





Perspectives on Implementing Delayed Cord Clamping

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Objectives

Upon completion of this activity, the learner will be able to:

1. Describe findings from the literature on newborn and maternal health outcomes associated with cord clamping practices.
2. Describe findings from the literature on attitudes and practices of obstetric providers with regard to cord clamping.
3. List some perspectives that can be disseminated to help drive evidence-based practice change with regard to cord clamping.

Continuing Nursing Education (CNE) Credit

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INTRODUCTION

The term *intervention* commonly implies “doing something.” Yet, there are times when withholding action, or “doing nothing,” is also considered an intervention and such is the case with delayed cord clamping (DCC). In most birth settings worldwide, the norm is to clamp and cut the umbilical cord almost immediately after the infant is born (Leslie, Chyjek, & Wright, n.d.). Waiting to clamp and cut the cord, or withholding action, is therefore the exception, and yet has assumed the role of an intervention. As such, DCC has become the practice that requires justification, evidence and new guidelines from authoritative and professional sources. Which is the true intervention? Is it “doing nothing” by allowing the infant to receive the full placental transfusion DCC allows (see Figures 1A and 1B), or is it stopping this transfusion by cutting the cord? Should the burden of proof be on early cord clamping (ECC) or DCC, or both?

Most importantly, it is ultimately not about the cord. The real story is about placental transfusion and the role of the umbilical cord in facilitating the delivery of the infant’s own blood supply. For an excellent review on DCC and placental transfusion, see Mercer and Erickson-Owens (2012).

PERSPECTIVES ON THE EVIDENCE

Evidence demonstrating the benefits of DCC continues to grow in the literature. The impact of the practice on both preterm and term infants as well as mothers has been examined.

NEWBORN OUTCOMES

In a classic study, Yao and Lind (1969) demonstrated that DCC provides as much as a 30 percent increase in blood volume for term infants and a 50 percent increase for preterm infants. A 2012 Cochrane review on preterm infants and DCC shows that waiting to clamp the cord improves systemic blood pressure, increases the cerebral oxygen index, reduces the number of blood transfusions required, lessens the need for inotropic support, lowers the risk of necrotizing enterocolitis and results in nearly a twofold reduced risk for intracranial hemorrhage of all types (Rabe, Diaz-Rossello, Duley, & Dowswell, 2012).

Abstract: Expanding evidence supports delayed cord clamping (DCC) for both term and preterm infants. This article explores issues that may be keeping early cord clamping (ECC) in place as usual practice. Professional organizations almost universally recommend DCC for preterm infants, but some reserve recommending it for term infants only in resource-poor settings. Concerns about polycythemia and jaundice persist in the literature, while years of published randomized controlled trials do not support the assumptions behind the concerns. New data suggest that DCC may improve resuscitative efforts in compromised infants. Multiple perspectives are offered for consideration when thinking about incorporating DCC into practice. DOI: 10.1111/1751-486X.12188

Keywords: delayed cord clamping | evidence-based practice | infant anemia | placental transfusion | practice change

(In preterm infants, DCC may involve either waiting to clamp the cord and/or “milking the cord,” which is gently pushing the blood in the cord toward the baby before cutting.)

A 2013 Cochrane review (McDonald, Middleton, Dowswell, & Morris, 2013) on term infants and timing of umbilical cord clamping reports that those with DCC had up to a 60 percent increase in red blood cells, higher hemoglobin levels at 24 to 48 hours of age and increased serum ferritin levels at 4 to 6 months. Infants whose cords were clamped and cut early were twice as likely to be iron deficient at 3 to 6 months. A recent study of 400 Swedish term infants also found that babies with DCC had a significantly higher concentration of serum ferritin at 4 months of age (Andersson, Hellström-Westas, Andersson, & Domellöf, 2011).

STEM CELLS

Also contained in an infant’s cord blood are millions of specialized stem cells that play a critical role in organ development for the central nervous, respiratory, cardiovascular, hematologic, immunologic and endocrine systems. In premature babies, the concentration of stem cells is even higher than in those babies born at term. According to Tolsa et al. (2010, p. 491), “the maturation of every organ system continues after the neonatal period; thus the artificial loss of stem cells at birth could potentially impact later development and predispose infants to diseases such as chronic lung disease, asthma, diabetes, epilepsy, cerebral palsy, Parkinson’s disease, infection and neoplasm.”

