Increasing Childhood Immunization in Low and Middle-Income Countries:

DEMAND-SIDE APPROACHES

Innovations for Poverty Action

EVIDENCE BRIEF

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Childhood immunization[1] is one of the most successful and cost-effective public health interventions to date, preventing an estimated 2 to 3 million deaths every year[2] and severe morbidity for millions more children from devastating diseases such as polio and the hepatitis B virus.[3] Although there have been substantial gains in childhood immunization globally, coverage still lags in many countries, leaving millions vulnerable to disease.[4] A particular challenge is on the demand side—even when vaccines are available, many people don't accept or get them (uptake). Demand-side interventions target the barriers to acceptance and uptake, such as lack of awareness about the schedule and benefits, low prioritization of immunization, financial obstacles, or distrust in immunization. These interventions will only move the needle in contexts where the vaccine supply chain and health services are not primary barriers to vaccination. In this brief, Innovations for Poverty Action has gathered evidence for demand-side interventions to increase child immunization in low and middle-income countries (LMICs).

Key Lessons:

1. Mobile phone reminders may improve complete and timely immunization, though their effectiveness may be limited in less-connected populations.
2. Wearable reminders are likely insufficient for improving childhood immunization.
3. Immunization education may improve immunization rates.
4. Immunization education delivered through community social networks and leaders may be especially effective in improving immunization uptake in some contexts.
5. Financial incentives have mixed impacts on child immunization, while in-kind incentives may improve coverage and timeliness of immunization.
6. Social signals that allow caregivers to share their child's vaccination status may improve timely and complete immunization.

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1. MOBILE PHONE REMINDERS MAY IMPROVE COMPLETE AND TIMELY IMMUNIZATION, THOUGH THEIR EFFECTIVENESS MAY BE LIMITED IN LESS-CONNECTED POPULATIONS[5]

Immunization is most effective when children complete the full schedule in a timely manner, but keeping track of when a child is eligible for a subsequent dose can be challenging for caregivers. Reminder interventions delivered through phone calls, text messages or app-based solutions alert caregivers when their child is due or overdue for vaccination.

A 2025 review found that text or phone call reminders significantly increased vaccination coverage.[6] A 2021 meta-analysis of 12 studies found that text message reminders significantly improved timely receipt of vaccines, and sending more than two reminders was more effective than only one or two.[7] In Ethiopia, text message reminders significantly improved complete and timely receipt of all recommended vaccines by 17 percent and 59 percent, respectively.[8] In Ghana, voice call reminders from study staff improved coverage of timely immunization by 10.5 percentage points,[9] and evidence from urban areas of Nigeria and Zimbabwe found that text reminders improved timely immunization completion by 8.7 to 16.3 percent, respectively.[10] Mixed positive effects were found in urban Burkina Faso and semi-rural Nigeria,[11] and no significant impact was found in rural Kenya.[12] However, phone coverage has increased substantially since these studies were conducted. In India, text message reminders alone had no impact, but as part of a package of interventions including local immunization ambassadors, and incentives that increased in amount with each immunization, measles vaccination increased 44 percent.[13]

Given that phone ownership and up-to-date health records for children are far from universal in LMICs, reminder interventions may only effectively reach a subset of caregivers. The poorest and hardest-to-reach caregivers, who may reside outside coverage areas, lack access to a phone, have low levels of digital literacy and have limited contact with health providers may be systematically excluded. Furthermore, child-level health records in LMICs primarily rely on paper-based systems, although digital health records are slowly growing more prevalent.[14] To make reminder systems feasible at scale, it is essential to digitize health records through tools like electronic immunization records (EIRs). EIRs streamline tracking of children's vaccination schedules and help identify due dates for upcoming vaccines based on actual uptake instead of birthdate-derived schedules, reducing the time health workers spend on manual record-keeping and improving overall efficiency.

