VaxSocial

Vaccines in the age of engagement

Behavioural and digital strategies to boost vaccine uptake in low- and middle income countries, with lessons from VaxSocial Nigeria

The Behavioural Insights Team 2025

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Acknowledgements / Foreword

We extend our thanks to the colleagues at BIT, valued partners, and clients who have collaborated with us on this and other vaccination-related projects. Their invaluable insights and experience underpin this report.

The research in this publication was supported by funding from the VaxSocial initiative which is funded by Gavi the Vaccine Alliance and Advancing Health Online (AHO) – a fiscally sponsored project of Global Impact. VaxSocial had no role in the interpretation of data, in writing of the manuscript or in the decision to submit the manuscript for publication. The content of this publication is solely the responsibility of the authors and does not represent the official views of VaxSocial or its funders.

Executive summary

Introduction

Vaccines rank among the greatest success stories in global public health. They contributed to the eradication of smallpox, nearly eliminated polio, drastically reduced deaths from measles, tetanus, and diphtheria and played a crucial role in controlling recent global pandemics such as COVID-19.

Every year, vaccines prevent around 3.5 to 5 million deaths, according to the WHO.[1] Given costs often as low as a few dollars per disability-adjusted life year (DALY) averted, they remain among the most cost-effective interventions in global health. Rollouts of new vaccines against HPV,[2] malaria[3] or diarrhea[4] represent exciting opportunities to save even more lives worldwide.

However, global routine immunisation coverage saw its largest sustained decline in decades during the COVID-19 pandemic. Between 2019 and 2021, DTP3 coverage fell from 86% to 81%, leaving 25 million children without full vaccination –18 million of whom received no doses at all, mostly in low- and middle income countries (LMICs).[5] Here COVID-19 disruptions and vaccine misinformation compounded longstanding challenges related to weak health systems, conflict and geographic barriers. As of 2019, two-thirds of zero dose children lived in just 5 countries: Nigeria, India, the Democratic Republic of the Congo, Pakistan and Ethiopia.[6] For instance, in 2023, Nigeria alone accounted for 2.3 million zero-dose children.[7]

By 2022, the global vaccination gap improved slightly to 14.3 million, but remained above pre-pandemic levels. This led to outbreaks of preventable diseases in low-coverage regions, for example, with over 10 million measles cases globally in 2023 alone.[8] Even in the WHO European Region, cases surged to the highest levels in over two decades, highlighting how fragile immunisation gains remain even in high-resource contexts.[9]

Social media platforms have emerged as a major tool for vaccine demand generation, as they rapidly spread and achieve high penetration across the globe.

Campaigns on social media platforms can complement some of the essential, traditional demand generation methods – such as education, incentives, reminders or community-based and social strategies – in areas with sufficient digital access and literacy, now including many LMICs. However, if left unmanaged, social media platforms can also help spread misinformation fuelling vaccine hesitancy.

Using behavioural, or more traditionally social and behaviour change (SBC), techniques in vaccine demand initiatives has been proven to improve their effectiveness and has been industry go-to practice for a while.[10, 11] Behavioural science brings together unique insights on human psychology, sociology and related disciplines in underpinning vaccination-related decision-making, carefully considering context-specific barriers and drivers. The recent surge of behavioural economics and experimental methods – recognised by 6 Nobel Prizes over the past two decades – has reinvigorated the field with new interventions. These range from simple nudges via SMS, to more targeted social media campaigns, personalised chatbots, and even reimagined system-level demand strategies.

This report summarises these emerging insights, showcasing their potential through the VaxSocial Nigeria project, and offers practical tools as well as a roadmap for practitioners looking to apply these approaches in social media vaccine demand efforts and beyond.

As many around the world consider how to optimise vaccination demand strategies – in the context of declining coverage, new vaccine rollouts, and a challenging funding environment – we hope this report offers useful evidence and actionable advice to help focus those efforts.

