



R&D for Maternal, Newborn & Child Health

How new tools can transform the fight

The chances of a mother and her child surviving and thriving are vastly different depending on where in the world they live. For example, around 80% of all global maternal and child deaths occur in sub-Saharan African and Southern Asia. Having the right intervention or tool—drug, vaccine, device, or diagnostic—at the right time is one of the most crucial factors for survival.

Thanks to global efforts to develop and scale up health solutions, child deaths have declined worldwide by nearly 60% and maternal deaths by nearly 45% since 1990. But vast challenges remain. Intensified research and development (R&D) efforts are needed to create low-cost, easy-to-use technologies to address common causes of maternal and child deaths in the world's poorest places.

5.3 million
children under five die each year

290,000
women die each year in pregnancy and childbirth

214 million
women have an unmet need for contraception

Research successes

New technologies have driven significant improvements in maternal, newborn, and child health (MNCH):

- **Vaccines against childhood diseases**, including polio, measles, diphtheria, pneumonia, and other illnesses, save two to three million lives each year.
- **Contraceptive innovations**, from decades-old tools like oral pills and implants, to newer options like a self-insertable, one-year vaginal ring and a discreet, self-injectable, long-acting contraception, have helped millions of women meet their unique family planning needs. Research shows that expanding access to contraception could reduce maternal deaths by nearly one-third and child deaths by one-quarter.
- Tools to combat childhood malaria—including **insecticide-treated bednets** and **child-friendly malaria medicines**—have significantly reduced child deaths.
- **Interventions to treat and prevent diarrhea**—including oral rehydration solutions, zinc supplements, and low-cost vaccines against diarrheal diseases like rotavirus, cholera, and typhoid—have helped reduce child mortality from diarrheal disease by more than one-third since 2005.
- **Nutrition innovations**, like biofortified crops and vitamin supplements, are helping more children thrive.
- Approaches to **prevent maternal-to-child transmission of HIV** have contributed to a 41% decline in new infections in children since 2010.

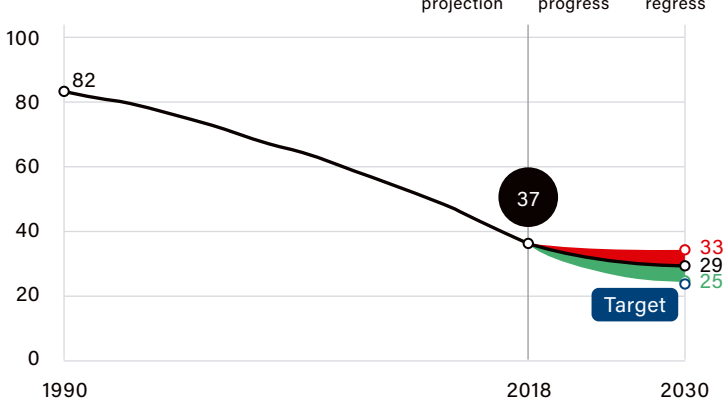
Key missing tools

New tools that are designed specifically for low-resource settings are needed to advance MNCH including:

