evaluate understanding of basic knowledge of NAS and a woman’s ability to breastfeeding while in a MAT program. The fifth question was a personal comfort scale in recommending breastfeeding in the MAT population. Participants to rate their comfort level in recommending breastfeeding in the MAT population by
Table 5.

Demographic Characteristics for CE Program Participants.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Participants in the Program (N=133)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient</td>
<td></td>
</tr>
<tr>
<td>Erie County Health Department</td>
<td>(n = 100) (75.2%)</td>
</tr>
<tr>
<td>Family Health Services</td>
<td>(n = 77) (57.9%)</td>
</tr>
<tr>
<td>NOMS OB/GYN</td>
<td>(n = 10) (7.5%)</td>
</tr>
<tr>
<td>Inpatient FRMC</td>
<td>(n = 33) (24.8%)</td>
</tr>
</tbody>
</table>

Gender Total

<table>
<thead>
<tr>
<th>Gender</th>
<th>(n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>121</td>
<td>91%</td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>9%</td>
</tr>
</tbody>
</table>

Gender Outpatient

<table>
<thead>
<tr>
<th>Erie County Health Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Health Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOMS OB/GYN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender Inpatient FRMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

making an “X” on a 10 centimeter line. Outcomes are presented in tables and are further expanded on in narrative form. The questions were separated into two themes based on NAS knowledge and personal feelings of comfort in recommending breastfeeding in the MAT population. The primary intent of this EBP project was whether maternal newborn care staff knowledge and personal comfort scores increased after attending the CE program. The secondary intent was whether inpatient maternal newborn care staff knowledge and personal comfort scores were rated higher as compared to the outpatient maternal newborn care staff’s knowledge and personal comfort scores.
Knowledge of NAS and Breastfeeding. Question 1 asked participants to state “true” or “false” for “A woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed?” A chi-square test of independence was performed to examine the relationship between the pre and post scores of the inpatient and outpatient groups combined scores. The relation between these variables was statistically significant, $\chi^2 (1, N = 257) = 76.01, p < .000$. Maternal newborn care staff answered question 1 correctly at a higher rate after the CE program. Table 6 provides a comparison of the pre and post questionnaire scores.

Table 6

Knowledge Questionnaire Conclusions for Question 1 Combined Scores.

<table>
<thead>
<tr>
<th>Question 1: A woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed?</th>
<th>N=133 (%) Pre</th>
<th>N=124 (%) Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>True (Correct)</td>
<td>n=67 (50.4%)</td>
<td>n=122 (98.4%)</td>
</tr>
<tr>
<td>False</td>
<td>n=66 (49.6%)</td>
<td>n=2 (1.6%)</td>
</tr>
</tbody>
</table>

A chi-square test of independence was performed to examine the relationship between the pre and post scores of the individual inpatient and outpatient group’s answer to Question 1. The relation between these variables was statistically significant, inpatient group’s scores $\chi^2 (1, N = 65) = 7.60, p < .006$ and outpatient group’s scores $\chi^2 (1, N = 192) = 71.38, p < .000$. Maternal newborn care staff answered Question 1 correctly at a higher rate after the CE program. Inpatient staff answered Question 1 at a higher rate (78.8% pre, 100% post) than the outpatient staff (41% pre, 97.8% post) both pre and post program. Table 7 provides a comparison of the pre and post Questionnaire scores for both the inpatient and outpatient groups.

Question 2 asked participants to state “true” or “false” for “A woman who is on a high treatment (methadone or buprenorphine) dosage should not be permitted to breastfeed?” A chi-square test of independence was performed to examine the relationship between the pre and post scores of the individual inpatient and outpatient group’s answer to Question 2. The relation between these variables was statistically significant, inpatient group’s scores $\chi^2 (1, N = 65) = 7.60, p < .006$ and outpatient group’s scores $\chi^2 (1, N = 192) = 71.38, p < .000$. Maternal newborn care staff answered Question 2 correctly at a higher rate after the CE program. Inpatient staff answered Question 2 at a higher rate (35.3% pre, 100% post) than the outpatient staff (22% pre, 99.5% post) both pre and post program. Table 8 provides a comparison of the pre and post Questionnaire scores for both the inpatient and outpatient groups.
Table 7

Knowledge Questionnaire Conclusions for Question 1 Separated Scores.

**Question 1:** A woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed?

<table>
<thead>
<tr>
<th></th>
<th>Inpatient</th>
<th>N=33 (%)</th>
<th>Post</th>
<th>N=32 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>True (Correct)</td>
<td>n=26 (78.8%)</td>
<td>n=32 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False</td>
<td>n=7 (21.2%)</td>
<td>n=0 (0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Outpatient</th>
<th>N=100 (%)</th>
<th>Post</th>
<th>N=92 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>True (Correct)</td>
<td>n=41 (41%)</td>
<td>n=90 (97.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False</td>
<td>n=59 (59%)</td>
<td>n=2 (2.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

scores of the inpatient and outpatient groups combined scores. The relation between these variables was statistically significant, \( \chi^2 (1, N = 257) = 82.68, p < .000 \). Maternal newborn care staff answered Question 2 correctly at a higher rate after the CE program. Table 8 provides a comparison of the pre and post questionnaire scores.

Table 8

Knowledge Questionnaire Conclusions for Question 2 Combined Scores.

**Question 2:** A woman who is on a high treatment (methadone or buprenorphine) dosage should not breastfeed?

<table>
<thead>
<tr>
<th></th>
<th>Combined</th>
<th>N=133 (%)</th>
<th>Post</th>
<th>N=124 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>True</td>
<td>n=89 (66.9%)</td>
<td>n=14 (11.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False (Correct)</td>
<td>n=44 (33.1%)</td>
<td>n=110 (88.7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A chi-square test of independence was performed to examine the relationship between the pre and post scores of the individual inpatient and outpatient group’s answer to Question 2. The relation between these variables was statistically significant, inpatient group’s scores \( \chi^2 (1, N = 65) = 14.27, p < .000 \) and outpatient group’s scores \( \chi^2 (1, N = 192) = 73.36, p < .000 \). Maternal newborn care staff answered question 2 correctly at a higher rate after the CE program. Inpatient staff answered Question 2 at a higher rate (63.6% pre, 100% post) than the outpatient staff (23%
pre, 84.8% post) both pre and post program. Table 9 provides a comparison of the pre and post questionnaire scores for both the inpatient and outpatient groups.

Table 9

Knowledge Questionnaire Conclusions for Question 2 Separated Scores.

<table>
<thead>
<tr>
<th>Question 2: A woman who is on a high treatment (methadone or buprenorphine) dosage should not breastfeed?</th>
<th>Inpatient</th>
<th></th>
<th>Outpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=33 (%) Pre</td>
<td>N=32 (%) Post</td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>n=12 (36.4%)</td>
<td>n=0 (0%)</td>
<td></td>
</tr>
<tr>
<td>False (Correct)</td>
<td>n=21 (63.6%)</td>
<td>n=32 (100%)</td>
<td></td>
</tr>
<tr>
<td>N=100 (%) Pre</td>
<td>N=92 (%) Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>n=77 (77%)</td>
<td>n=14 (15.2%)</td>
<td></td>
</tr>
<tr>
<td>False (Correct)</td>
<td>n=23 (23%)</td>
<td>n=78 (84.8%)</td>
<td></td>
</tr>
</tbody>
</table>

Question 3 asked “A woman who relapses back to illegal drug use, should stop breastfeeding when?” A chi-square test of independence was performed to examine the relationship between the pre and post scores of the inpatient and outpatient groups combined scores. The relation between these variables was statistically significant, \( \chi^2 (1, N=257) = 13.19, p < .001 \). Maternal newborn care staff answered Question 3 correctly at a higher rate after the CE program. Table 10 provides a comparison of the pre and post questionnaire scores.

Table 10

Knowledge Questionnaire Conclusions for Question 3 Combined Scores.

<table>
<thead>
<tr>
<th>Question 3: A woman who relapses back to illegal drug use should stop breastfeeding:</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=133 (%) Pre</td>
</tr>
<tr>
<td>a) gradually over 3-5 days</td>
<td>n=17 (12.8%)</td>
</tr>
<tr>
<td>b) gradually over 2-4 days</td>
<td>n=13 (9.8%)</td>
</tr>
<tr>
<td>c) immediately (Correct)</td>
<td>n=95 (71.4%)</td>
</tr>
<tr>
<td>d) it is not necessary to stop</td>
<td>n=8 (6%)</td>
</tr>
<tr>
<td>Correct</td>
<td>n=95 (71.4%)</td>
</tr>
<tr>
<td>Incorrect</td>
<td>n=38 (28.6%)</td>
</tr>
</tbody>
</table>
A chi-square test of independence was performed to examine the relationship between the pre and post scores of the individual inpatient and outpatient group’s answer to Question 3. The relation between these variables was statistically significant for inpatient group’s scores $\chi^2 (1, N = 65) = 20.58, \ p < .000$. The relation between these variables was not statistically significant for outpatient group’s scores $\chi^2 (1, N = 192) = 1.99, \ p < .158$. Maternal newborn care staff answered Question 3 correctly at a higher rate after the CE program. Outpatient staff answered Question 3 at a higher rate (78%) pre-program than the inpatient staff (51.5%). Inpatient staff answered Question 3 at a higher rate (100%) post-program than the outpatient staff (79%). Table 11 provides a comparison of the pre and post questionnaire scores for both the inpatient and outpatient groups.

Table 11

Knowledge Questionnaire Conclusions for Question 3 Separated Scores.

| Question 3: A woman who relapses back to illegal drug use should stop breastfeeding: | Inpatient | | Outpatient |
|---|---|---|
| | N=33 (%) Pre | N=32 (%) Post | N=100 (%) Pre | N=92 (%) Post |
| a) gradually over 3-5 days | n=6 (18.2%) | n=0 (0%) | n=11 (11%) | n=3 (3.3%) |
| b) gradually over 2-4 days | n=4 (12.1%) | n=0 (0%) | n=9 (9%) | n=4 (4.3%) |
| c) immediately (Correct) | n=17 (51.5%) | n=32 (100%) | n=78 (78%) | n=79 (85.9%) |
| d) it is not necessary to stop | n=6 (18.2%) | n=0 (0%) | n=2 (2%) | n=6 (6.5%) |
| Correct | n=17 (51.5%) | n=32 (100%) | n=78 (78%) | n=79 (85.9%) |
| Incorrect | n=16 (48.5%) | n=0 (0%) | n=22 (22%) | n=13 (14.1%) |
Question 4 asked “Neonate exposed to opioids during pregnancy are at high risk for developing what?” A chi-square test of independence was performed to examine the relationship between the pre and post scores of the inpatient and outpatient groups combined scores. The relation between these variables was statistically significant, $\chi^2 (1, N = 257) = 25.48, p < .000$. Maternal newborn care staff answered Question 4 correctly at a higher rate after the CE program. Table 12 provides a comparison of the pre and post questionnaire scores.

A chi-square test of independence was performed to examine the relationship between the pre and post scores of the individual inpatient and outpatient group’s answer to Question 4. The relation between these variables was not statistically significant for the inpatient group’s scores $\chi^2 (1, N = 65) = 2.14, p < .143$. The relation between these variables was statistically significant for the outpatient group’s scores $\chi^2 (1, N = 192) = 24.07, p < .000$. Maternal newborn care staff answered Question 4 correctly at a higher rate after the CE program. Inpatient staff answered Question 4 at a higher rate (81.8% pre, 93.8% post) than the outpatient staff (56% pre, 88% post) both pre and post program. Table 13 provides a comparison of the pre and post questionnaire scores for both the inpatient and outpatient groups.
Question 5 requested participants to rate their comfort level in recommending breastfeeding in the MAT population by making an “X” on a 10 centimeter line. The visual analog scale was anchored by “not at all” for “0” and “completely” for “10”. A metric ruler was used to determine the comfort level for each participant and recorded as actual placement of “X” on the line. A Mann-Whitney U test was conducted to evaluate whether maternal newborn care staff increased personal comfort scores after attending the CE program. The secondary area of intent was whether inpatient maternal newborn care staff increased personal comfort scores as compared to the outpatient maternal newborn care staff’s knowledge and personal comfort scores.

Comfort level ratings for both inpatient and outpatient pre questionnaire and post questionnaire were evaluated. The results of the Mann-Whitney test indicate that the comfort

Table 13

Knowledge Questionnaire Conclusions for Question 4 Separated Scores.

| Question 4: Neonates exposed to drugs during pregnancy are high risk for developing: | Inpatient | | | Outpatient |
|---|---|---|---|
| | N=33 (%) Pre | N=32 (%) Post | N=100 (%) Pre | N=92 (%) Post |
| a) newborn asphyxia syndrome (NAS) | n=1 (3%) | n=1 (3.1%) | n=5 (5%) | n=6 (6.5%) |
| b) neonatal abstinence syndrome (NAS) (Correct) | n=27 (81.8%) | n=30 (93.8%) | n=57 (57%) | n=81 (88%) |
| c) newborn drug dependence (NDD) | n=5 (15.2%) | n=1 (3.1%) | n=37 (37%) | n=5 (5.4%) |
| d) no risk for complications | n=0 (0%) | n=0 (0%) | n=1 (1%) | n=0 (0%) |
| Correct | n=27 (81.8%) | n=30 (93.8%) | n=56 (56%) | n=81 (88%) |
| Incorrect | n=6 (18.2%) | n=2 (6.3%) | n=44 (44%) | n=11 (12%) |
level ratings were greater in the post questionnaires (mean rank= 173.97, N= 124) than on the pre questionnaires (mean rank= 87.08, N= 133), U= 2670.00, z= -9.42, p < .000, two tailed. Table 14 provides the descriptive statistics of the pre and post questionnaire comfort level ratings for the combined inpatient and outpatient groups.

