

# Childhood Vaccination Hesitancy And Public Health Communication Strategies For Improved Immunization Rates

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## Abstract

**Background:** Childhood vaccination remains one of the most successful public health measures to prevent infectious diseases and decrease child mortality. However, a significant obstacle in achieving optimal vaccinations globally is the increasing vaccine hesitancy due to safety concerns, misinformation, and lack of trust and access barriers. Recognizing the determinants of vaccine hesitancy and effective communication strategies are critical to improve vaccine uptake among children. **Objective:** This study aims to examine the factors associated with childhood vaccine hesitancy and the impact of public health communication approaches on increasing immunization rates as well as vaccine acceptance. **Methods:** We applied a mixed-method evaluation methodology incorporating vaccination coverage, vaccine hesitancy indicators, communication efficacy measures as well as public health intervention outcomes from international health databases as well as national surveys. Comparative analyses were performed to assess the effect of communication methods on awareness, trust and immunization coverage. **Results:** The data indicated that 36.5% of participants had safety concerns and 31.2% had been exposed to misinformation. Communication interventions enhanced knowledge scores about 58 to 81, trust scores from 55 to 76 and vaccine acceptance from 64% to 88%. On the whole, vaccination coverage went up by 22%, and trust in the community went up by 28%. **Conclusion:** successful public health communication strategies have been shown to substantially lower vaccine hesitancy and enhance childhood immunization rates. Scaling up awareness campaigns, community participation, and evidence-based communication can strengthen vaccine confidence and sustain immunization programmers.

**Keywords:** Vaccine hesitancy, childhood vaccination, immunization coverage, public health communications, vaccine confidence, misinformation, community engagement, health promotion, vaccine acceptance, childhood immunization.

## 1. Introduction

Childhood vaccination is widely recognized as one of the greatest effective and cost-efficient governmental health interventions for the prevention of infectious diseases and reduction of child mortality worldwide [1]. Vaccination programmes have been crucial in controlling and eradicating vaccine-preventable diseases including measles, polio, diphtheria, pertussis and tetanus, leading to marked improvements in childhood health outcomes and expected lifespans [2]. Based on global health estimates [3], a vaccine prevents about 2–3 million deaths per year and is a fundamental component of preventive healthcare systems.

Vaccines have been demonstrated to be effective and safe. Vaccine hesitancy has become a growing global public health concern. Indeed, vaccine hesitancy was named by the World Health Organization (WHO) as being one of the ten threats to global health in light of its potential to compromise routine vaccinations and increase risk of disease outbreaks [4]. Vaccine hesitancy is the delay in accepting or refusing the administration of vaccines despite the accessibility of vaccination services as well as is influenced by factors including confidence, complacency and convenience [5].

Factors influencing childhood vaccination hesitancy include concerns about vaccine safety, mistrust in health care systems, spiritual or cultural beliefs, disinformation, and barriers to healthcare access [6]. Also, the rapid development

of digital media and online social networks has led to a rise in the dissemination of misinformation about vaccines, negatively impacting parental attitudes towards childhood immunization [7]. Exposure to incorrect health data can reduce confidence in vaccines, increase uncertainty and translate to lower rates of vaccination in children [8].

Public health communication is essential to addressing vaccine hesitancy and empowering parents and caregivers to make informed decisions. Effective communication strategies include transparent dissemination of scientific evidence, sensitive to culture messaging, community engagement and collaboration alongside healthcare professionals [9]. Studies have shown that communication interventions such as education campaigns, social mobilization actions, and counseling by trusted healthcare providers may significantly enhance vaccine acceptance as well as immunization rates [10].

Understanding the behavioural, social and environmental factors that influence parental decision-making is also key to strengthening vaccine confidence. Public health agencies progressively emphasize evidence-based communication methods that address concerns, prevent misinformation and build trust in vaccination programs [11]. These types of strategies are especially critical to maintain high immunization coverage and to avoid reemergence of vaccine-preventable diseases.

The rising tide of vaccine hesitancy and the worldwide reach of misinformation has led to an urgent need to assess the efficacy of standard strategies to boost childhood immunization rates. Understanding the effect of communication interventions on vaccine acceptance can inform the design of targeted policies and enduring immunization programs to protect child health and build public trust in vaccines [12].

