Care Practices of the Term, Well-Appearing Newborn Delivered to a Mother Diagnosed with Chorioamnionitis As Reported by Nurses in Virginia Hospitals

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"On my honor, I pledge that I have neither given nor received aid on this assignment."

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Abstract

A newborn delivered to a mother who has been diagnosed with chorioamnionitis is frequently separated from the mother shortly after birth for a period of time ranging from minutes to days as a result of national recommendations to collect lab work and start empiric antibiotics. Studies show there is wide variation in adherence to this guideline when the newborn is term and well-appearing. The purpose of this study was to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals. The primary investigator designed and administered a survey to nurses in clinical leadership roles working in 51 level I newborn nurseries in Virginia to describe the care practices of comfort, feeding, and monitoring, as derived from the Universe of Developmental Care. Of the 23 responses from 23 unique hospitals throughout Virginia, over 80% frequently or always allowed newborns in this population to have at least the first hour of life skin-to-skin (STS) with the mother (81.8%), have the first breastfeeding prior to any separation for sepsis screening (81.8%), and to room-in (82.6%). Newborns in this sample were rarely or never separated from the mother for monitoring in the NICU (56.3%) or nursery (52.7%), but most were monitored more closely than newborns receiving routine newborn care by frequently or always receiving more frequent vital signs (75%) and nursing assessments (65%). Although there was variation, the majority of hospitals sampled rarely or never collected lab work in the mother's room (40.9) or administered antibiotics in the mother's room (47.8). When compared with care practices described through national and other regional studies, the Virginia hospitals in this sample described frequent use of care practices that protect the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis. More study is needed to determine an evidence-based approach to caring for this population of newborns.

Keywords: newborn, care practices, early-onset sepsis, chorioamnionitis, skin-to-skin

The survival of a species is not determined by its strength or intellect, but by its ability to adapt to its environment (Megginson, 1963). The first adaptation every member of our species must make is the transition to the extrauterine environment at birth. The term, healthy newborn, vigorous at delivery, enters the world crying, flailing, hypertonic and grimacing with eyes tightly shut and hands clenched in fists, ready to fight for survival. Although vulnerable and unable to speak, the newborn is communicating through autonomic, motor, state and interactive responses (Als, H., 1982). Upon being placed skin-to-skin (STS) with the mother, the newborn's autonomic system responds with decreased oxygen consumption and lowered heart and respiratory rates (Feldman, 2004). Motor responses become slower and posture more relaxed. The newborn STS following delivery will exhibit a window of quiet, alert, highly attentive time during which eye contact is made with the mother and the first feeding may take place (United Nations Children's Fund [UNICEF], 2016). It is here that the newborn's needs for survival are met. The Universe of Developmental Care theory describes the newborn's skin as the boundary between the internal neuro-biologic systems and the external environment. It is on this shared surface of the skin that the newborn receives input that impacts physiologic functioning and neurologic development (Gibbins, S., Hoath, Coughlin, Gibbins, & Franck, 2008).

With medical advances such as antibiotics and improved prenatal care and labor management, the survival of the newborn has become an expectation with over 98% of births in the United States taking place in hospitals (Centers for Disease Control and Prevention [CDC], 2014). When a laboring woman in the hospital develops a fever or shows other signs that she may have developed an intraamniotic infection, an obstetric provider may make a clinical diagnosis of chorioamnionitis. This diagnosis can be problematic as symptoms are non-specific and can have an etiology independent of infection (Roberts et al., 2012). Because the CDC and

the American Academy of Pediatrics (AAP) recommend sepsis screening and a minimum of 48 hours of intravenous antibiotic administration for any newborn delivered to a mother with a diagnosis of chorioamnionitis, regardless of gestational age or clinical presentation, this diagnosis can significantly impact the care practices for the term, well-appearing newborn. Medical management following these national guidelines results not only in pain from lab work collection and disruption of the microbiome secondary to antibiotic exposure, but also potential separation of the newborn from the mother, including the first moments of life, when STS is the newborn's best environment for adaptation. Because separation, pain and antibiotic exposure are undesirable and the risk of early-onset sepsis (EOS) in the term newborn delivered to a mother diagnosed with chorioamnionitis is low (Braun, Bromberger, Ho & Getahun, 2016; Towers et al., 2017), there is wide variation in adherence to the CDC and AAP guidelines. In a review of over 30,000 newborns from 13 medical centers, Braun, Bromberger, Ho & Getahun (2016) found that compliance with antibiotic administration in this population varied from 7 – 76% with some hospitals permitting STS and rooming-in, while others separated the newborn from the mother for the duration of the hospital stay.

While evidence has guided care practices such as STS for a least the first hour of life and frequent, uninterrupted time afterwards for the healthy, term newborn (Association of Women's Health, Obstetric and Neonatal Nurses [AWHONN], 2016), no care practice guidelines exist for the term, well-appearing newborn delivered to a mother with a diagnosis of chorioamnionitis. Derived from the Universe of Developmental Care (Gibbons et al., 2008), care practices are defined as direct, intentional interactions taken to promote the comfort, feeding and monitoring of the newborn. Care practices respect and protect the newborn's unique needs.

The variation in medical management of this population further complicates identification and standardization of care practices. Regardless of the newborn provider's chosen method of management, there is no consensus on how or where to monitor the newborn for signs of illness during this time. Some newborns will be monitored in the mother's room, the transitional or well-baby nursery or the neonatal intensive care unit (NICU) (Mukhopadhyay et al., 2017).

Thus, the purpose of this study was to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals. The research question was what are the care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals as described by nurses in a clinical leadership role?

Background

The Universe of Developmental Care describes the need for the newborn to receive comfort, feeding, and monitoring to meet needs and support overall well-being (Gibbons et al, 2008). The care only the mother can provide, through comfort and feeding, should be respected. Monitoring the newborn's vital signs and clinical status, while protecting the newborn and mother from separation, are care practices the nurse can provide. The World Health Organization (WHO) recommends newborns have uninterrupted STS time with the mother as soon as possible after delivery (WHO, 2017). Similarly, the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN, 2016) recommends that all newborns at least 37 weeks gestation have STS contact with the mother for at least one hour following delivery as well as frequent uninterrupted time afterwards. In a systematic review of STS care for term, healthy newborns, Cleveland et al. (2017) noted that while the recommended amount of time a

newborn should spend STS with the mother following delivery varied from 20 minutes to 2 hours, the care practice of providing STS was consistently supported by the evidence for every term, healthy newborn and sometimes referred to as a golden hour for the mother-baby dyad. Although STS within ten minutes after birth is associated with improved breastfeeding success and promotes exclusive breastfeeding, it is recommended for all newborns, regardless of the mother's feeding preference and regardless of whether delivery is vaginal or by cesarean section (Feldman-Winter & Goldsmith, 2016). STS has also been demonstrated to have a positive lasting impact on mother-infant interaction one year later when compared to mother-interactions of newborns whose hospital routines resulted in their immediate separation from the mother (Bystrova et al., 2009).

The care practice of rooming-in helps ensure that a mother has ample time for unlimited, uninterrupted STS contact with her newborn. Rooming-in is defined by the AAP as keeping mothers and newborns together 24 hours a day for their duration in the hospital and is recommended for every full-term healthy newborn (Feldman-Winter & Goldsmith, 2016). Despite evidence for best care practices for the term newborn, there are situations in which implementation of medical interventions to ensure the safety of the newborn justify deviating from these practices such as when the newborn needs resuscitation or has signs of sepsis.

EOS is defined by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) and the Vermont Oxford Network (VON) as sepsis occurring within the first three days of life. Broader definitions, such as that of the CDC, may include sepsis occurring within the first week of life (CDC, 2010). While the definition of EOS varies from the onset of sepsis in the first 72 hours of life to the first week of life, there is agreement

that the associated morbidity and mortality is high and treatment of a newborn with broad spectrum antibiotics should not be delayed (Higgins et al, 2016; AAP, 2012; CDC, 2010).

Intraamniotic infection as defined by the American College of Obstetricians and Gynecologists (ACOG), which they also call chorioamnionitis, is an infection with resultant inflammation of amniotic fluid, placenta, fetus, fetal membranes and/or decidua. Clinical symptoms for diagnosis are maternal fever of at least 39°C or 38° – 38.9°C with at least one additional risk factor which include maternal leukocytosis, purulent cervical drainage or fetal tachycardia (ACOG, 2017). Chorioamnionitis has long been used as a broad term describing a presumed infectious process and can include situations limited to symptoms related to inflammation (Roberts et al., 2012).

There is evidence that the association between intraamniotic infection and chorioamnionitis is much higher in premature deliveries than in deliveries at term. Roberts et al. (2012) identified only 4% of acute histologic chorioamnionitis at term with an infectious etiology. The researchers state that inflammation at term is usually secondary to maternal fever. Maternal fever and inflammatory response can have many non-infectious causes including medical interventions such as prostaglandin administration commonly used to induce labor and epidural anesthesia for pain control, as well as environmental causes such as elevated room temperature and maternal dehydration (Higgins et al., 2016). Chorioamnionitis, in the absence of infection, does not pose the same risks for EOS in the term infant. In a prospective cohort study of 6057 women in labor ≥ 36 weeks gestation, Towers et al. (2017) found that 412 (6.8%) developed a temperature of at least 38°C. Only one of the five newborns with culture proven EOS identified in this study was born to a febrile mother while the other four were born to afebrile mothers. They calculated a rate of EOS in mothers who were febrile or who were

diagnosed with chorioamnionitis as 0.24%. Maternal fever or inflammation alone have not been shown in the literature to be accurate predictors of EOS in the term infant (Higgins et al, 2016; Towers et al., 2017).

While the collection of lab work and administration of intravenous antibiotics can cause pain for the newborn and emotional stress for the mother, the negative effects of the separation of the newborn from the mother should not be minimized. Currently no care practice guidelines exist for the term, well-appearing newborn when the mother's obstetric provider has diagnosed her with chorioamnionitis. Because the risk of EOS for the term newborn delivered to a mother diagnosed with chorioamnionitis is low (Braun, Bromberger, Ho, & Getahun, 2016; Towers et al., 2017), and because there is compelling evidence that the healthy term newborn benefits most when separation from the mother is avoided (Feldman-Winter & Goldsmith, 2016), there is wide variation in the medical management, as well as in the care practices, of these newborns (Mukhopadhyay et al., 2017). The purpose of this study was to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals. The research question was what are the care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals as described by nurses in a clinical leadership role?

Review of the Literature

Search strategy

Search terms included neonate or newborn, skin-to-skin or bonding or attachment, and separation. Basic searches of the electronic databases (Pubmed, CINAHL, Web of Science, Cochrane and Joanna Briggs) were completed. MeSH terms (Figure A1) were incorporated into

the Pubmed search and subject headings were utilized during the CINAHL search. This search was updated on January 2, 2019.

An additional search was conducted using search terms chorioamnionitis, newborn or neonate, antibiotic and sepsis. Basic searches of the electronic databases (Pubmed, CINAHL, Web of Science, Cochrane and Joanna Briggs) were completed, filtered to only include results that were in English and published during the past ten years. MeSH terms (Figure A2) were incorporated into the Pubmed search and subject headings were utilized during the CINAHL search. This search was updated on January 2, 2019.

A search for gray literature utilizing search engines Google and Google Scholar, as well as searching professional organization websites for pertinent information produced more literature. Ancestry searches from professional organizations' published practice briefs and recommendations produced additional pertinent literature.

Selection of Articles

The total number of articles retrieved during the search for barriers to the practice of providing skin-to-skin care was 455. Removing 77 duplicated articles resulted in 378 unique articles. Primary exclusion was done by title and abstract, excluding any articles that were not about newborns during the postpartum hospital stay or were about newborns with low birth weight, who were sick, premature or were a species other than human. After reviewing fully, secondary exclusion was made of any article that was not about the effect of separation of the newborn from the mother, pertained only to long-term NICU patients, or presented information that was available in more recent literature. The number of articles retrieved from each database, excluded based on the above criteria, and included in this review are summarized in a Prisma

Flow Diagram (Figure A3). Additional resources discovered through gray literature searches and ancestry searches were organized, summarized and included on the Prisma Flow Diagram in FigureA3.

The total number of articles retrieved in the search for chorioamnionitis was 210. Removing 92 duplicated articles resulted in 118 unique articles. Primary exclusion was done by title and abstract, excluding any articles that were not about newborns during the postpartum hospital stay, did not include newborns at increased risk of EOS, or included newborns effected by nosocomial infection or congenital anomalies. After reviewing full articles, secondary exclusion was made of any article that did not pertain to EOS risk, was not about term newborns, included sick newborns, or included data that was not collected in the United States. The number of articles retrieved from each database, excluded based on the above criteria, and included in this review are summarized in a Prisma Flow Diagram (Figure 4). The 25 articles retrieved through the literature search include six that specifically describe term or near-term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis (Braun, Bromberger, Ho & Getahun, 2016; Jan, Ramanathan & Cayabyab, 2017; Joshi et al., 2018; Money, Newman, Demissie, Roth, & Blau, 2017; Peterson et al., 2017; Shakib, Buchi, Smith, & Young, 2015). Two studies described results of managing term, well appearing newborns born to mothers diagnosed with chorioamnionitis without the use of antibiotics (Joshi et al., 2018; Jan, Ramanathan & Cayabyab, 2017). Two articles described risk of EOS in the term, well-appearing newborn (Braun, Bromberger, Ho & Getahun, 2016; Towers et al., 2017). One article by the developers of the Kaiser Permanente Early-Onset calculator included a full description of this multivariate tool and how it was developed (Puopolo et al., 2011). Also retrieved was the publication of the CDC guidelines for management of newborns thought to be at increased risk

for EOS (CDC, 2010). Additional resources discovered through gray literature searches and ancestry searches were organized, summarized, and included on the Prisma Flow Diagram in Figure A4.