Context of this report

The VaxSocial is an AHO and GAVI-led multi-million initiative focused on demonstrating how social media can help build vaccine confidence. In 2024, the Behavioural Insights Team (BIT) and HelpMum were selected to explore the use of behavioural and AI-driven social media solutions on vaccination uptake in Nigeria.

This final report brings together the foundational literature on behaviour change interventions – foundational (Chapter 1) and social media (Chapter 2) – aimed to improve vaccination uptake, with how we applied it through the VaxSocial Nigeria project (Chapter 3). It also includes a hands-on, detailed handbook (Chapter 4) and notes on evaluation (Appendix) for practitioners keen to design, implement and evaluate similar behavioural and social media vaccination interventions in their context, to help spread and scale successful solutions.

As such, it is a combination of formative research conducted for the VaxSocial project (detailed descriptions and manuals for our intervention) as well as BIT's broader bank of knowledge on behaviour change for vaccination, drawn from over 30 projects across a dozen countries working with UNICEF, WHO, FCDO, Vaccine Confidence Fund, Wellcome Trust and national health departments.

In sharing all this knowledge, we aim to contribute to VaxSocial's aim to provide resources, tools, and guidance to help scale successful vaccination programmes across different regions and contexts.

> **"Social media platforms have emerged as a major tool for vaccine demand generation"**

Report summary

Chapter 1. What works for vaccine uptake in low- and middle income countries?

In 2020, we conducted a global landscape review[12] to explore how behavioural insights (BI) could contribute most to increasing vaccine uptake. In this report, we provide an updated synthesis of available evidence on this topic, based on a review of over a hundred studies to include more recent systematic reviews, meta-analyses and large-scale trials published between 2019 and 2025 – with particular focus on effective approaches across diverse LMIC settings.

1.2 Behavioural barriers to immunisation

Barriers to vaccination in LMICs are often structural and practical, not just behavioural, and must be understood in local context. Unlike in high-income countries (HICs), where interventions often focus on addressing hesitancy or misinformation, people in LMICs may be willing to vaccinate, but face challenges such as long travel times, language barriers, or competing domestic and caregiving demands.

These barriers often overlap and compound each other. Addressing them requires behavioural strategies grounded in people's lived experiences alongside improvements to service delivery and access.

A range of behavioural biases shape vaccination decisions in LMICs, often leading to inaction despite intent. People may forget, postpone, or deprioritise vaccination due to friction costs, present bias, or the intention-action gap. Confirmation and overconfidence biases may lead individuals to trust (social) media content that aligns with their existing views, sometimes overriding professional advice. Others may be influenced by respected figures (authority bias), dramatic stories (availability bias), or group norms (conformity). These biases, while universal, are amplified by limited access to trusted information and overstretched health systems, which must be accounted for when designing effective interventions.

1.3 Strategies to improve vaccination uptake

Table 1. *Simplified overview of the most consistently studied intervention types in LMICs (see full table in Chapter 1).*

Examples or subtypes	Behavioural mechanisms mapped to BeSD domains	Relative evidence strength[13]	Key limitations
Intervention Type: Education			
Face-to-face Messages Visual /pictorial aids Leaflets Caregiver-, healthcare provider- or system-level	**Thinking & Feeling** Knowledge, capability, confidence, perception, misinformation **Motivation** Trust	**Moderate to strong** (esp. face-to-face formats)	May be insufficient alone; Highly context sensitive; Provider training effects are assumed
Intervention Type: Incentives			
Monetary incentives Non-monetary incentives Caregiver or provider-facing	**Practical Issues** Friction, real and perceived costs to vaccination **Motivation** Salience, present bias, prioritisation	**Mixed** (stronger for caregiver-facing compared to provider-facing)	Crowding out risks; Challenging to sustain or scale; Limited causal evidence on provider incentives
Intervention Type: Reminders			
SMS Phone call Immunisation cards Planning prompts	**Practical Issues** Forgetfulness, perceived urgency and timeliness **Motivation** Intention-action gap, planning fallacy	**Strong** (combined) **Moderate** (for SMS alone)	SMS-only is often insufficient; Infrastructure/ access dependent