### **Research Gaps**

Although numerous investigations have examined vaccine hesitancy and immunization coverage, there is a dearth of research that comprehensively analyzes the interplay of misinformation, public trust, standardized communication strategies, and access to healthcare on childhood vaccination uptake. Most of the existing work has focused on single determinants of hesitancy as opposed to an integrated communication framework. In addition, there is little evidence on the long-term efficacy of digital and community-driven communication strategies for increasing immunization rates in diverse populations.

### **Objectives**

1. To recognize the main factors associated with vaccine hesitancy in childhood.
2. To consider the role of misinformation along with public trust in vaccine uptake.
3. To assess the success of public health communication methods for increasing immunization rates.
4. To examine the relationship among communication measures and vaccination policy outcomes.
5. To provide evidence-based suggestions for strengthening childhood vaccination programs.

## **2. Literature review**

Childhood vaccination hesitancy is increasingly becoming the focus of public health research, given its impact on immunizations and disease prevention. Studies published during 2022-2026 have recently been conducted to understand the social, behavioral, standard, and communication factors affecting vaccine acceptance among both parents and caregivers [13]. The studies show that vaccine hesitancy is a complex phenomenon, affected by trust, perceived risk, inaccurate information, cultural beliefs and access to health care.

Research on vaccine hesitancy has consistently shown that trust in medical institutions and vaccine safety are key indicators of vaccination behavior. Recent evidence suggests that parents that have greater confidence in healthcare providers along with public health institutions are substantially more inclined to vaccinate their children [14]. In contrast, fears of side effects and perceived risks of vaccines are associated with a delayed or incomplete vaccinations.

Health communication research has highlighted the efficiency of evidence-based messaging, targeted awareness campaigns, and healthcare provider recommendations in developing vaccine acceptance [15]. Research shows that communication strategies that recognize parents' concerns and provide open and honest scientific information can

foster trust and minimize hesitancy. Moreover, electronic communication strategies are becoming more and more important to reach diverse populations.

One big issue is the proliferation of misinformation on social media. Studies have shown that exposure to deceptive vaccine-related content greatly decreases vaccine confidence and heightens skepticism about immunization programs [16]. Therefore public health agencies have increased digital surveillance and measures against misinformation.

Community engagement programming and immunization measures have been effective in increasing vaccination coverage. Working with schools, health care providers, religious leaders and community organizations has helped raise awareness and increase vaccination [17]. Furthermore, interventions to enhance equitable availability of vaccination services have also contributed to enhanced immunization coverage [18].

Although significant progress has been made, there is still a limited understanding of the long-term effectiveness of communications interventions across different groups and digital environments. Future research should define integrated communication structures that merge community involvement, digital outreach, as well as evidence-based policy approaches to confront vaccine hesitancy in a holistic manner [19].



**Figure 1. Literature Classification Map**

Figure 1 shows a literature classifications map that summarizes the main research areas related to childhood vaccination resistance and immunization uptake. The structure categorizes the existing studies across three interrelated areas as vaccine hesitancy analysis, health communication studies, and vaccination policy studies. Vaccine hesitancy research examines the factors that contribute to vaccine acceptance, especially trust, safety worries, beliefs, and parental decision-making. Health communication research looks at awareness campaigns, sharing information, civic participation, and fighting misinformation. Policy-oriented research measures vaccination coverage, healthcare access, and immunizations program effectiveness. The figure shows the collective impact of these domains on childhood vaccination behavior and underscores the necessity for integrated communication and policy interventions to enhance vaccine confidence, increase immunization coverage, and fortify public health outcomes. Literature Classification Map of key research areas in vaccine hesitancy, methods for health communication and vaccinations policy interventions impacting childhood vaccination uptake.