Results

WHO, AWHONN, and AAP recognize that the benefits of allowing a term, healthy newborn unlimited, uninterrupted access to the mother is the best way to meet the newborn's needs. STS care immediately following delivery not only helps the newborn regulate physiologic functions during transition to extrauterine life (Feldman, 2004), but also has a lasting regulatory effect for several hours following skin-to-skin care (Ferber & Makhoul, 2018). Newborns who spend the first two hours of life STS with their mother demonstrate better quiet sleep and better waking behaviors for feeding at four days of life when compared to newborns who are separated from their mothers soon after birth (Dumas et al., 2012). Newborns who remain unclothed during STS, compared to being swaddled or clothed, also demonstrate better waking behaviors for feeding at four days of life (Dumas et al., 2012). Although routine newborn care in the hospital can result in separation of the newborn from the mother (Niela-Vilen & Axelin, 2017), the newborn thought to have an increased risk of EOS is even more likely to be separated from the mother (Mukhopadhyay et al., 2017).

In 2010, Better Outcomes through Research for Newborns (BORN), a nationwide collaboration comprised of medical providers and researchers was formed with the goal of determining the best evidence-based practices for routine care of term and late preterm newborns (BORN, 2017). Nurseries in the BORN network were surveyed by Mukhopadhyay et al. (2017) between October 2015 and January 2016 with the primary purpose of identifying the management of the term, well-appearing newborn delivered to a mother diagnosed with

chorioamnionitis. From the 81 responding hospitals, from 33 states, the investigators found that the term, well-appearing newborn requiring EOS evaluation experienced some degree of separation from the mother in 95% of the hospitals. Separation occurred before one hour of life in nearly one-third of the hospitals if empiric antibiotics were initiated. Regarding the well-appearing, term newborn delivered to a mother with an obstetric diagnosis of chorioamnionitis, 86% of the surveyed hospitals reported they would obtain lab work and 85% reported they would initiate empiric antibiotics. Conversely, if the mother was diagnosed with an isolated fever, without the diagnosis of chorioamnionitis, lab work was collected at 23.9 -31% of responding hospitals and antibiotics initiated at only 6.1-14.1% of the responding hospitals. If the newborn was receiving antibiotics, care was provided in the NICU or special care nursery at 75.7% of the hospitals. While an additional 13.5% were allowed to room-in after a specified amount of time, ranging between 6 and 24 hours, others were separated from the mother at 40% of the hospitals until antibiotics were discontinued. Of the hospitals responding to the survey, the investigators found that 60.7% followed CDC or AAP guidelines for managing the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis, 13.9% reported using the Kaiser Permanente Early-Onset Sepsis calculator, 12.7% utilized a locally derived management protocol and another 12.7% reported that there was no consensus regarding management and was provider dependent. The investigators concluded that there was no national standard of care among hospitals for the medical management and care of term, well-appearing newborns thought to be at increased risk for EOS (Mukhopadhyay et al., 2017). In the commonwealth of Virginia, there is currently no regional data available regarding the medical management and care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis.

Ziegler, Paul, Hoffman, and Locke (2016) reviewed NICU admission rates and indications for admission of 233,844 live births between 35- and 42-weeks gestation delivered between 2002 and 2008, available through the Consortium on Safe Labor (CSL) database of 19 hospitals providing maternity services in the United States. The purpose of their investigation was to identify rates of term newborn NICU admissions not accounted for by the newborn's clinical presentation. The investigators found that NICU admissions for maternal chorioamnionitis ranged widely from 6 to 91.7% ($p<.001$) and identified hospital site as the most common variable accounting for this variability (Ziegler, Paul, Hoffman & Locke, 2016). This study provided further evidence that there is wide variation across the country in the management of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis, however it did not offer any insight into how practices may vary regionally.

NICU admission is not only financially costly, but also bears a high emotional cost. Mothers endure much emotional strain when their newborn is in the NICU, even when the duration is not long and the newborn is not seriously ill (Nystrom & Axelsson, 2002). In a systematic review of parental experience when their child is in the NICU, common themes were identified which included feelings of stress, strain, separation, depression, despair, disappointment, ambivalence and lack of control (Obeidat et al., 2009). Infants separated from their mother for EOS evaluation within two hours of birth were more likely to have delayed breastfeeding, which is highest in infants who spend 30 minutes or less of their first two hours of life with the mother (Mukhopadhyay et al., 2015).

There are undisputed benefits for the newborn to spend as much time as possible with the mother. STS care and rooming in, care practices associated with improved breastfeeding and transition to extrauterine life, are supported by the WHO, the AWHONN, and the AAP. From

the literature, well-appearing term infants who are admitted to the NICU for sepsis evaluation are more likely to be separated from the mother for longer periods of time. Recognizing the undesirable effects of admitting asymptomatic term newborns to the NICU, the doctors and nurses from the NICU and well-baby nursery (WBN) at one regional hospital delivering over 1600 newborns each year developed a Maternal Chorioamnionitis Pathway (MCP) designed to safely manage term, asymptomatic newborns in the WBN (Peterson et al., 2017). After lab work collection and first dose of antibiotics given, if the newborn remained asymptomatic, rooming-in with the mother commenced (Peterson et al., 2017). While this facility followed the CDC and AAP recommendations of limited sepsis screening and empiric antibiotics for managing these newborns, the MCP allowed most of the asymptomatic newborn's care to be provided by staff in their WBN, where the majority of the newborn's time was spent rooming-in with the mother. The investigators compared the outcomes of 39 asymptomatic, term newborns delivered to mothers diagnosed with chorioamnionitis between two time periods before and after a practice change. Outcomes were measured before implementation of the MCP to guide management, when NICU admission was the standard care practice at their institution, in January 2011 to 2016 and compared those to outcomes of 109 asymptomatic, term newborns delivered to mothers diagnosed with chorioamnionitis between January 1, 2011 and January 18, 2016, after the MCP was implemented using the MCP to guide management. The investigators found no statistically significant difference in time to first antibiotic administration of newborns admitted to the WBN when compared to those admitted to the NICU. Additionally, newborns managed in the WBN, where rooming-in was standard practice, benefited from higher exclusive breastfeeding rates (46% WBN vs 7.3% NICU, $p<0.0001$) and were given less formula when mothers planned to exclusively breastfeed (12% in WBN vs 46% in NICU, $p<0.0001$) (Peterson et al., 2017). The

MCP was useful for delineating responsibilities and timelines for the medical management of this newborn population, however it did not offer insight into how WBN staff should monitor the newborn for signs of sepsis while rooming-in with the mother.

Jan, Ramanathan and Cayabyab (2017) found that NICU admission rates were lower when asymptomatic term newborns delivered to mothers diagnosed with chorioamnionitis were not routinely started on empiric antibiotics. The investigators reviewed the medical records of 5637 newborns ≥ 35 weeks gestation delivered at Los Angeles County University of Southern California (LAC+USC) between May 2008 and December 2014. Of the 240 asymptomatic newborns delivered to mothers diagnosed with chorioamnionitis and admitted to the mother-infant unit, 162 (67.5%) remained well and avoided antibiotic exposure and NICU admission. Of the remaining 78 (32.5%) newborns subsequently admitted to the NICU, 59 (76%) were admitted secondary to abnormal lab values without clinical symptoms of sepsis. Twelve of these newborns had pathogen positive blood cultures, but only two were showing signs of sepsis at the time of admission. The remaining ten newborns were admitted to the NICU and started on antibiotics between 7 and 25 hours of life when their blood cultures turned positive. In this study, observation and lab work collection served as a judicious combination for management to avoid empiric use of antibiotics with no adverse outcomes regardless of whether treated in the NICU or managed in the mother-infant unit.

Physicians and nurses at Lucile Packard Children's Hospital Stanford, a tertiary care facility with about 4500 deliveries each year, developed a method for managing well-appearing newborns ≥ 34 weeks gestation born in the setting of chorioamnionitis (Joshi, et al., 2018). A neonatologist or neonatal nurse practitioner attended the delivery of any chorioamnionitis exposed newborn and, if clinically well on initial assessment, allowed the newborn to stay with

the mother for STS contact for the first two hours of life. During this time, a NICU nurse remained with the newborn and assessed the clinical condition every 30 minutes. If at any time symptoms consistent with sepsis presented, the newborn was transferred to the NICU for lab work and antibiotic treatment. Otherwise, at two hours of life, the newborn was admitted to the level II nursery for 24 hours of observation which included continuous cardio-respiratory monitoring and vital signs every four hours. No lab work was routinely collected nor were antibiotics routinely started. If clinically well at 24 hours of life, the newborn returned to the mother for rooming-in until discharged home. For 15 months, starting in March of 2015 when the guideline was implemented, researchers reviewed the electronic medical records of 277 chorioamnionitis exposed newborns who were well-appearing at birth. Of these newborns, 229 (82.7%) did not have lab work collected and 245 (88.4%) did not receive empiric antibiotics. Previously management was per CDC and AAP recommendations and all 227 (100%) of these newborns would have received lab work and empiric antibiotics, however with the monitoring method measured in this study, only 17% received lab work and only 11.6% received antibiotics (Joshi, et al., 2018). Although this method of monitoring drastically decreased the number of newborns receiving lab work and antibiotic exposure, without causing any delay in treatment and without any adverse outcomes, it also resulted in separation of the newborn from the mother for most of the first 24 hours of life.

In 2016, Higgins et al. published new guidelines regarding the diagnosis of chorioamnionitis from an expert panel consisting of the NICHD, the Society for Maternal-Fetal Medicine, the ACOG, and the AAP. The panel suggested the following diagnostic terminology: 1) isolated maternal fever, 2) suspected intraamniotic infection based on subjective clinical symptoms, and 3) confirmed intraamniotic infection based on objective laboratory studies, which

they suggested be called Triple I in an effort to exclude laboring women from being diagnosed with chorioamnionitis based on a fever alone or when chorioamnionitis is suspected, but not confirmed. They also stated that the CDC and AAP recommendation to collect lab work and start empiric antibiotics regardless of gestation or clinical appearance only applied to newborns delivered to mothers with confirmed intraamniotic infection (Triple I). In a follow-up practice brief in 2017, ACOG recommended continuing the practice of treating a laboring woman with suspected or confirmed intraamniotic infection with antibiotics during labor. However, if the newborn is term and well-appearing, they recommended monitoring clinically as well as utilizing a risk assessment tool such as the Kaiser Permanente Early-Onset calculator to guide practice in determining if lab work and/or antibiotics are indicated.

The Kaiser Permanente Early-Onset Sepsis calculator is a multivariate, predictive model that was designed to quantify the risk of EOS in newborns ≥ 34 weeks gestation by combining clinical condition and objective data available at the time of birth: gestational age, length of time membranes had been ruptured, highest maternal temperature, maternal GBS status and type and timing of any intrapartum antibiotics received instead of relying on subjective antenatal observations and clinical diagnoses such as chorioamnionitis. When the data is entered into this web-based tool, a risk value is calculated (Puopolo et al., 2011). The risk value is stratified into categories of well-appearing, equivocal and sick based on the newborn's clinical condition. Equivocal refers to newborns who may have symptoms that can be consistent with sepsis, but which resolve within two to four hours while the infant is transitioning to extrauterine life. A risk value for each stratification is generated with corresponding recommendations to observe only, monitor vital signs every 4 hours for 24 hours, collect lab work, and/or start antibiotics (Escobar et al., 2014). In a commentary from the Department of Pediatrics at Stanford University, the

authors asserted that the utility of risk assessment tools was limited and recommended that well-appearing term infants at increased risk of EOS be managed with close clinical observation (by Benitz et al., 2015). Several retrospective studies have been conducted to measure the utility of this tool to specifically assess risk of EOS and guide management in the population of term, or near-term, well-appearing newborns born to mothers who have been diagnosed with chorioamnionitis.

Shakib et al. (2015) reviewed over 20,000 newborns ≥ 34 weeks gestation delivered at the University of Utah between 2006 and mid-2013. Of the 698 newborns delivered to mothers diagnosed with chorioamnionitis who did not require NICU admission, 455 (62%) received lab work and antibiotics in accordance with the CDC and the AAP guidelines. By retrospectively calculating the EOS risk for each of these newborns, the investigators found that had these newborns been managed with recommendations based on the Kaiser Permanente Early-Onset Sepsis calculator, 612 (88%) would have been managed with observation alone with another 47 (8%) also having a blood culture collected. Antibiotics would have been indicated for only 39 (5%) of these newborns, a reduction in empiric antibiotic use of over 80%. The investigators also determined that the sepsis calculator would have recommended immediate sepsis screening and antibiotic initiation for the one newborn in the sample with true-positive, culture proven sepsis and concluded that the risk calculator would have safely guided management of these newborns while minimizing lab collection, antibiotic usage and separation from the mother.

A similar study was conducted by Money, Newman, Demissie, Roth, and Blau (2017). From more than 20,000 live births at SIUH between January 2009 and April 2016, the investigators identified 362 term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis. Following CDC and AAP guidelines, 362 (99.7%) received lab work and

empiric antibiotics. By retrospectively applying the Kaiser Permanente Early-Onset Sepsis calculator, they found that only 9 (2.5%) newborns would have received empiric antibiotics. Fifty (13.8%) would have received a blood culture without antibiotics and the remaining 303 (83.7%) would have only been observed or had vital signs monitoring. The one case of culture confirmed sepsis (0.3%) was in a newborn who remained asymptomatic and would have only been observed with vital sign monitoring every 4 hours if managed with the EOS calculator. It is unknown when, or if, symptoms would have presented to determine if treatment would have been seriously delayed. The researchers discussed the possibility that the organism, Enterococcus faecalis, could have been a contaminant, however because it has also been associated with EOS, they cautioned against relying solely on the recommendation of the calculator.

