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### Recommendations for interventions preventing neonatal disorders in Senegal

Within sub-saharan Africa, Senegal is a leading example of peace, democracy, and triumph over long prevailing repercussions of European colonialism. Senegal has seen three peaceful transitions within the presidential office since its independence obtained in 1960, an obscure trend within a region historically plagued by war, violence, and failing health systems. However, in spite of Senegal's political progress and development, it is still a country affected by poverty, a failing education system, and communicable disease. In 2019, neonatal disorders were recorded to be the leading cause of death, a national health crisis that has held this position since 2009 (IHME, 2020). Within the category of neonatal disorders, 27% of deaths can be attributed to preterm birth complications, 26% to intrapartum related events, and 21% to sepsis. (Healthy Newborn Network, 2019). As a nation who has made tremendous progress in combating the geographical and historical disadvantages that haunt its neighbors, action must be taken to overcome what is a preventable crisis. It must also be noted that persistence of neonatal disorders is not the product of inattentive mothers or ill-willed healthcare professionals, but is rooted in a failing education system. In order to efficiently and successfully eliminate neonatal disorders, it is crucial to implement a fundamental change within the Senegalese education system, reduce the incidence of preterm birth complications, and improve water, sanitation, and hygiene (WASH) conditions.

As per the sustainable development goal (SDG) four, “Quality Education,” the education system of a healthy and functioning nation is one that ensures “inclusive and equitable and quality education and promotes lifelong learning opportunities for all.” While Senegal excels in many areas of the SDGs, including certain aspects of education, it is still one that requires immediate attention. It cannot be overlooked that within the realm of education, Senegal has made tremendous progress since the year 2000. About one quarter of the annual budget is allocated toward education, and this financial commitment has induced change within the educational system (UNESCO, 2021). Since 2010, Senegal has successfully maintained gender parity within primary schools. Enrollment rates of girls and young women in schools have substantially increased, resulting in 87% of all Senegalese girls enrolled in primary school in 2016. However, retention and matriculation rates do not follow this trend. Only 60% of girls complete their primary education and only 50% will go on to secondary school (Fernald, 2017). Many of these girls will not complete their education. This not only reduces the possibility of professional development and opportunities for higher education, but maintains the prevalence of neonatal disorders.

Data published by the World Health Organization noted that “for each additional year of schooling of women, there is an associated 7-9% reduction in mortality of her children under five” (WHO, n.d.). Keeping girls in school is essential to combat neonatal mortality. Factors contributing the reduction of secondary school enrollment include: lack of access to secondary schools, lack of adequate resources in rural areas, teacher training, and sexual violence. Research conducted by the Human Rights Watch in 2017 found that sexual violence is becoming a foundational problem in perpetuating the lack of female enrollment within the Senegalese

secondary schools. Teachers and school officials often abuse their positions, using power and authority to intimidate and violate.

In order to protect and educate our female population, resources must be allocated to construct more schools in rural areas, reducing the distance between home and the classroom. This will not only reduce the likelihood of sexual violence that occurs during long walks to school, but will also promote community engagement within their children's education. In addition, mandatory sexual violence awareness training for teachers is recommended. It is important to note that use of Senegalese funds, rather than those provided by a high income country or aid organization, is crucial to this project's success. This promotes familiarity within the Senegalese government of how to successfully utilize financial resources and procurement procedures to create a long lasting, effective change within the education system (USAID, 2021). In regard to an underpopulated and underpaid workforce of teachers, funds allocated to incentive programs as well as scholarship opportunities for those pursuing a degree in teaching or training course are both well documented ways to produce well trained educators. This will ensure not only a workforce adequately trained to educate and protect our youth, but is also a solution to combat neonatal mortality.

In Senegal, 67,000 babies are born preterm each year and 3,870 children under the age of five die due to preterm complications, which is the largest contributor of Senegalese neonatal mortality (Every Premie, 2019). Solutions to improve and ensure the survival and health of newborns begin with skilled birth attendants. These individuals coordinate and educate new mothers on basic care and feeding support. Senegal has roughly 3.1 nurses and midwives per 10,000, which makes it one of the least qualified nations with regard to maternal healthcare (Fenton and Cali, 2020). Private hospitals are well populated within this category, given their

high fees resulting in exclusive access to wealthy families. Public hospitals are struggling to not only provide maternal care, but quality healthcare that is accessible to those in urban and rural communities. Allocating funds to increase pay for public healthcare workers, especially nurses and midwives, is crucial to reduce the prevalence of preterm birth and intrapartum complications, but also to ensure increased access to quality health services.

Given the 51.8% of people that live in rural areas (The World Bank, 2020), creating a program that trains midwives and nurses to make house calls in rural communities will ensure dissemination of these services, while also ensuring equitable access, as many rural residents may not have access to larger facilities, nor may they believe in a more “Western” medical atmosphere (Fenton and Cali, 2020). Sending trained individuals on house calls will also provide more opportunity to identify women more at-risk for preterm labor. Recognizing at-risk women early enough allows for interventions enabling extra care and support to give birth in a facility or local healthcare center (Healthy Newborn Network, 2019). Encouraging the safe management of labor and delivery, as well as postnatal care is crucial in reducing preterm labor and preventing complications among preemies.

Preterm birth complications are not only fueled by a lack of trained professionals, but are equally sustained by poor sanitation conditions within facilities. Inadequate WASH conditions within Senegalese healthcare facilities pose a serious threat to the relatively nonexistent immune system of a newborn, especially that of a preemie. However, there is optimism for improvement in this sector, as the 9th annual World Water Forum was held in Dakar, Senegal. This event is the first of its kind to be hosted in sub-Saharan Africa, a clear step toward the attainment of SDG six (Ndiaye, 2022). This also happens to be the only region in the world where the practice of open defecation is increasing. Due to legislative reforms and improvements in sanitation standards,

81% of the Senegalese population have access to basic drinking water sources, which is one of the highest among the region. However, only 21% have access to safely managed drinking water (Global Waters, 2020). Funds dedicated towards the installation of latrines within rural communities as well as hand washing stations to promote community hygiene will not only reduce the incidence of waterborne diseases, but foster community engagement in becoming more educated on WASH strategies. As for healthcare facilities, installation of hand hygiene stations as well as education on the importance of sterilization will contribute to the reduction of sepsis among neonates (World Vision, 2020). Community education on the dangers of open defecation as well as effective waste management strategies are also encouraged, as they have been well documented to reduce the incidence of communicable diseases, such as neonatal related diseases and mortality.

Senegal is a persevering nation, breaking the barriers that have long plagued sub-Saharan Africa. Although setting the example for neighboring countries, it is still a country burdened by preventable diseases, with neonatal disorders leading the way. Implementing intervention strategies to ensure equitable access to education, minimizing birth complications, and improving sanitation conditions, will be a start of eliminating a long standing endemic health crisis.

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