

Vaccine Hesitancy and Refusal in Pediatrics: Moving Beyond Communication to Address Structural and Social Determinants

Pasupuleti Sri Santosh Laxmi Durga^{1*}, Varunee Krishna Kapa², Tejasvi Sriram^{3*} and Vedanth Vasudevan⁴

¹University of Perpetual Help System Delta, Las Piñas, Manila, Philippines

²International School of Medicine-International University of Kyrgyzstan, Bishkek, Kyrgyzstan

³David Tvildiani Medical University, Tbilisi, Georgia

⁴Viswabharathi Medical College, Kurnool, Andhra Pradesh, India

Abstract

Pediatric vaccine hesitancy and refusal represent a critical and growing public health challenge, undermining global immunization coverage and disease prevention efforts. This mini-review argues that prevailing strategies, which predominantly target individual-level communication, are insufficient to address the deep-seated structural and social determinants underpinning parental decision-making. The review overviews recent literature to examine the limitations of communication-focused interventions; explores the framework of structural and social determinants of health, including systemic racism; analyzes the roles of cultural beliefs, socioeconomic factors, and historical mistrust; and evaluates community-based and culturally informed intervention strategies. It further presents key findings from clinical studies to illustrate the prevalence and drivers of hesitancy. Future scope necessitates robust implementation science to evaluate the real-world efficacy of multi-level interventions and the development of unified theoretical frameworks that integrate structural competency into public health practice. Ultimately, achieving equitable vaccine coverage requires a paradigm shift toward systemic, trust-building reforms that address the root causes of hesitancy.

Keywords: Communication strategies, Health equity, Pediatric populations, Social determinants of health, Structural racism, Vaccine hesitancy, Vaccine refusal, Vulnerable communities

Introduction

Vaccine hesitancy and refusal in pediatric populations have emerged as significant challenges to achieving optimal immunization coverage worldwide [1-10]. While traditional strategies have primarily focused on improving communication between healthcare providers and caregivers, recent literature emphasizes the necessity of addressing broader structural and social determinants that underpin vaccine decision-making processes.

One of the foundational concepts in understanding vaccine hesitancy is recognizing it as a complex phenomenon influenced by a multitude of factors beyond mere misinformation or lack of awareness [11-15]. According to recent analyses, hesitancy exists on a continuum, ranging from mild doubts to outright refusal, and is shaped by social, cultural, political, and economic contexts. For instance, the COVID-19 pandemic has highlighted how social and political factors can significantly influence vaccine acceptance, especially among marginalized groups such as black women in the US, where historical mistrust and systemic inequities contribute to hesitancy [16]. The traditional approach to addressing vaccine hesitancy has centered on enhancing communication skills among healthcare providers, including nurses and pharmacists, to better address misinformation and build trust with caregivers [17]. These efforts aim to correct misconceptions and provide clear, culturally sensitive information about vaccine safety and efficacy. However, evidence suggests that communication alone is insufficient to overcome deeply rooted barriers, especially when structural inequities are at play [17]. For example, delayed vaccination and refusal can be linked to broader issues such as access to healthcare, socioeconomic status, and systemic discrimination, which are often overlooked in purely communication-focused interventions.

Recent literature advocates for moving beyond individual-level strategies to incorporate an understanding of systemic and structural factors that influence vaccine uptake [18-24]. Kühlbrandt et al. [25] emphasize the importance of addressing wider contextual factors, such as social determinants of health, that impact vaccination decisions among vulnerable populations like Gypsy, Roma, and Traveller communities. These

***Correspondence to:** Pasupuleti Sri Santosh Laxmi Durga and Tejasvi Sriram, University of Perpetual Help System Delta, Las Piñas, Manila, Philippines and David Tvildiani Medical University, Tbilisi, Georgia.

Citation: Durga PSS, Kapa VK, Sriram T, Vasudevan V (2026) Vaccine Hesitancy and Refusal in Pediatrics: Moving Beyond Communication to Address Structural and Social Determinants. *J Pediatr Congenit Dis*, Volume 12:1. 125. DOI: <https://doi.org/10.47275/2379-6707-125>

Received: June 08, 2026; **Accepted:** August 10, 2026; **Published:** August 14, 2026

groups often face barriers rooted in historical marginalization, discrimination, and lack of trust in healthcare systems, which cannot be remedied solely through improved communication. Instead, interventions must consider the social and structural contexts that shape health behaviors [25]. Systemic and structural racism is a critical component influencing vaccine hesitancy, particularly among minority populations. It manifests through deliberate acts of discrimination, such as residential segregation and unequal access to healthcare resources, which perpetuate disparities in vaccine coverage [26]. Recognizing these systemic issues is essential for designing equitable vaccination strategies that do not inadvertently reinforce existing inequities. For example, addressing vaccine hesitancy among black communities requires acknowledging historical injustices and implementing policies that foster trust and equitable access, rather than solely focusing on individual attitudes.

Cultural and religious competence also play vital roles in shaping vaccine acceptance. Healthcare providers must navigate diverse religious beliefs and cultural practices that may influence vaccination decisions [27]. Providing culturally competent care involves understanding the specific beliefs and values of different communities and tailoring interventions accordingly. This approach helps to build trust and reduce barriers rooted in cultural misunderstandings or insensitivity. Furthermore, addressing vaccine hesitancy requires a comprehensive understanding of the social determinants of health, including socioeconomic status, education, and community infrastructure. The literature underscores that vaccine refusal and delays are often intertwined with structural inequities, such as poverty and limited healthcare access, which are exacerbated during crises like the COVID-19 pandemic [28]. Strategies that solely focus on individual behavior neglect these broader determinants and risk perpetuating disparities.