The Kaiser Permanente Early-Onset Sepsis calculator was evaluated for its ability to provide correct recommendations when retrospectively applied to chorioamnionitis exposed newborns with culture proven EOS. Carola et al. (2018) reviewed records for nearly 18,000 newborns ≥ 35 weeks gestation delivered at their facility between November 2006 and March 2017. Of these, 1159 were delivered to mothers diagnosed with chorioamnionitis and included five (0.43%) with culture proven EOS. The investigators retrospectively applied the sepsis calculator to the 896 newborns who had adequate data for calculation, which included all five newborns with EOS. As in the previous studies, utilizing the sepsis calculator would have greatly reduced the number of newborns requiring lab work and antibiotic administration, however it would have only recommended lab work and antibiotics for three of the five newborns with culture proven sepsis. In reviewing lab values, the investigators determined that all five newborns with EOS had abnormal complete blood counts and c-reactive protein levels and concluded that the use of Kaiser Permanente Early-Onset Sepsis calculator needs to be studied in

conjunction with lab values to determine if it can be safely used to minimize antibiotic use in the newborn exposed to chorioamnionitis.

Researchers have identified wide variation in hospital-wide adherence to the CDC and AAP guidelines on a national level, ranging from as few as 7% to as many as 76% (Braun, Bromberger, Ho & Getahun, 2016; Mukhopadhyay et al., 2017). In this review of the literature, medical management of term or near-term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis, using methods that vary from the current CDC and AAP guidelines, was described (Braun, Bromberger, Ho & Getahun, 2016; Jan, Ramanathan & Cayabyab, 2017; Joshi et al., 2018; Money, Newman, Demissie, Roth, & Blau, 2017; Peterson et al., 2017; Shakib, Buchi, Smith, & Young, 2015). The risk of EOS in the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis was found to be low (Braun, Bromberger, Ho & Getahun, 2016; Towers et al., 2017) and was safely managed without the use of antibiotics (Joshi et al., 2018; Jan, Ramanathan & Cayabyab, 2017) and without separation from the mother (Joshi, et al., 2018; Peterson et al, 2017).

Regardless of medical management, it is important to identify care practices that are most beneficial for this unique population of newborns, affording them the most time possible with their mothers without placing them at risk. The purpose of this study was to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals. The research question was: what are the care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals as described by nurses in a clinical leadership role?

Theoretical Framework

The developmental theory Universe of Developmental Care (UDC) was introduced by S. Gibbons, Hoath, Caughlin, A. Gibbons and Franck in 2008. This theory recognizes the interdependency of the developing newborn's brain to care practices and other environmental stimuli. UDC builds on the synactive theory which proposes that the environment impacts the newborn's neurobiologic functioning and development (Als, 1982). Synactive theory sought to describe the interdependency of the newborn's developing brain with external stimuli, however did not offer a measurable shared interface between the two. An integral concept of UDC is the shared surface, the skin, which acts as an interface between neurologic function and external input. UDC presents a model of patient-centered care with the newborn as the center of its universe with several concentric rings of planets representing physiologic function, care practices, family, staff and environment. Just as in any gravitational space, the disruption of one planet effects the movement of others, the relationship between the newborn's physiology, care giving practices, family and staff are all interdependent with no movement occurring in isolation.

The innermost planets represent the newborn's biologic systems: pulmonary, cardiac, gastrointestinal/genitourinary, hematologic, metabolic, immunologic, musculoskeletal, nervous and integumentary systems. At delivery, the newborn is vulnerable and neurologically immature. Major changes are occurring in the newborn's cardiopulmonary physiology as lung fluid is displaced by air and blood circulation favors the pulmonary vasculature in the absence of a placental pathway. Placing a newborn STS with the mother during this time helps stabilize respiratory and cardiac functioning as evidenced by decreased heart and respiratory rates and higher oxygen saturations (Feldman, 2004).

The next ring of planets represents newborn care practices that have a direct impact on the newborn: comfort, safety, feeding, positioning, skin care, thermoregulation, respiratory, monitoring and infection control. In the NICU, much of this care may be provided by the staff, but in the term newborn, comfort and thermoregulation are maximized, and feeding at the breast can commence when placed STS with the mother. The focus of this study was the care practices of comfort, feeding and monitoring.

Closely orbiting the newborn and the two rings of physiologic and care practice planets is the golden planet named family. Unlike the synactive theory, UDC incorporates the family into the developmental picture of the newborn, recognizing the close relationship of the interdependent members and the newborn. This is viewed as a microenvironment, encompassing the most intimate functioning and care of the newborn.

The remaining two orbiting planets, which comprise the macroenvironment, are staff and environment. They encompass the newborn and the family in a protective orbit, strategically positioned to not only preserve, but also to foster the family unit. The distance of these planets from the family unit demonstrates the role of the caregiver and the environment, such as the NICU or nursery, in providing care from far enough away so as not to eclipse the importance of the family. The mother is the optimal care giver to provide comfort, warmth and feeding to her newborn. To ensure all the newborn's care needs are met, the nurse is strategically placed to not only provide safety and monitoring, but to also ensure the care practices provided by the mother are safeguarded by minimizing separation.

Methods

Studies have shown that there is wide variation in the both the medical management, as well as the care practices, of term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis in U. S. hospitals (Braun, Bromberger, Ho & Getahun, 2016; Mukhopadhyay et al., 2017). The methods described here were developed to assess the care practices of this population of newborns delivered in Virginia hospitals as reported by nurse leaders.

Design

This study used a descriptive design to assess care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals. The primary investigator (PI) designed a web-based survey which was administered to clinical leaders, defined as nurse managers, nurse educators, nurse practitioners or clinical nurse specialists, caring for this population of newborns.

Definition of Terms

Skin-to-skin care (STS) describes placing an unclothed newborn directly against the skin of the mother's chest (Feldman-Winter, Goldsmith, Comm Fetus & Newborn, & Task Force, 2016).

Early-onset sepsis (EOS): Sepsis occurring within the first week of life (CDC, 2010).

Chorioamnionitis: An intraamniotic infection which results in inflammation of amniotic fluid, placenta, fetus, fetal membranes and/or decidua with clinical diagnosis based on maternal fever of at least 39°C or 38° – 38.9°C in addition to maternal leukocytosis, purulent cervical drainage or fetal tachycardia (ACOG, 2017).

Care practices: Derived from the Universe of Developmental Care, care practices are direct, intentional interactions taken to promote the comfort, feeding and monitoring of the newborn. Care practices respect and protect the newborn's unique needs (Gibbons et al., 2008).

AAP Acuity designations (2012)

Level I – well newborn nursery providing care for well newborns ≥ 35 weeks gestation

Level II – special care nursery providing care for ≥ 32 weeks and ≥ 1500g with moderate illness, requiring support for an anticipated short amount of time

Level III – neonatal intensive care unit providing care for newborns of all gestations and weights, with complex illnesses requiring sustained life support

Level IV – regional NICU providing level III care within a facility that can offer complex surgical interventions

Sample and Setting

The Commonwealth of Virginia is located on the central eastern seaboard of the United States, adjacent to Washington D.C. The majority of hospitals in Virginia are not-for-profit, with hospital sizes ranging from as few as 25 beds in rural areas to as many as 1000 beds in metropolitan areas. Virginia hosts general, community, regional, critical access, specialty acute care, teaching, military, and research hospitals (Virginia Health Information [VHI], 2018). The PI examined the websites of over 100 hospitals that were listed in the Virginia Hospital and Healthcare Association (VHHA) directory and identified those hospitals that advertised maternity services. The PI identified additional Virginia hospitals with maternity services through professional contacts including medical directors in hospital NICU's that are military or

part of large healthcare systems as well as neonatal products representatives whose service areas covered regions of Virginia hospitals with maternity services. This exhaustive search resulted in a list of 51 Virginia hospitals with maternity services, a number which corresponded to the Virginia Health Department's (VHD) reference at the Virginia Neonatal Perinatal Collaborative (VNPC) (Pursell, S., personal communication, October 29, 2018).

To describe care practices at each of the 51 Virginia hospitals providing maternity services, nurses in clinical leadership roles at each hospital, being knowledgeable of both the nursery's care practices and policies, were asked to complete the survey. Inclusion criteria included nurses who were managers, educators, practitioners and clinical specialists working with level I newborns in Virginia. Exclusion criteria included providers who were not nurses, who only worked in a level II, level III or level IV nursery, or who worked outside the Commonwealth of Virginia.

Protection of Human Subjects

Approval for this study, project # 2018-0476-00, was granted by the Institutional Review Board (IRB) at the University of Virginia. Due to a low response rate, a modification to the protocol was submitted and approved by the IRB. Consent was obtained at the start of the survey explaining that data would only be used in aggregate and asking participants to check a box as consent to proceed with the survey. An introductory letter was required for the paper survey which contained all of the information found in the electronic consent, but did not required an acknowledgement of any kind. All data collected was kept on the Qualtrics secure server or in a locked location until uploaded onto the Qualtrics secure server.

Instruments

The primary investigator developed a survey that had two sections: demographic data in a multiple-choice format and a description of care practices in a Likert scale rating from 1 – 5 (see Figure D1). Respondents were asked if they work in a level I nursery and to identify their role. Three multiple choice questions asked respondents about hospital demographic data including type of hospital, number of annual deliveries, and the highest AAP level of care provided. A fourth multiple choice question asked respondents to identify if the hospital had received Magnet designation from the American Nurses Credentialing Center (ANCC) for nursing excellence within the organization, Beacon recognition from the American Association of Critical Care Nurses (AACN) for unit-wide excellence, and if the hospital was designated as Baby-Friendly by adhering to the 10 Steps to Successful Breastfeeding and not accepting free or discounted formula products developed by the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). An additional multiple-choice question asked respondents to identify whether the medical management utilized at their hospital when providing medical care to the newborn delivered to a mother who has been diagnosed with chorioamnionitis followed CDC/AAP guidelines which recommend lab work and empiric antibiotic administration for a minimum of 48 hours, used a multivariate risk calculator such as the Kaiser Permanente Early-Onset Sepsis Calculator to estimate a newborn's risk of EOS, a unit derived algorithm or provider preference.

The second section of the survey consisted of the following scenario: "A term, well-appearing newborn is delivered to a mother who has been diagnosed with chorioamnionitis at your hospital." Participants were asked to answer nine Likert-style questions (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1) about breastfeeding, rooming in, monitoring, and location of care that most closely reflects the care practices for this newborn at

their hospital. The questions regarding care practices were derived from the Universe of Developmental Care theory as a framework, which describes care practices such as comfort, feeding, and monitoring as playing an integral role in the newborn's optimal physiologic functioning and transition to extrauterine life (Gibbons, et al., 2008).

Face validity of the PI-developed survey was established through a review by three neonatal experts: two neonatal nurse practitioners and a newborn hospital unit director. They were asked to rate each Likert scale question with a score from 1 –5, with 1 being strongly disagree and 5 being strongly agree, in three categories: clearly stated, easily understood, and if it investigated the care practices of comfort, feeding, or monitoring. Feedback was used to ensure the questions were relevant and measured the care practices of comfort, feeding and monitoring. Based on the feedback of these experts, three changes were made. The five-point Likert scale wording was changed from "often" to "frequently" and from "almost always" to "always." A question asking if intravenous access was obtained while the newborn remained in mother's room was removed as the consensus was that the question asking if antibiotics were administered in mother's room better described the care practice of rooming-in. Two questions were added regarding the frequency of vital signs and assessments to help describe the care practice of monitoring.

The web-based survey was distributed by email to the nurse managers at 51 Virginia hospitals with maternity services. Upon approval of a modification to the original IRB protocol, the second phase of recruitment began. The PI or colleagues hand delivered paper surveys to alternate nurse leaders identified through professional contacts at 13 of the 51 hospitals. For the remaining 38 hospitals, a paper survey was mailed to the attention of the nurse manager who had been identified in the first phase of recruitment.

Procedures

The primary investigator followed these procedures during study implementation:

1. Approval was obtained from the Institutional Review Board Social and Behavioral Services (see Figure C1). Consent was required to begin the electronic surveys (see Figure C2). Approval for a modification to the protocol to distribute paper surveys required that an introduction letter accompany the paper survey to explain the purpose and potential benefits and risks of participating in the survey (see Figure C3).
2. A list of the nurse managers of Level I nurseries in Virginia hospitals providing maternity services, along with their email addresses, was compiled by accessing directories available on each hospital's website, professional contacts, and hospital operators and unit secretaries.
3. Each hospital was assigned a unique identifier number for study purposes.
4. The consent and electronic survey link were distributed to the nurse managers of the 51 Virginia hospitals with maternity services, inviting them to respond to the survey and describe the care practices. The email sent through Qualtrics had a unique link to the survey that could only be used once. This prevented duplication of responses from nurses at the same hospital replying through the electronic link.
5. The primary investigator utilized Qualtrics, a survey research software available through the University of Virginia, for survey administration and secure storage of data.
6. To optimize the response rate, the survey was extended for two weeks with a second reminder email sent on February 21, 2019 with the option that recipients could forward this survey link to another nurse (educator, clinical nurse specialist or practitioner only).

7. To improve the response rate, the PI applied for a study modification with the IRB that allowed for distribution and collection of additional data from paper surveys. Upon approval (see Figure C2), the paper survey, along with an introductory letter, a stamped, self-addressed return envelope, and a $5 coffee gift card incentive, were distributed by hand by the PI or a professional colleague to an alternate nurse leader at 13 of the hospitals. Paper surveys were mailed to the other 38 hospitals, addressed to the attention of the nurse manager identified in the first phase of recruitment. Each paper survey was marked with the identifying number of the hospital to which it was distributed.
8. Data collected from each paper survey, including the unique identifying number, was transcribed into an electronic version of the survey using Qualtrics software, which also provided secure storage. The paper surveys were kept locked in a secure location until destroyed.
9. The primary investigator accepted completed surveys until March 20, 2019.

Data Analysis

IBM Statistical Package for the Social Sciences (SPSS) software was utilized for data analysis. Data was imported from Qualtrics, secure survey research software available at the University of Virginia, directly into SPSS. Frequencies and percentages were calculated for the role of the respondents, the hospital demographic data and medical management.