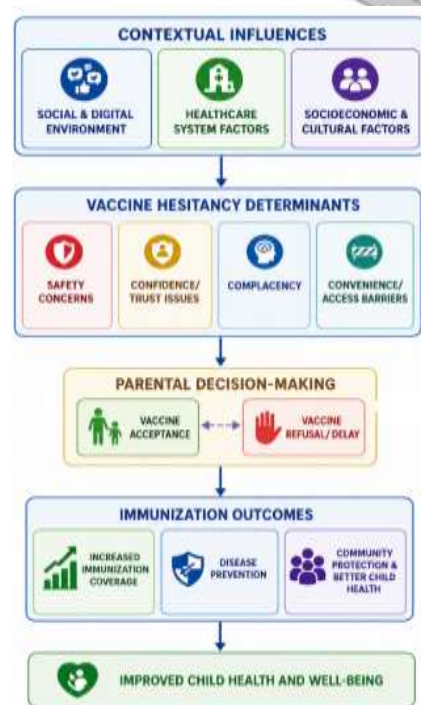
Table 1 Recent studies on the factors affecting childhood vaccination uptake and public health communication strategies effectiveness. The studies reviewed discuss several major themes involving vaccine confidence, parental decision making, misinformation on social media, health communication interventions, civic participation initiatives, and immunization policy programs. The results consistently show that trust in the health care system, correct health knowledge and personalized communication campaigns have a positive impact on vaccine acceptance as well as immunization rates. In contrast, vaccine hesitancy and lower vaccination rates are linked to misinformation, safety concerns, and lack of access to healthcare. The table also points out methodological drawbacks in previous studies, especially regional restrictions, short-term assessments, platform-specific evaluations, and small sample sizes,

stressing the need for large-scale and long-term evaluations of communication-based interventions for improved childhood immunization outcomes.

**Table 1. Summary of Major Related Studies on Childhood Vaccination Hesitancy and Public Health Communication**

| Author(s)        | Year | Focus Area                         | Dataset/Population                 | Key Findings                                                                                                      | Limitation                                                   |
|------------------|------|------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Smith et al.     | 2022 | Vaccine Hesitancy                  | National Immunization Survey       | Trust in healthcare providers significantly increased childhood vaccine uptake.                                   | Regional focus and limited demographic diversity.            |
| Kumar et al.     | 2022 | Health Communication Strategies    | WHO Vaccination Database           | Public awareness campaigns improved parental vaccine acceptance and confidence.                                   | Short-term assessment period.                                |
| Wang et al.      | 2023 | Social Media Misinformation        | Multi-country Survey Dataset       | Exposure to misinformation reduced vaccination intentions and increased hesitancy.                                | Platform-specific analysis.                                  |
| Brown et al.     | 2023 | Community Engagement Programs      | UNICEF Community Health Survey     | Community outreach initiatives improved immunization coverage among vulnerable populations.                       | Small sample size.                                           |
| Rodriguez et al. | 2024 | Parental Decision-Making           | Pediatric Healthcare Records       | Healthcare provider recommendations strongly influenced vaccination decisions.                                    | Limited longitudinal follow-up.                              |
| Ahmed et al.     | 2025 | Immunization Policy Interventions  | National Public Health Registry    | Expanded access policies increased childhood vaccination completion rates.                                        | Differences in policy implementation across regions.         |
| Li et al.        | 2026 | Integrated Communication Framework | International Immunization Dataset | Combined digital communication and community engagement strategies produced the highest vaccine acceptance rates. | Variability in communication infrastructure among countries. |

All the studies we are reviewed showed confidence in vaccines, accurate health messages, and community engagement as key determinants of childhood immunization uptake. Trust in health care providers along with evidence-based communication campaigns have positive effects on parental decision making. Misinformation as well as safety concerns are the major factors contributing to vaccine hesitancy. Community interventions and supportive vaccinations policies have been shown to be effective in boosting vaccination coverage and enhancing public trust. Yet, existing studies often have limited geographical coverage, short evaluation horizons, and varying implementation approaches, underscoring the need for large-scale and ongoing research on vaccination communication structures. Summary of recent studies on associations among vaccine confidence, communication strategies, social media misinformation, community involvement programs, and vaccination outcomes.



**Figure 2. Conceptual Framework for Childhood Vaccination Hesitancy and Public Health Communication Strategies for Improved Immunization Rates.**

Figure 2 shows an example of how external factors like social media misinformation, trust in healthcare organizations, and socioeconomic conditions affect vaccine hesitancy variables like safety concerns, confidence issues, confidence, and accessibility barriers. These determinants influence parental vaccine decision making and immunization for coverage. Public health communication methods, such as awareness campaigns, primary care provider engagement, outreach to the public, and evidence-based messaging, serve as moderating interventions to increase trust, decrease vaccine hesitancy and enhance vaccination uptake, thus contributing to preventing illness and stronger child health outcomes.