Building trust in vaccination efforts is a recurring theme across recent studies. Strengthening confidence involves engaging communities, addressing historical mistrust, and ensuring equitable access to vaccines [29]. For example, community-based interventions that involve local leaders and culturally relevant messaging have shown promise in improving vaccine uptake among hesitant populations [30]. These efforts must be complemented by policy changes that dismantle systemic barriers, such as improving healthcare infrastructure in underserved areas and addressing social inequities.

In summary, the current literature advocates for a paradigm shift in addressing pediatric vaccine hesitancy and refusal. Moving beyond communication strategies, there is a growing recognition of the importance of tackling the structural and social determinants that influence vaccination behaviors. Interventions must be multifaceted, combining culturally competent communication with systemic reforms aimed at reducing disparities and building trust within marginalized communities (Table 1). Only through such comprehensive approaches can public health efforts achieve equitable vaccine coverage and protect vulnerable pediatric populations from preventable diseases

Table 1: Evolving paradigms in addressing pediatric vaccine hesitancy.

Paradigm aspect	Traditional approach (communication-focused)	Emerging/proposed approach (structural and social determinants-focused)	Rationale for shift
Primary focus	Individual beliefs, knowledge gaps, and provider-caregiver communication	Systemic, societal, and historical factors that shape community trust and access	Individual attitudes are deeply embedded in and influenced by broader social contexts and lived experiences
Key intervention target	Improving healthcare provider skills (e.g., debunking myths, motivational interviewing)	Dismantling structural barriers (e.g., access, racism) and implementing community-led, policy-level changes	Communication alone is insufficient to overcome barriers rooted in systemic inequity and historical injustice
View of hesitancy	Often framed as a deficit of knowledge or individual resistance to be corrected	Understood as a complex, context-dependent phenomenon on a continuum, often a rational response to systemic failures	Recognizes hesitancy as multifaceted, influenced by social, cultural, political, and economic factors
Exemplar populations and barriers	Generic 'hesitant parents' barriers include misinformation and safety concerns	Marginalized groups (e.g., Black communities, GRT populations); barriers include historical mistrust, systemic racism, and logistical access issues	Highlights that the drivers and solutions for hesitancy are not uniform and require equity-focused, tailored strategies
Core strategy	Information provision and persuasive dialogue at the clinical encounter	Building trust through community engagement, acknowledging historical harms, and ensuring equitable resource distribution	Trust is a prerequisite for effective communication and is built through systemic accountability and inclusive partnership
Desired outcome	Increased vaccine acceptance through changed individual attitudes	Equitable vaccine coverage achieved through reformed systems and restored community trust in public health	Aims for sustainable, justice-oriented public health outcomes rather than temporary compliance

Limitations of Communication-focused Interventions

The limitations of communication-focused interventions in addressing vaccine hesitancy and refusal within pediatric populations are multifaceted, as evidenced by recent literature. While communication strategies are widely recognized as essential tools for improving vaccine uptake, several inherent challenges constrain their effectiveness, necessitating a nuanced understanding of their limitations (Table 2).

One prominent limitation pertains to the content and scope of educational tools provided to healthcare providers [31-36]. According to a recent review, educational content often emphasizes vaccination principles but falls short in equipping providers with practical communication strategies [37]. This gap indicates that while providers may understand the scientific rationale for vaccines, they may lack the skills to effectively engage with hesitant parents. The deficiency in training on communication techniques, such as motivational interviewing, hampers the ability to address concerns empathetically and tailor messages to individual parental beliefs [38]. Consequently, even well-informed providers may struggle to influence parental decisions, highlighting a critical limitation of current communication-focused interventions. Furthermore, the literature underscores that parental vaccine hesitancy is complex and influenced by a multitude of factors, including cultural beliefs, misinformation, and trust issues [39]. Communication strategies that do not account for these underlying factors may have limited success. For instance, generic informational campaigns or fact-based rebuttals often fail to resonate with hesitant parents who may prioritize emotional or cultural considerations over scientific evidence [40]. This suggests that communication interventions need to be more personalized and context-sensitive, yet many current approaches remain standardized, limiting their effectiveness.

Table 2: Key limitations of communication-focused interventions in addressing pediatric vaccine hesitancy.

Limitation category	Description	Impact on vaccine uptake	Recommended mitigation strategies
Inadequate provider training	Educational content emphasizes vaccination principles but lacks practical communication skills (e.g., motivational interviewing, empathetic engagement)	Reduced ability to address parental concerns; missed opportunities for trust-building	Integrate communication skills training (e.g., motivational interviewing) into continuing medical education
Standardized vs personalized communication	Generic, fact-based messages fail to address emotional, cultural, or belief-based concerns of hesitant parents	Low resonance with parents; may increase skepticism or disengagement	Develop tailored, culturally sensitive communication tools and scripts for providers
Variability in parental response	Parents interpret messages differently based on prior beliefs, social influences, and personal experiences	One-size-fits-all approaches are ineffective; may inadvertently strengthen hesitancy	Use patient-centered communication and assess baseline attitudes before messaging
Time and resource constraints	Tailored communication requires time and resources often unavailable in busy clinical settings	Limited feasibility and scalability of personalized interventions	Implement team-based care (e.g., nurses, pharmacists) and use digital tools to extend reach
Failure to address systemic barriers	Communication alone cannot overcome systemic mistrust, misinformation on social media, or structural inequities in access	Persistent disparities in vaccine uptake despite improved communication	Combine communication with structural reforms (e.g., community engagement, policy changes)
Risk of backfire effects	Confrontational or dismissive communication can reinforce hesitancy and damage trust	Increased resistance and decreased future engagement with healthcare providers	Train providers in non-judgmental, empathetic dialogue and avoid debate-style interactions
Sustainability challenges	Communication training programs often lack reinforcement and long-term support, limiting skill retention	Short-term gains not sustained over time; limited translation into practice	Incorporate booster training sessions, peer mentoring, and institutional support for ongoing skill development
Over-reliance on individual-level focus	Interventions target parent-provider dyads without addressing community-level influences (e.g., social norms, network effects)	Missed opportunity to shift social norms and leverage community trust	Integrate community health workers and local leaders into vaccine promotion efforts