Data from the nine Likert-style questions were not normally distributed, therefore reporting the median as central tendency with interquartile range as a measure of dispersion most clearly described the care practices. Frequencies and percentages of the responses to the nine questions (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1) were calculated.

Results

Thirty-four electronic and paper surveys were returned. Seven surveys were excluded because five of the respondents did not work in a Level 1 nursery and the other two respondents were not nurses. Of the 27 surveys from respondents who met the inclusion criteria, 10 were received through the electronic link and 17 through paper surveys distributed after modification of the protocol. Collecting responses through both electronic and paper surveys resulted in the receipt of duplicate responses from four hospitals. Duplicates were identified by hospital identifier number and excluded, resulting in 23 surveys from 23 unique hospitals (see Appendix E1).

Eighteen of the 23 respondents were nurse managers (78.3%), three were nurse practitioners (13%) and two were nurse educators (8.7%) (see Table A1). Seventeen of the 23 respondents (73.9%) worked in community hospitals. Three worked in academic (13%), two in private (8.7%), and one in military (7.4%) hospitals. Respondents worked in hospitals that provided all AAP levels of newborn care: level I (39.1%), level II (17.4%), level III (34.8%) and level IV (8.7%), with annual deliveries ranging from less than 1200 (34.8%) to greater than 4800 (4.3%). Eleven of the respondents worked in hospitals that had received Magnet designation (47.8%). Only two worked in hospitals that had received Beacon recognition (8.7%) and only one worked in a hospital with a Baby Friendly designation (4.3%). Most of the respondents worked in a newborn setting that either adhered to the CDC/AAP national guidelines (43.5%) or used a multivariate risk calculator such as the Kaiser Permanente Early-Onset Sepsis Calculator (39.1%). Demographics of the hospitals are summarized in Table A2.

Medians and interquartile ranges of the Likert-style responses, reported as (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1), were calculated. The median was 5

for first breastfeeding before separation, rooming-in, and collection of frequent vital signs. Medians for STS and frequent assessment were 4.5 and 4, respectively. The median for both monitoring in the NICU and monitoring in the nursery was 2. (Medians are summarized in Table A3).

Eighteen of the 22 hospitals (81.8%) always or frequently allowed the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis to spend at least the first hour of life STS with the mother, with 11 of the 22 (50%) reporting they always allowed STS for the first hour of life. Before being separated from the mother, the newborn was always allowed to breastfeed first in over half (54.5%) of the sample, with 18 of 22 (81.8%) reporting always or frequently allowing the newborn to breastfeed first.

The newborn was always or frequently allowed to room-in with the mother in 18 of the 22 hospitals (82.6%). Despite over half of the surveyed hospitals always allowing the newborn to room-in, lab work was rarely or never collected in the mother's room (40.9%) and antibiotics were rarely or never administered in the mother's room (47.8%). Although only 15.8% were always monitored in the nursery and only 18.8% were always monitored in the NICU, 75% of hospitals in the sample always or frequently obtained more frequent vital signs and 65% always or frequently obtained more frequent nursing assessments than what was provided during routine newborn care. The distribution of responses is summarized in Table A4.

Discussion

The care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals were described by nurses in clinical leadership roles at 23 hospitals distributed throughout the Commonwealth of Virginia. The impact of a maternal

diagnosis of chorioamnionitis in this sample was minimized, with the majority of hospitals in the sample always or frequently providing the care practices of STS, rooming-in and ensuring the first breastfeeding prior to separation of the newborn from the mother for sepsis screening, if needed. Only two hospitals (9.1%) reported rarely or never allowing the newborn to spend at least the first hour of life STS with the mother and only one reported never allowing the first breastfeeding to take place prior to separation (4.5%). The hospitals in this sample always or frequently took vital signs (75%) and completed nursing assessments (65%) more frequently for this population of newborns than provided during routine newborn care. Over 50% of hospitals in the sample rarely or never monitored the newborn in the NICU or nursery, which is reflected in the high percentage that allowed rooming-in. Despite allowing rooming-in, however, newborns were frequently separated from the mother if requiring lab work (40.9%) or antibiotic administration (48.8%).

In the sample of Virginia hospitals, 81.8% always or frequently allowed STS and first breast feeding before separation. Compared to the BORN study of this population of newborns, 29.9% had sepsis screening started before 1 hour of life. Only 33.7% ensured the first breast feeding occurred prior to sepsis screening and 36.4% reported there was no specific time for sepsis screening. While some hospitals permit this population of newborns to room-in, others separate the newborn from the mother for the duration of the hospital stay (Braun, Bromberger, Ho & Getahun, 2016). In the Virginia hospitals surveyed, 82.6% frequently or always allowed the newborn to room-in with the mother. Only two hospitals never allowed rooming-in when the newborn was being monitored for EOS (8.7%). However, many newborns were still separated from the mothers for sepsis screening. In this sample of Virginia hospitals, 40.9% rarely or never collected sepsis screening lab work in the mother's room and 47.8% rarely or never administered

intravenous antibiotics in the mother's room. Not only does the AAP recommend keeping newborns and mothers together 24 hours a day, AWHONN recommends STS for the term, stable newborn during painful procedures, such a lab work collection (2016).

Whether adhering to the CDC/AAP guidelines or using a risk-assessment calculator, there is no consensus on how or where to monitor the well-appearing newborn for signs of illness (Mukhopadhyay et al., 2017). In a national review of data from 19 hospitals in the United States, NICU admission of term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis varied from 6.0% - 91.7% ($p<0.001$) (Ziegler, Paul, Hoffman & Locke, 2016). In the study of Virginia hospitals, only 18.8% always admitted the newborn to the NICU, a favorable finding as NICU admission often has a negative impact on the mother-baby dyad, even when the newborn is not seriously ill or does not stay in the NICU long (Nystrom & Axelsson, 2002; Obeidat et al., 2009).

Newborns thought to be at an increased risk of EOS have been effectively monitored without NICU admission (Jan, Ramanathan & Cayabyab, 2017) and without separation from the mother (Joshi et al., 2018). Newborns who were managed in the well nursery, where rooming-in was the standard practice, benefitted from higher exclusive breastfeeding rates (46% WBN vs 7.3% NICU, $p<0.0001$) and given less formula when mothers plan to exclusively breastfeed (12% in WBN vs 46% in NICU, $p<0.0001$) (Peterson et al., 2017). Over half of Virginia hospitals in the sample avoided separating the newborn from the mother by rarely or never monitoring the newborn in the NICU (56.3%) or nursery (52.7%), while still monitoring these newborns more closely than newborns receiving routine care with 75% of hospitals always or frequently monitoring vital signs more closely and 65% always or frequently performing nursing assessments more frequently.

Analysis of medians for each of the nine Likert-style responses with the following choices: Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1, showed that the median for the care practices of first breastfeeding before separation, rooming-in, and collection of frequent vital signs was 5, STS was 4.5, and frequent assessments was 4, demonstrating that the central tendency in this sample was to always or frequently implement these care practices for term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis in the Virginia hospitals sampled. The medians demonstrate that newborns received vital signs and nursing assessments more frequently than newborns receiving routine care while rarely separating the newborn from the mother as evidenced by a median of 2 for both monitoring in the NICU and monitoring in the nursery.

Care practices, as derived from the Universe of Developmental Care framework (Gibbons et al., 2008), are direct intentional actions taken to promote the comfort, feeding and monitoring of the newborn. When compared with care practices described through national and other regional studies (Braun, Bromberger, Ho & Getahun, 2016; Jan, Ramanathan & Cayabyab, 2017; Joshi et al., 2018; Mukhopadhyay et al., 2017; Peterson et al., 2017; Ziegler, Paul, Hoffman & Locke, 2016), the Virginia hospitals in this sample described frequent use of care practices that protect the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis. More study is needed to determine an evidence-based approach to caring for this population of newborns.

Strengths and Weaknesses of the Design

The sample of 23 unique Virginia hospitals was representative of many regions throughout the Commonwealth. To the investigator's knowledge, this was the first description of care practices of the term, well-appearing newborn delivered to a mother diagnosed with

chorioamnionitis in Virginia. While there are evidence-based guidelines for medical management of this population from authoritative bodies such as CDC, AAP and ACOG, there are no guidelines for care practices, and studies for this population are lacking. The description of care practices in this sample of Virginia hospitals supports the need for further studies to identify an evidence based, standardized approach to care for this population of newborns.

This study had several limitations. Initial response to the electronic survey was low, necessitating a modification to the original IRB protocol allowing for collection of paper surveys as well. Survey methodology presented several barriers to collecting data. Wording could have been more specific, especially for a question that included a hard stop that prevented some participants from responding to the survey. Demographic information could have been more descriptive if definitions of types of hospitals from the American Hospital Association had been provided and the categories to choose from designed to reflect those definitions. If the Likert-style response choices had included "not applicable," there may have been fewer missing data in this section while the addition of more Likert-style questions could have provided a more thorough description of care practices in Virginia. The respondents included a large proportion of nurse managers, as they were the target for distribution. An electronic reminder gave the option for the nurse manager to forward the link to another nurse leader, however this language was not in the original invitation to participate in the electronic survey nor was it in the introductory letter included with the paper survey. Although the PI applied a rigorous method for identifying not only Virginia hospitals with maternity services, but also the name and email address for a nurse manager contact at each site, without access to an official directory of this information, it was not possible to know if this list was complete or if it contained inaccuracies. It is also unknown whether each survey was received, if it was completed by the person most knowledgeable of the

care practices for this population of newborns, or if the data reported was an accurate description of each hospital's care practices.

Nursing Practice Implications

The awareness of this unique subset of newborns is increased through publication and presentations of this study that describes the care practices in a sample of Virginia hospitals. This data adds to the body of evidence supporting the need for more studies in this area that can lead to an evidence based, standardized approach to safely care for this population of newborns while minimizing separation from the mother.

Though the PI followed a systematic method for identifying Virginia hospitals with maternity services and points of contact within those hospitals, having this information available in a validated format could aid in more robust data collection in future studies in which care practices may be more accurately described and associations between care practices in certain demographic areas identified. More studies are needed to identify standards for monitoring the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis.

Products of the Scholarly Project

An important product of this study will be the PI's Doctor of Nursing Practice Scholarly Project manuscript. Abstract submissions will be made to the Virginia Council of Nurse Practitioners (VCNP), the Virginia Association of DNPs (VADNP), and the Virginia Neonatal Perinatal Collaborative (VNPC). The manuscript will be submitted to AWHONN's journal, Nursing for Women's Health, for publication consideration (see Appendix F). The PI, having gained awareness of Better Outcomes Through Research for the Newborn (BORN), a national collaborative to improve newborn care and outcomes through evidence-based care, will seek

membership in their Region IV network that includes Virginia, Maryland, North Carolina and Washington D.C. The PI will also seek opportunities through the Virginia Neonatal and Perinatal Collaborative (VNPC) to participate in activities that can improve care and outcomes for newborns here in the Commonwealth of Virginia.

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Appendix A

Table A1

Nurse Leadership Role of Survey Participants (N = 23)

Role	*n*	%
Nurse Manager	18	78.3
Nurse Practitioner	3	13.0
Nurse Educator	2	8.7
Clinical Nurse Leader	0	0

Table A2

Demographic and Medical Management Data from a Sample of Virginia Hospitals (N = 23)

Characteristics	*n*	%
Type of Hospital		
Community	17	73.9
Academic	3	13.0
Private	2	8.7
Military	1	4.4
APA Level of Care		
Level 1	9	39.1
Level II	4	17.4
Level III	8	34.8
Level IV	2	8.7
Number of Annual Deliveries		
Less than 1200	8	34.8
1200 – 2400	5	21.7
2401 – 3600	7	30.4
3601 – 4800	2	8.7
More than 4800	1	4.4
Official Designations		
Magnet	11	47.8
Beacon	2	8.7

Baby Friendly	1	4.3
Medical Management		
CDC/AAP	10	43.5
Risk Assessment Tool	9	39.1
Provider Discretion	3	13.1
Unit Derived Algorithm	1	4.4

Table A3

Care Practices of Term, Well-Appearing Newborns Delivered to a Mother Diagnosed with Chorioamnionitis in a Sample of Virginia Hospitals

Care Practice	*n*	Median	*IQR*
Skin-to-Skin	22	4.5	4.00 – 5.00
First Breastfeeding	22	5.0	4.00 – 5.00
Rooming-In	23	5.0	4.00 – 5.00
Frequent Vital Signs	20	5.0	3.25 – 5.00
Frequent Assessments	20	4.0	3.00 – 5.00
Monitored in NICU	16	2.0	1.25 – 3.00
Monitored in Nursery	19	2.0	2.00 – 4.00
Lab Work in Mother's Room	22	3.0	1.00 – 4.25
Antibiotics in Mother's Room	23	3.0	1.00 – 4.00

Note. To assess the care practices, Likert-type questions were asked with the following choices: Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1.