In considering the value of allowing infants to retain their own stem cells through DCC, a new study from Duke University provides important information. Using autologous stem cell transfusion, infants with hypoxic ischemic encephalopathy were treated using standard methods of cooling. Outcomes were compared to similar infants without the stem cell infusions. At 15 months, 74 percent of the stem cell group survived with scores >85 on the Bayley Scale of Infant and Toddler Development. In the comparison group, the survival rate was 41 percent ($p = .05$; Cotten et al., 2014).

EARLY CORD CLAMPING AS A PREVENTIVE INTERVENTION

At one time, ECC was thought to prevent the potential harms of placental transfusion or “too much blood,” specifically infant polycythemia and jaundice. According to the evidence reviewed by Mercer and Erickson-Owens, since 1980, no published, randomized controlled trial has supported a relationship between

FIGURES 1A AND 1B COMPARISON OF UMBILICAL CORDS WITH ACTIVE VERSUS COMPLETE PLACENTAL PERFUSION



Note: Umbilical arteries are wrapped around the outside of the larger umbilical vein and carry deoxygenated blood to the placenta while the vein returns oxygen-rich blood cells to the infant. In Figure 1A (©iStock.com/joelblit), postbirth placental transfusion is occurring. Figure 1B (©iStock.com/ChenRobert) shows that the umbilical vein is no longer delivering oxygenated blood, at which time cord clamping and cutting can be performed. Images used with permission.

DCC and symptomatic polycythemia or hyperbilirubinemia (Mercer & Erickson-Owens, 2012).

MATERNAL OUTCOMES

No maternal outcomes have been shown to be significantly affected by DCC. These outcomes include postpartum hemorrhage rates, severe postpartum hemorrhage rates, hemoglobin values or the need for therapeutic uterotonics (McDonald et al., 2013). This is significant because ECC is still practiced by

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many around the world as a part of the active management of third-stage labor (AMTSL), although current evidence demonstrates that it does not help to prevent hemorrhage (Andersson, Hellstrom-Westas, Andersson, Clausen, & Domellof, 2013). The World Health Organization (WHO) now states that ECC is not required in AMTSL and a delay in clamping the cord for 1 to 3 minutes is recommended in this clinical setting (WHO, 2012; see Box 1).

POSITION AND TIMING

A common topic of interest is which positions and what amount of time are optimal with regard to delaying cord clamping. With regard to how long blood flows from the placenta to the infant, new research from Boere et al. (2014) reveals hereto for unknown physiology about the umbilical cord. Until now, it was commonly believed that the cessation of pulsations (caused by umbilical arteries) indicated the end of blood flow. Using

In light of these recent findings and in order to support immediate skin-to-skin contact, suggested best practice for DCC at this time would be placing an infant on its mother's abdomen and waiting to clamp and cut for 5 minutes

Doppler ultrasound during DCC, arterial and venous blood flow was measured on 15 infants in this study. No correlation between cessation of pulsation and the stopping of blood flow was found. In other words, the blood continued to flow after pulsations ended in some babies and flow ended while pulsations were palpable in others. In addition, in 57 percent of the infants, venous blood flowed through the cord for a median of 4.5 minutes. For 33 percent, it continued until clamping at a median of 5.25 minutes (Boere et al., 2014).

As for position, research by Farrar et al. (2011) found that complete transfusion can take place anywhere from 2 to 5 minutes, depending on position, and the individual infant. Early research established that infants held below the perineum for longer periods of time would receive their placental transfusion

BOX 1 WHO RECOMMENDATIONS FOR ACTIVE MANAGEMENT OF THIRD-STAGE LABOR

- Delaying cord clamping benefits the baby and does not interfere with the practices of active management of third stage labor (AMTSL).
- The risk of postpartum hemorrhage is no different if the provider performs ECC or DCC.
- Essential elements of the WHO AMTSL guideline include uterotonics, controlled cord traction, uterine assessment *and* DCC for all babies.

Sources: WHO (2012, 2014).

faster than those held above the maternal abdomen (level of placenta; Yao & Lind, 1969). As a result, common practice has been to keep infants at or below the perineum until the cord is cut. However, in light of the benefits of immediate skin-to-skin contact, early initiation of breastfeeding and bonding, placement on the mother's abdomen while waiting for the placenta to finish its work makes sense.