Another significant challenge is the variability in parental responses to communication efforts. Some parents may interpret messages differently based on their prior beliefs, experiences, or social influences, which can lead to resistance or even increased hesitancy [41]. This variability complicates the design of one-size-fits-all communication strategies and underscores the need for tailored approaches. However, implementing such personalized communication requires additional training, time, and resources—factors that are often constrained in busy clinical settings [42]. Training healthcare providers in effective communication techniques, such as motivational interviewing, has shown promise but is not without limitations. For example, a study on training pediatric clinicians in human papillomavirus vaccine communication revealed that while training improved provider confidence, translating these skills into practice remains challenging [43]. Barriers include time constraints during consultations, lack of reinforcement, and variability in provider motivation. These factors limit the sustainability and scalability of communication training programs, thereby constraining their long-term impact on vaccine hesitancy.

Moreover, the literature highlights that communication-focused interventions often do not sufficiently address broader social and systemic factors influencing vaccine refusal. For instance, issues such as mistrust in healthcare systems, misinformation spread through social media, and community-level beliefs are not easily mitigated through individual-level communication strategies alone [44]. These systemic barriers require multifaceted approaches beyond provider-parent dialogues, which are often overlooked or underfunded. Additionally, some studies point out that communication strategies may inadvertently backfire if not carefully implemented. For example, confrontational or dismissive communication can entrench hesitancy rather than alleviate it [45]. This underscores a limitation where well-intentioned interventions may have unintended negative consequences if providers are not adequately trained to navigate sensitive conversations.

In summary, while communication-focused interventions are a cornerstone of efforts to reduce pediatric vaccine hesitancy, their limitations are evident across multiple dimensions. These include insufficient training and resources for providers, the complexity of parental beliefs, variability in responses, systemic barriers, and the risk of adverse effects from poorly executed communication. Addressing these limitations requires a comprehensive approach that combines improved training, personalized messaging, systemic reforms, and community engagement to effectively overcome vaccine hesitancy and refusal in pediatric populations.

Structural and Social Determinants: A Framework for Understanding Hesitancy

A comprehensive understanding of vaccine hesitancy and health disparities necessitates an exploration of the interplay between structural and social determinants of health. The literature underscores that these determinants are fundamental in shaping health behaviors, access to healthcare, and ultimately, health outcomes across diverse populations. Several studies have adapted existing frameworks to elucidate how systemic inequities influence health disparities, including vaccine hesitancy, particularly among marginalized groups [46-51].

Vásquez-Vera et al. [52] adapt the World Health Organization's social determinants of health framework to the context of COVID-19, emphasizing the social mechanisms that contribute to the unequal distribution of COVID-19 incidence and mortality. Their adaptation highlights how structural factors such as socioeconomic status, healthcare infrastructure, and policy environments create conditions that disproportionately affect vulnerable populations. This framework underscores the importance of understanding the social context in which health disparities emerge, providing a foundation for analyzing hesitancy rooted in systemic inequities. Similarly, Javed et al. [53] apply a social determinant of health framework to explore racial and ethnic disparities in cardiovascular disease, emphasizing how structural racism operates across multiple domains—such as economic stability, neighborhood and physical environment, healthcare access, social context, and education—to exacerbate health burdens among underserved groups. Their analysis reveals that structural barriers, including discriminatory policies and practices, serve as pathways through which racial disparities in health are perpetuated. This approach underscores the significance of addressing systemic racism as a core component of interventions aimed at reducing health inequities, including vaccine hesitancy.

The concept of structural racism and its impact on health behaviors is further elaborated by Majee et al. [54], who investigate COVID-19 vaccine hesitancy among African American adults. Their qualitative study reveals that historical mistrust of government and pharmaceutical companies, rooted in unethical healthcare research, significantly influences vaccine attitudes. This mistrust is a manifestation of systemic injustices and historical trauma, illustrating how social determinants such as historical discrimination and ongoing systemic inequities shape health behaviors. The study emphasizes that vaccine hesitancy in black communities cannot be fully understood without considering these structural and social histories. Newman et al. [46] conduct a scoping review to identify determinants of COVID-19 vaccine hesitancy among marginalized populations in the United States and Canada. Their work highlights those social determinants, including socioeconomic status, education, cultural norms, and access to information—are central to understanding hesitancy. They advocate for a nuanced approach that considers the complex interplay of these factors, reinforcing the idea that structural and social contexts are critical in shaping health decisions.

Siu et al. [55] extend this understanding by applying the health belief model and the theory of planned behavior within a critical medical anthropology framework to analyze vaccine hesitancy among older Chinese adults. Their qualitative study demonstrates that perceptions of susceptibility, severity, benefits, and barriers are influenced by societal and cultural factors, including trust in healthcare systems and societal norms. This indicates that individual health beliefs are embedded within broader social and structural contexts, which can either facilitate or hinder vaccine acceptance. The importance of structural competency as a framework for addressing systemic inequities is emphasized by Whitman and Jayakumar [56], who argue that healthcare practitioners and educators must develop the capacity to recognize and respond to social determinants of health. Their framework advocates for a shift from cultural competency to structural competency, which involves understanding how systemic forces—such as policies, economic systems, and institutional practices—shape health disparities. This approach is crucial for designing interventions that address the root causes of hesitancy rooted in systemic inequities.

The influence of social media and information dissemination on vaccine hesitancy is explored by Zhang et al. [57], who examine how social media news impacts vaccination behavior in China. Their model reveals that both positive and negative social media content can significantly influence individuals' attitudes and decisions, mediated by societal factors such as trust and misinformation. This underscores the role of societal information environments as social determinants that can either promote or hinder vaccine uptake. In the context of racial and ethnic disparities, Towfighi et al. [58] discuss how social determinants such as neighborhood conditions, healthcare access, and systemic biases contribute to inequities in stroke outcomes. Although their focus is on stroke, the framework they highlight is applicable to vaccine hesitancy, emphasizing that systemic conditions shape health behaviors and outcomes across various health domains. They note the absence of a unified theoretical framework to compare interventions, suggesting a need for integrated models that incorporate social determinants.

