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Guest Editorial

Maternal and neonatal immunization in the Americas: The benefits, the hurdles, and the way forward ☆



Vaccination during pregnancy powerfully leverages maternal adaptive immunity for protection of both mothers and infants against infectious organisms that threaten their life and wellbeing. The benefits of this approach are well documented in reducing neonatal tetanus, infant hospitalization and death due to pertussis, and severe respiratory illness caused by influenza in mothers and their infants [1]. Vaccination of pregnant women holds great promise for preventing infection by other known and emerging pathogens. Growing evidence of the safety and serological benefit of vaccination to prevent SARS-CoV-2 infection in pregnant women, a high-risk group for severe COVID-19 disease with implications for maternal and neonatal morbidity, is a perfect example of this promise [2,3]. Industrialized nations have taken advantage of maternal immunization through specific recommendations, while many lower-resource countries have lagged.

Hurdles that prevent the expansion of maternal immunization are manifold. A lack of understanding of the advantages of vaccination, or how and how well, a specific vaccine works during pregnancy contributes to many women's vaccine hesitancy. Poor instruction, inadequate access to health care and limited communication with providers who can educate and discuss concerns, and often misinformation, contribute to reduced vaccine use. The development of new or better vaccines for pregnant women requires multidisciplinary efforts to identify safe and effective antigenic targets and suitable delivery platforms, and a better understanding of the intricacies of host immune adaptation during gestation. Substantial progress has been made in recent years to overcome regulatory challenges associated with clinical studies in pregnant women. Still, pregnant women are generally excluded from clinical trials until the latter stages in the path to licensure. This exclusion is understandable but, as we have seen during the COVID-19 pandemic, lack of pregnancy-specific data leads to confusion and concern for pregnant women asked to consider vaccination during disease outbreaks or public health emergencies, when the risk–benefit assessment favors vaccination [4].

Vaccination of pregnant women has tangible benefits to improve public health. However, implementing a robust vaccination-in-pregnancy platform and its success largely depends on access to a sustained and strong health care infrastructure for

mothers and infants, education, regional priorities, and economic and political will.

A series of manuscripts published on this issue, authored by the Pan American Health Organization (PAHO) and network collaborators, summarizes state-of-the-art maternal and neonatal immunization in Latin America and reveals windows of opportunity.

Pathogen screening and reporting practices in Latin America in the context of Group B streptococcus (GBS) were addressed by HogenEsch and colleagues [5]. Since infants are uniquely susceptible to GBS-associated mortality and morbidity, intrapartum antibiotic prophylaxis successfully reduces early- but not late-onset infant disease, and the benefits of an effective vaccine for mother and infant are obvious, determining the GBS-associated disease burden is critical in establishing public health priorities. The group concluded that true regional burden of pathogens such as GBS is likely underestimated and raised the need for national policies and resources to support ongoing pathogen surveillance to inform introduction of new interventions.

A systematic review of the safety of recommended vaccines for Latin America and the Caribbean was conducted by Macias Saint-Gerons by examining reported maternal-fetal and neonatal outcomes [6]. While no definite risks associated with vaccine administered during pregnancy were identified, inconsistent quality in the available data compels improvements to strengthen current monitoring and recording of maternal-fetal outcome practices, going beyond influenza and pertussis and encompassing other vaccines given in exceptional circumstances. They suggest that more robust safety analysis can be derived from randomized clinical studies with adequate reporting and better-quality observational studies in the regions.

A survey of perceptions and attitudes that influence vaccination of pregnant women in a *peri*-urban area of Peru by Carcelen and collaborators singled out lack of information as the primary factor for vaccine hesitancy during pregnancy [7]. The desire of expectant mothers to learn about vaccines and their trust in their health care providers, themes that have consistently been shown in more industrialized nations as well, emerged as opportunities to enhance vaccination programs.

Enablers and barriers to maternal and neonatal immunization were also addressed by Roperó-Alvarez et al. [8], who through a collection of interviews, identified concrete ways that can help mothers make informed decisions on vaccination for themselves and their children; these include offering clear and timely informa-

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tion, ensuring adequate vaccine supply, staff, and infrastructure. The implementation of integrated information systems to monitor progress of vaccination and adverse events following immunization was recommended.

Malik and colleagues delved further into Latin American women's perspectives on vaccination during pregnancy through focused group discussions [9]. The group identified educating pregnant women and their health care providers as a crucial step to increase vaccine use. They proposed prioritizing pregnant women for immunization and health care education and training of health care providers, who are consistently the most important influence on a pregnant woman's immunization decision, to fill the existing knowledge void. Malik and collaborators also queried the viewpoint of health care providers on maternal immunization, which laid bare the providers' limited knowledge and inadequate resources [10]. Special training for obstetricians and midwives and the concomitant improvement in vaccine supply and infrastructure were recommended.

The PAHO enacted the Regional Immunization Action Plan (2016–2020) to strengthen maternal and neonatal immunization in the Americas. This plan of action provided rationale, guiding principles, strategies, objectives, and indicators to bring to fruition the WHO Global Vaccine Action Plan 2011–2020 in the Region of the Americas [11]. Interventions launched under this strategic plan sought to fulfill the mission of the Decade of Vaccines (2011–2020): “to extend, by 2020 and beyond, the full benefit of immunization to all people, regardless of where they are born, who they are or where they live” [12]. Velandia-González et al. recapped the progress made toward the plan's targets relevant to maternal neonatal immunization, and proposed coordinated practices for vaccination data accrual, integration of health programs, and technical innovation [13].

Disparities in access to health care and prevention in the different regions, based on ethnicity, education, and maternal age outlined in these contributions remain of great concern. Specific recommendations that can benefit maternal immunization campaigns and access to preventive tools proposed in the accompanying articles include heightened efforts to educate pregnant women and providers, strengthened surveillance and reporting methods, and a centralized information network for data collection across countries that can facilitate education and inform interventions.

For various reasons, inadequate or incomplete information hobbles vaccination efforts across regional and economic boundaries. In the Americas, education must be accompanied by a robust health care infrastructure for vaccines to reach those most in need. Use of models that have been successful elsewhere adapted to meet countries' specific needs, along with sustained support and cooperation from the international community, can achieve this goal.

The 2019 COVID pandemic that affected all groups across the globe illustrates the need for preparedness. As of this writing, COVID-19 continues to have a disproportionate and devastating effect in Latin America due to fragile health care support, weak economy, and protracted virus infection waves as vaccines that were made promptly available in the US and Europe were not accessible to individuals living in many Latin American countries.

Only the recognition and concrete actions by individuals and institutions with decision making capacity at national levels can ensure the success of health improvement plans. Policies that facilitate economic growth, access to adequate sanitation, education,

health care, and interventions to improve the quality of life constitute a moral duty for those who hold public office and for the society as a whole, and are a necessary investment in the wellbeing of future generations. This is a prerequisite to disrupt the cycle of vulnerability—and the healthy mother–infant dyad is the place to start.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Marcela F. Pasetti*

Center for Vaccine Development and Global Health, University of Maryland School of Medicine, Baltimore, MD, United States

* Corresponding author.

E-mail address: mpasetti@som.umaryland.edu

C. Mary Healy

Infectious Disease Section, Department of Pediatrics, Baylor College of Medicine, Houston, TX, United States

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