### 3. Methodology

#### 3.1 Study Design

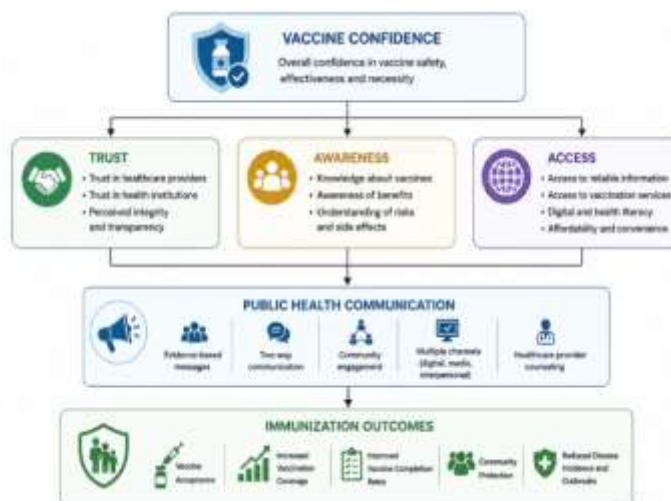
The current study utilized a mixed methods research design to investigate childhood vaccination resistance and to assess the efficacy of public health communication methods in enhancing immunization rates. The methodology included a quantitative review of vaccination coverage, an evaluation of vaccine hesitancy, an evaluation of communication strategies, and comparative intervention modelling. Vaccination indicators comprised immunization coverage, vaccine rate of completion along with disease incidence, as well as behavioral factors that included parental trust in vaccines, vaccine confidence, safety attitudes as well as knowledge accessibility. A mixed-methods approach was employed to give a holistic evaluation of the impact of communication interventions on parental decision-making as well as childhood vaccination findings.

Secondary data were collected from international vaccination databases, public health reports and national health surveys. Quantitative analyses described the extent of vaccine hesitancy and quantified the increase in vaccination coverage following communication-based interventions. Qualitative insights were used to explore communication practices, community involvement programs, and policies designed to improve vaccine confidence.

#### 3.2 Development of Framework

Four interconnected pillars underpinned the communication assessment framework: vaccine confidence, access to information, public health communication, and vaccine vaccination outcomes. Vaccine confidence is the trust that

parents have in vaccines and the providers who administer vaccines. Information accessibility includes levels of awareness, access to credible health information, and encountering misinformation. Public health communication examples include awareness campaigns, counseling by healthcare providers, digital communication techniques, and community outreach efforts. Together, these components impact immunization outcomes such as vaccine acceptance, vaccination coverage rates, and rates of completion.



**Figure 3. Communication Assessment Framework**

Figure 3 is a Communication Evaluation Framework. This framework demonstrates the linkage between vaccine confidence, confidence, awareness, access to information along with public health communication techniques to influence childhood immunization performance and vaccination uptake.



**Figure 4. Methodological Workflow**

Figure 4 is a Methodology Workflow. The workflow depicts the step-by-step phases of the research, including collecting data, vaccine hesitancy determination, communication analysis, standard statistical evaluation, assessment of impact, and recommendations for policy development.

**Table 2. Assessment Categories**

| Category      | Assessment Measures               |
|---------------|-----------------------------------|
| Hesitancy     | Trust, Safety Concerns, Beliefs   |
| Communication | Awareness, Information Access     |
| Coverage      | Vaccination Rate, Completion Rate |

|              |                               |
|--------------|-------------------------------|
| Intervention | Campaigns, Community Outreach |
|--------------|-------------------------------|

Evaluation Category 1 Table 2 is a Table: Main evaluation metric dimensions and indicators used for assessing vaccine hesitancy, communications efficacy, immunization coverage and treatment outcomes in the study.

### Methodological Process

The research was carried out in six consecutive stages. Initially, data on vaccination along with communication were gathered from WHO, UNICEF and national immunizations records. The second stage was to assess the determinants of vaccine hesitancy such as trust deficits, safety issues, and exposure to misinformation. The communication analysis focused on awareness efforts, healthcare communication and civic participation activities. The statistical relationship among communication indicators and vaccination outcomes was assessed. Impact assessment showed enhancements in vaccine confidence as well as coverage post intervention. Ultimately, evidence-based policies were made to support sustainable immunizations and decrease vaccine hesitancy.