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2. WEARABLE REMINDERS ARE LIKELY INSUFFICIENT FOR IMPROVING CHILDHOOD IMMUNIZATION

Two randomized evaluations (RCTs) found wearable reminders — bracelets or necklaces that act as a visual cue and reminder to complete the immunization schedule — had no impact on child immunization.[15] In India, pendant necklaces worn by children, and a visual reminder of immunization for caregivers, had no impact on DTP3 coverage or timeliness.[16] Two different styles of reminder bracelets, one with a simple design and one with more information about the immunization schedule, were found to have no effect on DTP3 or measles coverage and timeliness in Pakistan.[17] Pilot studies in Nigeria have found promising results but should be further explored through rigorous evaluations. Amongst mobile populations with low rates of vaccination coverage in Nigeria, color-coded bracelets[18] improved immunization completeness and timeliness.[19] Another pilot study in Nigeria found that an electronic wristband reminder worn by caregivers increased immunization timeliness by 30 percentage points.[20]

3. IMMUNIZATION EDUCATION MAY IMPROVE IMMUNIZATION RATES

Educational interventions aim to address gaps in knowledge or understanding about the schedule, safety, and benefits of the childhood immunization series. A 2024 review found that short-term sensitization and education campaigns—providing caregivers with information on immunization benefits, vaccination schedules, and access to services—led to a 38% increase in vaccination coverage.[21] A 2023 systematic review found that health education may lead to more children receiving all three doses of diphtheria-tetanus-pertussis-containing vaccine (DTP3) though evidence is of low certainty.[22] Another 2017 systematic review found that 36 percent of educational interventions were associated with a positive effect on immunization uptake, 18 percent were mixed-positive and 45 percent showed null effect.[23]

4. IMMUNIZATION EDUCATION DELIVERED THROUGH COMMUNITY SOCIAL NETWORKS AND LEADERS MAY BE ESPECIALLY EFFECTIVE IN IMPROVING IMMUNIZATION UPTAKE IN SOME CONTEXTS

In India, community members selected for their skills in relaying information acted as “ambassadors”, and shared immunization information throughout their social networks, leading to a 26 percent increase in measles vaccination.[24] A 2020 study engaging communities through traditional and religious leaders in Nigeria, where pockets of vaccine distrust persist,[25] reduced the number of unvaccinated children from 7 percent to 0.4 percent, and improved timeliness of later vaccines.[26] In Nigeria, training of older women, who traditionally play supervisory roles in infant care, improved infant vaccination timeliness and completion by 31 percentage points in urban communities.[27]

5. FINANCIAL INCENTIVES HAVE MIXED IMPACTS ON CHILD IMMUNIZATION, WHILE IN-KIND INCENTIVES MAY IMPROVE COVERAGE AND TIMELINESS OF IMMUNIZATION

Monetary or in-kind incentives aim to reward immunization uptake or alleviate financial obstacles such as transport costs. They are often paired with other interventions, such as reminders or improved availability of vaccines. A conditional cash transfer (CCT) program in northwest Nigeria improved vaccination coverage by 16, 21, and 14 percentage points for BCG, the first dose of pentavalent, and measles respectively, compared to children in comparison clinics.[28] In rural Kenya, a small monetary incentive (KES 200/US$1.82) combined with text message reminders led to increases in full immunization by 9 percentage points.[29] In Pakistan, small mobile cash transfers conditional on immunization (US 0.6-1.8 per immunization visit) combined with text message reminders increased full immunization coverage at 12 months, with airtime payments having a 3.4 percentage point greater impact than mobile money.[30]

Vaccination promotion from community health volunteers and a small monetary incentive for volunteers and caregivers (GHC1/US$0.25) led to 49.5 percentage point higher coverage of on-time vaccination in Ghana.[31] Additional evidence is mixed: While small unconditional cash transfers (US $1.50) in combination with text message reminders increased timely uptake of the first measles vaccine dose by 9-11 percentage points in Kenya, the magnitude of the effect was similar to text message reminders alone, suggesting no added effect of small transfers.[32] A 2017 systematic review found null results for cash transfer (including conditional and unconditional) studies on immunization, and mixed positive results for a cash transfer combined with services strengthening and community-based nutrition programming.[33] Similarly, a 2016 review[34] found evidence that monetary incentives have little to no effect on immunization uptake and a 2007 review[35] found unclear results for CCTs.

