Executive Summary

Maternal mortality remains a significant healthcare challenge across the world. More than 300,000 women died from complications of pregnancy and childbirth in 2015—approximately 800 women per day.[1] Moreover, many more women suffer from high levels of maternal morbidity, including injuries, infection, and subsequent diseases.[2] Since 1990, the World Health Organization (WHO) and the United Nations (UN) set the Millennium Development Goal to reduce the maternal mortality ratio by three-quarters across the globe before 2015, but only 9 countries achieved this goal.[3] Furthermore, 47 countries were categorized as making insufficient progress or no progress,[3] highlighting the substantial continued work necessary to decrease the maternal mortality and morbidity rates.

Complications before and during childbirth highlight the disparities among low-income and high-income countries and regions. In 2015, 99% of all maternal deaths occurred in developing regions.[3] The lifetime risk of maternal death in a developed country—1 in 4900—sharply contrasts with the lifetime risk for women in sub-Saharan Africa of 1 in 36.[3] The majority of these deaths are preventable, occurring in impoverished, low-resource settings.[4] Even in high-income countries such as the United States, regional differences have been observed, highlighting the impact of low-resource settings on maternal morbidity and mortality.[5]

The high rates of maternal death negatively correlate with childhood survival in low-income and developing nations, providing another rationale for reducing maternal mortality ratios.[6-8] For example, when a woman in sub-Saharan Africa died, her neonate was significantly more likely to die than survive, and those infants who did not die postpartum had worse survival trajectories than the children whose mothers did not die during childbirth.[8] The most common causes of neonatal deaths in developing countries are antepartum and intrapartum-related events.[9] Reducing maternal mortality and morbidity will significantly improve the health and survival of children worldwide.

Breech presentation or transverse lie are significant risk factors for maternal and neonatal morbidity and mortality in low-income countries.[10] Just over 4% of all term births involve breech presentation.[11] Indeed, breech presentation is often correlated with stillbirth due to asphyxia during labor, and fetal outcomes have been correlated with the skill level of the delivering healthcare provider.[12] Improving the skills of healthcare providers in assisted vaginal delivery and proper forceps technique will decrease the rate of mortality related to childbirth while also reducing the need for cesarean delivery, which may not be available in resource-limited settings.

To help prevent maternal and neonatal deaths, this company is requesting funding to educate healthcare providers on specific life-saving techniques that are critical to improving childbirth outcomes. The massive disparities between the richest and poorest countries highlight that appropriate resources and effective training can prevent many of these deaths. Furthermore, many women in low-resource countries perceive skilled healthcare providers as unnecessary or only marginally safer than traditional birth attendants.[13,14] By improving education of healthcare providers in these regions, this company will increase the amount of skilled care available, improving the rate of access among pregnant women.

This company's proposed initiative will contribute to the WHO & UN collaborative goal of The Global Strategy for Women's Children's and Adolescents' Health (2016 – 2030) by delivering free education to 1000 obstetric physicians, midwives, and healthcare providers who are unaware of the safe methodology for delivery breech babies and utilizing forceps in childbirth. Using the valuable insights and clinical experience of doctors who are exceptionally skilled, this initiative will combine didactic video and animation components in a novel and engaging way in a variety of languages. Once the videos are developed, an innovative distribution plan will disseminate the videos to healthcare providers throughout the world.

Needs Assessment

Clinical Practice Gap #1: After publication of the landmark Term Breech Trial in 2000, a large study demonstrating the positive impact of cesarean delivery on outcomes compared with vaginal breech delivery (VBD),[15] clinical treatment strategies and educational efforts radically shifted toward cesarean sections upon breech presentation.[16] Subsequent shifts in obstetric education have emphasized C-section training, with decreasing focus on VBD and forceps delivery training. Although the Term Breech Trial changed management of challenging deliveries in developed countries, C-sections are not always options in countries with limited resources. Nonetheless, the vital techniques of VBD and forceps delivery may soon be lost to future generations of clinicians worldwide with the evolution of new management practices for breech delivery and the decreasing prevalence of healthcare providers skilled in VBD.[17-20]