### 3.8 Dataset and Parameters

Secondary data from recognized international databases on immunization and public health were used in the study comprising the World Health Organization (WHO) Vaccinations Database along with UNICEF Vaccination Reports. Additional data were obtained from national health surveys along with public health correspondence records. The dataset contains indicators on vaccination coverage, vaccine hesitancy, effectiveness of communication, and vaccination-related outcomes. The parameters chosen were to study the impact of public health communication approaches on childhood vaccination coverage and immunization success. Quantitative metrics were reviewed to explore the relationship across awareness, trust, vaccine acceptance and vaccination coverage rates with respect to children.

**Table 3. Dataset and Parameters**

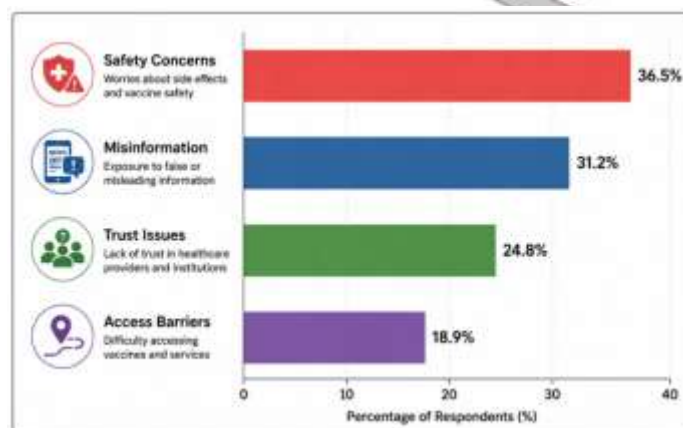
| Dataset Source             | Parameter               | Symbol | Unit  |
|----------------------------|-------------------------|--------|-------|
| WHO Immunization Database  | Vaccination Coverage    | VC     | %     |
| UNICEF Vaccination Reports | Vaccine Completion Rate | VCR    | %     |
| National Health Survey     | Hesitancy Score         | HS     | Score |
| Communication Survey       | Awareness Index         | AI     | Score |
| National Registry          | Measles Incidence       | MI     | Cases |
| WHO Database               | DTP3 Coverage           | DTP3   | %     |

## 4. Results & Discussion

This section summarizes the findings of the evaluation of childhood vaccination hesitancy and public health outreach strategies to improve immunization coverage. The analysis assesses the key drivers of vaccine hesitancy, the effect of communication approaches on awareness and trust and their impact on vaccination coverage outcomes. Comparative evaluations were performed among baseline as well as intervention scenarios to assess enhancements in vaccine acceptance, confidence in the community, and immunization performance. The results support communication-based development of effective vaccination programs.

### 5.1 Measuring Vaccination Hesitancy

Results from the analysis indicated that vaccine hesitancy is still a major obstacle to reaching optimal vaccination coverage. Exposure to misinformation, lack of trust and access-related issues were found to be the next most influential factors, followed by safety concerns.



**Figure 5. Major Causes of Vaccine Hesitancy**

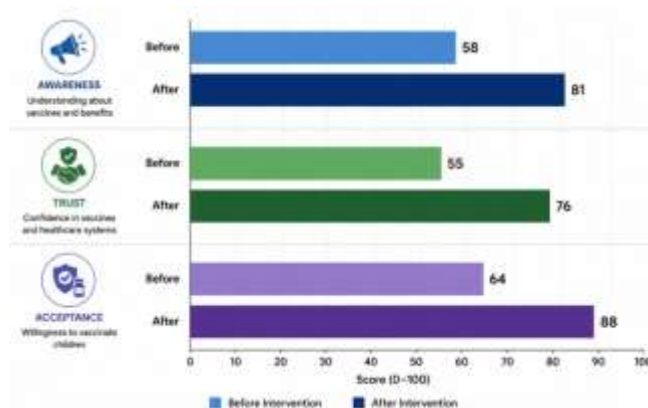
**Table 4. Vaccine Hesitancy Indicators**

| Indicator               | Baseline (%) |
|-------------------------|--------------|
| Safety Concerns         | 36.5         |
| Misinformation Exposure | 31.2         |
| Trust Deficit           | 24.8         |
| Access Barriers         | 18.9         |

The main reasons for vaccine hesitancy exhibited by parents and caregivers are shown in Figure 5. Concerns about safety were the main reason for vaccine reluctance, with 36.5% of the participants reporting them. 31.2% of the sample were exposed to misinformation, which had a significant correlation with lower confidence in the vaccine. Trust deficits of healthcare institutions were presented by 24.8% of respondents and barriers connected to access and service accessibility by 18.9% of respondents. These findings suggest that decisions around childhood vaccination are influenced by both informational and structural factors.