Downey and Thompson-Lastad [59] introduced the concept of structural competency in health professions education, emphasizing its role in understanding and addressing health inequities. Their ethnographic study illustrates how systemic factors at organizational and policy levels influence health professionals' capacity to serve marginalized populations. This perspective reinforces that addressing social determinants requires systemic change and awareness among healthcare providers. The impact of societal factors on health behaviors extends to the adoption of telemedicine, as studied by Jang [60], who incorporates the technology acceptance model with e-health literacy and social influence variables. Their findings suggest that social determinants such as technological access, literacy, and social networks significantly influence behavioral intentions, highlighting the importance of societal context in health technology adoption.

Moujahid et al. [61] focus on maternal health in Morocco, mapping socioeconomic determinants according to the Commission on Social Determinants of Health Framework. Their review demonstrates that factors like income, education, and healthcare infrastructure are pivotal in shaping maternal health outcomes, illustrating how social determinants operate within specific cultural and national contexts. Enyinnaya et al. [62] propose a combined framework integrating the health belief model with the socio-ecological model to understand how misinformation influences vaccine uptake. Their approach emphasizes that societal influences, including community norms and information environments, interact with individual beliefs, reinforcing the importance of addressing social determinants at multiple levels.

Pardo et al. [63] introduced the urban stress model to explain how urban living conditions—such as environmental stressors—affect perinatal mental health. Their work highlights those urban social determinants, including stress and environmental factors, are integral to understanding health disparities, which can extend to vaccine hesitancy in urban populations. Taylor et al. [64] applied the social determinants perspective to adolescent mental health during the COVID-19 pandemic, emphasizing that policies affecting access to education, social services, and community support are vital in fostering resilience. Their findings reinforce that social determinants are dynamic and context-dependent, influencing health behaviors and mental health outcomes. Finally, Richman et al. [65] explore vaccine hesitancy in rural Southern United States populations, emphasizing the role of trusted community leaders and social networks. Their study demonstrates that social influence and trust—key social determinants—are critical in shaping vaccine acceptance, especially in underserved communities.

In summary, the literature underscores that both structural and social determinants are central to understanding health behaviors such as vaccine hesitancy. Frameworks like the World Health Organization's social determinants of health, the Commission on Social Determinants of Health Framework, and the concept of structural competency provide valuable lenses for analyzing how systemic inequities, historical injustices, societal norms, and information environments influence health decisions. Addressing hesitancy effectively requires interventions that go beyond individual-level factors to target the broader social and structural contexts that shape health behaviors. Recognizing these determinants and integrating them into policy and practice is essential for advancing health equity and improving health outcomes across diverse populations.

The Role of Systemic and Structural Racism in Vaccine Uptake

The influence of systemic and structural racism on vaccine uptake, particularly within marginalized communities, has emerged as a critical area of investigation in recent literature. Multiple studies underscore how entrenched racial inequities and systemic barriers shape attitudes towards vaccination and hinder equitable access, thereby perpetuating disparities in health outcomes.

Oliver et al. [66] highlight significant inequities in COVID-19 vaccine receipt among healthcare workers in New York City, with black and Hispanic workers disproportionately affected. Their findings suggest that systemic racism within healthcare systems contributes to these disparities, emphasizing the need for targeted strategies that address underlying barriers to vaccine access and acceptance. Further, the study reinforces this point by demonstrating that even among healthcare workers, vaccine receipt is influenced by systemic factors, with 81% of surveyed workers having received the vaccine, leaving a notable proportion unvaccinated despite availability. Hildreth and Alcendor [67] delve into the roots of vaccine hesitancy among minority populations, attributing persistent distrust in the healthcare system to long-standing systemic racism and discrimination. They argue that the underrepresentation of minorities in vaccine trials and healthcare research has fostered skepticism, which in turn hampers vaccine uptake. This distrust is compounded by historical injustices, such as unethical medical experiments and ongoing disparities, which continue to influence perceptions and behaviors related to vaccination.

The concept of structural barriers is further elaborated by Njoku et al. [68], who discuss how structural barriers—such as limited access to healthcare facilities, socioeconomic disadvantages, and organizational inefficiencies—exacerbate racial and ethnic disparities in vaccine uptake. They advocate for public health, community-engaged, and health system approaches to mitigate these barriers and promote equity. Their work underscores that structural racism manifests through tangible obstacles that prevent marginalized groups from accessing vaccines, thus maintaining disparities. Shelton et al. [69] call for the explicit inclusion of structural racism in implementation science, proposing that addressing racism should be a core focus to advance health equity. They argue that dismantling systemic barriers requires a deliberate focus on the structural determinants of health, which are often overlooked in traditional research paradigms. Their recommendations aim to integrate anti-racist frameworks into health interventions, emphasizing that structural racism is a fundamental driver of disparities in vaccine uptake.

The intersection of racism and vaccine equity is further explored by Abdul-Mutakabbir and Simiyu [70], who provide a historical context of how systemic racism has contributed to healthcare inequities, including disparities in antimicrobial resistance and vaccine access. They emphasize that structural racism creates systemic health inequities that disproportionately impact minoritized groups, leading to lower vaccination rates and poorer health outcomes. Their framework advocates for addressing these systemic issues to improve vaccine equity. Community-based approaches are highlighted by Abdul-Mutakabbir et al. [71], who focus on leveraging black pharmacists to promote vaccine equity within black communities. They describe how black pharmacists serve as trusted sources of information, advocate for equitable vaccine distribution, and create low-barrier access points, thereby addressing some of the structural barriers rooted in systemic racism. Their framework demonstrates the importance of culturally competent, community-engaged strategies to overcome mistrust and access issues.