Examples or subtypes	Behavioural mechanisms mapped to BeSD domains	Relative evidence strength[14]	Key limitations
Intervention Type: Social & Community			
Social signalling Peer champions Trusted messengers Community engagement	**Social processes** Local norms, group attitudes, perceived social approval and accountability **Motivation** Trust in sources and delivery systems	**Moderate**	Depends on trust and local relevance of messengers; Role of "champions" is still poorly defined; Can backfire if prevailing norm is not pro-vaccine

The most robust and consistent global evidence points to the following strategies:

Education can be an effective tool in LMICs, especially when it fills real knowledge gaps and is delivered by trusted messengers through familiar systems.

Incentives can drive behaviour change when they meaningfully offset the costs (financial or otherwise) of getting vaccinated.

Reminders are among the most scalable and cost-effective tools for improving vaccine uptake in LMICs, particularly by reducing forgetfulness and missed opportunities. When integrated with education, access, or incentives, reminders form a low-cost backbone for responsive, people-centred delivery models.

Community-based and social strategies unlock harder-to-reach levers of change, such as trust and social norms. These strategies yield the greatest impact when communities are active partners, making them valuable investments in long-term system resilience and legitimacy.

1.4 Limitations and next steps

Beyond these core strategies, other behavioural tools tested in HICs, such as message framing, provider recommendations, defaults, or motivational interviewing show promise, but remain underexplored in LMICs. These approaches should be adapted and tested further, particularly to fit local systems and delivery models.

Chapter 2. How can social media and chatbots boost vaccine uptake?

Social media plays a key role in shaping beliefs about vaccination, especially as smartphone ownership and social media use rapidly increases in LMICs. This chapter explores how social media tools (beyond traditional SMS reminders) can support vaccine uptake, focusing on social media campaigns and chatbots.

2.1 Best behavioural practices for social media campaigns

There is no one-size-fits-all approach to using social media for vaccine uptake. Success depends on factors such as audience, vaccine type, culture, and barriers faced. However, eight communication principles aligned with our EAST framework – Easy, Attractive, Social, Timely – consistently improve outcomes of social media campaigns across various contexts:

1. EASY: Keep messages simple and engaging.
2. EASY: Include a clear call to action.
3. ATTRACTIVE: Tailor content to specific concerns and cultural contexts.
4. ATTRACTIVE: Use storytelling and personal narratives.
5. SOCIAL: Be cautious with mythbusting.
6. SOCIAL: Choose trusted messengers.
7. SOCIAL: Highlight positive social norms.
8. TIMELY: Carefully consider the timing of messages.

2.2 The promise of chatbots and dynamic conversations

While social media can raise awareness, its one-way communication limits personalisation and active engagement. Chatbots, on the other hand, enable real-time, two-way conversations that can help users overcome doubts and logistical barriers throughout their vaccination journey.

Chatbots reduce cognitive overload by breaking information into manageable chunks. Through interactive design, they address misinformation and hesitancy more effectively than broadcast messages. They are particularly effective for individuals who are not strongly opposed to vaccines, but face minor doubts or practical barriers – often referred to as the 'persuadable middle'. Key features that enhance chatbot effectiveness include: reminders and planning prompts to guide users, an empathetic tone to build trust, chunked information to ease processing, and personalised content for greater relevance. Additionally, using soft defaults can improve engagement while preserving autonomy.

2.3 The next wave: AI-enhanced chatbots and related challenges

Artificial intelligence (AI) powered chatbots have the potential to deliver more natural, adaptive conversations, which could help address identity- or emotion-based vaccine hesitancy. However, their persuasive nature introduces behavioural risks. AI models may 'hallucinate', mirror user biases, or mislead in less-represented languages or contexts. Risks of over-reliance on AI and misplaced trust, particularly as chatbots become more human-like. Additionally, over-reliance on AI and misplaced trust are concerns as chatbots become more human-like. To mitigate these risks, it is essential to incorporate user safeguards, transparent design, and culturally appropriate testing.