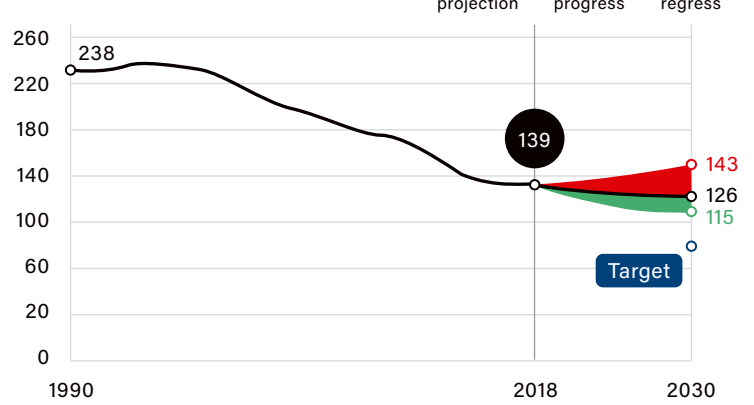
- **Better tools to manage respiratory disorders and pneumonia** in facilities that lack access to high-tech equipment, including low-cost, durable, easy-to-use neonatal resuscitators to help babies breathe and affordable, easy-to-operate tools to monitor respiratory rates and oxygen levels in children.
- **Vaccine innovations to improve immunization coverage** for vulnerable, hard-to-reach populations, such as heat-stable versions of vaccines that can be stored without refrigeration or easy-to-use, pain-free oral formulations.
- **Child-friendly formulations of existing and new medicines** that are appropriately-dosed, dissolvable, and more palatable to improve adherence in children.
- **Tools to prevent postpartum hemorrhage**, the leading cause of maternal death, including new easier-to-administer, heat-stable formulations of the drug oxytocin for use in settings without reliable electricity and low-cost, simple uterine balloon devices to control bleeding after childbirth.
- **Simple, low-cost tools to detect preeclampsia**, a dangerous pregnancy complication, including improved point-of-care diagnostics and handheld blood pressure monitoring devices.
- **New contraceptive options** with low side effects and suitable for women who live far from healthcare settings, as well multipurpose products that combine contraception with prevention of HIV and other sexually transmitted infections.
- **New low-cost tools to address other leading MNCH challenges** including obstructed labor, diarrheal disease, malaria, HIV/AIDS, and malnutrition.

Continued progress is possible, not inevitable

Under-five deaths per 1,000 live births



Maternal deaths per 100,00 live births



Breakthroughs on the brink

- An **oxytocin inhaler** designed to manage postpartum hemorrhage after childbirth, even in settings with no electricity, refrigeration, and limited access to trained health workers, is under development with support from USAID. It could save the lives of almost 20,000 new mothers each year.
- The **Odon Device**, a promising new tool that uses air pressure and suction to gently **assist with delivery during obstructed labor**, which was inspired by a trick to remove a cork from inside a wine bottle, is advancing through clinical trials. Developed with USAID support, this device could save an estimated 249,000 maternal and newborn lives by 2030.
- **Vaccines against shigella and enterotoxigenic Escherichia coli**, two leading causes of diarrheal disease, are in clinical development with DoD support. To date, no effective vaccines are available against these pathogens.
- The **Bilistick**, a simple, low-cost, portable **device to diagnose dangerous levels of jaundice** in newborns, designed for use by health workers in remote areas without laboratory facilities, is now undergoing clinical trials with USAID funding. At less than \$1 per test, it could help protect the lives of the estimated 60% of newborns worldwide affected by jaundice.
- **New contraceptive innovations** are in development including a microneedle contraceptive patch lasting six months, a male contraceptive gel now in clinical trials supported by NIH, and a vaginal ring which combines contraception with antiretroviral treatments to prevent HIV infection, supported by USAID and NIH.
- **Affordable, rapid point-of-care urine tests to diagnose preeclampsia** are now undergoing validation testing with USAID support. These tools, designed for low-resource settings, will improve detection of this deadly condition that impacts 1 in 20 women during pregnancy.

US Government R&D efforts

The US government is advancing MNCH research through a whole-of-government approach:

- **US Agency for International Development** develops affordable vaccines, treatments, and other tools to improve MNCH globally and address family planning (FP) and reproductive health (RH) needs, leading implementation of the US government's MNCH and FP/RH activities.
- **National Institutes of Health** conducts basic science and implementation research to develop and improve tools to advance MNCH and FP/RH.
- **Centers for Disease Control and Prevention** operates immunization programs, conducts surveillance and research to inform use of existing MNCH tools, and provides technical assistance to country partners to strengthen public health capacity.
- **Department of Defense** support research against diseases like malaria and diarrheal diseases that pose a risk to service members stationed abroad and that are also leading killers of children.