Table 14

**Comfort Level Rating Combined.**

<table>
<thead>
<tr>
<th>Question 5: Comfort level rating in recommending breastfeeding.</th>
<th>Pre (N=133)</th>
<th>Post (N=124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.71</td>
<td>7.16</td>
</tr>
<tr>
<td>Mean rank</td>
<td>87.08</td>
<td>173.97</td>
</tr>
<tr>
<td>Median</td>
<td>1.50</td>
<td>8.00</td>
</tr>
<tr>
<td>SD</td>
<td>3.06</td>
<td>2.98</td>
</tr>
</tbody>
</table>

Comfort level ratings for the inpatient pre questionnaire and post questionnaire were evaluated. The results of the Mann-Whitney test indicate that the comfort level ratings were significantly greater on the post questionnaires (mean rank= 43.73, N= 32) than on the pre questionnaires (mean rank= 22.59, N= 33), U= 184.50, z= -4.53, p < .000, two tailed. Table 15 provides descriptive statistics of the pre and post questionnaire comfort level ratings for the inpatient group.

Table 15

**Comfort Level Rating Inpatient.**

<table>
<thead>
<tr>
<th>Question 5: Comfort level rating in recommending breastfeeding.</th>
<th>Pre (N=33)</th>
<th>Post (N=32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.53</td>
<td>8.20</td>
</tr>
<tr>
<td>Mean rank</td>
<td>22.59</td>
<td>43.73</td>
</tr>
<tr>
<td>Median</td>
<td>4.50</td>
<td>9.00</td>
</tr>
<tr>
<td>SD</td>
<td>3.05</td>
<td>2.05</td>
</tr>
</tbody>
</table>
Comfort level ratings for the outpatient pre questionnaire and post questionnaire were evaluated. The results of the Mann-Whitney test indicate that the comfort level ratings were significantly greater on the post questionnaires (mean rank= 131.72, N=92) than on the pre questionnaires (mean rank= 64.10, N=100), U= 1360.00, z= -8.49, p < .000, two tailed. Table 16 provides descriptive statistics of the pre and post questionnaire comfort level ratings for the outpatient group.

Table 16

**Comfort Level Rating Outpatient.**

<table>
<thead>
<tr>
<th>Question 5: Comfort level rating in recommending breastfeeding.</th>
<th>Pre (N=100)</th>
<th>Post (N=92)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.12</td>
<td>6.80</td>
</tr>
<tr>
<td>Mean rank</td>
<td>64.10</td>
<td>131.72</td>
</tr>
<tr>
<td>Median</td>
<td>1.00</td>
<td>8.00</td>
</tr>
<tr>
<td>SD</td>
<td>2.83</td>
<td>3.17</td>
</tr>
</tbody>
</table>

A Mann-Whitney *U* test was conducted to determine if inpatient maternal newborn care staff have increased personal comfort scores as compared to the outpatient maternal newborn care staff’s personal comfort scores. The results of the Mann-Whitney test indicate that the comfort level ratings were significantly greater for the inpatient maternal newborn care staff (mean rank= 157.82, N= 65) than the outpatient maternal newborn care staff’s personal comfort scores (mean rank= 119.24, N= 192), U= 4367.00, z= -3.63, p < .000, two tailed.

**NAS Demographics.** A total of 731 births occurred in 2016 and a total of 617 in 2017 during the timeframe of the project. The combined sample of neonates identified as being assessed for NAS at the CWNFRMC consisted of 15 from 2016 and 21 from 2017. Of the 21 charts assessed from 2017, nine were reviewed as part of the post-implementation phase of this EBP project.
The maternal age of the 2016 group ranged from 23 to 35 years \((N=15, M=29.67, SD 3.55)\). Gravity ranged from one to seven \((M=3.53, SD 1.88)\). Parity ranged from zero to four \((M=1.80, SD 1.47)\). Eight (66.7%) delivered vaginally and four (33.3%) delivered via cesarean. Ten mothers (66.7%) were single; five (33.3%) were married; and one was married but separated (2.8%). All mothers were Caucasian. On admission for delivery three (20%) women in MAT reported taking prescribed buprenorphine. On admission for delivery of the women not in MAT, two (13.3%) women reported taking prescribed opioids; six (40%) reported taking unprescribed opioids; and four (26.7%) reported taking heroin. None of the mothers reported attending childbirth preparation class or lactation education.

The maternal age of the pre-implementation 2017 group ranged from 23 to 34 years \((N=12, M=28, SD 3.56)\). Gravity ranged from one to eight \((M=2.75, SD 1.91)\). Parity ranged from zero to two \((M=1.08, SD .90)\). Eight (66.7%) delivered vaginally and four (33.3%) delivered via cesarean. Eleven mothers (91.7%) were single; and one (8.3%) was married. Eleven (91.7%) mothers were Caucasian and one (8.3%) was African American. Maternal drug type reported on admission consisted of six (50%) women in MAT reported taking prescribed buprenorphine; one (8.3%) women not in MAT reported taking unprescribed buprenorphine; three (25%) women not in MAT reported taking unprescribed opioids; one (8.3%) women reported taking heroin; and one (8.3%) women not in MAT reported taking a combination of buprenorphine and heroin. No mothers reported attending childbirth preparation class or lactation education.

The maternal age of the post-implementation 2017 group ranged from 23 to 36 years \((N=9, M=27.67, SD 3.841)\). Gravity ranged from one to six \((M=3.78, SD 1.922)\). Parity ranged from zero to four \((M=1.89, SD 1.269)\). Seven (77.8%) delivered vaginally and two (22.2%)
delivered via cesarean. Five mothers (55.6%) were single; three (33.3%) were married; and one (11.1%) was married but separated. All mothers were Caucasian. Maternal drug use reported on admission consisted of two (22.2%) women reported taking prescribed buprenorphine; three (33.3%) women reported taking unprescribed opioids; three (33.3%) women reported taking heroin; and one (11.1%) women reported taking a combination of buprenorphine and heroin. No mothers reported attending childbirth preparation class or lactation education. Demographic data for the mothers of neonates identified as being assessed for NAS during 2016 and NAS pre and post-implementation during 2017 is summarized in Table 17.

**NAS Scores.** In 2016, a total of nine (60%) neonates were formula fed and six (40%) were breastfed. Combined initial NAS scores ranged from zero to 15 ($M=3.20, SD 4.16$). NAS scores at 48 hours ranged from zero to nine ($M=3.00, SD 2.56$). NAS scores at 72 hours ranged from one to eight ($M=3.00, SD 3.36$). The highest recorded NAS scores ranged from one to 15 ($M=5.47, SD 3.60$). Formula fed neonates had a mean NAS score of 6.22 (SD 4.38) compared to breastmilk fed neonates mean NAS score of 4.33 (SD 1.75). A total of 10 (83.3%) neonates were formula fed and two (16.7%) were fed a combination of formula and breastmilk in the pre-implementation 2017 period. Combined initial NAS scores ranged from zero to nine ($M=2.67, SD 2.83$). NAS scores at 48 hours ranged from zero to nine ($M=4.25, SD 2.59$). NAS scores at 72 hours ranged from zero to six ($M=3.08, SD 1.88$). The highest recorded NAS scores ranged from two to 10 ($M=6.58, SD 2.42$). Formula fed neonates had a mean NAS score of 6.80 (SD 2.61) compared to breastmilk fed neonates mean NAS score of 5.50 (SD .70).

A total of seven (77.8%) neonates were formula fed and two (22.2%) were breast fed in the post-implementation 2017 period. Combined initial NAS scores ranged from zero to five
Table 17

Summary of Maternal Demographics.

<table>
<thead>
<tr>
<th></th>
<th>2016 (N= 15)</th>
<th>Pre-implementation 2017 (N= 12)</th>
<th>2017 (N= 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>29.67 (SD 3.55)</td>
<td>28 (SD 3.56)</td>
<td>27.67 (SD 3.84)</td>
</tr>
<tr>
<td>Gravida</td>
<td>3.53 (SD 1.88)</td>
<td>2.75 (SD 1.91)</td>
<td>3.78 (SD 1.92)</td>
</tr>
<tr>
<td>Parity</td>
<td>1.80 (SD 1.47)</td>
<td>1.08 (SD .90)</td>
<td>1.89 (SD 1.26)</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>Vaginal: 8 (66.7%)</td>
<td>Vaginally: 8 (66.7%)</td>
<td>Vaginally: 7 (77.8%)</td>
</tr>
<tr>
<td></td>
<td>Cesarean: 4 (33.3%)</td>
<td>Cesarean: 4 (33.3%)</td>
<td>Cesarean: 2 (22.2%)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single: 10 (66.7%)</td>
<td>Single: 11 (91.7%)</td>
<td>Single: 5 (55.6%)</td>
</tr>
<tr>
<td></td>
<td>Married: 5 (33.3%)</td>
<td>Married: 1 (8.3%)</td>
<td>Married: 3 (33.3%)</td>
</tr>
<tr>
<td></td>
<td>Separated: 1 (2.8%)</td>
<td></td>
<td>Separated: 1 (11.1%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Caucasian: 15 (100%)</td>
<td>Caucasian: 11 (91.7%)</td>
<td>Caucasian: 9 (100%)</td>
</tr>
<tr>
<td></td>
<td>African American: 1 (8.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug type at delivery</td>
<td>PB: 3 (20%)</td>
<td>PB: 6 (50%)</td>
<td>PB: 2 (22.2%)</td>
</tr>
<tr>
<td></td>
<td>UO: 6 (40%)</td>
<td>UO: 3 (25%)</td>
<td>UO: 3 (33.3%)</td>
</tr>
<tr>
<td></td>
<td>PO: 2 (13.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heroin: 4 (26.7%)</td>
<td>Heroin: 1 (8.3%)</td>
<td>Heroin: 3 (33.3%)</td>
</tr>
<tr>
<td></td>
<td>CBH: 1 (8.3%)</td>
<td>CBH: 1 (8.3%)</td>
<td>CBH: 1 (11.1%)</td>
</tr>
</tbody>
</table>

PB= Prescribed buprenorphine; UB= Unprescribed buprenorphine; UO= Unprescribed opioids; PO= Prescribed opioids; CBH= Combination buprenorphine & Heroin

\(M=1.89, \text{SD} 1.76\). NAS scores at 48 hours ranged from three to 13 \((M=6.43, \text{SD} 3.50)\). NAS scores at 72 hours ranged from one to nine \((M=5.00, \text{SD} 2.38)\). The highest recorded NAS scores ranged from two to 13 \((M=7.44, \text{SD} 3.50)\). Formula fed neonates had a mean NAS score of 8.00 (SD 3.26) compared to breastmilk fed neonates mean NAS score of 5.50 (SD 4.95). Data from NAS assessments is summarized in Table 18.

One-way analysis of variance (ANOVA) was conducted to explore the impact of feeding method on NAS scores. Neonates were divided into two groups according to their feeding
Table 18

Summary of NAS Scores.

<table>
<thead>
<tr>
<th></th>
<th>2016 (N=15)</th>
<th>Pre-implementation 2017 (N=12)</th>
<th>Post-implementation 2017 (N=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Formula NAS</td>
<td>Breastmilk NAS (N=6)</td>
<td>Formula NAS (N=9)</td>
</tr>
<tr>
<td>Mean</td>
<td>6.22</td>
<td>4.33</td>
<td>6.80</td>
</tr>
<tr>
<td>Median</td>
<td>5.00</td>
<td>4.50</td>
<td>7.00</td>
</tr>
<tr>
<td>SD</td>
<td>4.38</td>
<td>1.75</td>
<td>2.61</td>
</tr>
</tbody>
</table>

...method (Formula and Breastmilk). There was no statistically significant difference at the p < .05 level for either group due to the small and uneven sample sizes.

**Treatment.** In 2016, one (6.7%) neonate received morphine; one (6.7%) neonate received sucrose water; and 13 neonates received no treatment for NAS symptoms. The total number of combined doses of morphine ranged from zero to 111 (M=7.80, SD 28.59). Formula fed neonates had a range of zero to 111 (M=13.00, SD 36.80) number of morphine doses compared to breastmilk fed neonates had no treatment with morphine (M=0, SD .00).

A total of four (33.3%) neonates received morphine, one (8.3%) neonate received sucrose water, and seven (58.3%) neonates received no treatment for NAS symptoms in the pre-implementation 2017 period. The total number of combined doses of morphine ranged from zero to 80 (M=23.00, SD 33.68). Formula fed neonates had a range of zero to 80 (M= 27.10, SD 35.68) number of morphine doses compared to breastmilk fed neonates range of zero to five (M=2.50, SD 3.53) number of morphine doses.

A total of six (66.7%) neonates received morphine and three (33.3%) neonates received no treatment for NAS symptoms in the post-implementation 2017 period. The total number of combined doses of morphine ranged from zero to 380 (M=67.67, SD 120.82). Formula fed
neonates had a range of zero to 380 ($M=83.14$, $SD=134.70$) number of morphine doses compared to breastmilk fed neonates had a range of zero to 26 ($M=13.50$, $SD=19.09$) number of morphine doses. Data from NAS treatments is summarized in Table 19.

One-way analysis of variance (ANOVA) was conducted to explore the impact of feeding method on pharmacological treatments needed for NAS. Neonates were divided into two groups according to their feeding method (Formula and Breastmilk). There was no statistically significant difference at the $p < .05$ level for either group due to the small and uneven sample sizes.