A recent study by Vain et al. (2014) compared the weights of infants as an indirect measure of blood volume. This was done at birth and then again after cutting the cord at 2 minutes in two positions—at the level of the perineum and on the maternal abdomen. No statistical difference in weight change was found (Vain et al., 2014). In terms of position, this is consistent with the original study by Yao and Lind (1969) who also found no significant difference in the residual volume in placentas for babies who were located 10 cm below or above the level of the placenta. The Vain study time cutoff was 2 minutes, whereas Yao and Lind used 3 minutes (Vain et al., 2014; Yao & Lind, 1969).

What is not known from the previous studies is the quantity of transfusion. In 2011, research by Erickson-Owens reported that when infants were placed on their mother's abdomen, cutting the cord at 5 minutes versus 2 minutes resulted in a >50 percent reduction in residual (25 mL/kg vs. 11 mL/kg), hence increasing the total amount available for transfusion (Erickson-Owens, 2011).

In light of these recent findings and in order to support immediate skin-to-skin contact, suggested best practice for DCC at this time would be placing an infant on its mother's abdomen and waiting to clamp and cut for 5 minutes. For a complete guideline on cord management including cord clamping and cord milking in both vaginal and cesarean births, see Mercer and Erickson-Owens (2014).

PROFESSIONAL ORGANIZATION RECOMMENDATIONS

The recommendations of professional organizations and leaders in maternal-child health have been gradually changing with regard to DCC. In 2012, the American College of Obstetricians and Gynecologists (ACOG) released Committee Opinion (#543), which supported DCC for preterm infants. With regard to term infants it stated: "Currently, insufficient evidence exists to support or to refute the benefits from delayed umbilical cord clamping for term infants that are born in settings with rich resources. Although a delay in umbilical cord clamping for up to 60 seconds may increase total body iron stores and blood volume, which may be particularly beneficial in populations in which iron deficiency is prevalent, these potential benefits must be weighed against the increased risk for neonatal phototherapy" (ACOG, Committee on Obstetric Practice, 2012, p. 3).

In 2013, the American Academy of Pediatrics (AAP) endorsed the ACOG committee opinion (AAP, 2013). Recently, WHO in 2014 released a report titled "Delayed Clamping of the Umbilical

Cord to Reduce Infant Anaemia” and recommended DCC for “all births,” stating that it should be “enthusiastically supported and promoted as a best practice” (WHO, 2014). The publication is endorsed by both the U.S. Agency for International Development and the Maternal Child Health Integrated Program.

Why the difference between recommending DCC for preterm but not term infants in “countries with resources”? One possible theory is that the benefits for preterm infants are many and clearly clinically significant, especially in light of the health risks facing the preterm neonate. By comparison, the primary benefits shown for term infants have to do with reducing infant anemia. Also, the effects of DCC have been shown to be magnified when maternal anemia is present. Two previous studies in India and Mexico showed that the benefits of DCC were more pronounced in infants whose mothers were anemic (Chaparro, 2006; Chapparo & Lutter, 2007; Gupta & Ramji, 2002). This finding was recently confirmed by Blouin et al. (2013) who investigated the impact of DCC on infants of both anemic and nonanemic mothers in Iquitos, Peru at 4 and 8 months, adjusting for altitude (Blouin et al., 2013). For infants whose mothers were anemic and who had DCC, anemia was reduced by 40 percent and 60 percent at 4 and 8 months, respectively.

It is likely that the recommendations to utilize DCC for term infants only in countries with fewer resources is based on the fact that these are the regions where both infant and maternal anemia are most prevalent. However, the underlying assumption that nations with resources do not sufficiently face the issues of maternal or childhood anemia to justify preventative health measures bears challenging.

DISPARITIES

In the United States, the Pediatric and Pregnancy Nutrition Surveillance System Data at the Centers for Disease Control and Prevention (CDC) gathered data on more than 9 million children and 1 million mothers from low-income families who attend federally funded maternal, child health and nutrition programs. In 2010 (the latest year for which data are available), 33.8 percent of these U.S. mothers were anemic in their third trimester. For black non-Hispanic mothers, the rate was 49.5 percent (Dalenius, Brindley, Smith, Reinold, & Grummer-Strawn, 2012). In comparison to figures released by WHO on the global prevalence of anemia, this maternal rate is higher than every region in the world except Africa, where the rate was 57.1 percent (WHO, 2008). By 6 to 12 months of age, 18 percent of the U.S. children studied had iron-deficiency, anemia, representing 1.6 million infants. Nearly one-fourth (23.5 percent) of black non-Hispanic babies were anemic at the same age.

Regional disparities exist as well, with centers in nine states reporting maternal anemia rates between 35 percent and 47 percent, and six states showing a prevalence of infant anemia between 19 percent and 28 percent (Dalenius et al., 2012) (see Figure 2).