In-kind incentives have proven effective in a few high-quality studies. In Pakistan, food and medicine coupon incentives for immunization led to a two-fold increase in timely up-to-date DTP coverage.[36] In India, consistent availability of immunization services, combined with an in-kind incentive--1 kg of lentils per vaccine and a set of metal plates upon completion of the full schedule--led to 39 percent of children being fully immunized compared to 18 percent in in villages receiving a reliable immunization intervention only, and 6 percent in the comparison villages.[37] A 2024 review of 12 systematic reviews found mixed effects for in-kind or financial incentives.[38]

Because features of incentive programs vary widely, it is difficult to draw strong conclusions about their effectiveness. However, given the high value of vaccination, if effective, the benefit of incentives may vastly outweigh the costs.

6. SOCIAL SIGNALS THAT ALLOW CAREGIVERS TO SHARE THEIR CHILD'S VACCINATION STATUS MAY IMPROVE TIMELY AND COMPLETE IMMUNIZATION

Distinct from monetary and in-kind incentives are social rewards for immunization designed to simultaneously signal timely receipt of immunization and leverage and reinforce social norms in favor of immunization. The promise of social signaling lies in leveraging and amplifying existing community norms in favor of vaccination through low-cost social signals. When caregivers are able to visibly "signal" their child's vaccination status, other caregivers may be prompted to vaccinate their children so they can demonstrate that they are responsible caregivers. There has only been one rigorous evaluation on social signaling in immunization, which produced promising evidence. In Sierra Leone, colored bracelets were used to signal that a child had initiated vaccination, progressed in the schedule, or completed all first-year vaccinations on time. All three approaches led to a significant increase in the number of vaccines a child received by age one, but only the completion-signaling bracelet led to a significant increase in the share of children that had completed all required vaccinations on time.[39] Bracelets signaling completed first-year vaccinations increased timely and complete vaccination by 13 percentage points.

Implications for Practice

This review examined interventions that target caregiver immunization-seeking behavior. These demand-side interventions are only advisable if low acceptance and/or uptake despite available vaccine supplies and services are the primary obstacle to complete and timely childhood vaccination coverage. If supply chain or service quality issues are at the root of low vaccination coverage, stimulating demand is unlikely to move the needle on immunization completion, and may even have detrimental consequences to future demand and uptake. While this evidence can be considered relevant across a wide range of populations and settings, local research to identify the context-specific determinants of vaccination will inform targeted uptake interventions, and the subsequent impact.

For the purpose of this review, we focused on WHO-recommended vaccines for children under two years of age and therefore did not include evidence around the HPV vaccine, which is recommended for girls starting at age nine. As of July 2024, 10 countries in Africa (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Kenya, Liberia, Malawi, Sierra Leone and South Sudan) offer malaria vaccines as part of their childhood immunization programmes, and at least 30 countries plan to introduce the vaccine.[40] The malaria vaccine is administered in four doses[41] and increases the number of visits —in some cases doubling the number — needed for a child to complete the full immunization schedule. The additional visits will likely be a challenge but evidence on improving uptake is not yet available.

Cost Effectiveness

Evaluating the cost relative to the benefits of different interventions allows decision-makers to determine the best use of limited resources. The economic evaluations conducted in the studies included in this review varied in both their methods and outcomes, resulting in evidence that is not directly comparable. Additionally, differences in cost-effectiveness values might stem from the specific methodologies or study characteristics rather than the inherent properties of the interventions themselves. Factors such as the outcomes used for cost-effectiveness calculations, the baseline prevalence of adverse outcomes in the study setting, the distribution coverage, and the delivery platform can all influence these values. The available economic evidence for demand-side approaches to increasing child immunization have been captured in a table available here.

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