Table 19

*Summary of NAS Treatments.*

<table>
<thead>
<tr>
<th></th>
<th>2016 ($N=15$)</th>
<th>Pre-implementation 2017 ($N=12$)</th>
<th>Post-implementation 2017 ($N=12$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Formula Morphine Doses ($N=9$)</td>
<td>Breastmilk Morphine Doses ($N=6$)</td>
<td>Formula Morphine Doses ($N=10$)</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Min.</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Max</strong></td>
<td>111</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>13.00</td>
<td>.00</td>
<td>27.10</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>36.80</td>
<td>.00</td>
<td>35.68</td>
</tr>
</tbody>
</table>

**LOS.** The combined length of hospitalization in 2016 for neonates being assessed for NAS ranged from three to 18 days ($M=5.07$, $SD=3.82$). Formula fed neonates had a mean LOS of 6.00 ($SD=4.79$) compared to breastmilk fed neonates mean LOS of 3.67 ($SD=.51$).

The combined length of hospitalization in the pre-implementation 2017 period for neonates being assessed for NAS ranged from three to 26 days ($M=9.08$, $SD=6.90$). Formula fed
neonates had a mean LOS of 9.90 (SD 7.34) compared to breastmilk-fed neonates mean LOS of 5.00 (SD .00).

The combined length of hospitalization in the post-implementation 2017 period for neonates being assessed for NAS ranged from three to 50 days ($M=16.00$, SD 15.32). Formula-fed neonates had a mean LOS of 19.00 (SD 16.23) compared to breastmilk-fed neonates mean LOS of 5.50 (SD 3.53). Data from NAS LOS is summarized in Table 20.

One-way analysis of variance (ANOVA) was conducted to explore the impact of feeding method on hospital LOS. Neonates were divided into two groups according to their feeding method (Formula and Breastmilk). There was no statistically significant difference at the $p < .05$ level for either group due to the small and uneven sample sizes.

**CE End of Program Evaluation.** Program participants completed a CE program evaluation following the education session. The evaluation provided each participant questions to reflect on the CE program. Questions included as a result of the presentation were: what concepts will you take back to your practice setting; was the information presented clearly; were

<table>
<thead>
<tr>
<th></th>
<th>2016 (N=15)</th>
<th>Pre-implementation 2017 (N=12)</th>
<th>Post-implementation 2017 (N=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Formula LOS (N=9)</td>
<td>Breastmilk LOS (N=6)</td>
<td>Formula LOS (N=10)</td>
</tr>
<tr>
<td>Range</td>
<td>15</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Min.</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Max.</td>
<td>18</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>Mean</td>
<td>6.00</td>
<td>3.67</td>
<td>9.90</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td>4.00</td>
<td>6.50</td>
</tr>
<tr>
<td>SD</td>
<td>4.79</td>
<td>.51</td>
<td>7.34</td>
</tr>
</tbody>
</table>
teaching methods effective; was the presentation without bias; general comments; and future program requests. CE end of program evaluation summary is provided in Appendix V

**Costs**

Costs associated with caring for neonates with NAS has an immense impact at every level of care. Breastfeeding neonates who are at risk of NAS demonstrate a decrease in LOS, pharmacological treatment, and improved neonatal outcomes (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogley, 2014; Dryden, Young, Hepburn, & Mactier, 2008; Isemann, Meinzen-Derr, & Akinbi, 2011; Jansson et al., 2008; MacMullen, Duls, & Blobaum, 2014; Pritham, Paul, & Hayes, 2012; Welle-Strand et al., 2013). Local costs associated with implementation of the structured education and training for maternal newborn care staff in Erie County Ohio were primarily associated with project development and staff education, as projected in Appendix W.

The primary source of cost reduction and saving is a decrease in hospital LOS and pharmacological treatment. Findings from research suggest the potential decrease in LOS is an average of eight days when neonates with NAS receive breastmilk (Abdel-Latif et al., 2006; Isemann, Meinzen-Derr, & Akinbi, 2011; Pritham, & Hayes, 2012; Wachman et. al., 2015). The average daily cost at CWNFRMC for assessment and treatment of NAS in the special care nursery is $1,150 per day. Reducing the LOS by eight days, at a cost of $1,150 per day, could result in savings of approximately $10,097 per baby.

**Identified Barriers and Facilitators to Implementation**

Performing an organizational analysis that identifies facilitators and barriers is an important step in the change process. This task is the responsibility of the nurse leader; a DNP student served as champion for implementation of the EBP project. Facilitators and barriers to
implementation of this EBP project were identified. Both facilitators and barriers are comprised of similar categories: patient preferences, healthcare providers, and hospital policies.

**Identified Barriers.** The first barrier involved individual patient’s personal decision to breastfeed. Breastfeeding rates for women in MAT are lower than the general postpartum patient population (Balain & Johnson, 2014). Patient personal choice to breastfeed can be affected by lack of information of benefits of breastfeeding; unsupportive social environment; low socioeconomic status; lack of prenatal care; co-occurring mental health disorders such as depression and anxiety; and most importantly, difficulty in feeding the infant due to NAS behaviors. Due to lower breastfeeding rates in the MAT population, low sample size and variability, statistical significance of the projects secondary outcomes was unable to be generated.

The second barrier involved healthcare providers, both nurses and physicians. Many healthcare providers lack knowledge of the evidence that supports breastfeeding by opioid dependent women in MAT programs. Personal beliefs and negative attitudes toward the drug using population contribute to this barrier as well.

The pre-existing institutional policy against breastfeeding by opioid dependent mothers in MAT was another barrier to implementation. The hospital policy required the mother to have a negative drug screen on admission in order to breastfeed. This policy was based on outdated professional guidelines that advised women not to breastfeed during active opioid treatment. Newer pharmacological options are available that are safer for the neonate with NAS and mother during substance withdrawal.

The final barrier encountered was a lack of maternal education prior to delivery and continued support for breastfeeding following discharge from the hospital. None of the mothers
reported attending childbirth preparation class or lactation education. Breastfeeding can be challenging for a non-complicated mother and infant dyad; the challenges increase significantly for women whose newborn is experiencing NAS. Women who lack understanding and the ability or capability to join or form peer support groups will not continue to breastfeed when obstacles are encountered.

**Identified Facilitators.** Facilitators to implementation of this EBP project included administrators, cooperative staff, current practice guidelines, and appropriate educational tools. The facilitators served as driving forces to overcome the identified barriers; this encompassed hospital and health department administrators, nurse director and nurse educators, and staff nurse champions. Buy-in for change was acknowledged by all of the facility administrators and the nurse director. Champions from nursing education and CWNFRMC staff nurses were identified. Guidelines and hospital policy that incorporate EBP helped facilitate needed change by directing staff to encourage opioid dependent women in MAT to breastfeed the neonate experiencing NAS. Ongoing education of staff, patients, and families regarding the benefits of breastfeeding also helped to facilitate implementation of this EBP practice.

The final facilitator of change was the use of Kotter’s (2012) Change Management Theory to guide project implementation. Using a change theory model increases awareness of how to introduce new strategies and increases the likelihood of change being adopted in the practice setting. Kotter’s (2012) change model details implementation strategies to facilitate change as well as guidance on errors to avoid.

**Discussion**

Non-pharmacological low risk supportive care measures are recommended for neonates at risk for developing NAS (Casper & Arbour, 2014). Recommended measures focus on
nutrition and sensory support such as breastfeeding (Bagley, Wachman, Holland, & Brogly, 2014). Breastfeeding is acknowledged as the best method of feeding the neonate through at least the first year of life and is thought to reduce the occurrence and the severity of NAS (Demirci, Bogen, & Klionsky, 2015).

The Breastfeeding’s Role in Neonatal Abstinence Syndrome program is an important part of educating maternal newborn care staff in fostering maternal decision making to breastfeed as a means to decrease the occurrence of NAS symptoms, pharmacological interventions, and decrease LOS in an acute care hospital setting for affected neonates. The evaluation of the CE program provided valuable information regarding the maternal newborn care staff’s knowledge and personal comfort in regards to breastfeeding and NAS. After participating in the Breastfeeding’s Role in Neonatal Abstinence Syndrome program, participants improved their understanding of basic knowledge of NAS and a woman’s ability to breastfeed while in MAT programs. Additionally, the participants’ comfort level in recommending breastfeeding in the MAT population increased.

**Step 6 of the Model: Integrate and Maintain Change in Practice**

Integrating and maintaining change in practice is the final step of The Model for Evidence-Based Practice Change. It is crucial to communicate recommended changes to identified stakeholders in a professional and motivating manner if change is to be sustained.

**Plans for Sustainability**

Continuing staff education is an important facilitator in sustaining maternal newborn care staff knowledge and understanding of national standards of care and practice guidelines. The project leader developed continuing education modules that are accessible 24/7 to all maternal newborn care staff on the hospital’s learning management system. The continuing education
modules are set up to be completed throughout the calendar year and are a job requirement of all maternal newborn care staff.

In order to improve the area community understanding of the effects of the opioid epidemic on neonates, the project leader developed an educational program titled *Hugging Helper*. The program provides community members with accurate education on the effects of opioids on mothers and neonates. The program was also designed to recruit volunteers to help provide nonpharmacological comforting care measures such as swaddling and soothing to NAS babies at CWNFRMC.

**Communication and Dissemination of Project Results**

The final and most anticipated stage of an EBP improvement project is dissemination of results in the final defense and publication of outcomes to the professional community. Dissemination of the literature review supporting this project occurred in the form of a podium presentation at the Greater Dayton Research Symposium *The Truth About the Opioid Crisis: Best Practices for Compassionate Care* conference in April 2017. The project leader has developed a presentation of the project including implementation process, outcome measures, and results to disseminate to the maternal newborn care staff of Erie County Ohio and project stakeholders on December 8th 2017.

An abstract has been submitted for a podium presentation at the Zeta Theta Tau Annual Research Program in February of 2018. Future plans of project result dissemination include submission of this manuscript to the Virginia Henderson Global Nursing e-Repository and abstract submission for poster presentation at the Ohio League for Nursing Education Summit in April of 2018. Lastly, a manuscript for submission to a scholarly journal for publication is planned.
**Future Recommendations**

It is essential that pregnant women in MAT programs receive appropriate education and support on the multiple benefits and protective effects that breastmilk has for both the neonate and their mother. Based on results of this EBP project, it is recommended that maternal newborn care staff be provided with up to date education on national standards of care and recommended practice guidelines in order to support drug dependent women and neonates at risk for NAS. Recommendations also include outpatient care provider focus on promotion of MAT woman’s attendance at child birth and breastfeeding education classes.

Identification of reliable methods to document and track maternal illicit drug use including the amount and frequency needs to be addressed. One strategy is for health care providers to add these specific questions to admission assessment documents so tracking of illicit drug use is possible.

**Conclusion**

Opioid abuse in America is at an epidemic level. The extent of this epidemic reaches the most vulnerable of populations, pregnant women and their neonates. As the incidence of opioid drug use during pregnancy continues to increase, so will the incidence of NAS and risk of neonatal morbidity and mortality. With appropriate identification and intervention, healthcare providers can improve neonatal outcomes and minimize life-long medical complications.

The purpose of this EBP improvement project was to increase maternal newborn care staff awareness, knowledge, and personal comfort on the national standards of care and recommended practice guidelines that encourage and support opioid dependent women in MAT programs to breastfeed their neonates. The maternal newborn care staff lacked knowledge of the national standards of care and practice guidelines at the beginning of the project. The maternal
newborn care staff were provided education necessary to guide and support breastfeeding in the MAT population. Following the program, participants demonstrated increased knowledge and understanding of breastfeeding and MAT programs and an increase in personal comfort levels in recommending breastfeeding in the MAT population.

The goal of the project was to foster maternal decision making to breastfeed as a means to decrease the occurrence of NAS symptoms, decrease the need for pharmacological interventions, and decrease the length of stay (LOS) in an acute care hospital setting for affected neonates. Through implementation of this EBP improvement project, positive outcomes for breastfeeding women in MAT and their neonates will increase and considerable costs savings will be demonstrated for segments of the healthcare system.
References


http://www.infantgrapevine.co.uk/pdf/inf_055_nen.pdf


http://www.samhsa.gov/data/


doi:10.1177/0890334415613823


Appendix A
FRMC Agency Permission Form

June 01, 2017

Holly Myers
Sandusky, Ohio 44870

Dear Ms. Myers:

Thank you for providing information pertaining to your Doctor of Nursing Practice Project for Institutional Review Board consideration. Leaders from the Quality and Legal Departments understand your project to include engagement and education for physicians and nurses providing perinatal care for chemically dependent women currently receiving treatment with opiate antagonists. The goal of the education is to share the evidence-base that infants born to these women experience more stable withdrawal and reduced lengths of hospital stay if the infant receives the mother’s breast milk. It is our understanding that the literature has documented the validity of this practice and it is considered to be a best practice. The goal of your specific project is to encourage learning and acceptance by practitioners and patients to facilitate adoption of the practice. Measures will focus on compliance with best practices with exclusions taken into account. Pre- and post-implementation outcomes related to newborn stability and length of stay will be collected to provide feedback to involved practitioners relative to success with their own patients. You will participate in preparing educational materials, educating staff, post-education monitoring, and providing feedback to demonstrate outcomes and encourage ongoing adoption of the program with all providers in the community who provide maternal-child services.