Table A4

Distribution of Frequency of Care Practices in a Sample of Virginia Hospitals

Care Practice	*n*	Always/Frequently	Sometimes	Rarely/Never
Skin-to-Skin	22	18 (81.8%)	2 (9.1%)	2 (9.1%)
First Breastfeed	22	18 (81.8%)	3 (13.6%)	1 (4.5%)
Rooming-In	23	19 (82.6%)	1 (4.3%)	3 (13.0%)
Frequent Vital Signs	20	15 (75.0%)	2 (10.0%)	3 (15.0%)
Frequent Assessments	20	13 (65.0%)	3 (15.0%)	4 (20.0%)
Monitor in NICU	16	3 (18.8%)	4 (25.0%)	9 (56.3%)
Monitor in Nursery	19	5 (26.3%)	4 (21.1%)	10 (52.7%)
Lab Work in Mother's Room	22	8 (36.3%)	5 (22.7%)	9 (40.9%)
Antibiotics in Mother's Room	23	8 (34.8%)	4 (17.4%)	11 (47.8%)

Appendix B

Figure B1

MeSH terms

(("infant, newborn"[MeSH Terms] OR ("infant"[All Fields] AND "newborn"[All Fields]) OR "newborn infant"[All Fields] OR "neonate"[All Fields]) OR ("infant, newborn"[MeSH Terms] OR ("infant"[All Fields] AND "newborn"[All Fields]) OR "newborn infant"[All Fields] OR "newborn"[All Fields])) AND (("object attachment"[MeSH Terms] OR ("object"[All Fields] AND "attachment"[All Fields]) OR "object attachment"[All Fields] OR "bonding"[All Fields]) OR attachment[All Fields] OR skin-to-skin[All Fields]) AND ("divorce"[MeSH Terms] OR "divorce"[All Fields] OR "separation"[All Fields])

Figure B2

MeSH terms

("chorioamnionitis"[MeSH Terms] OR "chorioamnionitis"[All Fields]) AND (("infant, newborn"[MeSH Terms] OR ("infant"[All Fields] AND "newborn"[All Fields]) OR "newborn infant"[All Fields] OR "newborn"[All Fields]) OR ("infant, newborn"[MeSH Terms] OR ("infant"[All Fields] AND "newborn"[All Fields]) OR "newborn infant"[All Fields] OR "neonate"[All Fields])) AND ("anti-bacterial agents"[Pharmacological Action] OR "anti-bacterial agents"[MeSH Terms] OR ("anti-bacterial"[All Fields] AND "agents"[All Fields]) OR "anti-bacterial agents"[All Fields] OR "antibiotic"[All Fields]) AND ("sepsis"[MeSH Terms] OR "sepsis"[All Fields]) AND ("2008/05/10"[PDat] : "2018/05/07"[PDat] AND English[lang])

Figure B3

Search Strategy Keywords (MeSH terms included in PubMed & subject headings included in CINAHL): (newborn OR neonate) AND (bonding OR attachment OR skin-to-skin) AND separation

Database Results (search executed on Aug 1, 2018):
PubMed (n = 249)
CINAHL (n = 70)
Web of Science (n = 102)
Cochrane (n = 6)
Joanna Briggs (n=15)

Citation Manager: RefWorks

Article Selection Process

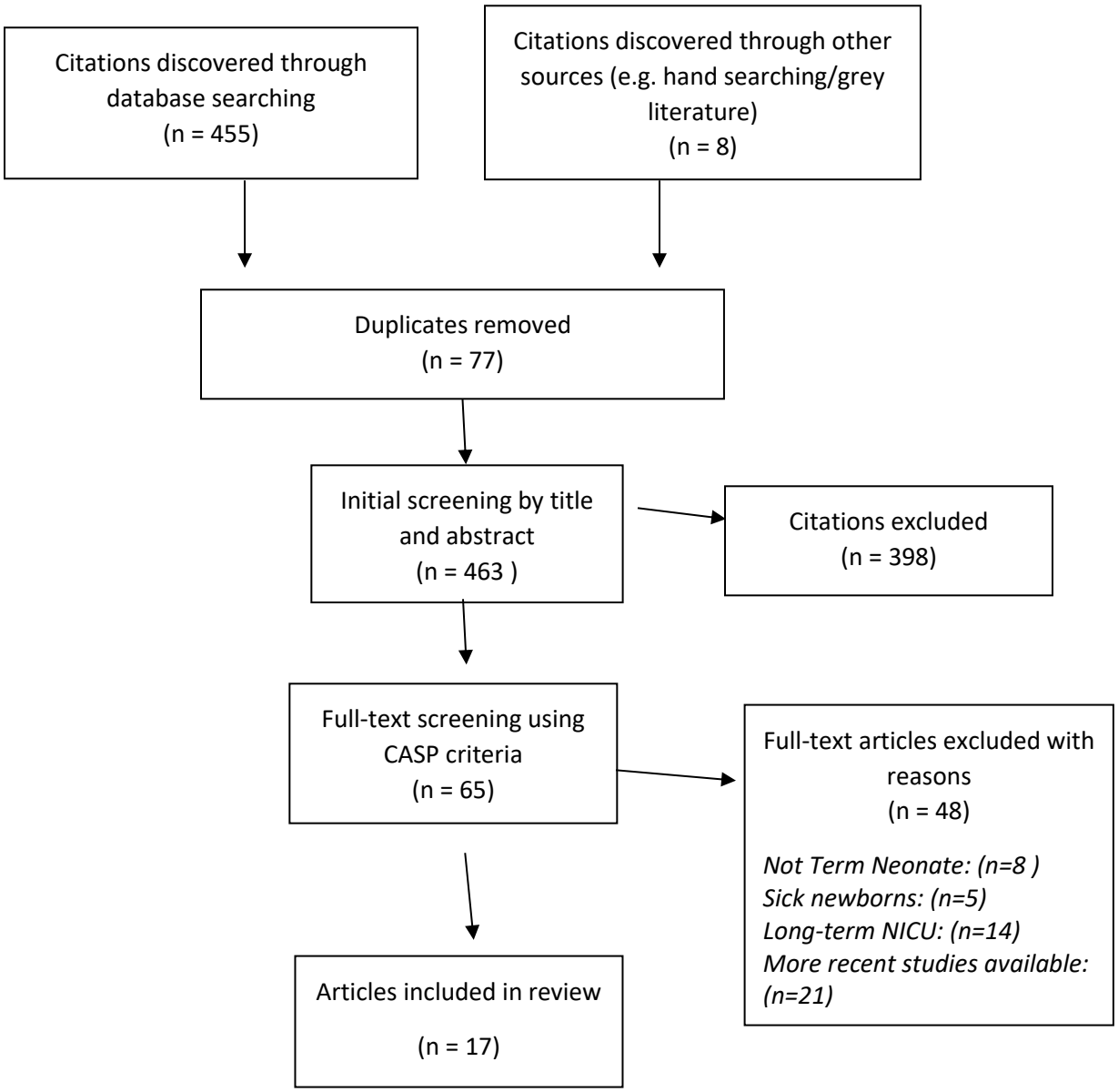


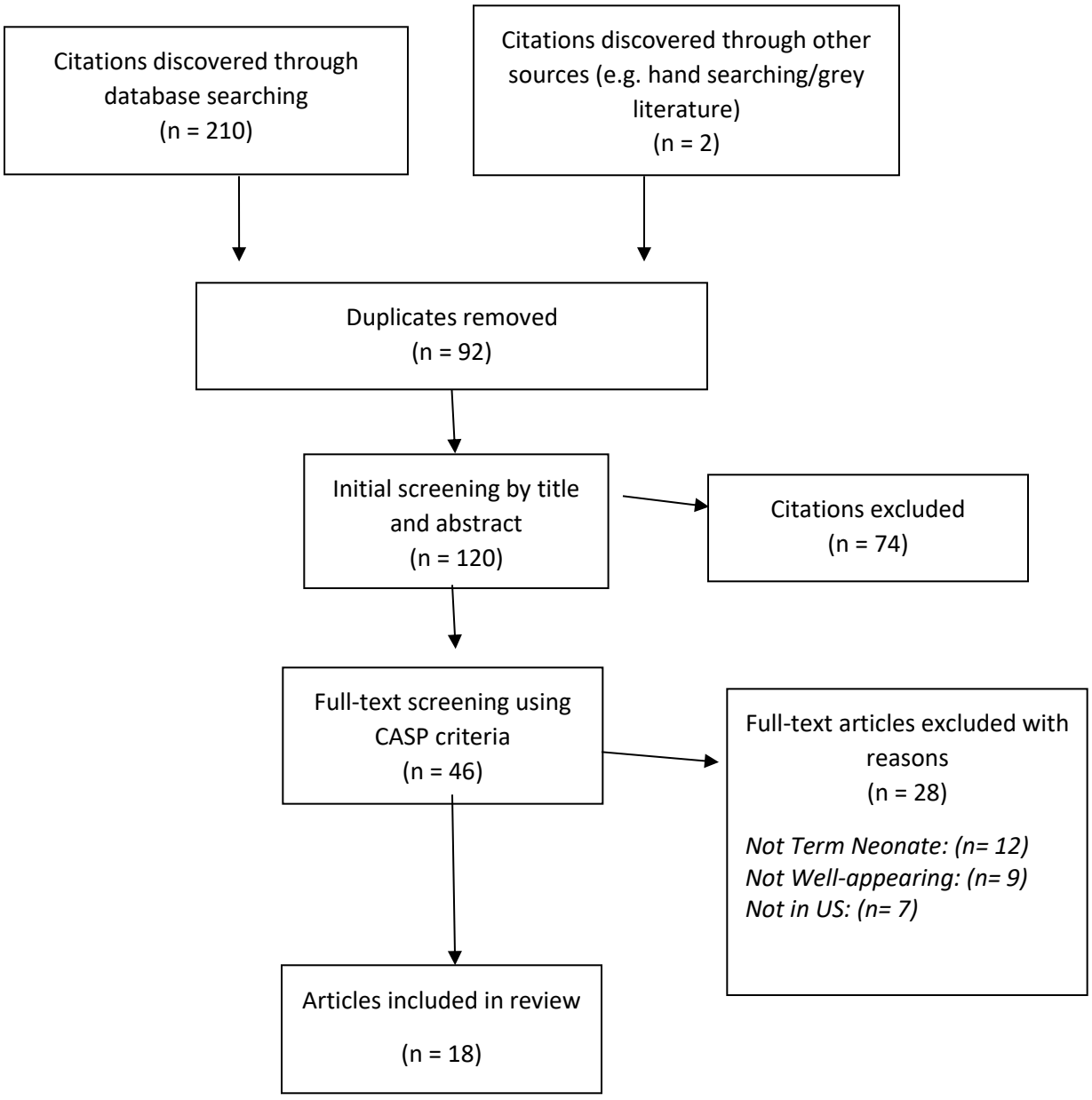
Figure B4

Search Strategy Keywords (MeSH terms included in PubMed & subject headings included in CINAHL): chorioamnionitis AND (neonate OR newborn) AND antibiotic AND sepsis / Limits: English language and Current 10 years

Database Results (search executed on May 4, 2018):
PubMed (n = 57)
CINAHL (n = 42)
Web of Science (n=71)
Cochrane (n = 39)
Joanna Briggs (n=1)

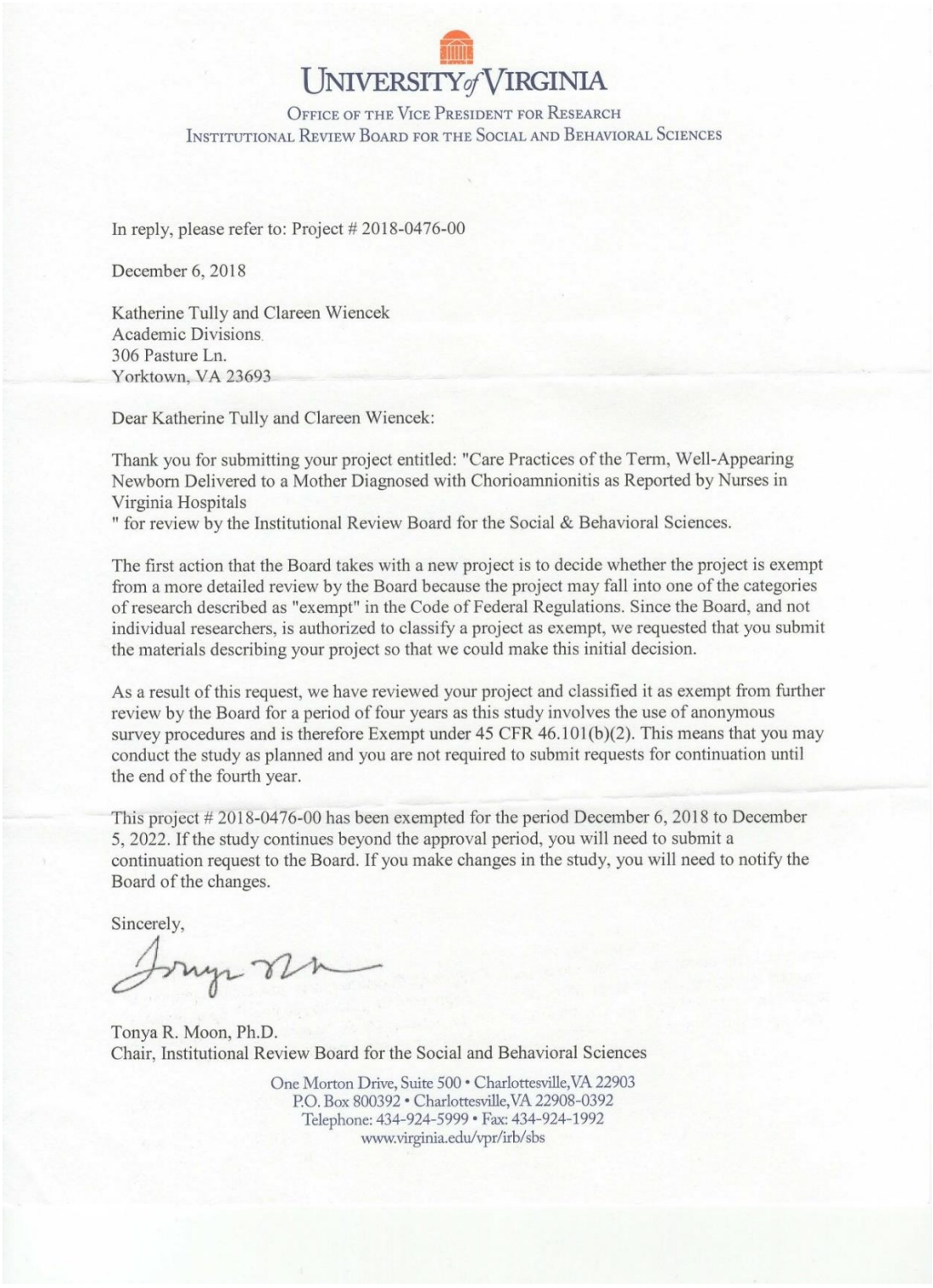
Citation Manager: RefWorks

Article Selection Process



Appendix C

Figure C1: IRB Project Approval



UNIVERSITY of VIRGINIA

OFFICE OF THE VICE PRESIDENT FOR RESEARCH
INSTITUTIONAL REVIEW BOARD FOR THE SOCIAL AND BEHAVIORAL SCIENCES

In reply, please refer to: Project # 2018-0476-00

December 6, 2018

Katherine Tully and Clareen Wiencek
Academic Divisions
306 Pasture Ln.
Yorktown, VA 23693

Dear Katherine Tully and Clareen Wiencek:

Thank you for submitting your project entitled: "Care Practices of the Term, Well-Appearing Newborn Delivered to a Mother Diagnosed with Chorioamnionitis as Reported by Nurses in Virginia Hospitals
" for review by the Institutional Review Board for the Social & Behavioral Sciences.