Research by Dong et al. [72] provides qualitative insights into vaccine hesitancy among black Americans, revealing that mistrust rooted in historical and ongoing systemic racism significantly influences vaccination intentions. Their interviews with community members and stakeholders highlight the need for culturally sensitive dissemination strategies that acknowledge and address these deep-seated concerns. Wilson et al. [73] conducted a comprehensive review of factors explaining disparities in COVID-19 vaccination, finding that racism and discrimination are frequently cited as key barriers. They note that over 43% of the literature explicitly mentions racism/discrimination as a factor influencing vaccine hesitancy and access, reinforcing the pervasive role of systemic racism in shaping vaccine disparities. Jindal et al. [74] develop a conceptual model that redefines trust in the context of systemic racism, illustrating how structural factors influence vaccine receipt. Their model emphasizes that trust is not merely individual but is deeply embedded in systemic structures, and addressing these requires structural reforms to improve vaccine uptake among communities of color.

Bishop-Royse et al. [75] further explore trust and trustworthiness in the Chicago area, finding that trust in government and healthcare institutions—both affected by systemic racism—are associated with higher vaccination rates. Their findings suggest that systemic efforts to build trust must confront and dismantle the structural inequities that undermine confidence in health systems. Comfort et al. [76] focus on black women in Alameda County, CA, illustrating how anti-black racism influences perceptions of vaccine hesitancy. They argue that black people's vaccination decisions are complex and rational responses to systemic injustices, emphasizing that understanding these decisions requires acknowledging the broader racialized context. Finally, Jones et al. [77] examine medical distrust in disinvested black communities, linking high skepticism to historical and ongoing systemic racism. Their study underscores that distrust is a rational response to systemic failures and discrimination, which significantly impacts vaccine uptake.

In summary, the literature demonstrates that systemic and structural racism are fundamental drivers of disparities in vaccine uptake. These forms of racism manifest through historical injustices, underrepresentation in research, organizational barriers, and ongoing discrimination, all of which foster mistrust and limit access. Addressing these issues requires comprehensive strategies that include community engagement, culturally competent interventions, and structural reforms aimed at dismantling systemic barriers. Recognizing racism as a core determinant of health disparities is essential for developing effective, equitable vaccination programs and ultimately achieving health equity.

Cultural and Religious Beliefs: Navigating Diverse Values and Practices

The intersection of cultural and religious beliefs significantly influences vaccine hesitancy and refusal in pediatric populations, presenting complex challenges for healthcare providers worldwide. The diversity of religious and cultural backgrounds necessitates a nuanced understanding of how these beliefs shape parental attitudes toward vaccination, as well as the development of tailored strategies to improve vaccine acceptance.

Cultural competence emerges as a critical component in addressing vaccine hesitancy. According to Dillard et al. [27], the broad spectrum of religious practices and beliefs across different societies complicates the delivery of culturally sensitive medical care. Healthcare providers must recognize and respect these diverse perspectives to foster trust and facilitate effective communication. This cultural awareness is essential because beliefs rooted in religion or tradition can influence perceptions of vaccine safety, necessity, and morality, thereby impacting parental decisions regarding their children's immunizations. Religious beliefs, in particular, have been identified as influential factors in vaccine hesitancy. The

literature indicates that certain religious groups harbor specific concerns that can lead to vaccine refusal or delay. For instance, a study analyzing religious groups found that doctrinal beliefs and religious teachings often underpin vaccine hesitancy, affecting vaccination coverage rates within these communities [78]. These beliefs may include notions that vaccines interfere with divine will, concerns about the use of certain ingredients derived from animal products, or mistrust of medical interventions perceived as incompatible with religious doctrines. Such convictions can result in a spectrum of behaviors, from complete refusal to delayed acceptance, thereby undermining herd immunity and public health efforts.

The role of cultural and religious values extends beyond individual beliefs to influence community norms and social attitudes. A recent review by Begum et al. [79] of COVID-19 vaccination attitudes highlighted that in Japan, higher levels of hesitancy correlated with specific cultural and religious attitudes, emphasizing that societal context plays a vital role in shaping vaccine perceptions. Addressing these deeply rooted beliefs requires culturally sensitive engagement strategies that respect community values while promoting accurate information about vaccine safety and efficacy. Effective communication strategies are paramount in navigating these diverse beliefs. Personalized approaches that consider cultural and religious contexts can enhance trust and acceptance. For example, pediatricians are encouraged to tailor their discussions with hesitant parents by understanding their specific concerns, beliefs, and literacy levels [41]. Such personalized communication can dispel misinformation, address safety concerns, and clarify misconceptions rooted in cultural or religious narratives. Moreover, involving community and religious leaders in vaccination campaigns has been suggested as a way to leverage trusted voices within communities to promote vaccine acceptance [30].

The ethical considerations surrounding vaccination in children also intersect with cultural and religious beliefs. Ethical frameworks emphasize respecting parental autonomy and cultural values while balancing public health priorities. As discussed in the literature, parents' hesitancy often stems from worries about vaccine safety, the maturity of the child, or religious objections [80]. Navigating these concerns ethically involves transparent communication, acknowledging parental beliefs, and providing evidence-based information without coercion. This approach fosters trust and can lead to increased vaccine uptake, even within communities with strong cultural or religious reservations. Furthermore, misinformation propagated through social media and other channels can exacerbate cultural and religious hesitations. Addressing this requires proactive engagement and culturally sensitive education campaigns that counteract false narratives and reinforce positive attitudes toward vaccination [81]. Recognizing the influence of social and cultural attitudes on vaccine behavior is essential for designing interventions that resonate with community values and beliefs.