It is our evaluation that this project does not present a risk to human subjects nor does it require participation by subjects who would be required to provide informed consent. We do not assess this to be a pilot study but rather an effort to contribute to the local evidence base and implementation of a tested method in this population to enhance outcomes for infants born to women in treatment for chemical dependency. Accordingly, the project is viewed as a service enhancement and does not require enrollment for Institutional review board evaluation or approval through the processes in place at Firelands Regional Medical Center.

You are authorized to complete the chart reviews needed to collect data for evaluation and action planning. We agree that this project does not conflict with your employment as an instructor in the School of Nursing nor will there be any interface between job performance and the project. We agree that all information collected for the project will be de-identified prior to submission for review by faculty within your academic program. Additionally, it is expected that any data collected and held prior to de-identification will be maintained on paper or electronically in a secure manner until such point as de-identification can be achieved. At that point, original, identifiable data will be destroyed per Firelands Regional Medical Center policy. Please feel free to contact Patty Martin at 419-557-6817 if we can provide any additional information in this regard.

Sincerely,

Patricia Martin, MOD, BSN, RN, FACHE
Vice President, Quality & Patient Satisfaction

Martin Tursky
President and CEO
Appendix B
Erie County Health Department Agency Permission Form

May 18, 2017

IRB Committee
University of Toledo
2801 W. Bancroft Street
Toledo, Ohio 43608

Dear IRB Committee Members:

This letter is to acknowledge our permission for Holly Myers to present an educational learning session to our staff at our Annual Wellness Day, June 16, 2017.

The title of her presentation is "The Breastfeeding Role in Neonatal Abstinence Syndrome".

We are pleased to have Holly share her information and knowledge with our interested staff.

Sincerely,

[Signature]

Peter T. Schade, MPH, RS
Health Commissioner
Erie County Health Department
Erie County Community Health Center

Board of Health: Linda Miller-Moore (Board President); Nancy Thomhill (President Pro-Tem); Richard S. Keller, MD; Michael D. Kaufman, Esq.; Martha D. Cooper, MD; George E. Steinmann; Richard Pulan; Thelma Darden; Larry Holkenborg; Joey Supina; Dina C. Bauer, DPM
420 Superior Street, Sandusky, Ohio 44870 • Phone (419) 628-5023 • Toll-free (888) 399-4085 • Fax (419) 628-8778
www.eriecohealthohio.org • echd@eriecohealthohio.org

66
Appendix C
Family Health Services of Erie County Agency Permission Form

To: Holly A. Myers  
FRMC School of Nursing, Faculty

From: Dollie Hopkins, BSN, RN  
Director of Nursing

Date: May 17, 2017

RE: Permission to Provide Staff Education

Dear Holly,

In response to your email dated May 16, 2017, in which you requested permission to provide the nursing staff education on the topic of "Breastfeeding's Role in Neonatal Abstinence Syndrome", Family Health Services is granting you the permission to do this. When we spoke briefly in my office, I was very impressed with your knowledge and your passion towards this subject matter. I am looking forward to your presentation on this subject matter at our Lunch & Learn on Friday, June 16, 2017. The Lunch & Learn is from 12pm-1pm and will be in FRMC School of Nursing, classroom H. In case you need any other document, please feel free to contact me.

Sincerely,

Dollie Hopkins, RN BSN  
Director of Nursing  
Family Health Services  
PH: 419 502-2818  
FAX: 419 502-2828
Appendix D
NOMS Obstetrics & Gynecology Agency Permission Form

To the University of Toledo IRB Committee Members:

Holly Myers has my permission to come into NOMS OBGYN office and provide education on Breast Feeding and Neonatal Absent Syndrome on June 13th 2017 at 8:00am.

Thank you,
Chris McLaughlin

Chris McLaughlin
Office Manager
2500 W. Strub Rd. | Suite 210
Sandusky, OH 44870
📞 (419) 626-6161 Ext. 3200 | 📞 (419) 625-1299

Like us, follow us | www.nomshealthcare.com
Appendix E
FRMC Breastfeeding Guidelines for Drug-Dependent Women Policy and Procedure

<table>
<thead>
<tr>
<th>Title: Breastfeeding Guidelines for Drug-Dependent Women</th>
<th>ID #: Effective: 4/1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STANDARD POLICY AND PROCEDURE FORM</strong></td>
<td></td>
</tr>
<tr>
<td>Written By: Holly Myers</td>
<td>Distribution: OB Manual</td>
</tr>
<tr>
<td>Title: MSN, RN, CNE</td>
<td>Revised:</td>
</tr>
<tr>
<td>Approved By: Medical Director, Pediatric Hospitalists</td>
<td></td>
</tr>
<tr>
<td>VP Quality &amp; Patient Satisfaction</td>
<td>Reviewed:</td>
</tr>
</tbody>
</table>

PURPOSE:

To provide evidence-based guidelines for the evaluation and management of the neonate of an opioid-dependent mother who chooses to breastfeed.

INTRODUCTION:

- Neonatal withdrawal or Neonatal Abstinence Syndrome (NAS) is a group of symptoms that occur in the neonate after delivery due to the abrupt cessation of maternal opioid exposure during pregnancy.

- Examples of opioids can include: heroin, methadone, buprenorphine, hydrocodone, oxycodone, morphine, codeine, fentanyl, etc.

- NAS develops in 55-94% of opioid-exposed neonates.

- Symptoms may involve the Central and Autonomic Nervous Systems, Respiratory, and Gastrointestinal systems.

- Onset of withdrawal symptoms depends on the half-life of the opioid used, duration, and time of the last maternal dose prior to delivery.

Breastfeeding is a recommended nonpharmacological treatment and preferred feeding method for managing NAS in neonates born to opioid dependent postpartum women who are participating in an opioid maintenance therapy program (methadone and buprenorphine).

- A reduction in the incidence and severity of NAS has been identified through breastfeeding (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogley, 2014; MacMullen, Duls, & Blobaum, 2014; McQueen, Murphy-Oikonen, Gerlach, & Montelpare, 2011).
• A significant reduction in the need for pharmacological treatment for NAS has been identified through breastfeeding (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogley, 2014; Dryden, Young, Hepburn, & Mactier, 2008; Jansson et al., 2008; MacMullen, Dulska, & Blobaum, 2014; Welle-Strand et al., 2013).

• A reduction in the length of hospitalization required for neonates with NAS has been identified through breastfeeding (Abdel-Latif et al., 2006; Bagley, Wachman, Holland, & Brogley, 2014; Isemann, Meinzen-Derr, & Akinbi, 2011; Pritham, Paul, & Hayes, 2012).

INDICATIONS:

Mothers who are stable in and plan on continuing in an opioid maintenance treatment program after discharge should be encouraged to breastfeed unless the risks clearly outweigh the benefits.

CONTRAINDICATIONS:

Contraindication include using other illicit drugs or relapse to illicit drug use. For medical indications that contradict breastfeeding see the Infant Feeding Policy.

PROCEDURE:

• An individualized prenatal plan should be developed with the woman to prepare for breastfeeding prior to delivery and discharge (Reece-Stremtan, Marinelli, & The Academy of Breastfeeding Medicine, 2015).

  o Evaluation should include:

    ▪ Plans for substance abuse treatment postpartum.

    ▪ Medical and psychiatric status.

    ▪ Infant NAS status.

    ▪ Support systems.

• “Mothers who are stable in an opioid maintenance treatment program with either methadone or buprenorphine should be encouraged to breastfeed unless the risks clearly outweigh the benefits” (WHO, 2014, p. 8).
When stopping breastfeeding, weaning should be done gradually to reduce the risk of the neonate/infant developing withdrawal symptoms.

- Mothers who are currently in an opioid maintenance treatment program on either methadone or buprenorphine should be encouraged to breastfeed regardless of the treatment dose of methadone or buprenorphine (Reece-Stremtan, Marinelli, & The Academy of Breastfeeding Medicine, 2015).

- A hospital protocol needs to be in place to recognize, assess, monitor, and intervene using both nonpharmacological and pharmacological treatments for neonates with NAS (WHO, 2014).
  - All infants need to be assessed using a valid and reliable NAS assessment instrument within 2 hours after birth and then every 3 to 4 hours (coordinated with feeds) until discharge.
  - It would be reasonable for neonates who are exposed to opioids be hospitalized for at least 4 to 7 days for monitoring.

- If relapse to illegal drug use should occur breastfeeding should be discontinued (Reece-Stremtan, Marinelli, & The Academy of Breastfeeding Medicine, 2015).

REFERENCES:


### Appendix F

#### Databases Searched and Data Abstraction

<table>
<thead>
<tr>
<th>Date of Search</th>
<th>Keyword(s), Subject headings, MeSH terms Used</th>
<th>Database/Source Used</th>
<th>Limits Applied</th>
<th>Study Selections</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/9/16</td>
<td>breastfeed* AND neonatal abstinence syndrome AND opioid*</td>
<td>CINAHL Plus</td>
<td>Publication dates 2006-2016, English language.</td>
<td># of Hits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>3/11/16</td>
<td>(&quot;neonatal abstinence syndrome&quot;[MeSH Terms] OR (&quot;neonatal&quot;[All Fields] AND &quot;abstinence&quot;[All Fields] AND &quot;syndrome&quot;[All Fields]) OR 'neonatal abstinence syndrome&quot;[All Fields]) AND (&quot;breast feeding&quot;[MeSH Terms] OR (&quot;breast&quot;[All Fields] AND &quot;feeding&quot;[All Fields]) OR &quot;breast feeding&quot;[All Fields] OR &quot;breastfeeding&quot;[All Fields])</td>
<td>PubMed</td>
<td>English language, publication dates 2006-2016.</td>
<td>57</td>
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<td>breastfeeding AND neonatal abstinence syndrome AND opioid</td>
<td>Academic Search Complete</td>
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<td>3/20/16</td>
<td>Breastfeeding and opioid</td>
<td>National Guideline Clearinghouse</td>
<td>Publication dates 2006-2016.</td>
<td>19</td>
</tr>
</tbody>
</table>
Appendix G
Rapid Critical Appraisal Question Form

Print & Use to Rapidly Critically Appraise Cohort Studies

1. Are the results of the study valid?
   a. Was there representative and well defined sample of patients at a similar point in the course of the disease?
      Yes  No  Unknown
   b. Was follow up sufficiently long and complete?
      Yes  No  Unknown
   c. Were objective and unbiased outcome criteria used?
      Yes  No  Unknown
   d. Did the analysis adjust for important prognostic risk factors and confounding variables?
      Yes  No  Unknown

2. What are the results?
   a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?
   b. How likely is the outcome event(s) in a specified period of time?
   c. How precise are the study estimates?

3. Will the results help me in caring for my patients?
   a. Were the study patients similar to my own?
      Yes  No  Unknown
   b. Will the results lead directly to selecting or avoiding therapy?
      Yes  No  Unknown
   c. Are the results useful for reassuring or counseling patients?
      Yes  No  Unknown

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### Appendix H
Johns Hopkins Nursing Evidence-Based Practice
Evidence Level and Quality Guide

<table>
<thead>
<tr>
<th>Evidence Levels</th>
<th>Quality Guides</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level I</strong></td>
<td><strong>A High quality:</strong> Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence</td>
</tr>
<tr>
<td>Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Level II</strong></td>
<td><strong>B Good quality:</strong> Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence</td>
</tr>
<tr>
<td>Quasi-experimental study Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Level III</strong></td>
<td><strong>C Low quality or major flaws:</strong> Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn</td>
</tr>
<tr>
<td>Non-experimental study Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only, with or without meta-analysis Qualitative study or systematic review with or without a meta-synthesis</td>
<td></td>
</tr>
<tr>
<td>Evidence Levels</td>
<td>Quality Guides</td>
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</tr>
<tr>
<td><strong>Level IV</strong></td>
<td><strong>A High quality:</strong> Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years</td>
</tr>
<tr>
<td>Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence</td>
<td><strong>B Good quality:</strong> Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years</td>
</tr>
<tr>
<td>Includes:</td>
<td><strong>C Low quality or major flaws:</strong> Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years</td>
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<tr>
<td>• Clinical practice guidelines</td>
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<tr>
<td>• Consensus panels</td>
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<tr>
<td>Evidence Levels</td>
<td>Quality Guides</td>
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<td>--------------------------------------------------------------------------------</td>
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<tr>
<td><strong>Level V</strong></td>
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<tr>
<td>Based on experiential and non-research evidence</td>
<td>Organizational Experience:</td>
</tr>
<tr>
<td></td>
<td>A High quality: Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence</td>
</tr>
<tr>
<td>Includes:</td>
<td>B Good quality: Clear aims and objectives; consistent results in a single setting; formal quality improvement or financial or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence</td>
</tr>
<tr>
<td>• Literature reviews</td>
<td>C Low quality or major flaws: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial or program evaluation methods; recommendations cannot be made</td>
</tr>
<tr>
<td>• Quality improvement, program or financial evaluation</td>
<td>Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference:</td>
</tr>
<tr>
<td>• Case reports</td>
<td>A High quality: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field</td>
</tr>
<tr>
<td>• Opinion of nationally recognized experts(s) based on experiential evidence</td>
<td>B Good quality: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions</td>
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<tr>
<td></td>
<td>C Low quality or major flaws: Expertise is not discernable or is dubious; conclusions cannot be drawn</td>
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</tbody>
</table>
## Appendix I

Synthesis and Recommendations Tool
Johns Hopkins Nursing Evidence-Based Practice

<table>
<thead>
<tr>
<th>Category (Level Type)</th>
<th>Total Number of Sources/Level</th>
<th>Overall Quality Rating</th>
<th>Synthesis of Findings Evidence That Answers the EBP Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level I</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Experimental study</td>
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<tr>
<td>· Randomized Controlled Trial (RCT)</td>
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<tr>
<td>· Systematic review of RCTs with or without meta-analysis</td>
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<tr>
<td><strong>Level II</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>· Quasi-experimental studies</td>
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<td></td>
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<tr>
<td>· Systematic review of a combination of RCTs quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis</td>
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<tr>
<td><strong>Level III</strong></td>
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<tr>
<td>· Non-experimental study</td>
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<tr>
<td>· Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis</td>
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<tr>
<td>· Qualitative study or systematic review of qualitative studies with or without meta synthesis</td>
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<tr>
<td><strong>Level IV</strong></td>
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<tr>
<td>· Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence</td>
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</tbody>
</table>
### Level V
- Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports
- Opinion of nationally recognized expert(s) based on experiential evidence

---

**Directions for Use of This Form**

**Purpose:** This form is used to compile the results of the evidence appraisal to answer the EBP question. The pertinent findings for each level of evidence are synthesized, and a quality rating is assigned to each level.