When designed responsibly, AI chatbots can broaden access by offering multilingual, round-the-clock support. Yet their reliance on digital access and literacy means they can widen inequalities, if not paired with human outreach. Therefore, chatbots should complement, not replace, person-led care.

Chapter 3. Embedding behavioural insights into social media tools for vaccine uptake: A case study from Nigeria

Nigeria continues to struggle with low childhood immunisation rates, driven by misinformation, mistrust, and practical barriers. In response, HelpMum (a Nigerian social enterprise) partnered with BIT to leverage behavioural science and digital tools to tackle these challenges. This chapter presents this work as a case study.

Supported by the VaxSocial fund, the focus centred on two digital interventions: enhancing HelpMum's WhatsApp chatbot and designing a targeted social media campaign to boost vaccine uptake among caregivers of young children and adolescents.

3.1 Embedding BI into HelpMum's WhatsApp chatbot

HelpMum's WhatsApp chatbot had already reached over 20,000 users across Nigeria, when a behavioural audit was conducted, guided by the EAST framework, identified areas for improvement. BIT redesigned the chatbot to incorporate behavioural features such as tailored reminders, planning prompts, and simplified vaccine content. Additionally, Helpmum developed a prototype AI assistant, drawing exclusively on trusted national guidance, to help respond to vaccine-related queries.

User testing with 24 caregivers in Lagos revealed that while the chatbot was generally well-received, issues such as dense visuals, unclear formatting, and confusing fictional character names surfaced. These insights informed the next iteration, which was completed in Q3 2024.

3.2 A social media campaign to promote vaccination

In parallel with the chatbot development, a social media campaign was designed to tackle vaccine hesitancy and promote vaccine uptake. The campaign's content was tailored to reflect the linguistic, cultural, and digital preferences of audiences in Northern and Southern Nigeria.

Informed by behavioural science principles, the campaign emphasised social norms, ease of action, emotional appeal, and messenger trust. The messaging addressed common concerns, particularly around HPV, while reinforcing vaccination as normal, important, and achievable. Its key goal was to drive uptake of both the behavioural and AI chatbot.

Testing and refinement

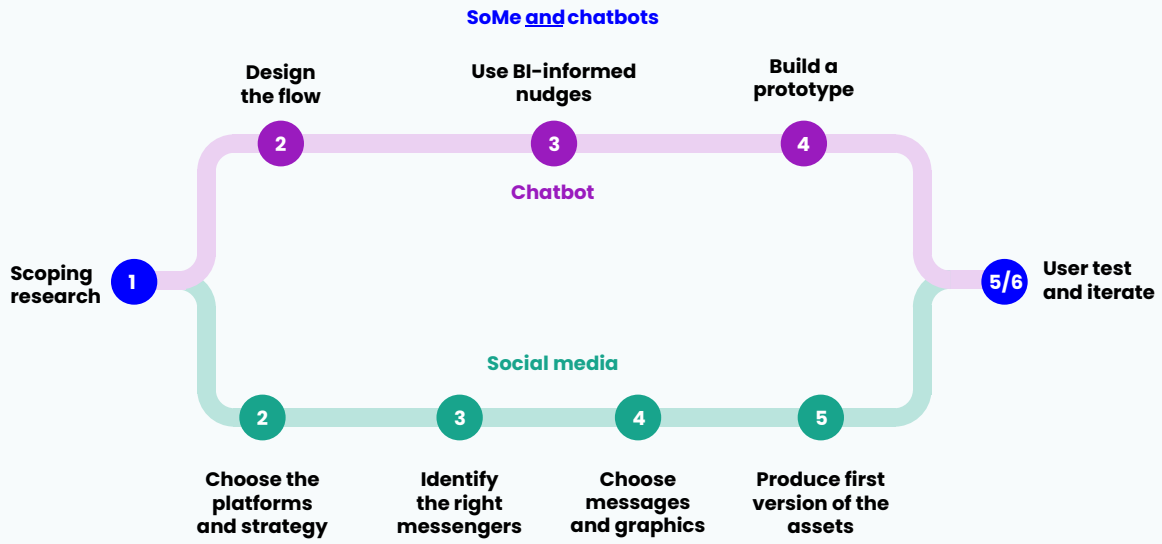
Two rounds of user research with 40 caregivers from Northern and Southern Nigeria provided valuable feedback, which was then used to improve the chatbot and campaign content for clarity and cultural relevance.