In summary, cultural and religious beliefs are central to understanding vaccine hesitancy and refusal in pediatric populations. The diversity of these beliefs necessitates culturally competent healthcare practices, personalized communication, and community engagement to effectively address concerns and promote vaccine acceptance. As the literature indicates, respecting cultural and religious identities while providing accurate, empathetic information is vital for overcoming barriers to immunization and safeguarding public health. Developing strategies that integrate cultural sensitivity with ethical considerations can help bridge the gap between vaccine recommendations and parental beliefs, ultimately improving vaccination coverage and health outcomes in diverse populations.

Socioeconomic Factors, Access to Care, and Their Impact on Immunization

The interplay between socioeconomic factors, access to healthcare, and their influence on vaccine hesitancy and refusal in pediatric populations has garnered significant attention in recent literature. Multiple studies underscore that vaccine hesitancy is a multifaceted issue shaped by a combination of individual, social, and systemic determinants.

Goruntla et al. [82] conducted a hospital-based cross-sectional study in Andhra Pradesh, India, revealing that socioeconomic status significantly influences vaccine hesitancy among mothers of children under five. The study identified that lower socioeconomic status correlates with increased hesitancy, primarily due to limited awareness and access issues. This finding aligns with broader observations that economic constraints can hinder timely vaccination, as families may prioritize immediate needs over preventive health measures. Similarly, Hong et al. [83] examined sociodemographic factors affecting vaccine acceptance during the COVID-19 pandemic in South Korea. Their nationwide study highlighted that age, income level, and educational background are critical determinants of vaccine acceptance. Notably, lower-income groups exhibited higher levels of hesitancy, which was partly attributed to concerns about vaccine costs and perceived risks. The study emphasizes that targeted policies considering age-specific and socioeconomic factors are essential to improve vaccine uptake.

The role of trust in healthcare providers emerges as a pivotal element influencing parental decisions. The study by Thorakkattil et al. [84] underscores that parents often rely heavily on healthcare professionals' advice, and their trust significantly impacts vaccination decisions. When trust is compromised, whether due to previous adverse events or systemic mistrust, vaccine refusal tends to increase. This suggests that improving communication and fostering trust within healthcare interactions could mitigate hesitancy. Financial barriers are recurrent themes across studies. O'Leary et al. [30] report discusses how vaccine refusal and delayed immunizations impose financial burdens on healthcare systems and payers. Missed vaccinations lead to increased disease burden and associated costs, highlighting that economic considerations are not only individual but also systemic. Furthermore, a study by Kaushik et al. [38] notes that access barriers, including costs and logistical challenges, disproportionately affect marginalized populations, exacerbating disparities in immunization coverage.

Access to healthcare services is another critical factor influencing vaccine uptake. Goje and Kapoor [42] emphasizes that populations mistrust the healthcare system or have limited access to vaccination sites, which directly impacts immunization rates. The study advocates strategies that improve healthcare accessibility, such as mobile clinics and community outreach, to address these barriers. Similarly, the Brazilian study by França et al. [85] and Faria et al. [86], identify operational difficulties, including the strategic placement of health units and logistical challenges, as significant contributors to vaccine hesitancy and refusal. These operational barriers often intersect with socioeconomic disadvantages, further complicating efforts to improve coverage.

Parental awareness and satisfaction with vaccination services also play a role. Parental vaccine hesitancy is often linked to their understanding

of vaccine benefits and safety. Parental knowledge and positive experiences with healthcare providers are associated with higher vaccination rates, as noted in recent evidence supporting the need for improved communication strategies [39]. Moreover, social determinants such as maternal health practices, prenatal care, and breastfeeding indirectly influence vaccination behaviors, suggesting that broader social factors shape vaccine acceptance [87]. The impact of socioeconomic disparities extends to the timing and completeness of immunization. A study by Hill [88] reports that children born during or after major healthcare disruptions, such as the COVID-19 pandemic, exhibit lower vaccination rates, partly due to parental hesitancy compounded by access issues. This indicates that systemic disruptions and socioeconomic vulnerabilities can have lasting effects on immunization coverage.

In summary, the literature demonstrates that socioeconomic factors and access to healthcare are deeply intertwined with vaccine hesitancy and refusal in pediatric populations. Lower socioeconomic status, financial constraints, operational barriers, and systemic mistrust significantly contribute to reduced vaccine uptake. Addressing these issues requires multifaceted strategies that include improving healthcare accessibility, fostering trust through effective communication, and implementing policies sensitive to socioeconomic disparities. Recognizing and mitigating these barriers are essential steps toward increasing immunization coverage and safeguarding child health.

Historical Mistrust and Legacies of Injustice in Healthcare

Historical mistrust and legacies of injustice in healthcare significantly contribute to vaccine hesitancy and refusal in pediatric populations, particularly among racially marginalized communities. This mistrust is deeply rooted in historical and ongoing experiences of racism, unethical medical practices, and systemic inequities. These factors have led to a pervasive skepticism towards medical interventions, including vaccines, among black, Latinx, and other minority groups. Addressing this issue requires a multifaceted approach that acknowledges historical injustices and actively works to rebuild trust through community engagement and culturally sensitive healthcare practices.

Historical roots of medical mistrust

- The mistrust among black Americans is historically rooted in unethical medical practices, such as the Tuskegee Syphilis Study, which have left lasting scars on the community's perception of healthcare systems [89].
- Cultural oppression and systemic racism have perpetuated a cycle of mistrust, leading to adverse health outcomes and increased healthcare costs for black communities [89].
- Similar patterns of mistrust are observed in other marginalized groups, such as the Somali diaspora in Minneapolis, where historical and relational experiences with the healthcare system contribute to vaccine hesitancy [90].

Impact on vaccine hesitancy

- Vaccine hesitancy is prevalent among racially diverse parents, with significant disparities in vaccine uptake observed across different racial and ethnic groups [91].
- In Boston, black and Latinx adolescents showed lower COVID-19 vaccination rates compared to their White and Asian peers, highlighting the impact of historical mistrust on vaccine acceptance [92].
- Among Hispanic parents, factors such as economic marginalization and cultural beliefs further compound vaccine hesitancy, with a significant portion expressing uncertainty or refusal to vaccinate their children [91].