**Total Number of Sources per Level:** Record the number of sources of evidence for each level.

**Overall Quality Rating:** Summarize the overall quality of evidence for each level. Use the “Evidence Level and Quality Guide” (Appendix C) to rate the quality of evidence.

**Synthesis of Findings:** Evidence That Answers the EBP Question

- Include only findings from evidence of A or B quality.
- Include only statements that directly answer the EBP question.
- Summarize findings within each level of evidence.
- Record article number(s) from individual evidence summary in parentheses next to each statement so it is easy to identify the source of the finding.

**Develop Recommendations Based on Evidence Synthesis and the Selected Translation Pathway:** Review the synthesis of findings and determine which of the following four pathways to translation represents the overall strength of the evidence:

- Strong, compelling evidence, consistent results: solid indication for a practice change.
- Good and consistent evidence: consider pilot of change or further investigation.
- Good but conflicting evidence: no indication for practice change; consider further investigation for new evidence or develop a research study.
- Little or no evidence: no indication for practice change; consider further investigation for new evidence or develop a research study or discontinue project.
## Appendix J

**Critical Appraisal and Evaluation**

<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization (WHO) (2014). Guidelines for the identification and management of substance use and substance use disorders in pregnancy. Geneva (Switzerland): World Health Organization (WHO); 204 p. Guideline summary NGC-10619. Retrieved from: <a href="http://www.guideline.gov/content.aspx?id=48894&amp;search=guideline+for+the+identification+and+management+of+substance+use+and+substance+use+disorders+in+pregnant+women">http://www.guideline.gov/content.aspx?id=48894&amp;search=guideline+for+the+identification+and+management+of+substance+use+and+substance+use+disorders+in+pregnant+women</a>. To enable pregnant women to make healthy decisions about alcohol and other substance use in the context of pregnancy and breastfeeding.</td>
<td>To provide evidence-based technical advice to healthcare providers on identifying and managing substance use and substance use disorders in pregnant women. To enable pregnant women to make healthy decisions about alcohol and other substance use in the context of pregnancy and breastfeeding.</td>
<td>Clinical practice guideline. Interprofessional Database searched included: Medline/PubMed, EMBASE, PsycINFO, CINAHL, Cochrane Central Register of Controlled Trials.</td>
<td>Total of 93 randomized control trials and systematic reviews included.</td>
<td>IV- BF DV-NAS</td>
<td>A rating scheme for strength of evidence is based on grading of recommendations assessment, development, and evaluation (GRADE) working group grades of evidence.</td>
<td>Guideline recommendations have been peer reviewed.</td>
<td>Mothers who are stable on OMT with either MMT or BMT should be encouraged to BF unless the risks clearly outweigh the benefits. (Strength: strong; quality: low)</td>
<td>Guidelines are applicable to practice. AGREE II score: 7/7. Quality rating (JHNEBP): A</td>
</tr>
</tbody>
</table>

Guidance on breastfeeding is still not widely accepted by healthcare providers in pregnancy: A rating scheme for strength of evidence is based on grading of recommendations assessment, development, and evaluation (GRADE) working group grades of evidence (strength: strong; quality: low).
<table>
<thead>
<tr>
<th>Se+disorders+in+pregnancy</th>
<th></th>
</tr>
</thead>
</table>

identifying, assessing, monitoring and intervening, using non-TX and TX methods for neonates exposed to opioids (Strength: strong; quality: low)

Legend: BF- breastfeeding; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; BMT- buprenorphine maintenance therapy; TX- pharmacologic treatment; IV- independent variable; DV- dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
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<tbody>
<tr>
<td>Reece-Stremtan, S., Marinelli, K. A., and The Academy of Breastfeeding Medicine (2015). ABM clinical protocol #21: Guidelines for breastfeeding and substance use of substance use disorder, revised 2015. <em>Breastfeeding Medicine, 10</em>(3), 135-141. doi:10.1089/bfm.2015.9992</td>
<td>To provide literature-based guidelines for the evaluation and management of women with substance use or a substance use disorder who is considering BF.</td>
<td>Clinical practice guideline.</td>
<td>Care of BF mothers and infants.</td>
<td>BF with substance use or a substance use disorder.</td>
<td>A rating scheme for strength of evidence is based on the U.S. Preventive Services Task Force Ratings. Level of evidence I, II-1, II-2, II-3 and III.</td>
<td>Guideline recommendations were peer reviewed.</td>
<td>Concentrations of methadone and buprenorphine found in BM are low. Women receiving OMT or BMT should be encouraged to BF. BF infants had less severe NAS and less likely to require TX for NAS than FF infants.</td>
<td>Guidelines are applicable to practice. AGREE II score: 6/7. Quality rating (JHNEBP): A</td>
</tr>
</tbody>
</table>

Legend: BF- breastfeeding; BM= breast milk; FF= formula fed; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; BMT- buprenorphine maintenance therapy; TX- pharmacologic treatment; IV- independent variable; DV- dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
</table>
guideline, and case series.

No data analysis for studies were provided.

Conclusion & Feasibility: BF should be encouraged for mothers who are chemically dependent on drugs if not contraindicated. Evidence is applicable.

Legend: BF- breastfeeding; BM- breastmilk; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; BMT- buprenorphine maintenance therapy; TX- pharmacologic treatment; LOS- hospital length of stay; IV- independent variable; DV- dependent variable.
<table>
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<th>Article Citation</th>
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<th>Sample/Setting</th>
<th>Major Variables</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
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<tbody>
<tr>
<td>Jansson, L. M., Choo, R., Velex, M. L., Harrow, C., Schroeder, J. R., Shakleya, D. M., &amp; Huestis, M. A. (2008). Methadone maintenance and breastfeeding in the neonatal period. <em>Pediatrics, 121</em>, 106-114. doi:10.1542/peds.2007-1182</td>
<td>Evaluate the concentrations of methadone in BM among BF women and concentration of methadone in maternal and infant plasma in BF group and a FF group.</td>
<td>A non-randomized clinical trial</td>
<td>Women enrolled in a substance abuse treatment program for pregnant and postpartum drug-dependent women and their newborn between 2001-2005. 2257 eligible subjects. All infants not exposed to methadone</td>
<td>IV-Mothers and infants BF. IV-Mothers and infants FF. DV- NAS scores. DV- BM methadone levels. DV- Plasma methadone levels. DV-TX.</td>
<td>Trough and peak maternal methadone levels of maternal and infant blood and BM specimens. Modified Finnegan tool.</td>
<td>Wilcoxon signed rank test to compare BF subjects and matched controls for methadone concentrations. Fisher’s exact test for categorial variables. Spearman correlations for strength of association</td>
<td>Concentrations of methadone in BM are low, calculated average amount of methadone ingestible by infant was &lt;0.2 mg/day. Concentrations of methadone in BM increase over time. Concentrations in BM are unrelated to maternal dose.</td>
<td>Level (JHNEBP): III Quality rating (JHNEBP): A Strengths: Data is consistent with previous studies. Limitations: Small group sizes. High level of bias in measurements due to dried specimens. Conclusion &amp; Feasibility:</td>
</tr>
</tbody>
</table>
were excluded.
N=16 mother infant pairs.

- Infant plasma methadone concentrations were not related to the infant’s need for TX for NAS or NAS scores.
- BF decreased need for TX for NAS.

**Legend:** BF - breastfeeding; BM = breastmilk; TX - pharmacological treatment; NAS - neonatal abstinence syndrome; MT - methadone therapy; FF = formula fed; IV - independent variable; DV - dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
</table>
0528.2008.02073.x | NAS (OR 0.55, 95% CI 0.34-0.88).

**Conclusion & Feasibility:** Drug-misusing women should be encouraged and supported to BF. Evidence is applicable.

Legend: BF- breastfeeding; BM= breastmilk; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; IV- independent variable; DV- dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
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<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isemann, B., Meinzen-Derr, J., &amp; Akinbi, H. (2011). Maternal and neonatal factors impacting response to methadone therapy in infants treated for neonatal abstinence syndrome. <em>Journal of Perinatology</em>, 31(1), 25-29. doi:10.1038/jp.2010.66</td>
<td>To identify maternal and neonatal factors that impact response to MT for NAS.</td>
<td>Retrospective cohort study of singleton infants receiving MT for NAS.</td>
<td>Newborns that received MT for NAS. The University Hospital NICU in Cincinnati Ohio between 2002-2007. 142 eligible subjects. 14 were excluded due to no documentation, non adherence of MT, transfer or demise. N=128 infants.</td>
<td>IV- Infants born to women receiving MT during pregnancy. DV- NAS incidence. DV- Maternal dose of MT. DV- NAS needing pharmacological treatment. DV- LOS. DV- Infants being BF.</td>
<td>Finnegan abstinence scoring method to assess for NAS.</td>
<td>$t$-test of Wilcoxon’s sum rank test. Differences between categorical data $\chi^2$ analysis or Fisher’s exact test. Spearman’s correlation coefficients were used to assess relationships among factors.</td>
<td>56 infants received BM. Ingestion of BM was associated with shorter LOS (median 12.5 93 to 52). % of BM was independently associated with LOS ($\beta$ = -0.03, $P$=0.02 for every 10% increase in proportion of BM intake).</td>
<td>Level (JHNEBP): III Quality rating (JHNEBP): A Strengths: Findings are consistent with previous studies. Setting represents population of MT women, generalizable results. Limitations: Incomplete data collection from medical records. Subjective assessment of NAS can lead to differences</td>
</tr>
</tbody>
</table>
Multiple linear regression analysis.
Significance level of 5% was chosen for tests of significance.

in initiation of treatment. Finnegan scoring may not be sensitive in detection of NAS in preterm infants.

**Conclusion & Feasibility:**
Ingestion of BM should be encouraged to reduce methadone therapy for NAS. Evidence is applicable.

Legend: BF - breastfeeding; BM = breastmilk; NAS - neonatal abstinence syndrome; MT - methadone therapy; NICU - newborn intensive care unit; LOS - hospital length of stay; IV - independent variable; DV - dependent variable.
<table>
<thead>
<tr>
<th><strong>Article Citation</strong></th>
<th><strong>Conceptual Framework and Purpose</strong></th>
<th><strong>Design/Method</strong></th>
<th><strong>Sample/Setting</strong></th>
<th><strong>Major Variables Studied</strong></th>
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<th><strong>Data Analysis</strong></th>
<th><strong>Findings</strong></th>
<th><strong>Appraisal: Worth to Practice</strong></th>
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<tbody>
<tr>
<td>Abdel-Latif, M. E., Pinner, J., Clews, S., Cooke, F., Lui, K., &amp; Oei, J. (2006). Effects of breast milk on the severity and outcome of neonatal abstinence syndrome among infants of drug-dependent mothers. <em>Pediatrics,</em> 117(6), e1163-e1169. doi:10.1542/peds.2005-1561</td>
<td>To assess the effects of BM on the severity and outcome of NAS.</td>
<td>Retrospective cohort study of infants of drug-dependent mothers admitted to a hospital unit between 1998-2004.</td>
<td>Infants of drug-dependent mothers admitted to a hospital unit between 1998-2004.</td>
<td>IV-Neonate FF. IV-Neonate BM DV- NAS incidence. DV- NAS TX. DV- Duration of TX. DV-LOS.</td>
<td>Finnegan score to assess for NAS.</td>
<td>$X^2$ test and $t$ test. KaplanMeier method used to estimate the # of infants needing TX. Differences compared by 2 sided log rank test. Multiple logistic regression for factors of TX for NAS after controlling for potential confounder s.</td>
<td>Mean NAS scores for BM neonates were significantly less than FF neonates. BM neonates significantly less likely to require TX for NAS, TX dose were less. Mean LOS for FF was 5 days longer than BM. BM intake is associated with reduced NAS severity, delayed onset, and</td>
<td>Level (JHNEBP): III Quality rating (JHNEBP): A Strengths: Large sample size. Reliable and validated NAS assessment tools. Limitations: Subjective assessment of NAS can lead to differences in initiation of treatment. Conclusion &amp; Feasibility:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Significance level of 5% using 2-tailed comparison s.</td>
<td>decreased need for TX.</td>
<td>Women of all infants at risk of NAS be encouraged to BF Evidence is applicable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: BF- breastfeed; BM- breastmilk; FF- formula feed; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; TX- pharmacologic treatment; LOS- length of hospitalization; IV- independent variable; DV- dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
</table>
| | | | | | | No cost data reviewed.  

**Conclusion & Feasibility:**  
Infants who are BF require less NAS treatment and duration of hospitalization. Evidence is applicable.