Iron deficiency and iron-deficiency anemia in infancy are associated with poor cognitive, motor, social-emotional and neurophysiologic outcomes (Georgieff, 2011; Lozoff et al., 2006). Such effects can persist even when iron treatment and anemia correction take place (Lozoff et al., 2013; Wang, Zhang, Gong, & Lee, 2013). Existing longitudinal studies demonstrate

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persisting differences between children with childhood anemia and those without (Lozoff et al., 2013).

Given that early cord cutting is associated with a double chance of anemia at 3 to 6 months in term infants (McDonald et al., 2013) and that evidence has shown up to a 60 percent reduction in risk for infant anemia for each minute that cord cutting is delayed when maternal anemia is present (Blouin et al., 2011), serious consideration of the racial and ethnic disparities in U.S. maternal child health is warranted when it comes to umbilical cord management.

RESUSCITATION AND DCC

One of the current contraindications to DCC is the need to separate an infant from its mother for resuscitation away from the birthing area. Ironically, it is the infant with indications for possible resuscitation who is the baby most likely to benefit from the increased blood volume and cardiovascular benefits of maintaining the placental transfusion afforded by DCC.

In and of itself, the issue of hypovolemia is at the heart of the matter when it comes to debating whether or not it makes sense to cut and clamp the cord of an infant in need of resuscitation. Adequate volume is required for the transition from intrauterine to extrauterine life, for the perfusion of vital organs to function and is itself one step in resuscitation. Hence, DCC allows the placenta to infuse volume as part of the resuscitative effort.

When the umbilical cord with active blood flow is clamped, systemic peripheral resistance rises causing an increase in arterial pressure (afterload; Dawes, 1968; Rudolph, 1979). Fetal cardiac circulation is now halted, preventing placental venous return to the baby (the vessel carrying the oxygen rich blood). This results in a reduction of 30 percent to 50 percent of blood volume and causes a decrease in cardiac output (Crossley et al., 2009). In the normal transition from fetal to newborn circulation, venous return to the left ventricle

helps the baby shift from relying on placental-umbilical circulation to pulmonary circulation. For this to happen, adequate oxygenation at birth (breathing) is because aeration of the lungs causes an 8- to 10-fold increase in pulmonary blood flow. ECC can cause harm by forcing a premature reliance

Current U.S. practice has not been well-studied, and knowledge about how or how often maternity care providers facilitate placental transfusion for infants at birth remains a mystery

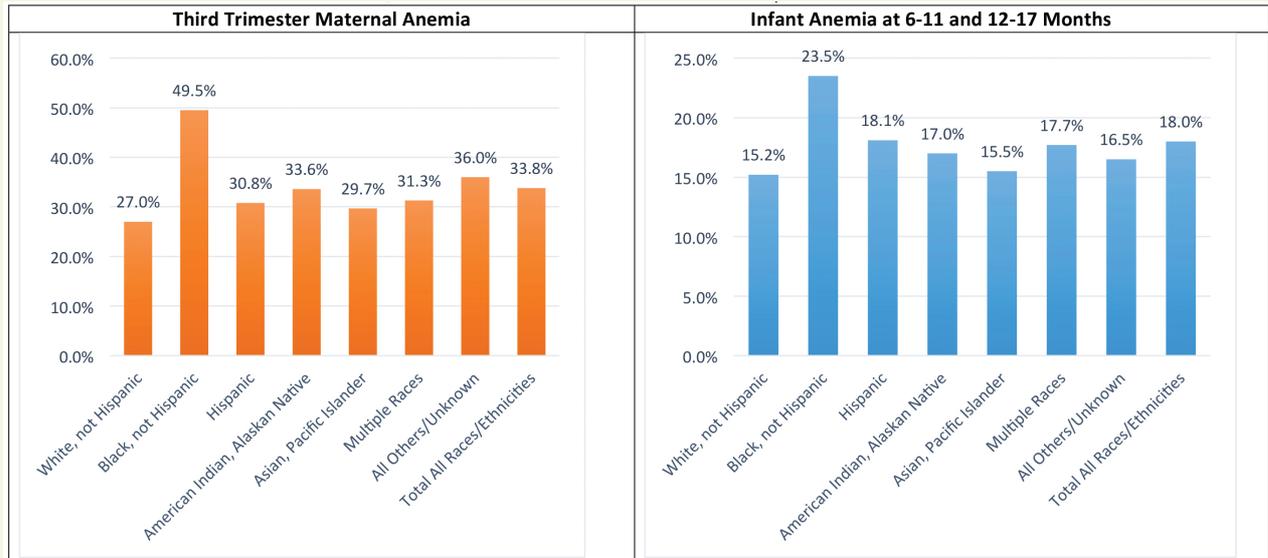
on pulmonary oxygenation, especially in the neonate who does not breathe spontaneously. For these infants, ensuring adequate blood volume via placental perfusion through DCC until pulmonary blood flow is established, can improve the efficacy of resuscitative efforts.