The first action that the Board takes with a new project is to decide whether the project is exempt from a more detailed review by the Board because the project may fall into one of the categories of research described as "exempt" in the Code of Federal Regulations. Since the Board, and not individual researchers, is authorized to classify a project as exempt, we requested that you submit the materials describing your project so that we could make this initial decision.

As a result of this request, we have reviewed your project and classified it as exempt from further review by the Board for a period of four years as this study involves the use of anonymous survey procedures and is therefore Exempt under 45 CFR 46.101(b)(2). This means that you may conduct the study as planned and you are not required to submit requests for continuation until the end of the fourth year.

This project # 2018-0476-00 has been exempted for the period December 6, 2018 to December 5, 2022. If the study continues beyond the approval period, you will need to submit a continuation request to the Board. If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences

One Morton Drive, Suite 500 • Charlottesville, VA 22903
P.O. Box 800392 • Charlottesville, VA 22908-0392
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www.virginia.edu/vpr/irb/sbs

Figure C2: IRB Modification Approval

In reply, please refer to: Project # 2018-0476-00

February 13, 2019

Katherine Tully and Clareen Wiencek
Academic Divisions
306 Pasture Ln.
Yorktown, VA 23693

Dear Katherine Tully and Clareen Wiencek:

Thank you for submitting the February 1, 2019 MODIFICATION to your project entitled: "Care Practices of the Term, Well-Appearing Newborn Delivered to a Mother Diagnosed with Chorioamnionitis as Reported by Nurses in Virginia Hospitals" for review by the Institutional Review Board for the Social & Behavioral Sciences.

The MODIFICATION to this project # 2018-0476-00 has been exempted for the period February 11, 2019 to December 5, 2019. If the study continues beyond the approval period, you will need to submit a continuation request to the Board. If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences

Appendix D

Figure D1: Survey

Care Practices of Term, Well-Appearing Newborns Delivered to Mothers Diagnosed with Chorioamnionitis

Part I: Demographics

Do you work in a level I or newborn nursery in a Virginia hospital?

- ○ Yes
- ○ No

What is your role working with level I newborns?

- ○ Nurse manager/director
- ○ Nurse educator
- ○ Nurse practitioner
- ○ Clinical nurse specialist

Which American Academy of Pediatrics Level of Care most closely describes your hospital's newborn services?

- ○ Level I
- ○ Level II
- ○ Level III
- ○ Level IV

What is the number of deliveries at your hospital annually?

- ○ Less than 1200
- ○ 1200 - 2400
- ○ 2401 - 3600
- ○ 3601 - 4800
- ○ More than 4800
- ○ Not sure

Which best describes your hospital?

- ○ Academic/teaching/research
- ○ Community
- ○ Private/For Profit
- ○ Military
- ○ Other

Which best describes the medical management of a term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis at your hospital?

- ○ CDC/AAP guidelines
- ○ Multivariate risk-assessment tool such as the early-onset sepsis calculator
- ○ Unit derived algorithm
- ○ Provider discretion
- ○ Other

Which official designations has your hospital been awarded (check all that apply)?

- ○ Beacon
- ○ Magnet
- ○ Baby Friendly

Part II: Scenario

A term, well-appearing newborn is delivered to a mother who has been diagnosed with chorioamnionitis at your hospital. Please choose the answer that most closely reflects the care practice for this newborn at your hospital.

	Never	Rarely	Sometimes	Frequently	Always
This newborn is allowed to spend at least the first hour of life skin-to-skin with the mother.	○	○	○	○	○
This newborn's first breastfeeding occurs before any lab work or monitoring in a separate location.	○	○	○	○	○
This newborn is allowed to room-in with the mother.	○	○	○	○	○
This newborn is monitored in the NICU for a period of time.	○	○	○	○	○
This newborn is monitored in the nursery (newborn, transitional, observation, special care) for a period of time.	○	○	○	○	○
This newborn will receive vital signs more frequently than a newborn delivered to a mother without a diagnosis of chorioamnionitis.	○	○	○	○	○

This newborn will receive nursing assessments more frequently than a newborn delivered to a mother without a diagnosis of chorioamnionitis.	○	○	○	○	○
If this newborn has sepsis screening lab work, the lab work is collected in the mother's room.	○	○	○	○	○
If this newborn is started on antibiotics, the antibiotics are administered in the mother's room	○	○	○	○	○

You have completed the survey. Thank you for your time.

Figure D2: Electronic Consent

Please read this consent agreement carefully before you decide to participate in the study.
Purpose of the research study: The purpose of this study is to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals.
What you will do in the study: To answer what the care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals are, you, as a nurse manager, clinical nurse specialist, nurse educator or nurse practitioner working with level 1 newborns in Virginia hospitals, have the opportunity to complete this student-designed, web-based survey. All responses will be kept secure in the Qualtrics secure server and reported only in aggregate. The demographic section of this survey asks for respondent's role, type of hospital where they work and the medical management strategy that most closely matches their unit's medical management of the study population. This information is essential for the accurate description of the data, but broad enough that the identity of individuals or hospitals will not be disclosed in the data analysis and reporting. Your participation is optional. You may skip any question that makes you uncomfortable and you can stop the survey at any time.
Time required: The study will require about 10 – 15 minutes of your time to complete both the multiple-choice demographics and rate the Likert scale statements about care practices.
Risks: The data you provide will be handled confidentially and presented only in aggregate. Your name will not appear in any report. All data will be collected, stored, and analyzed within the Qualtrics secure server and destroyed once this research project is completed.
Benefits: There are no direct benefits to you for participating in this research study. The study may help us understand the care received by term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis in Virginia hospitals
Confidentiality: The information that you give in this study will be handled confidentially. The data collected will be stored securely within the Qualtrics server. Data will be presented in aggregate, categorized by type of hospital or type of medical management utilized for the study population. Your name will not be used in any report. Once the study has concluded, the data will remain secure within the Qualtrics server from where it will be deleted.
Voluntary participation: Your participation in the study is completely voluntary.
Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.
How to withdraw from the study: Notify the principle investigator of your desire to withdraw your responses from this research study. Your responses will then be deleted from their secure storage on the Qualtrics server.
If you want to withdraw from the study, notify the principle investigator. There is no penalty for withdrawing. Any information you provided will be destroyed.
Payment: You will receive no payment for participating in the study.
If you have questions about the study, contact:
Katherine Tully, MSN, CNNP
School of Nursing
University of Virginia, Charlottesville, VA 22903.
Telephone: (757) 343-6146

kdt9ff@virginia.edu
Clareen Wiencek, RN, PhD, ACNP, ACHPN
P. O. Box 800782
University of Virginia, Charlottesville, VA 22903.
Telephone: (434) 982-2890
caw2pa@virginia.edu

To obtain more information about the study, ask questions about the research procedures, express concerns about your participation, or report illness, injury or other problems, please contact:

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Agreement:

Click to consent to participate in the research study described above.

Figure D3: Paper Survey Introduction Letter

Hello, my name is Katherine Tully. I am a DNP candidate at The University of Virginia. I am inviting all nurse managers, nurse educators, nurse practitioners or clinical nurse specialists working with newborns in Virginia hospitals to participate in my study survey.

The purpose of this study is to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns delivered in Virginia hospitals.

Your participation in this survey about care practices in the hospital where you work should take no longer than 10 - 15 minutes. The data you provide will only be disclosed in aggregate and not in relation to the participant or their hospital. Data will be promptly uploaded onto the Qualtrics secure server and will be discarded at the close of this research project.

Your participation in the study is completely voluntary. You may skip any question that makes you uncomfortable. You have the right to withdraw from the study at any time without penalty. Notify the principle investigator of your desire to withdraw your responses from this research study and any information you provided will be destroyed.

If you would like to participate in this study, please complete the enclosed survey and return to the principle investigator by **February 25, 2019** using the enclosed self-addressed stamped envelope.

In appreciation for your time, please enjoy the $5 coffee gift card that is enclosed.

If you have questions about the study, contact:

Katherine Tully, MSN, CNNP
School of Nursing, University of Virginia, Charlottesville, VA 22903.
Telephone: (757) 343-6146 kdt9ff@virginia.edu

Clareen Wiencek, RN, PhD, ACNP, ACHPN
P. O. Box 800782, University of Virginia, Charlottesville, VA 22903.
Telephone: (434) 982-2890 caw2pa@virginia.edu

To obtain more information about the study, ask questions about the research procedures, express concerns about your participation, or report illness, injury or other problems, please contact:

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
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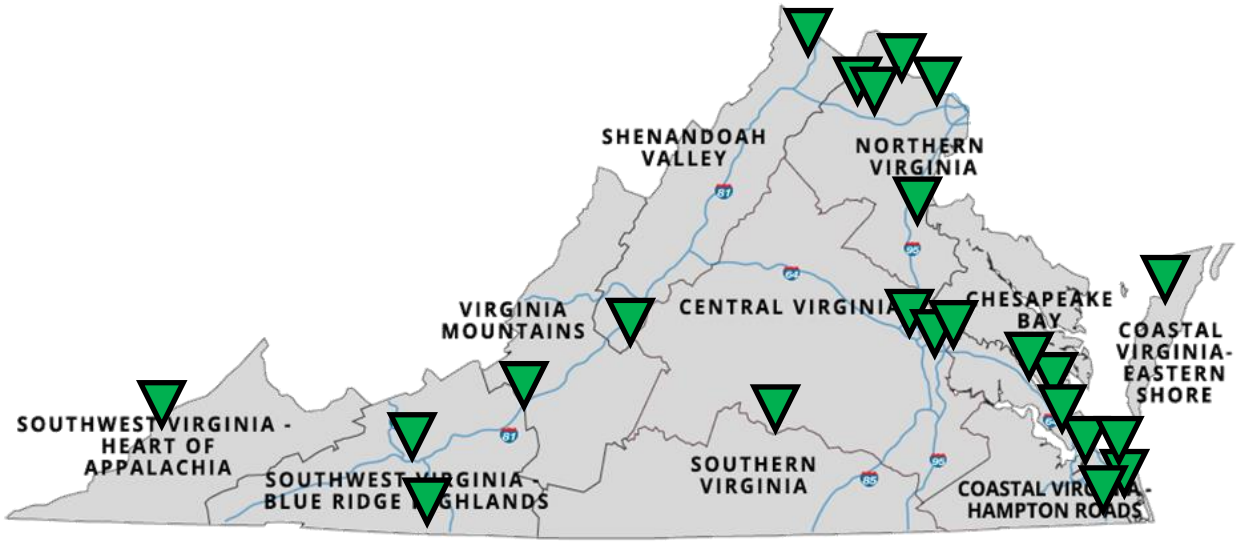
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Appendix E

Geographic Representation of Survey Responses



Appendix F

Care Practices of Term, Well-Appearing Newborns Born to Mothers Diagnosed with Chorioamnionitis as Reported by Nurses in Virginia Hospitals

Abstract

Objective: The purpose of this study was to describe the impact of a maternal diagnosis of chorioamnionitis on the care practices of term, well-appearing newborns born in Virginia hospitals.

Design: This was a descriptive study.

Setting/Local Problem: 51 level I newborn nurseries in Virginia hospitals comprised the sample.

Participants: Nurses in clinical leadership roles were asked to answer the survey.

Intervention/Measurements: The primary investigator designed and administered a survey to describe the care practices of comfort, feeding, and monitoring, as derived from the Universe of Developmental Care.

Results: Of the 23 responses from 23 unique hospitals throughout Virginia, over 80% frequently or always allowed the newborns in this population to have at least the first hour of life skin-to-skin (STS) with the mother (81.8%), have the first breastfeeding prior to any separation for sepsis screening (81.8%), and to room-in (82.6%). Newborns in this sample were rarely or never separated from the mother for monitoring in the NICU (56.3%) or nursery (52.7%), but most were monitored more closely than newborns receiving routine newborn care by frequently or always receiving more frequent vital signs (75%) and nursing assessments (65%). Although there was variation, the majority of hospitals sampled rarely or never collected lab work in the mother's room (40.9) or administered antibiotics in the mother's room (47.8).

Conclusion: When compared with care practices described through national and other regional studies, the Virginia hospitals in this sample described frequent use of care practices that protect

the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis. More study is needed to determine an evidence-based approach to caring for this population of newborns.

Keywords: newborn, care practices, early-onset sepsis, chorioamnionitis, skin-to-skin

Precis: Virginia hospitals in this sample described frequent use of care practices that protect the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis.

.

Clinical Implications

- Care practices, derived from the Universe of Developmental Care (Gibbons et al., 2008), are direct, intentional interactions taken to promote the comfort, feeding and monitoring of the newborn.
- Care practices of the term, well-appearing newborn born to a mother diagnosed with chorioamnionitis are not well described in the literature.
- Term, well-appearing newborns thought to be at an increased risk of early-onset sepsis need to be carefully monitored for signs of illness while in an environment that respects and protects the newborns unique needs.

