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Reducing intrapartum stillbirths and intrapartum-related neonatal deaths

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Acute intrapartum emergencies and poor fetal oxygenation commonly contribute to stillbirth and neonatal deaths, as well as to long-term neurologic disabilities including mental impairment and cerebral palsy [1–5]. Much of modern obstetric care in high- and many middle-income countries has been directed at reducing both antepartum and intrapartum fetal oxygen deprivation. These efforts have included the identification of women at risk, such as those women with pre-eclampsia, sickle cell disease and diabetes, and those with compromised fetuses at risk in the absence of maternal complications, such as those with growth restriction or oligohydramnios. Identification of these conditions in the antepartum period is usually followed by various types of prenatal screening to detect those fetuses at even higher risk for poor oxygenation. The use of ultrasound for monitoring amniotic fluid levels and fetal growth, electronic fetal heart rate monitoring, fetal movement counting, and Doppler blood flow measurements have all contributed to better identification of at-risk pregnancies [6–8]. At least as important is skilled care during labor, including fetal heart rate monitoring to identify those fetuses in jeopardy. Rapid instrumental birth or cesarean delivery results in substantial mortality reductions during labor and in the early neonatal period [9]. Thus, by and large, high-income countries have successfully reduced intrapartum fetal organ damage and the associated adverse pregnancy outcomes, including intrapartum stillbirth and intrapartum-related neonatal mortality [5].

In low- and middle-income countries, especially those without a well-functioning healthcare system, intrapartum fetal organ damage due to poor oxygenation remains a very substantial problem [5,10–13]. In these areas, because of chronic nutritional deprivation, increased exposure to environmental pollutants, and the presence of many poorly or untreated medical conditions, the risk of fetal damage during labor is substantially increased compared with that seen in high-income countries. As chronically malnourished women tend to have small pelvises, they are at increased risk of suffering long and obstructed labors, which also substantially increases the risk of the fetus or neonate suffering an intrapartum injury. Lack of access to appropriate obstetric care, especially during labor, compounds the risk of adverse fetal outcomes such as death or disability.

In this issue, an international team of over 30 distinguished investigators led by Drs Joy Lawn (Saving Newborn Lives/Save the Children), Gary Darmstadt (Gates Foundation), and

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Conflict of interest

The authors have no conflicts of interest to declare.

Anne CC Lee (Johns Hopkins University) have presented an overview of intrapartum-related complications and their sequelae, and have undertaken a thorough evaluation of interventions that might potentially reduce their numbers [14–20]. This work—presented as a series of 7 papers in this Supplement to the *International Journal of Gynecology and Obstetrics*—originally began as an expert meeting on “birth asphyxia” held in Cape Town in 2002 and has been substantially updated and expanded. The work was funded by the Bill & Melinda Gates Foundation through the Saving Newborn Lives program of Save the Children because of the desire of both organizations to define more clearly the evidence base for programs and interventions to reduce intrapartum stillbirths and intrapartum-related neonatal deaths. The authors of these papers have provided a huge service to those interested in improving pregnancy outcomes in low- and middle-income countries (Fig. 1).

Interestingly, a major point in the first paper is a request for a change in terminology [14]. The authors argue that “asphyxia” is an imprecise term that is defined differently by many of its users, which does not help us much in either defining a suitable prevention strategy or choosing the appropriate timing for any proposed intervention. Instead, the authors propose the use of terms that describe the timing of the insult and the specific adverse outcome. We agree with this proposal and have therefore titled this commentary “Reducing intrapartum stillbirths and intrapartum-related neonatal deaths,” and for the most part have tried to avoid the word “asphyxia.”

While initially aimed at reducing intrapartum-related adverse outcomes, a careful reading of these papers provides a roadmap to reducing nearly all adverse pregnancy outcomes in low- and middle-income countries, since interventions aimed at reducing this complication should also have a substantial impact on other adverse perinatal and indeed maternal outcomes as well. We agree with the authors that the consequences of intrapartum fetal organ damage due to poor oxygenation are often difficult to distinguish from those associated with other perinatal conditions, including infection and trauma. However, differentiating the specific outcomes associated with each condition may not be that important. In fact, these conditions often co-occur, and when they present together, substantially increase the likelihood of fetal/neonatal death or disability. In addition, intrapartum fetal organ damage due to poor oxygenation is the final common pathway for many stillbirths and early neonatal deaths, whether the precipitating event is hemorrhage associated with placental abruption or previa, obstructed labor, an umbilical cord complication, or pre-eclampsia/eclampsia. Interventions directed at poor fetal oxygenation, especially those involving system building, training, transportation and audits are likely to affect multiple conditions and outcomes. While not specifically evaluated in trials, the package known collectively as Emergency Obstetric Care, which focuses on timely cesarean delivery, along with other interventions to reduce maternal death and morbidity, should have an important impact on reducing intrapartum fetal organ damage due to poor oxygenation, and stillbirth and neonatal mortality as well.