In an important landmark study, Bhatt et al. (2013) demonstrated that preterm lambs whose cords were kept intact until after adequate ventilation showed improved cardiovascular function via increased pulmonary blood flow versus those whose cords were cut before ventilation. This points to the importance of not interfering with placental transfusion before spontaneous respirations or ventilation can occur, especially in compromised infants.

Similarly, adult cardiopulmonary resuscitation guidance has recently incorporated new evidence on cardiocerebral resuscitation, which revealed that maintaining blood volume during resuscitation efforts increases the ability to maintain perfusion to the heart and brain. In animal studies, the group receiving continuous blood volume saw an increase of up to 80 percent survival for cardiac arrest compared to 13 percent in the standard resuscitation group (Ewy, 2005; Yang, Wen, Li, & Shi, 2012). The new method includes providing continuous chest compressions without stopping for ventilation. Maintaining blood volume during resuscitative efforts appears to be critical.

The International Liaison Committee on Resuscitation recommended delaying umbilical cord clamping for infants

FIGURE 2 MATERNAL AND INFANT ANEMIA BY RACE/ETHNICITY IN FEDERALLY FUNDED PROGRAMS FOR WOMEN AND INFANTS



Note: Data collected from federally funded programs that serve low-income mothers and children including the Special Supplemental Nutritional Program for Women, Infants and Children (WIC; 87.5 percent) and other programs (12.5 percent). In 2010 (the latest year for which data are available), nearly 9 million mothers and infants were represented from 46 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands and six Indian Tribal Organizations. Maternal anemia was defined as hemoglobin concentration <11 g/dL or hematocrit level <33 percent (Dalenius et al., 2012). Children ages 6 to 24 months were considered anemic if their hemoglobin was <11.0 g/dL or their hematocrit was <32.9 percent (Dalenius et al., 2012).

who do not require resuscitation but noted that “evidence is insufficient to recommend a time for clamping” in those that do (Perlman et al., 2010). The WHO now states that the cord should not be cut and clamped to facilitate resuscitation. Instead, the current recommendation suggests that if the clinician has experience, “ventilation can be initiated at the perineum with the cord intact to allow for delayed cord clamping” (WHO, 2013).

Resuscitation of compromised infants at the bedside (or born via cesarean) while leaving the cord intact is next. Thomas, Yoxall, Weeks, and Duley (2014) reported 78 infants in need of resuscitative measures who were cared for on a bedside resuscitation trolley with DCC clamping. The study included both preterm and term infants as well as vaginal and cesarean births. There were no adverse events related to the cart. The majority of providers (86 percent) rated the trolley as “the same,” “better” or “much better” than conventional resuscitation equipment. For this purpose, an FDA-approved unit has recently been made available in the United States (Inditherm P/C, 2014). U.S. studies are in process on bedside resuscitation with intact cord (ClinicalTrials.gov, 2015). New work by Mercer and Erickson-Owens (2014) provides a substantial resource on the physiology of ECC in potentially compromised infants and on bedside resuscitation with DCC.

CORD CLAMPING PRACTICE IN THE UNITED STATES

Cord clamping practices in the United States are not well-understood. Only a few studies of U.S. providers have been conducted. The first was published in 1949 and involved a survey of 1,198 diplomates of the American Board of Obstetrics and Gynecology (McCausland, Holmes, & Schumann, 1949). At that time, 42 percent of the obstetric providers clamped immediately after birth. A total of 58 percent clamped “somewhat later,” including 33 percent at less than 5 minutes and 16 percent after cord pulsations ceased.