With medical advances such as antibiotics and improved prenatal care and labor management, the survival of the newborn has become an expectation with over 98% of births in the United States taking place in hospitals (Centers for Disease Control and Prevention [CDC], 2014). When a laboring woman in the hospital develops a fever or shows other signs that she may have developed an intraamniotic infection, an obstetric provider may make a clinical diagnosis of chorioamnionitis. Intraamniotic infection as defined by the American College of Obstetricians and Gynecologists (ACOG), which they also call chorioamnionitis, is an infection with resultant inflammation of amniotic fluid, placenta, fetus, fetal membranes and/or decidua. Clinical symptoms for diagnosis are maternal fever of at least 39°C or 38° – 38.9°C with at least one additional risk factor which include maternal leukocytosis, purulent cervical drainage or fetal tachycardia (ACOG, 2017). Chorioamnionitis has long been used as a broad term describing a presumed infectious process and can include situations limited to symptoms related to inflammation (Roberts et al., 2012). There is evidence that the association between intraamniotic infection and chorioamnionitis is much higher in premature births with one study showing only 4% of acute histologic chorioamnionitis at term being associated with an infectious etiology (Roberts et al., 2012). Inflammation at term is usually secondary to maternal fever (Roberts et al., 2012) which can have many non-infectious causes including medical interventions such as prostaglandin administration commonly used to induce labor and epidural anesthesia for pain control, as well as environmental causes such as elevated room temperature and maternal dehydration (Higgins et al., 2016). Chorioamnionitis, in the absence of infection, does not pose the same risks for EOS in the term infant (Towers et al., 2017). Maternal fever or inflammation alone have not been shown in the literature to be accurate predictors of EOS in the term infant (Higgins et al, 2016; Towers et al., 2017).

A diagnosis of chorioamnionitis can be problematic as symptoms are non-specific and can have an etiology independent of infection (Roberts et al., 2012). Because of concerns that the newborn exposed to chorioamnionitis may develop early-onset sepsis (EOS), defined by the CDC as sepsis occurring within the first week of life (CDC, 2010), the CDC and the American Academy of Pediatrics (AAP) recommend sepsis screening and a minimum of 48 hours of intravenous antibiotic administration for any newborn delivered to a mother with a diagnosis of chorioamnionitis, regardless of gestational age or clinical presentation, this diagnosis can significantly impact the care practices for the term, well-appearing newborn. Medical management following these national guidelines results not only in pain from lab work collection and disruption of the microbiome secondary to antibiotic exposure, but also potential separation of the newborn from the mother, including the first moments of life.

Skin-to-skin (STS), which is recommended for all newborns at least 37 weeks gestation for at least one hour following delivery (Association of Women's Health, Obstetric and Neonatal Nurses [AWHONN], 2016), is consistently supported by the evidence for every term, healthy newborn (Cleveland et al., 2017). The care practice of rooming-in, keeping newborns with the mothers 24 hours a day (AAP, 2015), helps ensure unlimited, uninterrupted STS and is recommended for every full-term healthy newborn (Feldman-Winter & Goldsmith, 2016). Newborns separated from their mother for EOS evaluation within two hours of birth were more likely to have delayed breastfeeding, which is highest in infants who spend 30 minutes or less of their first two hours of life with the mother (Mukhopadhyay et al., 2015). Investigators at one hospital allowed term, well-appearing newborns to spend the first 2 hours of life STS with the mother with a designated NICU nurse who remained with the newborn and assessed the clinical condition every 30 minutes (Joshi, et al., 2018).

In a survey of 81 hospitals, from 33 states, in the Better Outcomes through Research for Newborns (BORN) network between October 2015 and January 2016, investigators found that the term, well-appearing newborn requiring EOS evaluation experienced some degree of separation from the mother in 95% of the hospitals with 86% reporting they would obtain lab work and 85% reporting they would initiate empiric antibiotics (Mukhopadhyay et al., 2017). If the newborn was receiving antibiotics, separation from the mother occurred before one hour of life in 29.9% of the hospitals and care was provided in the NICU or special care nursery at 75.7% of the hospitals. While an additional 13.5% were allowed to room-in after a specified amount of time, ranging between 6 and 24 hours, others were separated from the mother at 40% of the hospitals until antibiotics were discontinued. The investigators concluded that there was no national standard of care among hospitals for the medical management and care of term, well-appearing newborns thought to be at increased risk for EOS (Mukhopadhyay et al., 2017).

A review of over 230,000 deliveries occurring throughout the U.S. between 2002 and 2008 showed that NICU admission of well-appearing newborns ≥ 35-weeks gestation born to mothers diagnosed with chorioamnionitis ranged widely from 6 to 91.7% ($p<.001$) and identified hospital site as the most common variable accounting for this variability (Ziegler, Paul, Hoffman, and Locke, 2016). NICU admission rates were found to be lower when term, asymptomatic newborns were not routinely started on antibiotics (Jan, Ramanathan and Cayabyab, 2017). Newborns benefit when care is provided in the newborn nursery instead of the NICU. Investigators found that newborns cared for in the well-baby nursery, where rooming-in was standard practice, benefitted from higher exclusive breastfeeding rates (46% WBN vs 7.3% NICU, $p<0.0001$) and were given less formula when mothers planned to exclusively breastfeed (12% in WBN vs 46% in NICU, $p<0.0001$) (Peterson et al., 2017).

The Kaiser Permanente Early-Onset Sepsis calculator is a multivariate, predictive model that was designed to quantify the risk of EOS in newborns ≥ 34 weeks gestation by combining clinical condition and objective data available at the time of birth: gestational age, length of time membranes had been ruptured, highest maternal temperature, maternal GBS status and type and timing of any intrapartum antibiotics received instead of relying on subjective antenatal observations and clinical diagnoses such as chorioamnionitis. When the data is entered into this web-based tool, a risk value is calculated (Puopolo et al., 2011). The risk value is stratified into categories of well-appearing, equivocal and sick based on the newborn's clinical condition. Equivocal refers to newborns who may have symptoms that can be consistent with sepsis, but which resolve within two to four hours while the infant is transitioning to extrauterine life. A risk value for each stratification is generated with corresponding recommendations to observe only, monitor vital signs every 4 hours for 24 hours, collect lab work, and/or start antibiotics (Escobar et al., 2014). Several retrospective reviews have shown that utilization of this tool can significantly reduce lab collection and antibiotics administration in this population of newborns (Shakib et al., 2015; Money, Newman, Demissie, Roth, and Blau, 2017; Carola et al., 2018). In In 2017, ACOG cautioned against relying solely on a risk assessment tool to guide practice in determining if lab work and/or antibiotics are indicated and recommended its use be in conjunction with close clinical monitoring.

Researchers have identified wide variation in hospital-wide adherence to the CDC and AAP guidelines on a national level, ranging from as few as 7% to as many as 76% (Braun, Bromberger, Ho & Getahun, 2016; Mukhopadhyay et al., 2017). Medical management of term or near-term, well-appearing newborns born to mothers diagnosed with chorioamnionitis has described, using methods that vary from the current CDC and AAP guidelines (Braun,

Bromberger, Ho & Getahun, 2016; Jan, Ramanathan & Cayabyab, 2017; Joshi et al., 2018; Money, Newman, Demissie, Roth, & Blau, 2017; Peterson et al., 2017; Shakib, Buchi, Smith, & Young, 2015). The risk of EOS in the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis was found to be low (Braun, Bromberger, Ho & Getahun, 2016; Towers et al., 2017) and was safely managed without the use of antibiotics (Joshi et al., 2018; Jan, Ramanathan & Cayabyab, 2017) and without separation from the mother (Joshi, et al., 2018; Peterson et al, 2017).

Currently no care practice guidelines exist for the term, well-appearing newborn when the mother's obstetric provider has diagnosed her with chorioamnionitis. Because the risk of EOS for the term newborn delivered to a mother diagnosed with chorioamnionitis is low (Braun, Bromberger, Ho, & Getahun, 2016; Towers et al., 2017), and because there is compelling evidence that the healthy term newborn benefits most when separation from the mother is avoided (Feldman-Winter & Goldsmith, 2016), there is wide variation in the medical management, as well as in the care practices, of these newborns (Mukhopadhyay et al., 2017).

Regardless of medical management, it is important to identify care practices that are most beneficial for this unique population of newborns, affording them the most time possible with their mothers without placing them at risk. In the commonwealth of Virginia, there is currently no regional data available regarding the medical management and care practices of the term, well-appearing newborn born to a mother diagnosed with chorioamnionitis.

Methods

Design

This study used a descriptive design to assess care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals. The primary investigator (PI) designed a web-based survey which was administered to clinical leaders, defined as nurse managers, nurse educators, nurse practitioners or clinical nurse specialists, caring for this population of newborns.

Sample and Setting

The Commonwealth of Virginia is located on the central eastern seaboard of the United States, adjacent to Washington D.C. The majority of hospitals in Virginia are not-for-profit, with hospital sizes ranging from as few as 25 beds in rural areas to as many as 1000 beds in metropolitan areas. Virginia hosts general, community, regional, critical access, specialty acute care, teaching, military, and research hospitals (Virginia Health Information [VHI], 2018). The PI examined the websites of over 100 hospitals that were listed in the Virginia Hospital and Healthcare Association (VHHA) directory and identified those hospitals that advertised maternity services. The PI identified additional Virginia hospitals with maternity services through professional contacts including medical directors in hospital NICU's that are military or part of large healthcare systems as well as neonatal products representatives whose service areas covered regions of Virginia hospitals with maternity services. This exhaustive search resulted in a list of 51 Virginia hospitals with maternity services, a number which corresponded to the Virginia Health Department's (VHD) reference at the Virginia Neonatal Perinatal Collaborative (VNPC) (Pursell, S., personal communication, October 29, 2018). The primary investigator assigned a unique identifier number to each hospital for study purposes.

To describe care practices at each of the 51 Virginia hospitals providing maternity services, nurses in clinical leadership roles at each hospital, being knowledgeable of both the nursery's care practices and policies, were asked to complete the survey. Inclusion criteria included nurses who were managers, educators, practitioners and clinical specialists working with level I newborns in Virginia. Exclusion criteria included providers who were not nurses, who only worked in a level II, level III or level IV nursery, or who worked outside the Commonwealth of Virginia. A list of the nurse managers of Level I nurseries in Virginia hospitals providing maternity services, along with their email addresses, was compiled by accessing directories available on each hospital's website, professional contacts, and hospital operators and unit secretaries.

Protection of Human Subjects

Approval for this study, project # 2018-0476-00, was granted by the Institutional Review Board (IRB) at the University of Virginia. Due to a low response rate, a modification to the protocol was submitted and approved by the IRB.

Instruments

The primary investigator developed a survey that had two sections: demographic data in a multiple-choice format and a description of care practices in a Likert scale rating from 1 – 5 (see Figure D1). Respondents were asked if they work in a level I nursery and to identify their role. Three multiple choice questions asked respondents about hospital demographic data including type of hospital, number of annual deliveries, and the highest AAP level of care provided. A fourth multiple choice question asked respondents to identify if the hospital had received Magnet designation from the American Nurses Credentialing Center (ANCC) for nursing excellence

within the organization, Beacon recognition from the American Association of Critical Care Nurses (AACN) for unit-wide excellence, and if the hospital was designated as Baby-Friendly by adhering to the 10 Steps to Successful Breastfeeding and not accepting free or discounted formula products developed by the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). An additional multiple-choice question asked respondents to identify whether the medical management utilized at their hospital when providing medical care to the newborn delivered to a mother who has been diagnosed with chorioamnionitis followed CDC/AAP guidelines which recommend lab work and empiric antibiotic administration for a minimum of 48 hours, used a multivariate risk calculator such as the Kaiser Permanente Early-Onset Sepsis Calculator to estimate a newborn's risk of EOS, a unit derived algorithm or provider preference.

The second section of the survey consisted of the following scenario: "A term, well-appearing newborn is delivered to a mother who has been diagnosed with chorioamnionitis at your hospital." Participants were asked to answer nine Likert-style questions (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1) about breastfeeding, rooming in, monitoring, and location of care that most closely reflects the care practices for this newborn at their hospital. The questions regarding care practices were derived from the Universe of Developmental Care theory as a framework, which describes care practices such as comfort, feeding, and monitoring as playing an integral role in the newborn's optimal physiologic functioning and transition to extrauterine life (Gibbons, et al., 2008).

Face validity of the PI-developed survey was established through a review by three neonatal experts: two neonatal nurse practitioners and a newborn hospital unit director. They were asked to rate each Likert scale question with a score from 1 –5, with 1 being strongly

disagree and 5 being strongly agree, in three categories: clearly stated, easily understood, and if it investigated the care practices of comfort, feeding, or monitoring. Feedback was used to ensure the questions were relevant and measured the care practices of comfort, feeding and monitoring. Based on the feedback of these experts, three changes were made. The five-point Likert scale wording was changed from "often" to "frequently" and from "almost always" to "always." A question asking if intravenous access was obtained while the newborn remained in mother's room was removed as the consensus was that the question asking if antibiotics were administered in mother's room better described the care practice of rooming-in. Two questions were added regarding the frequency of vital signs and assessments to help describe the care practice of monitoring.

Procedures

The consent and electronic survey link to the web-based survey were distributed to the nurse managers of the 51 Virginia hospitals with maternity services, inviting them to respond to the survey and describe the care practices. The email sent through Qualtrics had a unique link to the survey that could only be used once. This prevented duplication of responses from nurses at the same hospital replying through the electronic link. To optimize the response rate, the survey was extended for two weeks with a second reminder email sent on February 21, 2019 with the option that recipients could forward this survey link to another nurse (educator, clinical nurse specialist or practitioner only).

To further improve the response rate, the PI applied for a study modification with the IRB that allowed for distribution and collection of additional data from paper surveys. Upon approval, the paper survey, along with an introductory letter, a stamped, self-addressed return envelope, and a $5 coffee gift card incentive, were distributed by hand by the PI or a professional

colleague to an alternate nurse leader at 13 of the hospitals. Paper surveys were mailed to the other 38 hospitals, addressed to the attention of the nurse manager identified in the first phase of recruitment. Each paper survey was marked with the identifying number of the hospital to which it was distributed. Data collected from each paper survey, including the unique identifying number, was transcribed into an electronic version of the survey using Qualtrics software, which also provided secure storage. The paper surveys were kept locked in a secure location until destroyed.