Much of this series has focused on improving the functioning of the healthcare system. The reviews examining components of the healthcare system, with a careful examination of the different types of health providers working in various types of facilities and their training needs, are an especially thoughtful contribution [20]. Their focus on how to maximize the contribution of each type of provider is especially useful. The value of training the lay community and traditional birth attendants to recognize problems, stabilize women in jeopardy, and transfer them appropriately has been doubted by many. In this series, the authors put this issue into the proper context and provide evidence for benefit of identifying roles for community cadres and linking them to the healthcare system [18]. We have been especially impressed with the potential of community mobilization around issues related to birth planning and childbirth to improve various perinatal outcomes, particularly through increasing the proportion of women coming for facility birth [21]. We appreciate the

authors' efforts in providing the evidence base for various community mobilization efforts to improve the system of pregnancy-related care. As the authors state, there is encouraging evidence that mobilizing communities to address pregnancy-related care is an important step in reducing the large burden associated with intrapartum complications [17].

The authors also discuss the use of emergency response teams and emergency drills [15]. Since an important contribution to the adverse outcomes associated with intrapartum asphyxia in low-income countries has been conceptualized as a series of delays—delay in recognizing the problem placing the pregnancy at risk, delay in arranging transportation to a medical facility, and delay in providing appropriate care at the facility—the emphasis throughout the papers on strategies to reduce these delays is important [22]. The thoughtful exploration of different methods for enhancing the availability of transportation to a facility for women in jeopardy was of particular importance in conceptualizing the creation of a medical care system for community-based deliveries.

The third delay, quality of care at facilities, is addressed in the paper reviewing the evidence for the content of neonatal resuscitation, provider training and competency, and equipment and supplies specifically for resource-constrained settings [16]. The authors estimate that basic neonatal resuscitation may avert 30% of intrapartum-related neonatal deaths in facility settings and emphasize that better use of resuscitation in those settings is more easily attainable than for community deliveries; they also provide a useful discussion on methods to improve resuscitation in facility settings. Since few newborns require resuscitation with an endotracheal tube and drugs, and in many cases these babies may not survive without ongoing ventilation, advanced neonatal resuscitation is not recommended as a priority in settings without neonatal intensive care. Currently, 60 million births per year occur outside facilities and the vast majority does not have access to resuscitation. Evidence presented here suggests that neonatal resuscitation may be performed by a range of health workers who already attend deliveries, with significant reductions of intrapartum-related stillbirths and neonatal deaths [23].

In the paper by Pattinson et al. [19], the authors show us that simply conceptualizing or creating an obstetric/neonatal care system is not enough. They make a very strong case that continuous evaluation of adverse outcomes directed toward finding correctable causes of death is an important component of any system of care directed at improving pregnancy outcomes. They emphasize that the effect of perinatal audit depends on the ability to close the audit loop. Without effectively implementing the solutions to the problems identified, audit alone will not improve the quality of care [24].

The major take-home message from this series is that there are 2 million or so intrapartum-related perinatal deaths in low-income countries [14]. The use of certain specific interventions has the potential to substantially reduce this burden as well as to improve a number of other adverse perinatal outcomes. However, we also know that attempts to introduce a single intervention are likely to produce only minimal benefits that are often not sustainable. Conversely, as presented in this series, a thoughtful evaluation of the current obstetric care system and the creation of an integrated system, including the capacity to identify obstetric complications, the ability to stabilize and transfer those women who are in jeopardy, and enhancing the ability of the health facilities to provide emergency obstetric and newborn care, will go a long way to improving perinatal outcomes in many low- and middle-income countries. This series outlines the potential for health systems in any setting to substantially reduce stillbirth and neonatal deaths, as well as maternal mortality, by prioritizing care at the time of birth.

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Fig. 1. Prenatal care in rural Ethiopia. Photo reprinted with permission granted by Save the Children/Ethiopia 2008.