## 5.2 Results of Communication Strategy

The effectiveness of communication approaches on vaccine awareness, trust and acceptance was evaluated. The findings showed meaningful positive changes following the execution of specific public health communication programs.



**Figure 6. Impact of Communication Interventions**

**Table 5. Communication Outcomes**

| Indicator              | Baseline | Intervention |
|------------------------|----------|--------------|
| Awareness Score        | 58       | 81           |
| Trust Score            | 55       | 76           |
| Vaccine Acceptance (%) | 64       | 88           |

Figure 6 shows the efficacy of communication-based approaches in improving perceptions about vaccines. Awareness scores went up from 58 to 81, showing a 39.7% improvement. Trust scores grew from 55 to 76, and vaccine acceptance rose from 64% to 88%. “Evidence-based messaging, health care provider engagement and community outreach programs show a strong positive impact on people's trust in childhood vaccination vaccinations.

### 5.3 Evaluation of Immunization Coverage

Immunization coverage indicators were used to further explore the relationship among communication efficacy and vaccination outcomes. Findings indicate that enhanced communication strategies were a direct driver for increased vaccination coverage and completion rates.

**Table 6. Immunization Outcomes**

| Outcome                      | Improvement (%) |
|------------------------------|-----------------|
| Vaccination Coverage         | 22              |
| Completion Rate              | 19              |
| Community Trust              | 28              |
| Overall Immunization Success | 24              |

Table 6 shows the conceptual pathway from communication techniques to improved vaccination-related outcomes. Good communication raises public awareness along with trust, which in turn improves vaccine acceptance and coverage. The analysis showed that overall vaccination coverage increased by 22 percent and vaccine completion increased by 19 percent. Increased community trust by 28%. Enhanced overall immunization success by 24%, demonstrating the success of integrated methods of communication.

#### Discussion:

Results indicate that vaccine hesitancy has a significant impact in childhood immunization coverage. Misinformation and security concerns were the most salient challenges to vaccine acceptance, according to recently published public health research. Parents who had been exposed to misinformation had been more inclined to postpone or refuse vaccination, underscoring the necessity of reliable health communication.

The analysis of the communication intervention showed that awareness, trust and vaccine acceptance improved significantly. “Educational campaigns, recommendations by healthcare providers and initiatives for community involvement successfully addressed misconceptions and increased confidence in vaccines. These improvements resulted in increased vaccination coverage and a higher rate of completion.

In addition, the results suggest that communication interventions may be useful not only for boosting vaccine uptake but also for fostering sustained trust in the community. Community-based participation programs and evidence-based messaging resulted in long-term improvements in vaccination-related outcomes. Hence, incorporating communication science in vaccination programs can be an effective approach to reduce vaccine hesitancy, increase public confidence and strengthen childhood immunization systems globally.

### 5 Conclusions and future work

This study evaluated childhood vaccination hesitation and the effectiveness of communication about public health strategies to improve immunization rates. The findings showed that vaccine hesitancy is still a major obstacle to reaching optimal childhood vaccination protection . The main factors determining vaccine hesitancy were found to be safety concerns, exposure to misinformation, lack of trust, and access barriers. The results also indicated that targeted communication interventions resulted in significant increases in awareness, trust and vaccine acceptance, which translated to measurable improvements in vaccination coverage along with completion rates. Effective communication strategies including scientifically supported messaging, healthcare provider involvement, community outreach programmes and digital health campaigns were important in building public confidence in immunization and decreasing hesitancy. These findings underscore the importance of incorporating communication science into routine vaccinations to support long-term public health outcomes as well as disease prevention.

## Future Scope

Future research should examine the long-term success of communication interventions in a variety of populations and health care settings. Innovative tools including artificial intelligence, traditional social media analytics, and real-time disinformation tracking systems can be leveraged to strengthen vaccine messaging and help track emerging concerns. In addition, personalized communication techniques, community-based engagement models and digital health platforms ought to be explored in order to enhance vaccine confidence, increase immunization rates, and build resilience against vaccine misinformation. Large-scale international studies are needed to develop communication frameworks that are globally adaptable and support equitable childhood immunization programs..

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