

Protecting mothers and infants from infectious diseases



PATH's work in maternal immunization

Everyone deserves the chance to reach their full potential, wherever they live. Despite progress toward their health and survival, too many mothers and infants die unnecessarily each year—mostly in low-resource settings. Many of these deaths could be prevented by increasing access to health solutions—including vaccines.

For a child, the first days and months of life are the most vulnerable. In fact, 4.1 million children under one year of age (infants) died in 2017, accounting for 75% of all deaths under five years of age.¹ For such young children, some infectious diseases hit particularly hard. During the newborn period, for example, sepsis, meningitis, pneumonia, and tetanus are major causes of death.² Pregnant women are also at increased risk for some diseases such as influenza and tetanus, and influenza episodes can be more severe. Although vaccination is a powerful tool for preventing disease, early infancy and pregnancy are two periods of life often underserved in traditional immunization programs, especially in resource-limited settings.

A promising way to reach and protect very young infants and mothers simultaneously is maternal immunization (MI)—when a woman safeguards herself and her baby by getting vaccinated in pregnancy. Though used safely and effectively in many countries against certain diseases, MI is not widely available in low- and middle-income countries (LMICs) beyond tetanus prevention. A more robust MI toolkit is needed in LMICs to fight diseases that hit hard in early life and pregnancy. To meet this need, PATH is advancing MI strategies against several pathogens that disproportionately threaten young children and/or pregnant women, including respiratory syncytial virus (RSV), Group B *Streptococcus* (GBS), pertussis (whooping cough), and influenza.

Maternal immunization—a promising strategy

Direct vaccination, which works for older children, is often not an effective option for newborns and very young infants. Their immune systems are immature and require time and multiple vaccine doses to mount full defenses against many diseases, leaving them vulnerable. Vaccinating a woman during pregnancy can enhance her own immunity and the natural transfer of antibodies through the placenta to her fetus. The transferred antibodies can protect the baby in the first critical months after birth until its own immune system matures and direct vaccination is effective.

MI has a history of success in reducing cases of a variety of infections in mothers and infants, including maternal and newborn tetanus (MNT), influenza, and pertussis. Since 2000, for example, the intervention has helped more than 40



Immunization during pregnancy can help mothers like Winnie Navumbia in Uganda protect themselves and their babies from certain life-threatening illnesses. Photo: PATH/Will Boase

LMICs eliminate MNT, which is often otherwise a death sentence.³

Now, momentum is accelerating around MI to address additional disease prevention gaps in LMICs. New maternal vaccines are being developed against pathogens like RSV and GBS. Efforts are also underway to identify how routine delivery of current and future maternal vaccines can be optimized in LMICs—posing a natural opportunity for immunization and maternal, newborn, and child health (MNCH) programs to come together in unprecedented ways to identify strategies that enhance health services overall. Through our work, PATH is helping to address scientific, policy, economic, regulatory, programmatic, and communication needs so that MI can reach its full potential and help more mothers and babies survive and thrive.

RSV prevention in early life

RSV is a leading cause of infant respiratory infections and hospitalizations worldwide, and a significant cause of death. Of the more than 30 million childhood cases worldwide, RSV causes 3.2 million hospitalizations and 120,000 deaths in children under five years of age each year. Half of all RSV-related hospitalizations and deaths occur in the first six months of life.⁴ Though symptoms are often mild, like a cold, RSV can be severe—even deadly—for infants, especially in resource-limited settings. It can also lead to serious complications like pneumonia and bronchiolitis and may be linked to long-term effects like asthma.

The lack of a licensed RSV vaccine leaves a significant gap in the infant health and survival toolkit. Fortunately,

promising RSV interventions are in development and could be available in a few years. These include vaccines for MI and affordable monoclonal antibodies, which are antibodies that can be administered at birth to protect infants from certain infections in early life. PATH is collaborating across sectors to ready the enabling environment for incoming RSV interventions so that, when they are available, the global health community is poised to implement them and make them universally accessible.

A vaccine to prevent newborn GBS

GBS is the leading cause of sepsis and meningitis in young infants worldwide—often affecting babies just a few hours old. It also plays a role in premature delivery, miscarriage, and stillbirth—responsible for as many as 3.5 million preterm births and nearly 150,000 stillbirths and infant deaths annually according to estimates.⁵ Infants less than three months of age are at highest risk of severe complications and death from GBS. Those that survive are often left with lifelong disabilities. In some high-resource countries, pregnant women are screened for GBS colonization; those who carry the bacterium are given antibiotic treatment during labor, which can significantly reduce the chance of GBS passing to her newborn and causing early-onset disease. This strategy, however, is neither feasible nor available in most low-resource countries. A GBS vaccine could save countless lives in these underserved settings; yet, no such vaccine exists. To fill this gap, PATH is supporting the development of a potentially groundbreaking maternal vaccine designed to provide early newborn protection against the most common kinds (or serotypes) of GBS.

Affordable pertussis protection for newborns

Pertussis is a highly contagious respiratory infection that starts as a mild cough and can progress to severe coughing fits and difficulty breathing. In serious cases, pertussis can cause pneumonia, seizures, brain damage, and death. An estimated 24 million cases of pertussis occur worldwide each year, mostly in low-resource countries, and about 160,000 children are estimated to die from the disease.⁶ Infants in the first months of life are the most vulnerable.

Routine childhood vaccination programs worldwide include combination vaccines that protect against pertussis, but newborns are too young for these vaccines to be effective. MI could reduce their susceptibility by providing immunity until successful active vaccination can take place. The World Health Organization (WHO) supports the MI strategy, and it is used in many industrialized countries—but the pertussis vaccines currently available for pregnant women are not affordable for all countries. To close this gap, PATH is exploring affordable maternal vaccines to protect young babies from pertussis in low-resource settings and is supporting a Phase 2b clinical study of pertussis vaccine in pregnant women in Thailand.

Maternal influenza immunization feasibility

Influenza is a common respiratory infection that causes three to five million cases of severe illness and up to 650,000 deaths each year.⁷ Deaths could surge into the millions if a highly virulent pandemic strain emerges as in past pandemics. Influenza can infect anyone, but newborns, infants, and pregnant women are at increased risk of poor outcomes. Consequently, WHO identifies pregnant women as a high priority group for influenza vaccination to protect both mother and baby.

A variety of countries have maternal influenza immunization strategies, but more information is needed to support broadening use in LMICs. PATH has conducted formative research in Malawi and El Salvador on the knowledge and acceptability of maternal influenza immunization among pregnant women and policymakers, as well as on implementation feasibility in these settings.^{8,9} The findings from those studies provide valuable information for policy makers in those countries and others to make informed decisions on introducing new maternal vaccines or expanding the use of those currently provided.

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Mailing Address
PO Box 900922
Seattle, WA 98109 USA

Street Address
2201 Westlake Avenue
Suite 200
Seattle, WA 98121 USA

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