Legend: BF- breastfeeding; NAS- neonatal abstinence syndrome; LOS- length of hospital stay; IV- independent variable; DV-dependent variable; RX- pharmacotherapy treatment.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>McQueen, K., Murphy-Oikonen, J., Gerlach, K., &amp; Montelpare, W. (2011). The impact of infant feeding method on neonatal abstinence scores of methadone-exposed infants. <em>Advances in Neonatal Care, 11</em>(4), 282-290. doi:10.1097/ANC.0b013e318225a30c</td>
<td>To determine whether NAS of infants exposed to methadone in utero differed by infant feeding method.</td>
<td>Retrospective cohort of infants who experienced symptoms of NAS and were exposed to methadone in utero.</td>
<td>All infants born to women on MMT.</td>
<td>IV- Infants born to women on MMT.</td>
<td>Modified Finnegan Scoring tool to assess for NAS.</td>
<td>Non-parametric Kruskal-Wallis one way analysis for variance.</td>
<td>Feeding method: BF n=8,CB n=11, FF n=9. Mean NAS scores :BF (M=25, SD=23.5), CB(M=56.2, SD=39.1), FF (M=95.6,SD =34.6). Kruskal-Wallis (H[2]=13.75; P=0.001). Magnitude of NAS: BF (M=4.9, SD=2.9), CB (M=6.5, SD=3.7), FF (M=6.9, SD=4.2).</td>
<td>Level (JHNEBP): III Quality rating (JHNEBP): A Strengths: Data is consistent with previous studies. Setting represents population of MT women, generalizable results. Limitations: Sample of BF group small. Group allocation was self-selected, limiting control for confounding variables.</td>
</tr>
</tbody>
</table>
methadone were excluded.
N=28 mother infant pairs.

Wallis (H[2]=43.52; p=0.0001).
Infants who were predominantly BF had lower NAS taken and severity of NAS.

Instrument bias for Modified Finnegan tool.

**Conclusion & Feasibility:**
BF should be encouraged only in the absence of contraindications such as illegal drugs and positive HIV status. Evidence is applicable.

<p>| Legend: BF- breastfeeding; BM= breastmilk; NAS- neonatal abstinence syndrome; MT- methadone therapy; CB=combination breast feeding &amp; formula; FF=formula fed; IV- independent variable; DV- dependent variable. |</p>
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welle-Strand, G. K., Skurtveit, S., Jansson, L. M., Bakstad, B., Bjarko, L., &amp; Ravndal, E. (2013). Breastfeeding reduces the need for withdrawal treatment in opioid-exposed infants. Acta Paediatrica, 102(11), 1060-1066. doi:10.1111/apa.12378</td>
<td>To examine the rate and duration of BF in a cohort of women in OMT in Norway, as well as the effect of BF on incidence and duration of NAS.</td>
<td>National cohort of 124 women treated with MMT or BMT in an OMT during pregnancy and their neonates in a three part study.</td>
<td>Women who gave birth in Norway between 1999-2009 who were in an OMT during pregnancy and birth. 139 eligible subjects. 15 excluded. N=124. 78 neonates exposed to IV- Women BF while in OMT. DV- NAS incidence. DV- NAS treatment duration.</td>
<td>Modified Finnegan score to assess for NAS.</td>
<td>X² test to assess incidence of NAS in BF vs. not BF. Multivariate linear regression analysis to assess duration of NAS treatment and BF vs. not BF adjusted for covariates. Significance level of 5% was chosen for tests of significance.</td>
<td>Treated for NAS BF=57%. Not BF=69% p=n.s. NAS treatment duration BF M=28.6 (SD, 19.1) p=&lt;0.05. Not BF M=46.7 (SD, 26.3) p=&lt;0.05. Adjusted for covariates p=0.00. It was found that there was a shorter treatment duration for NAS in BF vs. not BF.</td>
<td>Level (JHNEBP): III Quality rating (JHNEBP): A Strengths: National study. High proportion of BF women to evaluate the effects of BF on NAS incidence and duration. Limitations: Retrospective data may be less accurate. 18 different hospitals completed NAS scoring increases error. Small sample size for BMT group = insufficient.</td>
<td></td>
</tr>
<tr>
<td>methadone.</td>
<td>46 neonates exposed to buprenorphine.</td>
<td>power to determine sig. differences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Conclusion & Feasibility:**
Infants who are BF require shorter NAS treatment.
Evidence is applicable.

Legend: BF- breastfeeding; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; BMT- buprenorphine maintenance treatment; IV- independent variable; DV- dependent variable.
<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Conceptual Framework and Purpose</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied</th>
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<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pritham, U. A., Paul, J. A., &amp; Hayes, M. J. (2012). Opioid dependency in pregnancy and length of stay for neonatal abstinence syndrome. JOGNN: Journal of Obstetric, Gynecologic &amp; Neonatal Nursing, 41(2), 180-190. doi:10.1111/j.1552-6909.2011.01330.x</td>
<td>To examine opioid replacement therapy in pregnancy and effect on neonatal outcomes including feeding method, LOS for NAS.</td>
<td>Retrospective descriptive study.</td>
<td>Chart review for opioid dependent pregnant women on MMT or BMT and their newborns delivered between 2005-2007. 152 eligible subjects. 136 women on MMT.</td>
<td>IV-Newborns born to women on MMT.  IV-Newborns born to women on BMT. DV- NAS incidence. DV- NAS TX. DV-LOS. DV- BF. DV-FF.</td>
<td>Unknown how NAS was assessed.</td>
<td>Descriptive statistics for demographic factors. Multiple linear regression statistics for LOS to maternal methadone dose. t test means comparison or chi-squared for categorical variables. Significance level of 5%.</td>
<td>LOS was shorter in BF newborn than FF newborns. Newborns exposed to MMT had longer LOS for NAS TX than newborns exposed to BMT. TX for NAS MMT 84.6%. TX for NAS BMT 68.8%. It was found that BF newborns were discharged home earlier</td>
<td>Level (JHNEBP): V Quality rating (JHNEBP): A Strengths: Findings are consistent with other studies. Limitations: Findings dependent on accuracy of documentation. Drug use was self-reported, unreliable. Unmeasured cofounders such as maternal MMT or BMT length of TX. Unknown NAS scale. Conclusion &amp; Feasibility:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 women on BMT.</td>
<td></td>
<td>than those who were FF.</td>
<td>BF should be recommended to shorten LOS. Evidence is applicable.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: BF- breastfeeding; BM- breastmilk; OMT- opioid maintenance treatment; NAS- neonatal abstinence syndrome; MMT- methadone maintenance treatment; BMT- buprenorphine therapy; TX- pharmacologic treatment; LOS- hospital length of stay; IV- independent variable; DV- dependent variable.
## Appendix K

### Synthesis Table

<table>
<thead>
<tr>
<th>LOE</th>
<th>QR</th>
<th>SS</th>
<th>NAS</th>
<th>LOS</th>
<th>TX</th>
<th>NAS ST</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;0&lt;/sup&gt;</td>
<td>I</td>
<td>A</td>
<td>9</td>
<td>↓ with BF</td>
<td>NA</td>
<td>↓ with BF</td>
<td>F, L, NWI, NNWI</td>
</tr>
<tr>
<td>2&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>16</td>
<td>↓ with BF</td>
<td>NA</td>
<td>↓ with BF</td>
<td>F</td>
</tr>
<tr>
<td>3&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>450</td>
<td>↓ with BF</td>
<td>10 days</td>
<td>↓ with BF</td>
<td>F</td>
</tr>
<tr>
<td>4&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>128</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>F</td>
</tr>
<tr>
<td>5&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>28</td>
<td>↓ with BF</td>
<td>NA</td>
<td>↓ with BF</td>
<td>F, L</td>
</tr>
<tr>
<td>6&lt;sup&gt;0&lt;/sup&gt;</td>
<td>I</td>
<td>B</td>
<td>7</td>
<td>↓ NAS Scores</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>F, L</td>
</tr>
<tr>
<td>7&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>124</td>
<td>↓ with BF</td>
<td>NA</td>
<td>↓ with BF</td>
<td>F, L</td>
</tr>
<tr>
<td>8&lt;sup&gt;0&lt;/sup&gt;</td>
<td>III</td>
<td>A</td>
<td>190</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>F</td>
</tr>
<tr>
<td>9&lt;sup&gt;0&lt;/sup&gt;</td>
<td>V</td>
<td>A</td>
<td>152</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>↓ with BF</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

<sup>1</sup>= MacMullen, et al. (2014); <sup>2</sup>= Jansson, et al. (2008) <sup>3</sup>= Dryden, et al. (2008); <sup>4</sup>= Isemann, et al. (2011); =<sup>5</sup>= McQueen, et al. (2011); <sup>6</sup>= Bagley, et al. (2014); <sup>7</sup>= Welle-Strand, et al. (2013); <sup>8</sup>= Abdel-Latif, et al. (2006); <sup>9</sup>= Pritham, et al. (2012).

LOE= level of evidence; QR= quality rating; SS= sample size; NAS= % of neonates with neonatal abstinence syndrome requiring treatment; LOS= hospital length of stay; TX= pharmacological treatment for NAS; NAS ST= neonatal abstinence syndrome scoring tool; ES= evidence supports use of breastfeeding; BF= breastfeeding; F= Finnegan; L=Lipsitz; NWI= Neonatal Withdrawal Inventory; NNWI= Neonatal Narcotic Withdrawal Index; NA= not applicable.
Appendix L
CE Flyer

Firelands Regional Medical Center
Nursing & Education Departments
Present:

Topic:
“Breastfeeding’s Role in Neonatal Abstinence Syndrome”

Presented by
Holly Myers
MSN, RN- CNE

Offering:

June 16, 2017
0845 Erie County Health Department
1200 FRMC School of Nursing

June 20, 2017
0800 NCMS OB/GYN

June 26, 2017
FRMC 3W Conference RM

June 27, 2017
FRMC 3W Conference RM

June 28, 2017
FRMC 3W Conference RM

June 29, 2017
FRMC 3W Conference RM

June 30, 2017
FRMC 3W Conference RM

Outcome Statement: The nurse will have knowledge of the current breastfeeding policy and guidelines to encourage women who are in a medication-assisted opioid treatment (methadone, buprenorphine, etc.) program to breastfeed to improve maternal and neonatal outcomes.

Contact Hour Information:
0.5 contact hour will be awarded upon successful completion

Successful completion requires attendance at 100% of the program, return demonstration, and submission of a completed evaluation.

Firelands Regional Medical Center is an approved provider of continuing nursing education by the Ohio Nurses Association, an accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation. (OBN-001-91) (OH-114, 12-1-18)

Nurse Planners and presenters have declared no conflict of interest for this presentation.
Appendix M
CE Pre-Questionnaire
Pre-Questionnaire

Directions:
Circle the correct answer for each question.

1. A woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed.
   True or False

2. A woman who is on a high treatment (methadone or buprenorphine) dosage should not breastfeed?
   True or False

3. A woman who relapses back to illegal drug use should stop breastfeeding
   a) gradually over 3-5 days.
   b) gradually over 2-4 days.
   c) immediately.
   d) it is not necessary to stop breastfeeding.

4. Neonates exposed to drug during pregnancy are high risk for developing:
   a) newborn asphyxia syndrome (NAS).
   b) neonatal abstinence syndrome (NAS).
   c) newborn drug dependence (NDD).
   d) no risks for complications.

5. My comfort level in recommending breastfeeding to a woman who is participating in a medication-assisted treatment (methadone or buprenorphine) program is:
   (Place an x on the line below indicating your comfort level)

Not at all ____________________________________________________________ Completely

Work Location: Inpatient_____ Outpatient_____  
Gender: Female_______ Male_______
Appendix N
CE Power Point Presentation

Slide 1

Breastfeeding’s Role in Neonatal Abstinence Syndrome
Holly Myers MSN, RN, CNE
The University of Toledo

Slide 2

Objectives
• Describe neonatal abstinence syndrome (NAS).
• Discuss breastfeeding in the reduction of NAS symptoms, decrease in pharmacological treatments, and reduction of hospital length of stay.
• Define the evidence based practice guidelines of breastfeeding for managing NAS.
• Review the Finnegan Scoring Tool and NAS treatment.
• Describe and demonstrate how to use scripting to encourage breastfeeding.

Slide 3

Drug Epidemic
• According to the National Survey on Drug Use and Health (NSDUH), 27 million Americans used an illicit drug in the past 30 days (Center for Behavioral Health Statistics and Quality, 2015).
• The use of opioids during pregnancy was reported as ranging from 4.4% to 14% (Center for Behavioral Health Statistics and Quality, 2015).
Neonatal Abstinence Syndrome

- The incidence of NAS in Ohio is approximately 134 per 10,000 live births in 2014 (Ohio Department of Health, 2016).
- Multiple body systems are affected.
- Management of NAS symptoms should include both pharmacological and non-pharmacological supportive care measures.

Finnegan Scoring Tool

- Comprehensive assessment tool used to assess signs & symptoms of opiate withdrawal.
- Assessment tool is comprised of 21 signs & symptoms of withdrawal:
  - Central nervous system disturbances
  - Metabolic, vasomotor, and respiratory disturbances
  - Gastrointestinal disturbances
- Documentation of assessment.

