How Can We Accelerate Maternal Vaccination Globally?

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Abstract: New maternal vaccines could reduce infant deaths at and after birth, especially in low- and middle-income countries. Work is underway to prepare for new maternal vaccines globally, and the Maternal Immunization Readiness Network for Africa and Asia will support in-country preparation in several low- and middle-income countries. However, the impact of new maternal vaccines will only be realized with supportive policy recommendations and sufficient financing for the development of maternal immunization platforms.

Key Words: maternal, neonatal, vaccination, immunization

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Maternal immunization (MI) is an opportunity to reduce death and disease, for both mother and infant, before, during, and after birth. Successful use of MI has been demonstrated through the decline in neonatal tetanus deaths by 92% worldwide,[1] with the use of maternal tetanus toxoid-containing vaccine. New maternal vaccines have been, or are being, developed for the prevention of respiratory syncytial virus (RSV)[2] and group B Streptococcus (GBS) disease,[3] which cause death and disability among neonates and infants, with the burden highest in low- and middle-income countries (LMICs), where over 95% of deaths occur. However, new maternal vaccines developed will only have an impact and support progress toward reduction of maternal and newborn deaths and stillbirths (as targeted in Every Woman Every Newborn Everywhere) if there is an evidence base for decision-making on introduction, a platform to successfully deliver the vaccine, and high uptake supported by demand.

Future introduction of new maternal vaccines has been supported by evidence generated to date. Understanding the disease burden and cost-effectiveness of new maternal vaccines is essential in terms of the evidence base for decision-making on introduction. Global estimates of disease burden have been generated for both GBS and RSV. These studies demonstrate a considerable burden worldwide; among infants under 6 months, each year more than 90,000 infant deaths are attributed to GBS, together with 46,000 stillbirths.[4] For RSV, each year there are over 100,000 infant deaths, together with hospitalization of 1.4 million children.[5] Building on these estimates, health economic analyses have been done, indicating cost-effectiveness.[6] An analysis of the annual net monetary benefit of a maternal GBS vaccine was found to have a benefit ranging from US$1.1 billion to US$17 billion, according to a range of normative assumptions from least to most favorable.[7]

In terms of the readiness of health systems and delivery platforms, the development of the Maternal Immunization and Antenatal Care Assessment checklist[8] has provided a rapid tool for countries to evaluate their capacity and readiness, including local and national policy requirements, burden of disease, cold-chain requirements, strengthening public health communication and resource needs. Additionally, a Health Facility Readiness Assessment tool to support assessment at the health facility level[9] has also been developed and piloted in Kenya and Bangladesh and subsequently adapted for use in other countries. Furthermore, as new maternal vaccines may have specific gestational age windows for administration, implementation research is assessing antenatal care attendance by gestational age in several LMICs to assess the potential uptake of new maternal vaccines. To support demand-generation activities for new maternal vaccines, work has been done to understand the specific drivers of vaccine demand among pregnant women, healthcare workers and policymakers in both Kenya and Bangladesh, learning from COVID-19 vaccination.[10] These studies note the importance of safety and efficacy data for decision-making and the need for clear communication tools to support the rationale and rollout of new maternal vaccines, for pregnant women and their families, healthcare workers and for the community.

Alongside a strong evidence base, a health system able to support delivery and demand for new products, together with aligned activities such as postintroduction safety surveillance, are important. Introduction of any new intervention into a health system, including antenatal care, can affect service delivery, even if supporting resources are provided. While strengthening antenatal care service delivery to support new vaccines may support broader benefits through improved access to high-quality care, there is also the potential for services to be overstretched, and this will need to be monitored and acted upon. In terms of maternal vaccine safety surveillance, the Global Alignment on Immunization safety Assessment in pregnancy consortium was initiated to support a common understanding of outcomes and approaches to monitoring the safety of vaccines used in pregnancy with a particular focus on LMICs. Subsequently, existing safety surveillance platforms in LMICs to support active maternal vaccine safety surveillance have been described in a Landscape Analysis of Pregnancy Exposure Registries in Low- and Middle-Income Countries.[11] Use of digitization supported by artificial intelligence for interpretation is being tested in some settings to support data capture and to link maternal and child health records.

We developed a theory of change illustrating the activities required to move from the availability of new maternal vaccines to the impact that these new maternal vaccines could have

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(See Figure, Supplemental Digital Content, http://links.lww.com/INF/F9911), following discussions with partners. This was done in the context of the examples earlier to support future maternal vaccine implementation. It was apparent that much of the work to date had been at the global level and/or undertaken for different elements, for example, evidence generation, in different countries. To support the successful introduction and implementation of maternal vaccines in countries, there was a need to bring these different elements together, to ensure a strong evidence base, a strong delivery platform and demand generation, with country ownership and leadership. The Bill & Melinda Gates Foundation therefore funded what has become the Maternal Immunization Readiness Network for Africa and Asia (MIRNA), with leadership from countries across the Global South. Within this network, investigators are engaging with key stakeholders to support the country's readiness for future maternal vaccines. This work includes providing a situational assessment of the health system and delivery platform, a framework for vaccine demand generation and assessing the available and potential evidence on the burden of disease, while considering the cost of vaccine delivery in their context, to inform cost-effectiveness modeling.

The new MIRNA is learning from and building on previous work and applying and adapting tools that have been developed. For example, the situational assessments MIRNA is undertaking include elements from both the Maternal Immunization and Antenatal Care Assessment checklist (WHO Maternal Immunization Checklist 2024, available from World Health Organization) and the Health Facility Readiness Assessment tool and will assess the opportunities and challenges of administering new maternal vaccines, alongside other interventions, in existing antenatal care platforms, and where areas of strengthening will have the greatest impact. Similarly, a framework for vaccine demand generation is being developed utilizing a combination of approaches and will inform context-appropriate interventions for new maternal vaccines. For an improved understanding of the disease burden and surveillance systems, MIRNA is undertaking country-based systematic and scoping reviews and considering how gaps in the evidence base could be filled. Health economics analyses are being developed to quantify the cost of delivering new maternal vaccines with both antenatal care and expanded program of immunization programs. The program of work is supported by engagement with key stakeholders and interest groups in-country, including pregnant women and their families, ministries of health, national immunization technical advisory groups and professional and civil societies. As new maternal vaccines move to introduction, MIRNA will provide a basis to inform decision-making and implementation activities, including platform strengthening.

While considerable work has been done to accelerate maternal vaccination globally, and more work is in progress, the challenge remains extremely high. For successful acceleration of maternal vaccination worldwide, supportive global policy recommendations, sufficient financing for new maternal vaccines developed and MI platform development, with programmatic adaptations, are critical. This will require a concerted effort across disciplines and all partners and agencies, locally, nationally and internationally, if we are to see benefits from these life-saving interventions for the benefit of women and children worldwide.

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