Introduction

The combination of practices recommended in this document is unique in that it crosses the divide between "maternal" and "neonatal" care, thus truly contributing to the goal of a "continuum of care" for mothers and infants.

It is now well recognized that delivery and the immediate postpartum period is a vulnerable time for both the mother and infant. During the first 24 hours after delivery it is estimated that 25 to 45% of neonatal deaths and 45% of maternal deaths occur.[1,2] Thus delivery and postpartum care practices that attend to the most serious and immediate risks for the mother (e.g. postpartum hemorrhage and postpartum infections) and neonate (e.g. asphyxia, low birth weight/prematurity, and severe infections) are the most commonly addressed by public health interventions. Only recently has the fate of the newborn been directly focused upon, since previous delivery care initiatives mainly addressed the health and safety of the mother at childbirth[2] while child survival programs tended to concentrate on conditions affecting survival after the neonatal period (i.e. after the first 28 days of life).[1]

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The recent quantification of the immense contribution of neonatal mortality to overall under-five child mortality (roughly 1/3 of all under-five deaths),[1] provided the opportunity to highlight several simple, inexpensive and evidence-based delivery care practices that can improve survival of the "forgotten newborn" during the delivery/postpartum period.[3,4] However, while attention is now being paid more equally to improving survival of both components of the mother-infant dyad during delivery and the post-partum period, a crucial opportunity to implement simple practices that can affect long-term nutrition, health and development outcomes may be being overlooked. Delayed umbilical cord clamping, immediate mother to newborn skin-to-skin contact and initiation of exclusive breastfeeding, are three simple practices that, in addition to providing immediate benefit, can have long-term impact on the nutrition and health of both mother and child and possibly affect the development of the child far beyond the immediate neonatal and postpartum period. Therefore, an integrated package of care that includes these three practices, together with maternal care practices already being promoted to prevent maternal morbidity and mortality, such as active management of the third stage of labor, will optimize both short- and long-term infant and maternal outcomes.

Objectives

The objective of the present document is twofold. First, the current knowledge of the immediate and long-term nutritional and health benefits of three practices will be reviewed. These include:

1. Delayed umbilical cord clamping
2. Immediate and continued skin-to-skin contact between mother and infant
3. Immediate initiation of exclusive breastfeeding

While there are clearly many essential delivery care practices, the three practices that we review

have either not received adequate attention, or deserve renewed emphasis, and have positive effects on nutritional status, which is generally not an outcome encompassed in the discussion of delivery care practices.

Secondly, we aim to illustrate that these three practices can be feasibly and safely implemented together for the benefit of both mother and infant. Previous recommendations have implied that several maternal and infant care practices may not be compatible with one another: for example, early cord clamping was until recently recommended as a part of active management of the third stage of labor[5] *(Box 1)* and one of the reasons suggested for practicing immediate cord clamping was to place the infant in contact with the mother as soon as possible after delivery.[6] Delivery practices have generally been described without simultaneously mentioning both components of the mother-infant dyad (e.g. active management guidelines gen-

Box 1: Active management of the third stage of labor for the prevention of postpartum hemorrhage

Postpartum hemorrhage is the leading cause of maternal mortality worldwide, contributing to 25% of all maternal deaths,[85] and uterine atony is its most common cause. Fourteen million cases of postpartum hemorrhage are estimated to occur annually on a global level.[85] Active management of the third stage of labor (as it was previously recommended[110]) significantly reduced the incidence of postpartum hemorrhage from uterine atony by 60%,[5] the incidence of postpartum blood loss of 1 liter or more and the need for costly and risky blood transfusions,[94] and prevented complications related to postpartum hemorrhage. Recently, the World Health Organization revised its recommendations for active management to include delayed umbilical cord clamping rather than early cord clamping.[94] Since cord clamping time has never been shown to have an effect on maternal bleeding, and to the contrary, there is evidence that a less distended placenta is more easily delivered, it is not expected that this change will affect the efficacy of active management for the prevention of postpartum hemorrhage. However the efficacy of the revised protocol should be formally assessed.

As it is currently recommended, active management includes three steps to be performed by a skilled provider:[94,111]

1. Administration of an uterotonic drug (e.g. 10 IU of oxytocin intramuscularly) soon after delivery of the infant to avoid uterine atony.
2. Delayed clamping and cutting of the umbilical cord followed by delivery of the placenta by controlled cord traction: After clamping and cutting the cord, keep slight tension on the cord and await a strong uterine contraction. Very gently pull downwards on the cord while stabilizing the uterus by applying counter traction with the other hand placed just above the mother's pubic bone.
3. Uterine massage immediately following delivery of the placenta, and every 15 minutes for the first two hours.

erally do not include mention of the infant). We provide an integrated framework of steps, based on current evidence, which should be readily adaptable to a variety of delivery settings.

Target audience

Our target audience for this document includes health practitioners attending deliveries in health facilities as well as public health decision makers who are responsible for establishing health policy for maternal and newborn care. The intended target audience for this document is intentionally broad in order to increase knowledge regarding the recommended practices among a wide range of individuals who will all be essential in effecting change. While we acknowledge that different individuals involved in maternal and newborn care will need varying levels of knowledge in order to promote and implement the recommended practices, the scientific evidence and practical recommendations included in this document will be useful to the entire audience. For example, practicing obstetricians, pediatricians and midwives may want more practical information on "how" to implement the practices, as well as strong scientific evidence in order to justify changes in their clinical practice. Public health decision makers may be more interested in the overall health benefits of the practices presented through the scientific evidence, but will also need to understand the basic skills in order to assess how existing systems and programs can be adapted to accommodate the recommended practices. Thus for all groups, the "why" and "how" behind the recommended practices are essential knowledge, and therefore this document will be valuable to both practicing clinicians and public health decision makers.

Delayed umbilical cord clamping, immediate mother to newborn skin-to-skin contact and initiation of exclusive breastfeeding, are three simple practices that, in addition to providing immediate benefit, can have long-term impact on the nutrition and health of both mother and child and possibly affect the development of the child far beyond the immediate neonatal and postpartum period.

Organization of document

The first three sections of the document address each of the three practices in the following format: a recommendation for practice is presented first followed by a discussion of the evidence indicating short- and long-term benefit for both mother and infant. The final section of the document presents an integration of the separate steps into a feasible sequence and addresses what is known regarding current delivery care practices. We conclude with a discussion of what steps may need to be taken to overcome barriers to the adoption and sustained implementation and integration of the essential delivery care practices discussed.