

# Increasing Immunization in Low- and Middle-Income Countries



*Rigorous Evidence on Increasing Demand for Vaccinations*



PHOTO: HAROLD PARRAGA

For the public health sector, the rollout of COVID-19 vaccines presents new challenges—a rapid timeline, targeting of adults, and, given limited initial supply, prioritization of high-risk populations. It also presents well-known challenges in building acceptance and achieving high uptake. Research on these challenges in the context of childhood immunization has shed light on the barriers and enablers to vaccination, as well as effective demand-generation strategies to improve acceptance and uptake. While new information will emerge over time, evidence from decades of global efforts to immunize children offers important lessons to inform COVID-19 vaccination rollouts. In this brief, Innovations for Poverty Action’s Path-to-Scale Research team has compiled evidence from demand-side interventions to increase vaccination in low and middle-income countries (LMICs) to help inform COVID-19 vaccination programming.

## Based on the research, the following are key lessons to consider:



Mobile phone reminders may improve coverage and timeliness of vaccination.



Vaccine promotion and education may improve the coverage of some vaccines.



Socially embedded education interventions may be particularly effective for introducing new vaccines and in contexts with misconceptions about vaccination.



Financial incentives—*independent of other interventions*—have demonstrated mixed impacts on vaccination, while *in-kind incentives* may improve coverage and timeliness.



Social incentives that allow individuals to signal vaccination status may improve acceptance and uptake.



## Mobile phone reminders may improve coverage and timeliness of vaccination.

Forgotten appointments or not knowing the vaccination schedule can lead to missed opportunities and under-vaccination among non-vaccine-hesitant populations. This may be the case for COVID-19 vaccination, which includes two doses and is being introduced in stages by population risk groups. Reminder interventions delivered via phone call or text message aim to encourage timely vaccination for those due or overdue for vaccination. Evidence from Ghana found that voice call reminders improved coverage of timely immunization by 10.5 percentage points,<sup>1</sup> 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.<sup>2</sup> Mixed-positive effects were found in urban Burkina Faso and semi-rural Nigeria<sup>3</sup> and null results were found in rural Kenya.<sup>4</sup>

Given that phone ownership and up-to-date electronic health records for adults and children are far from universal in LMICs, reminder interventions may only effectively reach a subset of the population without additional efforts to collect up-to-date contact and relevant health information. The poorest individuals, who may lack access to a phone or network coverage, and have limited contact with health providers may be systematically excluded.



## Vaccine promotion and education may improve the coverage of some vaccines.

Given the newness of the COVID-19 vaccine, there may be a lack of understanding about how it works, the schedule, safety, and relative benefits. Education interventions may increase demand for vaccination when a lack of understanding of the benefits of vaccination and how to receive them drive low coverage.

A combination of community-level education and health system activities, which included home visits and health

worker education, improved the proportion of pregnant women with tetanus protection by the time of child birth.<sup>5</sup> A systematic review found that home visits by community health workers and community activities improved tetanus immunization in pregnant women by 11 percent.<sup>6</sup> An educational intervention aimed at high-risk adults aged 45-65 years with one or more chronic diseases in Thailand found no significant effect.<sup>7</sup> A Cochrane review found moderate evidence that community-based health education improved coverage of all three doses of DTP (Diphtheria, Tetanus, and Pertussis) by 68 percent, and information campaigns utilizing posters, leaflets, and other media, increased coverage of at least one dose of a vaccine by 43 percent.<sup>8</sup> Another 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 a null effect.<sup>9</sup>



## Socially embedded education interventions may be particularly effective for introducing new vaccines and in contexts with misconceptions about vaccination.

Social influences, such as community-level beliefs and subjective norms, are a key determinant of vaccine acceptance and uptake.<sup>10</sup> Community engagement and sensitization activities were found to be a critical factor to success of the new HPV vaccine in pilots and demonstrations in 45 LMICs.<sup>11</sup> Targeting girls, parents, and community influencers with information on cervical cancer protection, vaccine safety, misconceptions and rumors, and national and global endorsement<sup>12</sup> helped achieve over 70 percent final-dose coverage in 83 percent of programs, with the rest achieving over 50 percent final-dose coverage.<sup>13</sup>

A recent study engaging communities through traditional and religious leaders in Nigeria, where pockets of vaccine distrust persist,<sup>14</sup> effectively reduced the number of unvaccinated children from 7 percent to 0.4 percent and improved timeliness of later vaccines but did not impact up-to-date vaccination.<sup>15</sup>