Treatment of NAS

- Pharmacological
  - Oral morphine
- Nonpharmacological
  - Breastfeeding
  - Swaddling
  - Decreased exposure to light & sound
  - Clustering of care
**EBP Guidelines For Breastfeeding**

- An individualized prenatal plan that incorporates breastfeeding should be developed with the woman prior to delivery and discharge (Reece-Stremtan, Marinelli, & ABM, 2015).
- "Mothers who are stable on opioid maintenance treatment with either methadone or buprenorphine should be encouraged to breastfeed unless the risks clearly outweigh the benefits" (WHO, 2014, p. 8). Regardless of treatment dose.
- When stopping breastfeeding, weaning should be done gradually to reduce the risk of the neonate or infant developing withdrawal.
- A protocol to recognize, assess, monitor, and intervene using both nonpharmacological and pharmacological treatments for neonates with NAS needs to be in place (WHO, 2014).
- If relapse to illegal drug use should occur, breastfeeding should be stopped (Reece-Stremtan, Marinelli, & ABM, 2015).

**Firelands Breastfeeding Policy**

To provide evidence-based guidelines for the evaluation and management of the neonate of an opioid-dependent mother who chooses to breastfeed.

**Scripting**

What is scripting?

- How to discuss and teach desired behaviors.

When should scripting be done?

- With each patient interaction.
  - Prenatal visits
  - Hospital visits
  - Birth
Appendix O
CE Certificate of Completion

Certificate of Completion
This is to certify that

has successfully completed
"Breastfeeding’s Role in Neonatal Abstinence Syndrome"
Presented by

Holly Myers
MSN, RN, CNE

Date: June ________, 2017 at ________

Program Number: 12-17 Contact Hours: 0.5

Firelands Regional Medical Center is an approved provider of continuing nursing education by the Ohio Nurses Association, an accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation. (OBN-001-91) (OH-114, 12-1-18)

• Outcome Statement: The nurse will have knowledge of the current breastfeeding policy and guidelines to encourage women who are in a medication-assisted opioid treatment (methadone, buprenorphine, etc.) program to breastfeed to improve maternal and neonatal outcomes.
Appendix P
CE End of Program Evaluation
"Breastfeeding’s Role in Neonatal Abstinence Syndrome"

Please complete the following evaluation and submit at the end of the program.

Check session attended:  

0800-0830 ___  0845-0915 ___  0730-0800___
1200-1230 ___  1030-1100___  1930-2000___

As a result of this presentation, what concepts will you take back to your setting?

____________________________________________________________________________
____________________________________________________________________________

Holly Myers MSN, RN, CNE

1. Presented information clearly.  Yes  No

2. Used effective teaching methods.  Yes  No

Was the information presented fair, balanced and without bias?  Yes  No

General Comments:

____________________________________________________________________________

Future program requests include:

____________________________________________________________________________

Thank you for your attendance and response!
Appendix Q
Neonatal Abstinence Syndrome: A Guide for Families

Contents
What is Neonatal Abstinence Syndrome (NAS)? .. 4
When might I notice signs of NAS? ........ 4
What happens if I notice NAS? ........ 4
Who are the signs of NAS? ........ 4
Treatment for Babies with NAS—Care, Help, and Hope ........ 6
How can this help my baby? ........ 6
How will my baby be helped? ........ 6
Does your baby need medication? ........ 7
What happens if your baby needs medication? ........ 7
When can my baby come home? ........ 7
What to Expect When Your Baby Leaves the Hospital ........ 8
A Letter from the Neonatal Team ........ 8
When we see you, we care about you ........ 9
Ways to Support and Care for Your Baby ........ 10
Tips or Concerns about Using Preparations ........ 11
Key Contacts ........ 12
Notes ........ 13

OPG acknowledges: Dartmouth - Hitchcock Medical Center for the contributions to this guide.
Treatment for Babies with NAS—
Love, Hugs and Care

How can I help my baby?
- The most important thing you can do for your baby is to provide love and comfort. Babies who are exposed to nicotine or other toxic substances may be more irritable, feed less frequently, and not gain weight as quickly as babies who are not exposed.
- If your baby has NAS, talk to your doctor about how to help your baby.

How to enable your baby
- Make sure your baby has a quiet and comfortable place to sleep.
- Keep your baby’s bed at a safe height so you can easily reach them.
- Use a soft, comfortable mattress and blanket.
- Make sure your baby is comfortable and warm, but not too hot.
- Provide your baby with love and comfort.

Ways to Support and Care for Your Baby

Parents and caregivers of babies with NAS can help provide

When baby comes home, the journey continues

When your baby comes home, you may feel nervous and anxious. It is important to remember that you are not alone. You have a support network of family, friends, and healthcare professionals who can help you through this difficult time.

- Make sure your baby is safe and comfortable.
- Talk to your baby and reassure them.
- Encourage your baby to eat and drink.
- Make sure your baby gets enough sleep.
- Help your baby with their daily routines.
- Seek support from family and friends.

If you have any questions or concerns, please talk to your doctor or healthcare provider. They can provide you with guidance and support to help you through this difficult time.
Key Contacts

My doctor’s name and contact information:


My nurse’s name and contact information:


Other contacts:


Taking care of your baby also means taking care of yourself. Follow your doctor's advice on keeping up your treatment plan. Please remember we are here to help you and your family.

Notes

Babies’ shoes and bodies are used to communicate all the time. Write down the things that seem to make your baby happy and sleepy. Also, note the best way to comfort your baby.

How do I know when my baby is unhappy?


How do I know when my baby is happy?


What seems to relax my baby?


How else can I help my baby?


Tips for Caring for Babies Going Through Withdrawal

- Crying and Kempyness are your baby’s way of communicating.
- Clean your hands—uncontaminated, as germs can help raise withdrawal—your baby can become sick from germs.
- Provide my mother with professional care during these withdrawal.
- Look at your baby’s condition and the signs of withdrawal—such as irritability, hyperactivity, restlessness, and stomach problems.
- Make sure your baby’s needs are met.
- Keep your baby’s sleep and eating habits consistent.
- Take your baby to a pediatrician if necessary.

You play an important role in helping your baby get better. My attention to your baby’s needs indicates the quality of care and comfort. If you have any questions, ask your doctor or nurse.

The NICU Project is funded by the Ohio Department of Medicaid.
Appendix R
CE Post-Questionnaire
Post-Questionnaire

Directions:
Circle the correct answer for each question.

2. A woman in a medication-assisted treatment (methadone or buprenorphine) program is permitted to breastfeed.
   True or False

2. A woman who is on a high treatment (methadone or buprenorphine) dosage should not breastfeed?
   True or False

3. A woman who relapses back to illegal drug use should stop breastfeeding
   e) gradually over 3-5 days.
   f) gradually over 2-4 days.
   g) immediately.
   h) it is not necessary to stop breastfeeding.

4. Neonates exposed to drug during pregnancy are high risk for developing:
   e) newborn asphyxia syndrome (NAS).
   f) neonatal abstinence syndrome (NAS).
   g) newborn drug dependence (NDD).
   h) no risks for complications.

5. My comfort level in recommending breastfeeding to a woman who is participating in a medication-assisted treatment (methadone or buprenorphine) program is:
   (Place an x on the line below indicating your comfort level)

   Not at all ____________________________________________________________ Completely

   Work Location: Inpatient_____ Outpatient_____ 
   Gender: Female_______ Male_______
MEMORANDUM

TO: Susan Batten, Ph.D., RN, CNS
     UT College of Nursing
     Holly Myers, MSN, RN, CNE
     UT DNP Candidate

FROM: Carolyn Pinkston, MPH, RN, CIP
     Director, Department for Human Research Protections

CC: Roland T. Skeel, M.D., Chair, Biomedical IRB

DATE: June 9, 2017


Thank you for submitting the documentation associated with the Doctoral Project noted above. During our evaluation of the project, you provided additional information relaying this activity will be conducted as a quality improvement project in collaboration with the Firelands Regional Medical Center. The documentation received for review included:

- Breastfeeding for NAS Project Summary
- Breastfeeding for NAS Power Point
- Breastfeeding Continuing Education (CE) Flyer
- Breastfeeding Pre-CE Questionnaire
- Breastfeeding Post-CE Evaluation Form
- NAS Chart Review Log
- Firelands Regional Medical Center Project Agreement
- Firelands Regional Medical Center Waiver Document
- Site permission letters from:
  - Erie County Health Department
  - Family Health Services/Sandusky, OH
  - NOMS Ob/Gyn Office/Sandusky, OH
- Response to initial IRB Reviewer questions

According the submitted materials, the purpose of this evidence-based practice project is to provide continuing education (CE) for maternal newborn care staff in Erie County on the national standards of care and recommended practice guidelines that encourage and support opioid dependent postpartum...
women in medication assisted treatment (MAT) programs to breastfeed their neonates. The nurses will be invited to attend a continuing education presentation, take a pre-test, listen to the educational component and then take a post-test approximately 30 day after the CE presentation.

The Vice President of Quality and the IRB at the Firelands Medical Center has determined this to be a process/quality improvement project and the Firelands Medical Center Vice President of Legal Services has approved the use of their institution’s PHI during the chart review process.

Based on this information presented, we agree this project meets quality improvement criteria as the assessment and knowledge obtained will directly benefit internal Firelands practices.

Thank you for your submission. You may proceed with this project without further review from the IRB or Department for Human Research Protections unless changes are made to the project that might bring the project within the scope of human subject research.

Please contact the UT Biomedical IRB Office at IRB.Biomed@utoledo.edu or 419-383-6796 if you have any additional questions.
June 1, 2017

Institutional Review Board
University of Toledo
CCE Building, Room 0106
Mail Stop 1035
Toledo, OH 43606

Re: Holly Myers / PHI Access

Dear Ladies and Gentlemen:

A request has been received from Holly Myers for a Waiver/Alteration of Individual HIPAA Authorization to access and use Protected Health Information (PHI) for her Doctor of Nursing Practice project entitled "Breastfeeding: An Evidence-Based Intervention for Neonatal Abstinence Syndrome."

The project involves engagement and education for physician and nurse caregivers who provide obstetrical care for women who are receiving treatment with opiate antagonists and neonatal care for their newborns. Caregivers are to be provided education relative to best practices associated with breast feeding with this population; it is the intent of the project to engage practitioners in the inclusion of best practices in routine plans of care. Pre and post-implementation outcomes will be abstracted from the health records of these patients to demonstrate the value of the best practice thereby encouraging its consistent application in care delivery.

Ms. Myers has provided an outline of the data to be collected for the project and the specific detail as to the management and protection of the PHI needed to accomplish the project goals. Her plan meets criteria for collection of only the minimum necessary for PHI to meet project objectives. Identifiable data will be kept secure and consistent with Firelands Regional Medical Center standards until it is aggregated for evaluation and education and will then be destroyed per policy. No individually identifiable information will be shared with any person or entity including the academic institution at which Ms. Myers is a student.

It is the position of Firelands Regional Medical Center that granting Ms. Myers access to PHI for the identified project will not adversely affect the privacy rights and welfare of individuals whose information will be used. The value of the project would be seriously compromised if Ms. Myers did not have access to the PHI. Accordingly, access to the PHI described in the project and managed as indicated is granted.

If I can answer any additional questions or be of further assistance in regard, please feel free to contact me at 419-557-5510. Thank you for your consideration.

Sincerely,

Robert Moore, Vice President of Legal Services
and General Counsel, and Corporate Compliance Officer
## FINNEGAN NEONATAL ABSTINENCE SCORE TOOL

*Start New Sheet EACH DAY with feeding closest to 0800*

### CNS

- **Crying:** Excessive High Pitched 2
- **Cry:** Cont. High Pitched 3
- **Sleeps < 3 Hr After Feeding** 1
- **Sleeps < 2 Hr After Feeding** 2
- **Sleeps < 1 Hr After Feeding** 3
- **Hyperactive Moro Reflex** 2
- **Markedly Hyperactive Moro** 3
- **Mid Tremors – Disturbed** 1
- **Mod-Severe Tremors Disturbed** 2
- **Mid Tremors – Undisturbed** 3
- **Mod-Severe Tremors Undisturbed** 4
- **Markedly Increased Muscle Tone** 2
- **Excoriation (from friction)** 1
- **Myoclonic Jerk** 3
- **Seizure Activity** 5

### METABOLIC

- **Sw eating** 1
- **Fever < 101 (37.2 to 38.3C)** 1
- **Fever > 101 (More than 38.4C)** 2
- **Respiratory Rate over 60/min.** 1
- **Respir. over 60/min & Retractions** 2
- **Frequent Yawning > 3** 1
- **Mottling** 1
- **Nasal Stiffness** 1
- **Sneezing > 3** 1
- **Nasal Flaring** 2

### GASTROINTESTINAL

- **Poor Feeding** 2
- **Regurgitation over 25% of Feed** 2
- **Projectile Vomiting** 3
- **Loose Stools** 2
- **Watery Stools** 3
- **Excessive Sucking/Mouthing** 1

### TOTAL SCORE:

**Initials**
GUIDELINES FOR USING THE FINNEGAN NEONATAL ABSTINENCE SCORE TOOL

(SEE REVERSE SIDE FOR SCORE SHEET)

All symptoms occurring within an interval period are scored. The score represents the entire scoring interval. Infants should be quieted before assessment.

Place a zero in the column after the symptom if it is not seen in the scoring interval.

Begin a new scoring sheet every day with the feeding closest to 0800.

CNS:

- Crying Behavior
  Score 2 points if infant is unable to decrease crying within 15 seconds using self-consoling measures or continues to cry for up to 5 minutes despite caregiver interventions.
  Score 3 points if infant unable to self-console in 15 seconds or continuous for greater than 5 minutes despite interventions.