Data Analysis

IBM Statistical Package for the Social Sciences (SPSS) software was utilized for data analysis. Data was imported from Qualtrics directly into SPSS. Frequencies and percentages were calculated for the role of the respondents, the hospital demographic data and medical management.

Data from the nine Likert-style questions were not normally distributed, therefore reporting the median as central tendency with interquartile range as a measure of dispersion most clearly described the care practices. Frequencies and percentages of the responses to the nine questions (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1) were calculated.

Results

Thirty-four electronic and paper surveys were returned. Seven surveys were excluded because five of the respondents did not work in a Level 1 nursery and the other two respondents were not nurses. Of the 27 surveys from respondents who met the inclusion criteria, 10 were received through the electronic link and 17 through paper surveys distributed after modification of the protocol. Collecting responses through both electronic and paper surveys resulted in the

receipt of duplicate responses from four hospitals. Duplicates were identified by hospital identifier number and excluded, resulting in 23 surveys from 23 unique hospitals.

Eighteen of the 23 respondents were nurse managers (78.3%), three were nurse practitioners (13%) and two were nurse educators (8.7%) (see Table 1). Seventeen of the 23 respondents (73.9%) worked in community hospitals. Three worked in academic (13%), two in private (8.7%), and one in military (7.4%) hospitals. Respondents worked in hospitals that provided all AAP levels of newborn care: level I (39.1%), level II (17.4%), level III (34.8%) and level IV (8.7%), with annual deliveries ranging from less than 1200 (34.8%) to greater than 4800 (4.3%). Eleven of the respondents worked in hospitals that had received Magnet designation (47.8%). Only two worked in hospitals that had received Beacon recognition (8.7%) and only one worked in a hospital with a Baby Friendly designation (4.3%). Most of the respondents worked in a newborn setting that either adhered to the CDC/AAP national guidelines (43.5%) or used a multivariate risk calculator such as the Kaiser Permanente Early-Onset Sepsis Calculator (39.1%). Demographics of the hospitals are summarized in Table 2.

Medians and interquartile ranges of the Likert-style responses, reported as (Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1), were calculated. The median was 5 for first breastfeeding before separation, rooming-in, and collection of frequent vital signs. Medians for STS and frequent assessment were 4.5 and 4, respectively. The median for both monitoring in the NICU and monitoring in the nursery was 2 (see Table 3).

Eighteen of the 22 hospitals (81.8%) always or frequently allowed the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis to spend at least the first hour of life STS with the mother, with 11 of the 22 (50%) reporting they always allowed STS for the first hour of life. Before being separated from the mother, the newborn was always

allowed to breastfeed first in over half (54.5%) of the sample, with 18 of 22 (81.8%) reporting always or frequently allowing the newborn to breastfeed first.

The newborn was always or frequently allowed to room-in with the mother in 18 of the 22 hospitals (82.6%). Despite over half of the surveyed hospitals always allowing the newborn to room-in, lab work was rarely or never collected in the mother's room (40.9%) and antibiotics were rarely or never administered in the mother's room (47.8%). Although only 15.8% were always monitored in the nursery and only 18.8% were always monitored in the NICU, 75% of hospitals in the sample always or frequently obtained more frequent vital signs and 65% always or frequently obtained more frequent nursing assessments than what was provided during routine newborn care. The distribution of responses is summarized in Table 4.

Discussion

The care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia hospitals were described by nurses in clinical leadership roles at 23 hospitals distributed throughout the Commonwealth of Virginia. The impact of a maternal diagnosis of chorioamnionitis in this sample was minimized, with the majority of hospitals in the sample always or frequently providing the care practices of STS, rooming-in and ensuring the first breastfeeding prior to separation of the newborn from the mother for sepsis screening, if needed. Only two hospitals (9.1%) reported rarely or never allowing the newborn to spend at least the first hour of life STS with the mother and only one reported never allowing the first breastfeeding to take place prior to separation (4.5%). The hospitals in this sample always or frequently took vital signs (75%) and completed nursing assessments (65%) more frequently for this population of newborns than provided during routine newborn care. Over 50% of hospitals in the sample rarely or never monitored the newborn in the NICU or nursery, which is reflected

in the high percentage that allowed rooming-in. Despite allowing rooming-in, however, newborns were frequently separated from the mother if requiring lab work (40.9%) or antibiotic administration (48.8%).

In the sample of Virginia hospitals, 81.8% always or frequently allowed STS and first breast feeding before separation. Compared to the BORN study of this population of newborns, 29.9% had sepsis screening started before 1 hour of life. Only 33.7% ensured the first breast feeding occurred prior to sepsis screening and 36.4% reported there was no specific time for sepsis screening. While some hospitals permit this population of newborns to room-in, others separate the newborn from the mother for the duration of the hospital stay (Braun, Bromberger, Ho & Getahun, 2016). In the Virginia hospitals surveyed, 82.6% frequently or always allowed the newborn to room-in with the mother. Only two hospitals never allowed rooming-in when the newborn was being monitored for EOS (8.7%). However, many newborns were still separated from the mothers for sepsis screening. In this sample of Virginia hospitals, 40.9% rarely or never collected sepsis screening lab work in the mother's room and 47.8% rarely or never administered intravenous antibiotics in the mother's room. Not only does the AAP recommend keeping newborns and mothers together 24 hours a day, AWHONN recommends STS for the term, stable newborn during painful procedures, such a lab work collection (2016).

Whether adhering to the CDC/AAP guidelines or using a risk-assessment calculator, there is no consensus on how or where to monitor the well-appearing newborn for signs of illness (Mukhopadhyay et al., 2017). In a national review of data from 19 hospitals in the United States, NICU admission of term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis varied from 6.0% - 91.7% ($p<0.001$) (Ziegler, Paul, Hoffman & Locke, 2016). In the study of Virginia hospitals, only 18.8% always admitted the newborn to the NICU, a

favorable finding as NICU admission often has a negative impact on the mother-baby dyad, even when the newborn is not seriously ill or does not stay in the NICU long (Nystrom & Axelsson, 2002; Obeidat et al., 2009).

Newborns thought to be at an increased risk of EOS have been effectively monitored without NICU admission (Jan, Ramanathan & Cayabyab, 2017) and without separation from the mother (Joshi et al., 2018). Over half of Virginia hospitals in the sample avoided separating the newborn from the mother by rarely or never monitoring the newborn in the NICU (56.3%) or nursery (52.7%), while still monitoring these newborns more closely than newborns receiving routine care with 75% of hospitals always or frequently monitoring vital signs more closely and 65% always or frequently performing nursing assessments more frequently.

Analysis of medians for each of the nine Likert-style responses with the following choices: Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1, showed that the median for the care practices of first breastfeeding before separation, rooming-in, and collection of frequent vital signs was 5, STS was 4.5, and frequent assessments was 4, demonstrating that the central tendency in this sample was to always or frequently implement these care practices for term, well-appearing newborns delivered to mothers diagnosed with chorioamnionitis in the Virginia hospitals sampled. The medians demonstrate that newborns received vital signs and nursing assessments more frequently than newborns receiving routine care while rarely separating the newborn from the mother as evidenced by a median of 2 for both monitoring in the NICU and monitoring in the nursery.

Care practices, as derived from the Universe of Developmental Care framework (Gibbons et al., 2008), are direct intentional actions taken to promote the comfort, feeding and monitoring of the newborn. When compared with care practices described through national and other

regional studies (Braun, Bromberger, Ho & Getahun, 2016; Jan, Ramanathan & Cayabyab, 2017; Joshi et al., 2018; Mukhopadhyay et al., 2017; Peterson et al., 2017; Ziegler, Paul, Hoffman & Locke, 2016), the Virginia hospitals in this sample described frequent use of care practices that protect the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis.

Limitations

This study had several limitations. Initial response to the electronic survey was low, necessitating a modification to the original IRB protocol allowing for collection of paper surveys as well. Survey methodology presented several barriers to collecting data. Wording could have been more specific, especially for a question that included a hard stop that prevented some participants from responding to the survey. Demographic information could have been more descriptive if definitions of types of hospitals from the American Hospital Association had been provided and the categories to choose from designed to reflect those definitions. If the Likert-style response choices had included "not applicable," there may have been fewer missing data in this section while the addition of more Likert-style questions could have provided a more thorough description of care practices in Virginia. The respondents included a large proportion of nurse managers, as they were the target for distribution. An electronic reminder gave the option for the nurse manager to forward the link to another nurse leader, however this language was not in the original invitation to participate in the electronic survey nor was it in the introductory letter included with the paper survey. Although the PI applied a rigorous method for identifying not only Virginia hospitals with maternity services, but also the name and email address for a nurse manager contact at each site, without access to an official directory of this information, it was not possible to know if this list was complete or if it contained inaccuracies. It is also unknown

whether each survey was received, if it was completed by the person most knowledgeable of the care practices for this population of newborns, or if the data reported was an accurate description of each hospital's care practices.

Nursing Practice Implications

The awareness of this unique subset of newborns is increased through publication and presentations of this study that describes the care practices in a sample of Virginia hospitals. The sample of 23 unique Virginia hospitals was representative of many regions throughout the Commonwealth. To the investigator's knowledge, this was the first description of care practices of the term, well-appearing newborn delivered to a mother diagnosed with chorioamnionitis in Virginia. While there are evidence-based guidelines for medical management of this population from authoritative bodies such as CDC, AAP and ACOG, there are no guidelines for care practices, and studies for this population are lacking. The description of care practices in this sample of Virginia hospitals supports the need for more studies in this area that can lead to an evidence-based, standardized approach to safely care for this population of newborns while minimizing separation from the mother.

Though the PI followed a systematic method for identifying Virginia hospitals with maternity services and points of contact within those hospitals, having this information available in a validated format could aid in more robust data collection in future studies in which care practices may be more accurately described and associations between care practices in certain demographic areas identified. The challenge of identifying nurse leaders at each Virginia hospital delivering newborns underscores a nearly complete absence of nurses and nurse leaders on the hospital web pages. Development of a standardized, evidence-based method of safely

monitoring newborns thought to be at an increased risk of EOS is a necessary step to ensuring newborn care practices are maximized.

Conclusion

Overall, the description of care practices provided by nurse leaders in this sample of Virginia hospitals was favorable. Despite its limitations, this study provides a small start in the pursuit of maximizing care practices for this population of newborns. When compared with care practices described through national and other regional studies, the Virginia hospitals in this sample described frequent use of care practices that protect the term, well-appearing newborn's unique needs when delivered to a mother diagnosed with chorioamnionitis. More study is needed to determine an evidence-based approach to caring for this population of newborns.

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Appendix

Table 1

Nurse Leadership Role of Survey Participants (N = 23)

Role	*n*	%
Nurse Manager	18	78.3
Nurse Practitioner	3	13.0
Nurse Educator	2	8.7
Clinical Nurse Leader	0	0

Table 2

Demographic and Medical Management Data from a Sample of Virginia Hospitals (N = 23)

Characteristics	*n*	%
Type of Hospital		
Community	17	73.9
Academic	3	13.0
Private	2	8.7
Military	1	4.4
APA Level of Care		
Level 1	9	39.1
Level II	4	17.4
Level III	8	34.8
Level IV	2	8.7
Number of Annual Deliveries		
Less than 1200	8	34.8
1200 – 2400	5	21.7
2401 – 3600	7	30.4
3601 – 4800	2	8.7
More than 4800	1	4.4
Official Designations		
Magnet	11	47.8
Beacon	2	8.7

Baby Friendly	1	4.3
Medical Management		
CDC/AAP	10	43.5
Risk Assessment Tool	9	39.1
Provider Discretion	3	13.1
Unit Derived Algorithm	1	4.4

Table 3

Care Practices of Term, Well-Appearing Newborns Delivered to a Mother Diagnosed with Chorioamnionitis in a Sample of Virginia Hospitals

Care Practice	*n*	Median	*IQR*
Skin-to-Skin	22	4.5	4.00 – 5.00
First Breastfeeding	22	5.0	4.00 – 5.00
Rooming-In	23	5.0	4.00 – 5.00
Frequent Vital Signs	20	5.0	3.25 – 5.00
Frequent Assessments	20	4.0	3.00 – 5.00
Monitored in NICU	16	2.0	1.25 – 3.00
Monitored in Nursery	19	2.0	2.00 – 4.00
Lab Work in Mother's Room	22	3.0	1.00 – 4.25
Antibiotics in Mother's Room	23	3.0	1.00 – 4.00

Note. To assess the care practices, Likert-type questions were asked with the following choices: Always = 5, Frequently = 4, Sometimes = 3, Rarely = 2 and Never = 1.

Table 4

Distribution of Frequency of Care Practices in a Sample of Virginia Hospitals

Care Practice	*n*	Always/Frequently	Sometimes	Rarely/Never
Skin-to-Skin	22	18 (81.8%)	2 (9.1%)	2 (9.1%)
First Breastfeed	22	18 (81.8%)	3 (13.6%)	1 (4.5%)
Rooming-In	23	19 (82.6%)	1 (4.3%)	3 (13.0%)
Frequent Vital Signs	20	15 (75.0%)	2 (10.0%)	3 (15.0%)
Frequent Assessments	20	13 (65.0%)	3 (15.0%)	4 (20.0%)
Monitor in NICU	16	3 (18.8%)	4 (25.0%)	9 (56.3%)
Monitor in Nursery	19	5 (26.3%)	4 (21.1%)	10 (52.7%)
Lab Work in Mother's Room	22	8 (36.3%)	5 (22.7%)	9 (40.9%)
Antibiotics in Mother's Room	23	8 (34.8%)	4 (17.4%)	11 (47.8%)