## Financial incentives—**independent of other interventions—have demonstrated mixed impacts on vaccination, while in-kind incentives may improve coverage and timeliness.**

Conditional cash transfers (CCTs) or in-kind material incentives may reward specific behaviors—including immunization uptake—and alleviate financial obstacles to vaccination such as transport costs. 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.<sup>16</sup> A CCT program in northwest Nigeria significantly improved self-reported vaccination coverage for BCG (16 percentage points), the first dose of pentavalent (21 percentage points), and measles (14 percentage points) compared to children in comparison clinics.<sup>17</sup> Further evidence from Nigeria indicates that maternal tetanus toxoid vaccination is highly responsive to cash incentives: an approximately US\$5 incentive in 2013 increased uptake by 28 percentage points, while an incentive just under US\$2 increased uptake by 19 percentage points.<sup>18</sup>

Yet, a 2017 systematic review found null results for CCT studies on immunization, and mixed-positive results for a cash transfer combined with services strengthening and community-based nutrition programming.<sup>19</sup> A 2016 review<sup>20</sup> found evidence that monetary incentives have little to no effect on immunization uptake and a 2007 review<sup>21</sup> 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 up-to-date DTP coverage at the recommended age.<sup>22</sup> Reliable immunization, i.e. regular availability of immunization services on the supply side, combined with an in-kind incentive (1 kg of lentils per vaccine and a set of metal plates upon completion of the full schedule) in India led to 39 percent of children being fully immunized (BCG, full course of DTP, full course of polio, measles) compared to 18 percent in villages receiving a reliable immunization intervention only, and 6 percent in the comparison villages.<sup>23</sup>

Because features of incentive programs vary widely, it is difficult to draw strong conclusions about their effectiveness. Policymakers should carefully consider the cost of incentives for COVID-19 vaccination given mixed evidence on their effectiveness in increasing immunization. However, given the high value of vaccination,<sup>24</sup> if effective, the benefit of incentives may vastly outweigh the costs.

Another concern is potential negative impacts on intrinsic motivation and what incentives may imply about the value of vaccines.<sup>25</sup> Studies have not demonstrated negative effects on intrinsic motivation from incentives designed to motivate other healthy behaviors. However, attaching incentives may communicate that, unlike other vaccines, if the new COVID-19 vaccine requires payment, it may not be of sufficient value on its own.<sup>26</sup> Second, individuals might come to expect payment for all vaccinations, causing potential harm to longstanding efforts in childhood immunization.<sup>27</sup>

In contexts where citizens value immunization less than the state does, other challenges can occur. In Nigeria, citizens used immunization refusal as a bargaining tool with the state, recognizing that the government had more interest in complete vaccination than individuals. This "block rejection" of polio vaccination allowed people to extract additional community resources from the state.<sup>28</sup> In the context of COVID-19 vaccinations, the state's interest in controlling the disease may be far greater than that of individuals, given low rates of COVID-19 deaths in comparison to familiar diseases such as polio, tuberculosis, and tetanus in many lower-income countries.



## Social incentives that allow individuals to signal their vaccination status may improve acceptance and uptake.

Distinct from monetary and in-kind incentives are rewards for immunization designed to simultaneously signal the receipt of immunization and shape social norms in favor of immunization. There has only been one high-quality trial in this approach to stimulating immunization demand, 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.<sup>29</sup> All three treatments led to a significant increase in the number of vaccines a child received by age 1, but only the completion-signaling bracelet led to a significant increase in the share of children that had completed all required vaccinations (BCG, full course DTP, measles) on time. Bracelets signaling completed first-year vaccinations increased timely and complete vaccination by 14 percentage points at a cost of approximately US\$1 per child.

The promise of social incentives lies in leveraging and amplifying existing community norms of vaccination through low-cost social signals. Where vaccine acceptance is high, but fails to reach herd immunity thresholds, when vaccinated people "signal" their vaccination status, they may amplify recognized social norms,<sup>30</sup> which may influence acceptance and uptake among those who are disinclined or do not prioritize vaccination.

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## Implications for Practice

This review focused on demand-side interventions. Demand-side interventions are only advisable if demand-side challenges, related to low acceptance and uptake despite available vaccine supplies and services, are the primary obstacles to complete and timely vaccination coverage. 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. This is especially true for the COVID-19 vaccine, which will likely encounter specific challenges across populations and settings.

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