Festin et al. (2003) surveyed multiple providers from mixed countries on their specific practices when performing AMTSL. Of a total of 452 subjects, 30 physicians were from the U.S. Ninety-seven percent of those providers practiced ECC as part of AMTSL, which was a standard practice at that time. In 2000, U.S. midwives were surveyed ($n = 157$; Mercer, Nelson, & Skovgaard, 2000). The findings revealed that 27 percent of the midwives cut the cord early and 69 percent practiced DCC by today’s WHO recommendation of waiting at least 1 to 3 minutes (1 to 3 minutes: 36 percent; >3 minutes: 4 percent; after pulsations ceased: 29 percent). In 2013, U.S. obstetricians were surveyed on their attitudes and beliefs on umbilical cord clamping (Jelin, Kuppermann, Erickson, Clyman, & Schulkin, 2013). Eighty-eight percent of the physicians reported that their hospitals did not have a policy for umbilical cord clamping. When asked about the optimal time for clamping the cord,

BOX 2 NEW PERSPECTIVES TO SHARE WHEN TRYING TO INITIATE A PRACTICE CHANGE

- Waiting to clamp and cut the cord is not an intervention, but cutting the cord early (while the infant’s blood is running through it) is.
- Shift from focusing on the cord to placental transfusion—to the baby’s own blood supply.
- There is no credible evidence to support the routine intervention of cutting the cord early.
- There is evidence that ECC causes harm, with research showing a doubled risk of anemia at 3 to 6 months in term infants (McDonald et al., 2013).
- There is no justification to pit the priorities of preterm babies against term babies—all infants deserve their own blood supply.
- Infants and mothers with iron deficiencies and iron-deficiency anemia exist in resource-rich settings as well as low-resource setting. Babies deserve the added benefits of placental transfusion in all countries and settings.
- Newborns compromised at birth will especially benefit from placental transfusion. Exploration of resuscitation with an intact cord at the mother’s side is an important research pathway.

the most common response was “don’t know” regardless of the gestational age of the baby (51 percent).

The bottom line is that current U.S. practice has not been well-studied, and knowledge about how or how often maternity care providers facilitate placental transfusion for infants at birth remains a mystery.

IMPLICATIONS FOR NURSING PRACTICE

Nurses, however, *do* know about the umbilical cord clamping practices in the United States. For most of the 3.9 million babies born each year, a nurse is there to witness whether or not an infant receives its own blood supply from the placenta. If there is any group well-positioned to explore this issue within the context of mother-baby care and to support a shift in practice, it is nurses. While changing the actual clinical practice of when to clamp the cord may be in the hands of the obstetric provider, the change occurs within a community of practice that includes all members of the care team.

The beliefs and knowledge of the individuals involved are a critical component in evolutions of practice changes. Research in components essential to providers shifting toward evidence-based practice reveals that in addition to evidence, personal

beliefs and the input of colleagues are critical (Leslie, Erickson-Owens, & Cseh, in press; Tonelli, 2012). Thus, participating in a cultural shifting of perspectives is an active role a colleague can play in bringing about changes in practice. Anyone can do this. The tool of the trade is using one's voice. See Box 2 for potential new perspectives to incorporate and disseminate.

Nurses and nurse-midwives can be leaders in educating all members of the birth team, as well as families, on the evidence surrounding DCC

Of course, a change in practice requires much, much more than shifting perspectives, although it is a start. ECC is a deeply embedded practice in maternity care. It exists in the cultural context and beliefs, but it is also fixed in the physical routine of labor and birth. In the majority of births taking place in hospitals, the usual practice of immediate clamping and cutting immediately sets off a series of events for providers and staff that constitutes a pattern of normalcy for the team. When providers choose to wait to clamp and cut, especially if they are not used to it, the world can seem to switch into slow motion, and the

BOX 3 DISPELLING THE MYTH THAT FAMILIES MUST CHOOSE EITHER DCC OR CORD BLOOD BANKING

Some cord blood banking companies now offer resources for families and providers who plan delayed cord blood clamping but are also interested in cord blood collection (Americord, 2014; Cord Blood Registry, n.d.).

Both ACOG and AAP state that cord blood collection should not alter the timing of umbilical cord clamping (AAP et al., 2007; ACOG, 2008).

As with all cord blood collection, the issue is quality of cells more than quantity. A minimum of about 30 to 40 mL is needed for a collection. This amount can be obtained after placental transfusion to the baby is complete by drawing blood from the either the cord or the placenta. Parents and providers should discuss details with cord blood banking vendors directly.

For a thoughtful, in-depth discussion on this topic see Hull (2014).

new sequence feels awkward, strange and out of order. Transitioning to a new routine takes time and patience.