In summary, while historical mistrust and systemic racism are significant barriers to vaccine acceptance, it is also important to consider the role of systemic factors in shaping these perceptions. The focus should shift from merely addressing mistrust to enhancing the trustworthiness of healthcare systems. This involves acknowledging and addressing the systemic racism that undermines confidence in medical institutions. By improving the trustworthiness of these systems, it may be possible to close racial gaps in vaccine uptake and improve health outcomes for all communities.

Community-based and Culturally Informed Intervention Strategies

Addressing vaccine hesitancy and refusal in pediatric populations requires community-based and culturally informed intervention strategies. These strategies are essential to overcoming barriers such as distrust, misinformation, and cultural beliefs that contribute to vaccine hesitancy. By engaging communities and tailoring interventions to cultural contexts, healthcare providers can improve vaccine uptake among children (Figure 1) [39].

Community engagement and education

- Community-based clinics and education programs: Initiatives like the 'Ask-a-Doc' program in Boston demonstrate the effectiveness of community-based clinics combined with educational outreach. By partnering with local schools and stakeholders, these programs can directly address health inequities and misinformation, leading to increased trust and vaccine uptake among black and Latinx adolescents [92].
- Parent advocates and community leaders: Programs such as the 'Immunity Community' in Washington State have successfully mobilized parents as immunization advocates. This approach leverages peer influence to change attitudes and reduce hesitancy, although changes in actual vaccination behavior were not statistically significant [92].

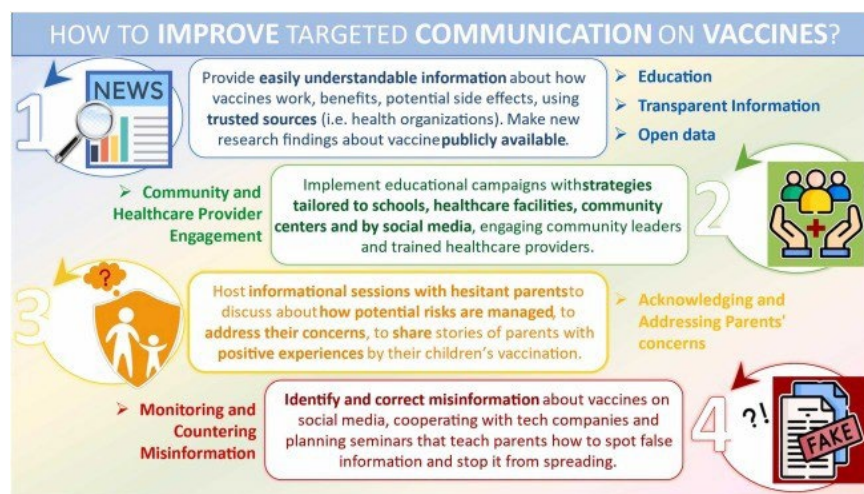


Figure 1: How to improve targeted communication on vaccines? [39].

Culturally informed communication

- **Culturally aligned storytelling:** Digital storytelling interventions, particularly among Hispanic communities, have shown promise in reducing vaccine hesitancy. By sharing personal stories of conversion to vaccine acceptance, these interventions can resonate culturally and emotionally with hesitant parents [93].
- **Tailored communication strategies:** Engaging community health workers and using culturally tailored materials, such as handouts and videos featuring local youth, can facilitate dialogue and shared decision-making. This approach has been effective in promoting vaccine uptake among Black and Hispanic youth [94].

Addressing misinformation and building trust

- **Trust-building and accurate information:** Providing accurate information and addressing myths are crucial strategies. Engaging local influencers and utilizing digital platforms can help disseminate trustworthy information and counteract misinformation [95].
- **Trauma-informed approaches:** For communities with historical trauma, such as American Indian and Alaska Native populations, trauma-informed communication is vital. This approach acknowledges past injustices and builds trust through culturally competent dialogue [96].

Collaborative and participatory approaches

- **Community-based participatory research:** Involving community members in the design and implementation of interventions ensures that strategies are relevant and accepted. For example, in Mewat District, India, community accountability boards and workshops led to interventions that improved vaccine knowledge and acceptance [97].
- **Mixed-methods crowdsourcing:** Engaging community and family partners in co-developing interventions, as seen in the study with black and Hispanic youth, ensures that strategies are culturally and locally tailored, addressing specific community concerns [94].

In summary, while these strategies show promise, it is important to consider the broader context of vaccine hesitancy. Factors such as legislative policies, access barriers, and general distrust in authorities also play significant roles in vaccine uptake. Addressing these systemic issues requires a comprehensive approach that includes policy changes, improved healthcare access, and ongoing community engagement. By integrating these elements, interventions can be more effective in promoting vaccine acceptance and protecting public health.

Clinical Studies

A study by Whelan et al. [98] involved 436 parents or caregivers of children attending general pediatric clinics in a tertiary pediatric hospital in Dublin, Ireland, between September and December 2018. A significant portion of the population, 55%, reported non-vaccination. The most commonly cited vaccines of concern were Human papillomavirus (115%) and measles, mumps, rubella (67%). Autism spectrum disorder was the most frequently mentioned side effect of concern, cited by 43% of participants. The mean parent attitudes about childhood vaccines (PACV) score for the entire study population was 269 (SD 191). There was a statistically significant difference in mean PACV scores between non-vaccinators and vaccinators (532 vs 253, $p < 0.001$). Safety and efficacy concerns were identified as the primary contributors to non-vaccination. Using the conventional cut-off score, 144% of the population were classified as vaccine hesitant. This percentage increased to 22% when an optimal cut-off score, which maximized sensitivity and specificity, was applied. The PACV score demonstrated good accuracy in identifying non-vaccination, with an area under the receiver operating characteristic curve of 0.827. The optimal cut-off score also showed a high negative predictive value of 985%. In summary, the study found that a substantial percentage of parents in an Irish pediatric outpatient setting reported non-vaccination, driven mainly by concerns about vaccine safety and efficacy. The PACV questionnaire proved to be an accurate tool for identifying vaccine hesitancy and reported non-vaccination in this population, suggesting its potential utility for screening and targeted interventions.