Educational Need #1: Over the past 25 years, intensive efforts to reduce the number of mothers and babies from the developing world who die in pregnancy and childbirth have produced significantly improved outcomes, leading to a decline in maternal and neonatal mortality rates.[3] Nonetheless, improved obstetric training for healthcare providers is still needed, particularly in remote areas of developing nations with limited finances, education, and facilities for cesarean section. Fundamental skills such as VBD and forceps techniques remain vital to community health, and are critical components for continued reduction in maternal and perinatal morbidity and mortality. Indeed, suboptimal forceps placement is associated with higher levels of maternal and neonatal morbidity, highlighting the importance of proper training in instrumental deliveries.[21]

Clinical Practice Gap #2: Breech presentation requires complex decision making even in the most ideal conditions.[22] Multiple studies in developed countries have found, in opposition to the 2000 Term Breech Trial, that VBD may not result in a high absolute risk for mother or child when proper techniques are used.[23-25] This is in direct contrast with findings in developing countries, which suggest that VBD carries substantial risk for both mother and child.[10,26,27] For example, more than 15% of all vaginally delivered neonates with breech presentation died intrapartum or immediately postpartum in Tanzania compared with 2% of neonates delivered by C-section.[26] Based on these data, healthcare providers may be unfamiliar with the clinical indications and techniques for spontaneous, assisted, and extraction breech delivery.

Educational Need #2: In a recent collaborative assessment of the steps required to achieve a safe VBD, several themes were identified that will form essential cornerstones for this company's educational video series.[28] In general, clinicians must be prepared for spontaneous delivery, assisted breech delivery, and total breech extraction. Spontaneous delivery, in which no traction

of the infant is used, is most commonly performed in pre-term and pre-viable deliveries,[29] but assisted delivery with minimal manipulation is often possible in term deliveries as well.[30] Overall, healthcare providers will be given tools to make appropriate decisions about when to directly assist in breech delivery and when to allow delivery to proceed spontaneously. Clinicians will also be educated on appropriate techniques for complications, such as entrapment of the aftercoming head or nuchal arms, which will ultimately improve the outcomes of VBD.

Clinical Practice Gap #3: Forceps technique is increasingly viewed as an antiquated procedure, and healthcare providers are rarely given the opportunity to perform the techniques enough to acquire an acceptable level of skill.[18-20] Births by forceps often have a relatively high level of maternal and neonatal morbidity, but a good deal of evidence indicates that this risk stems from the skill level of the operating clinicians and not the instruments themselves.[21,31-33] In general, the most common maternal complication resulting from operative vaginal delivery is trauma to the genital tract, highlighting the need for procedures with forceps to be performed by knowledgeable and skilled healthcare providers.[34]

Educational Need #3: To effectively deliver breech infants with forceps, healthcare providers must be familiar with the indications and contraindications, the periprocedural care, and the appropriate positioning and techniques.[35] The most common indication for forceps-assisted delivery is a prolonged second stage of labor, which requires healthcare provider intervention to ensure maternal and neonatal wellbeing. Once the healthcare provider has determined that forceps delivery is the best way to proceed and no contraindications are present, clinicians must properly position the mother in semi-recumbency or in a left-lateral position. Furthermore, selection of the proper tool is an important component of forceps delivery and should take into consideration fetal head position and operator preference.[35] The proposed initiative will provide education on the many considerations of forceps delivery and facilitate the use of the most evidence-based practices.

Clinical Practice Gap #4: Decisions regarding VBD must be made in collaboration with the patient, taking into consideration the mother's cultural and societal background. Unfortunately, studies evaluating perceptions of healthcare facilities among pregnant women in developing countries routinely reveal mistrust and a lack of confidence in the available healthcare settings.[36,37] This is not entirely surprising, as pregnant women may be treated with disrespect and abuse in some healthcare environments, which undermines women's desire to seek healthcare.[37] To improve the perceived quality of care among pregnant women, healthcare providers must use interpersonal skills, including compassionate patient counseling and postpartum care.

Educational Need #4: Similar to technical clinical skills, interpersonal communication skills can be taught and learned. Many women value interpersonal communication as a key component of an ideal healthcare visit, so the proposed educational initiative will focus on compassionate and empathetic communication of diagnoses.[36] Furthermore, clinicians will be provided tools to obtain informed consent before initiating instrumental delivery, which will improve the patient-provider relationship by establishing trust.[35] After the infant has been delivered, postpartum care may differ depending on the method of VBD, so clinicians should tailor their care to the mother's and

neonate's individual needs. The proposed educational initiative will improve the care provided to both mothers and infants, ultimately decreasing the rate of maternal and neonatal mortality.

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