Nurses and nurse-midwives can be leaders in educating all members of the birth team, as well as families, on the evidence surrounding DCC and by dispelling misconceptions or myths (see Boxes 3 and 4 and Figure 3). Offering to do grand rounds or to arrange to bring in a known expert or other forms of educational activities can bring credibility to the practice and support DCC as an evidence-based form of clinical care. Consider initiating a hospital policy for umbilical cord clamping based on evidence and include multidisciplinary participation (Vanderbilt University Medical Center, 2011).

Multiple studies on interventions that are effective in supporting organizational change, especially in maternity care, show that multifaceted strategies and the use of opinion leaders is effective (Chaillet et al., 2006; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012). The strategy of using an "opinion leader" is to have an already well-respected individual serve as the lead on a change initiative. A qualitative study on individual maternity care providers who changed on their own to DCC found that the influence of colleagues and believing the evidence were two important drivers of change (Leslie, Erickson-Owens, & Cseh, in press).

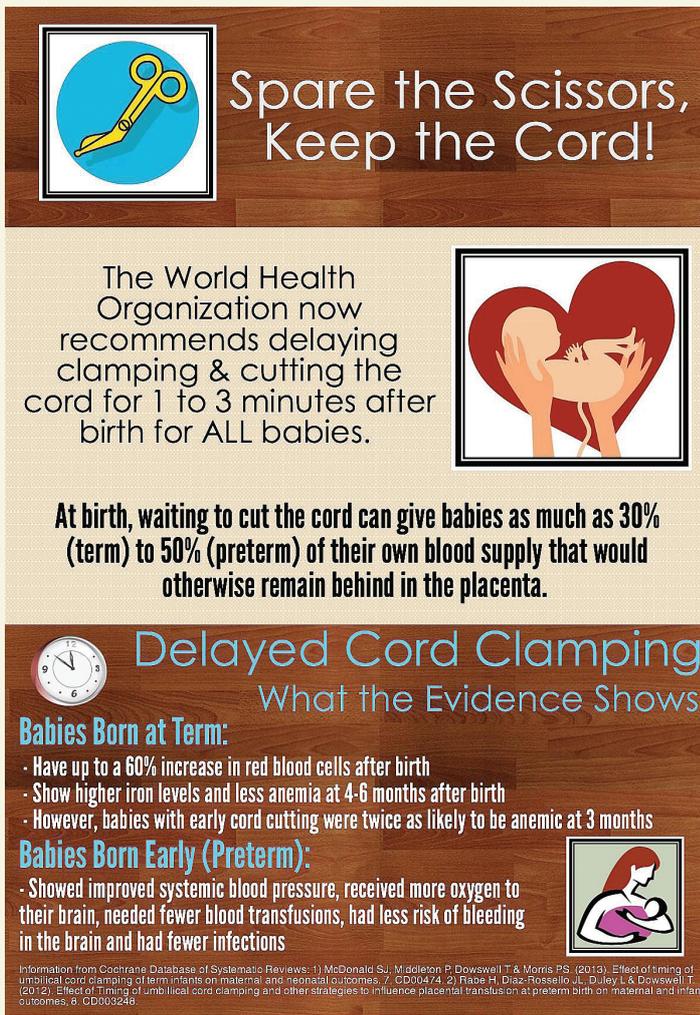
CONCLUSION

The analogy has been made that it is not a usual practice to turn off the heart-lung machine in surgery with 30 percent to 50 percent of the patient's blood still in it, but this could be considered analogous to what occurs with most babies when they are born. Perhaps someday DCC will become a national health campaign with slogans such as "spare the scissors, keep the cord," or "cuddle, don't cut," or "good to the last drop: delayed cord clamping for *all* babies." It wasn't so long ago that it seemed impossible to turn the tide of elective deliveries. With sufficient dissemination of the evidence, collegial partnerships, political willpower and consumer demand, this tide can also begin to turn. **NWH**

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FIGURE 3 SAMPLE INFOGRAPHIC FOR PUBLIC HEALTH CAMPAIGN FOR DELAYED CORD CLAMPING



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BOX 4 DISPELLING THE MYTH THAT EARLY CORD CLAMPING PREVENTS JAUNDICE AND POLYCYTHEMIA

No published randomized controlled trial in 33 years has shown a link between DCC and hyperbilirubinemia or symptomatic polycythemia.

Within the current Cochrane review on term infants and cord clamping, while no difference was found in clinical jaundice, in studies that reported jaundice requiring phototherapy, a significant increase was found for the DCC group. The difference between groups was small (3 percent ECC and 5 percent DCC; McDonald et al., 2013).