- Sleeping
  Score 0 if infant sleeps greater than 3 hours of the scoring interval.
  Score 1 point if infant sleeps less than 3 hours of the scoring interval.
  Score 2 points if infant sleeps less than 2 hours of the scoring interval.
  Score 3 points if infant sleeps less than 1 hour of the scoring interval.

- Moro Reflex
  Score 2 points if infant has moderate arm and/or leg extension when Moro reflex is assessed.
  Score 3 points if infant has marked arm and/or leg extension when Moro reflex is assessed along with hand or foot clonus (more than 8-10 beats).

- Tremors - Disturbed
  Score 1 points if tremors are mild, involuntary, rhythmic movements of hand or feet.
  Score 2 points if tremors are moderate to severe including hands and arms or feet and legs.

- Tremors - Undisturbed
  Score 3 points if tremors of hands or feet are mild when undisturbed.
  Score 4 points if tremors of hands and arms or feet and legs are moderate to severe when undisturbed.

- Tone
  Score 2 points if there is no head lag with total body rigidity.

- Skin Excoriation
  Score 1 point if skin is red or broken down as a result of friction against bed surface.
  Do not include peri-anal excoriation.

METABOLIC:

- Sweating
  Score 1 point for sweating/moist skin, but not if wrapped in more than 3 blankets.

- Yawning
  Score 1 point if infant yawns more than 4 times in the scoring interval.

- Mottling
  Score 1 point if mottling present.

- Sneezing
  Score 1 point if infant sneezes three or more times in the scoring interval.

GASTROINTESTINAL:

- Poor Feeding
  Score 2 points if feeding time takes more than 30 minutes; ineffective sucking pattern unrelated to prematurity.

- Regurgitation
  Score 2 points if infant has more than one emesis of more than 25% of a feeding.

- Projectile Vomiting
  Score 3 points if infant has more than one episode of projectile vomiting.

- Loose Stools
  Score 2 points if infant has stools.

- Watery Stools
  Score 3 points if infant has stools with water ring.

- Excessive Suckling/Mouthing
  Score 1 point if infant exhibits extreme rooting behaviors.

Appendix V

CE End of Program Evaluation Summary

"Breastfeeding’s Role in Neonatal Abstinence Syndrome"

Outpatient Evaluations: N= 100
Erie County Health Department, Family Health Services of Erie County, and NOMS Obstetrics & Gynecology

As a result of this presentation, what concepts will you take back to your setting?

- Just for my personal use, it helps to understand what babies go through when withdrawing.
- My view on prenatal clients who are on drugs breastfeeding has now changed. Stopping cold turkey could harm or kill the baby. The breastmilk is better for the baby.
- Educate moms that are struggling with addiction.
- Info to our WIC and PN programs.
- Breastfeeding is safe during MAT.
- Supportive of this change for betterment of mother and newborn.
- A better understanding that a pregnant mom using drugs as long as she is in treatment can breastfeed.
- Information to possibly make a referral.
- Not relevant to my field.
- Encouraging those in recovery to breastfeed.
- Decision making regarding appropriateness of breastfeeding.
- Women who are on the mend/trying to get off drugs can breastfeed to help their babies get better faster.
- Breastfeeding is beneficial for babies with NAS.
- The benefits of supportive breastfeeding.
- Encouraging breastfeeding!
- Encourage BF for all women.
- Neonatal abstinence syndrome at a local level.
- Encouraging moms to breastfeed.
- Mothers on medicated assisted treatment high or low levels are encouraged to breastfeed.
- Scripting for breastfeeding/encouraging breastfeeding.
- Encourage breastfeeding in those patients in treatment for drug addiction and getting those addicted in treatment.
- I am a high school nurse and have had students that are pregnant that are possible drug users. I will help encourage breastfeeding. I will also refer these students to WIC and Help Me Grow.
- Won’t be so quick to discourage addicted moms from breastfeeding.
- That women should breastfeed their infants.
- The importance of long term development for the baby through breastfeeding.
- I work quite a bit at the jail. I will now talk to the pregnant inmates about treatment and breastfeeding. I had no idea prior to this presentation they could breastfeed.
- Encourage breastfeeding X 2
- Educating our patients on breastfeeding when asked.
- Educating patients.
- Resources for referral.
- Women who are in formal treatment are able to breastfeed safely!
- To encourage breastfeeding for mothers on treatment programs.
- A better understanding of drug treatments and breastfeeding.
- Encourage pregnant moms with addiction to seek treatment and to breastfeed for benefit of both mom and baby.
- A better understanding of NAS and the knowledge to encourage breastfeeding. Re-confirmed benefits of breastfeeding.
- To let people know that as long as mother is in treatment they can still breastfeed.
- Knowledge of breastfeeding role in NAS.
- Knowledge of breastfeeding and drug use on medication assisted breastfeeding.
- How important breastfeeding is for both mother and infant, in patient with med-assisted treatment.
- Encourage breastfeeding for all prenatal patients, esp. those with substance abuse issues (undergoing treatment).
- To encourage prenatal women in approved opiate treatment programs to breastfeed.
- Breastfeeding outcomes, importance or affects on baby and mom who breastfeed.
- I have more knowledge about breastfeeding while in treatment that I will be able to pass along to my clients.
- Breastfeeding is an important component in treating babies born to drug addicted moms.
- Encourage PN (Prenatal) patients to breastfeed more.
- Breastfeeding should be encouraged for addicted mothers, reasons why they are encouraged-resources available now and coming in the future.
- A different outlook.
- Knowing that women on medication assisted treatment is okay for them to breastfeed.
- How to go about presenting this information to our clients.
- Refer or encourage pregnant women to breastfeed.
- Encouragement of breastfeeding for drug dependent women is beneficial to the baby.
- I will be comfortable speaking to our prenatals who are in drug treatment about the benefits of breastfeeding.
- Drug epidemic is effecting more women of childbearing years than most people recognize.
- Encouraging breastfeeding to women who are on a drug treatment plan.
- Encourage all moms, even on treatment to breastfeed.
- Helping mothers in WIC with breastfeeding.
- Special attention must be paid to mother baby dyad. ODH WIC program needs to emphasize this topic as local units deal with this sky-rocketing issue.
- CE on a medication assisted treatment is to encourage moms to breastfeed.
- Encourage breastfeeding to women as long as they are using medically assisted drugs, not illegal.
- Recommending breastfeeding to our moms who are taking methadone or buprenorphine.
- Women in treatment can breastfeed. Enhanced promotion of breastfeeding to all.
- Mothers who have addictions may be able to breastfeed, which is better for the baby.
- This was very informative. I will encourage breastfeeding now.
- Encourage breastfeeding in most situations, compassion towards drug addicted mothers, educate benefits/risks.
- Women being treated for drug abuse can breastfeed.
• Encouraging drug dependent moms to breastfeed baby.
• A clear understanding of breastfeeding with NAS.
• Breastfeeding with NAS.
• Totally changed my view on neonatal and prenatal care for drug addiction patients.
• EVERYTHING!!
• Patients who are on treatment with methadone are able to breastfeed if on maintenance treatment.
• Educate these patients’ moms that it is ok to nurse, shorter hospital stay for mom and baby.
• Guidelines for breastfeeding.
• Knowing that is encouraged to breastfeed if mom is on a drug program.
• Pro breastfeeding.
• More information to give to patients regarding breastfeeding.
• Encourage all nurses and physicians to encourage and support breastfeeding.
• Encouraging breastfeeding in mothers who are in treatment programs.
• Effective and supportive prenatal scripting and patient interactions. Resources to inform mothers.

_Holly Myers MSN, RN, CNE_

1. Presented information clearly. 100 Yes 0 No

2. Used effective teaching methods. 99 Yes 0 No

Was the information presented fair, balanced and without bias? 100 Yes 0 No

General Comments:

• Excellent presentation and information.
• Length of time was good, any longer would lose interest.
• Great presentation, lots of info!
• Great info given on helping the moms who are addicted and not being so judgmental.
• Very informative as someone who is not a nurse, the presentation was easy to understand and I learned a lot!
• Very educational.
• She is passionate about the topic.
• Less handouts.
• Excellent/informative.
• Very informative
• Great job X2.
• Great info.
• You did a great job with this presentation!
• Excellent speaker to relay importance of information and driving importance home in effective and efficient.
• Great presentation and topic.
• Very nice presentation.
• Great presentation, I have learned a lot.
• Awesome presentation! Very knowledgeable and passionate.
• Enjoyed your presentation, very informative.
• Very well presented.
• Great information.
• Holly Myers did an excellent job presenting the information on breastfeeding in NAS.
• Great presentation! I enjoyed!
• Very informative presentation.
• Was informed Dr. Visci has not started prescribing to patients because there is not a place staffed to monitor new starts.
• Very nice presentation, thank you!
• Presented nicely, well spoken. Good with questions.
• Very informative, good to know since I work in WIC.
• Very timely topic, Nicely done. Great informative. Speaker very knowledgeable.
• Thank you! Very informative!
• I found it very interesting and learned quite a bit.
• Very good! I learned a lot of helpful information and stats.
• Very informative.
• Holly is an excellent speaker.
• I learned a lot from the presentation. It was very helpful.
• Great presentation.
• Thankful for Holly’s knowledge on this topic.
• Thank you for all your hard work on this subject.
• GREAT PRESENTATION!!
• Very informative! Thank you!
• Very informative. Great job!
• Great program with informative information.
• Holly did an excellent job presenting and providing unbiased information.
• She is well educated presenter and I look forward to seeing her become a proactive beacon of education and community involvement.
• You can tell Holly is very passionate about this topic and does a really good job presenting and discussing the information in a way that people can understand.

Future program requests include:

• Fetal Alcohol Syndrome and breastfeeding.
• Postpartum education.
• Are there patient education info available to give out at patient appointments?
• Updates.
• Longer seminar time, more resources to provide to patients.

Thank you for your attendance and response!
"Breastfeeding’s Role in Neonatal Abstinence Syndrome"

**Inpatient Evaluations: N=33**  
Firelands Regional Medical Center

As a result of this presentation, what concepts will you take back to your setting?

- Encourage women to breastfeed if enrolled in a treatment program.
- Breastfeeding for treatment addicted mothers on treatment.
- More comfort in educating patient on breastfeeding on treatment program.
- More knowledge of who can and cannot breastfeed while in drug treatment.
- Is able to help encourage mothers in treatment for opiate addiction with breastfeeding.
- Nursing is a great this for NAS babies!
- Breast is best!
- To educate mothers in a treatment program to breastfeed their babies.
- Breastfeeding comfort.
- Encourage moms to BF more while in treatment and better scripting.
- Women who are using recovery medications for drug use are able to breastfeed should be encouraged.
- Encourage mothers in treatment to breastfeed.
- Methadone/buprenorphine moms can nurse!
- Encourage breastfeeding. X 4
- Breastfeeding promotion for women in MAT.
- Breastfeeding in opiate addicted moms.
- Feel more comfortable with educating those in treatment. X 3
- Promoting breastfeeding to all moms who are on approved treatment.
- If relapse to drug use stop breastfeeding.
- I will be able to educate my patients better. X 2
- Encourage drug addicted moms in MAT to breastfeed.

**Holly Myers MSN, RN, CNE**

1. Presented information clearly.  
   33 Yes  0 No

2. Used effective teaching methods.  
   33 Yes  0 No

**Was the information presented fair, balanced and without bias?**  
33 Yes  0 No
General Comments:

- Great presentation! Very informative!
- Really great job Holly!
- Material clearly presented and explained.
- Good presentation x 3
- Great presentation! This is a much needed topic to go over repeatedly with nurses that take care of these babies!
- Very interesting. X 2
- Great presentation! Very informative and knowledgeable. Thank you!
- Wonderful job! X 4
- Excellent info, well presented.
- Very informative!! X 5
- Excellent presenter. You can tell Holly is very passionate about this topic!

Future program requests include:

- Law.
- Pictures of examples of NAS withdraw signs and symptoms.
- More info on NAS scoring!

Thank you for your attendance and response!
## Appendix W

Cost Projection

<table>
<thead>
<tr>
<th>Personnel</th>
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</thead>
<tbody>
<tr>
<td><strong>Policy &amp; Guidelines Development</strong></td>
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<tr>
<td>DNP Student</td>
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<td><strong>Policy Development Total Cost</strong></td>
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<tr>
<td><strong>Staff Education Development</strong></td>
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<td>DNP Student</td>
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<td><strong>Staff Education Development Total Cost</strong></td>
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<td><strong>Staff Education Development Total Cost</strong></td>
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<td><strong>Hospital Education</strong></td>
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<tr>
<td>Staff RN (N=33)</td>
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<td><strong>Hospital Education Total Cost</strong></td>
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<td><strong>OB/GYN Office Education</strong></td>
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<td>OB/GYN Office Staff LPN (N=10)</td>
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<td><strong>OB/GYN Office Education Total Cost</strong></td>
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<td><strong>Health Department Education</strong></td>
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<tr>
<td>Lactation Staff Nurse</td>
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<td>Peer Mentor</td>
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<td>General Staff (N=75)</td>
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<td><strong>Health Department Education Total Cost</strong></td>
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<td><strong>Items</strong></td>
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<tr>
<td>Ohio Perinatal Quality Collaborative Neonatal Abstinence Syndrome: A Guide for Families (Education Booklet)</td>
<td>Free</td>
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<td>Special Care Nursery Charge for NAS Evaluation and Treatment</td>
<td>$1.150.00/day</td>
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<td>Pharmacological Treatment</td>
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<tr>
<td><strong>Items Total Cost</strong></td>
<td>$TBD</td>
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</tbody>
</table>

**Total Project Costs** | $TBD 1,090.00 |