The case study demonstrates how social media tools, grounded in behavioural science and shaped by user feedback, can effectively address vaccine uptake barriers in complex and diverse contexts.

Chapter 4. Promoting vaccination uptake through social media: A handbook

This chapter provides a practical roadmap for designing and testing social media campaigns and chatbots to increase vaccine uptake. Drawing from BI, it outlines critical steps and considerations for creating interventions that resonate with audiences and drive action.

Figure 1. *Roadmap to developing social media and chatbot interventions.*



1

1. Scoping research: Begin with a clear understanding of the target audience. Conduct early research through literature reviews and qualitative methods to identify vaccination barriers. Use this to shape both the overall approach and campaign messaging.

2

2.A Chatbots - Design the flow: Map out the chatbot flow to guide users toward action. This involves selecting the key functionalities and designing the conversation structure.

3

3.A Chatbots - Use BI-informed nudges: Incorporate BI to make messaging clear, empathetic, and timely, with a strong call to action. Add elements such as personalisation, location finders, and gamification to further motivate users.

4

4.A Chatbots - Build a prototype: Integrate structure and content into a functional prototype. This step may require developers, although no-/low-code platforms can simplify the process. Test to ensure the chatbot performs as intended as is safe for users.

2

2.B Social media - Choose the platforms and strategy: Select the right platform based on where your target audience is most active and which features will best facilitate engagement.

3

3.B Social media - Identify the right messengers: Messenger credibility can be as influential as the message itself. Use authority figures, influencers, or peer messengers who align with the values of your audience.

4

4.B Social media - Choose messages and graphics: Craft messages that are concise, jargon-free, and engaging, with clear calls to action. Ensure graphics are visually appealing and support the core message.

5

5.B Social media - Produce first version of assets: Develop prototypes of campaign assets based on earlier decisions about messengers, messages, and graphics. These prototypes serve as the foundation for user testing.

5/6

5/6 User test and iterate: Conduct testing with a small, diverse group of target users to identify what works and what needs refinement. Analyse feedback systematically and use it to iterate and improve the campaign.

Appendix A. Evaluating impact of social media interventions

Effective evaluation is key to understanding the impact of social media vaccination campaigns. This involves mainly two approaches: performance monitoring to guide real-time adjustments, and rigorous impact evaluation (e.g., A/B testing or RCTs) to assess changes in vaccination behaviour.

I. Monitoring performance

Performance monitoring tracks metrics such as reach, engagement, clicks-throughs, and sentiment. For chatbots, this includes user counts, drop-off points, and common queries, helping to identify effective content and areas for improvement. Monitoring should also capture qualitative feedback to reveal insights beyond raw metrics.

II. Impact evaluation

Impact evaluation aims to determine whether a campaign or chatbot directly caused changes in behaviour. A/B testing allows comparison between versions of ads by varying specific elements and measuring performance.

For more robust results, randomised controlled trials (RCTs) assign participants to treatment or control groups to isolate effects. When a design is not feasible, alternative methods such as cluster-randomised trials, quasi-experimental designs, or before-and-after comparisons can provide insights. The evaluation method should fit the team's goals and resources, with more rigorous evidence enabling greater confidence in scaling effective interventions.

Final recommendations: Future research

This report summarises much of the current state of knowledge in using social media platforms to increase vaccination uptake in LMICs. Future research could further explore, for instance:

- What physical vaccination interventions work across diverse settings, populations, and vaccine types;
- How social media influences behaviour in LMICs and how best to counter misinformation – like much of the VaxSocial Initiative;
- Effectiveness, equity, long-term engagement, and safe integration of AI features into vaccination chatbots.