One of the seven trials ($n = 2,324$) reporting this finding is a 17-year-old unpublished, non-peer-reviewed dissertation study ($n = 963$; McDonald, 1996). The validity of this finding has been debated in the literature because the participating study pediatricians were not blinded to the umbilical cord management nor was the bilirubin level for jaundice treatment predefined (Mercer & Erickson-Owens, 2012). If removed from the analysis, the finding in the systematic analysis is no longer significant. Another meta-analysis of 15 trials—many of which were the same as in the Cochrane review—found no significant difference in treatment for jaundice between infants with ECC or DCC. Asymptomatic polycythemia was noted as a significant finding in the DCC group and is noted to likely be a physiologic outcome (Hutton & Hassan, 2007). The 2011 research study by Andersson et al. also found no evidence of increased jaundice in the DCC group. Since 1980, no published, peer-reviewed randomized controlled trial has found that term infants with DCC show an increased need for phototherapy for jaundice. For preterm infants, the Cochrane review reported higher bilirubin levels in the DCC group, but no significant differences in the frequency of treatment for jaundice between both groups (Rabe et al., 2012). Evidence to support the practice of ECC as routine or preventative care does not exist. All infants, regardless of gestational age or timing of cord clamping, deserve to have testing and treatment for jaundice available when indicated.

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Post-Test Questions

Instructions: To receive contact hours for this learning activity, please complete the online post-test and participant feedback form at <http://journalsCNE.awhonn.org>. CNE for this activity is available **online only**; written tests submitted to AWHONN **will not** be accepted.

- In a landmark study in 1969, authors Yao and Lind demonstrated that DCC provides how much increased blood volume for term and preterm infants, respectively?
 - 10 and 30 percent
 - 20 and 40 percent
 - 30 and 50 percent
- ECC is still practiced by many providers as a part of the Active Management of Third Stage Labor (AMTSL), although current evidence demonstrates that it does not help to prevent what?
 - Maternal hemorrhage
 - Newborn hypothermia
 - Prolonged labor
- Which of the following is described in this article as an important area for future research?
 - Potential benefits of DCC in healthy term births.
 - Effect on newborn blood volume with ECC versus DCC.
 - Newborn resuscitation at the mother's side with cord intact.
- A 2013 Cochrane review (McDonald, Middleton, Dowswell, & Morris, 2013) on term infants and timing of umbilical cord clamping found that infants whose cords were clamped and cut early:
 - Had increases in the cerebral oxygen index.
 - Had increased serum ferritin at 4 to 6 months.
 - Were twice as likely to be iron deficient at 3 to 6 months.
- In light of recent findings on position and timing of clamping, and in order to support immediate skin-to-skin contact, what is the suggested best practice for DCC at this time?
 - Choosing a position and timing at the discretion of the obstetric provider.
 - Keeping an infant at or below the perineum until the cord is cut.
 - Placing an infant on its mother's abdomen and waiting to clamp and cut for 5 minutes.
- What is a perspective that can be shared when trying to initiate an evidence-based practice change toward adopting DCC?
 - ECC is fine for healthy term infants but DCC is preferable for preterm infants.
 - The decision of when to clamp and cut should be up to the obstetric provider alone.
 - Waiting to clamp and cut the cord is not an intervention, but cutting the cord early (while the infant's blood is running through it) is.
- At the time this article was written, which of the organizations listed was the only one to endorse DCC for all births?
 - AAP
 - ACOG
 - WHO
- What is the stance of the WHO with regard to cord clamping and neonatal resuscitation?
 - ECC is preferred in cases when newborns require resuscitation.
 - Evidence is insufficient to recommend a time for clamping.
 - Ventilation can be initiated at the perineum with the cord intact to allow for DCC.
- What is a myth that can be dispelled when educating families about DCC?
 - That DCC cannot be implemented if cord blood is to be banked.
 - That DCC only benefits preterm infants.
 - That ECC is preferred to promote early breastfeeding.
- In a study by Jelin et al. (2013), which percentage of U.S. obstetricians surveyed said that their hospitals did not have a policy for umbilical cord clamping?
 - 27 percent
 - 69 percent
 - 88 percent
- Which of the following were found by Leslie, Erickson-Owens and Cseh (n.d.), to be important drivers of change among maternity care providers who changed on their own to DCC?
 - Influence of colleagues and believing the evidence
 - Preference of families and influence of colleagues
 - Strength of the evidence and number of studies published