A study by Hough-Telford et al. [99] highlights a growing challenge for pediatricians, with increased rates of vaccine refusals and delays, alongside a rise in patient dismissals for non-compliance, indicating a shifting landscape in vaccine discussions between healthcare providers and parents. The proportion of pediatricians reporting parental vaccine refusals significantly increased from 74.5% in 2006 to 87.0% in 2013 ($p < 0.001$). In 2013, a substantial 92.5% of pediatricians reported experiencing parental requests for vaccine delays. A significant majority of pediatricians (75.0%) noted that parents delay vaccines due to concerns about discomfort. Another common reason cited by pediatricians (72.5%) for parental vaccine delays was concern regarding the immune system burden. Pediatricians observed an increasing trend among vaccine-refusing parents who believe that immunizations are unnecessary. The percentage of pediatricians who reported 'always' dismissing patients for continued vaccine refusal nearly doubled, rising from 6.1% in 2006 to 11.7% in 2013 ($p = 0.004$).

An international cross-sectional study by Cag et al. [100] investigated parental attitudes towards childhood vaccination. The study included 4,029 parents. A significant majority, 2,863 (78.1%), of the participants were female. The overall rate of vaccine hesitancy and refusal among parents was found to be 13.7%. Additionally, 19.3% of parents did not fully adhere to vaccination programs. The vaccine hesitancy and refusal rate was observed to be higher in high-income countries. Parents with disabled children and those with immunocompromised children exhibited higher vaccine hesitancy and refusal rates. Lower education levels among parents were associated with increased vaccine hesitancy and refusal rates. Parents who relied on social media networks as their primary source of information for childhood immunizations also showed higher vaccine hesitancy and refusal rates. For all these identified factors, the statistical significance was established ($p < 0.05$). In summary, the study highlighted that vaccine hesitancy, and refusal is a significant concern, with specific demographic and informational factors playing a crucial role in its prevalence.

A study by Fisher et al. [91] investigated parental attitudes and beliefs regarding COVID-19 vaccination for children under 5 years old in the United States, revealing significant levels of hesitancy and specific concerns driving these decisions (Figure 2). A significant portion of parents exhibited hesitancy, with 46.2% intending not to vaccinate their child (resistant parents), 22.6% being 'unsure parents', and only 31% intending to vaccinate (accepting parents). This level of resistance is higher than reported in earlier studies concerning 0 to 4 and 5 to 11 year-old children. The study noted that vaccination rates for 5 to 11 year-olds are nearly half those of 12 to 17 year-olds, suggesting that rates for children under 5 might be even lower. This was the most frequent concern for unsure (53.8%) and resistant (46.2%) parents, encompassing worries about immediate, long-term, and unknown side effects, as well as the rushed nature of vaccine approval. Some parents based their belief on personal or others' adverse reactions. Approximately 33% of resistant parents and 24% of unsure parents expressed distrust, believing that decisions might be 'politically influenced' or that their child would be used as an 'experiment.' This distrust was rarely mentioned by accepting parents. More resistant parents (15.8%) than unsure parents (6.5%) believed the vaccine was unnecessary, citing reasons such as mild disease in young children, natural immunity, or the perception that the vaccine was no longer effective against new variants. Concerns that young children were especially vulnerable to the vaccine were expressed by 8% of resistant and 17% of unsure parents, fearing the vaccine might be more serious than the virus itself or that young children don't need chemicals. This was the most common reason given by accepting parents (over 66%), who largely trusted FDA approval and



Figure 2: Percent of resistant, unsure, and accepting parents reporting agreement with COVID-19 pediatric vaccination survey items [91].

desired protection from severe illness and community spread. Unsure parents were more aligned with accepting parents regarding the influence of their child's doctor on vaccination decisions (78.5% for unsure vs 84.4% for accepting), suggesting doctors have a crucial role in persuading unsure parents. Resistant parents showed much lower reliance on provider opinion (40.0%).

A study by Olusanya et al. [101], conducted from November 2021 to July 2022, analyzed data from the United States National Immunization Survey—Child COVID Module to understand trends and correlations in parental hesitancy towards pediatric COVID-19 vaccines and routine childhood immunizations among parents/guardians of children aged 5 to 11 years (Figure 3). Over the 9-month period, the proportion of parents hesitant about pediatric COVID-19 vaccines significantly increased by 15.8 percentage points, rising from 24.8% to 40.6%. While parents' concerns about pediatric COVID-19 infections decreased, there was a growing worry regarding the safety and overall importance of pediatric COVID-19 vaccines. Pediatric COVID-19 vaccine hesitancy was more prevalent among specific demographic groups: parents of white children (43.2%) compared to black (29.3%) or Hispanic (26.9%) children, parents residing in rural areas (51.3%) versus urban areas (28.9%). The proportion of parents reporting routine childhood immunizations initially increased by 4.7% points from November 2021 to May 2022, but by July 2022, it returned to its baseline level. In contrast to COVID-19 vaccine hesitancy, routine childhood immunizations hesitancy showed a different pattern: It was higher among parents of black children (32.0%) compared to Hispanic (24.5%) or white (23.6%) children. The study found a significant positive correlation between parental hesitancy towards pediatric COVID-19 vaccines and routine childhood immunizations. Pediatric COVID-19 vaccine hesitancy was 2 to 6 times more prevalent among parents who were hesitant about routine childhood immunizations compared to those who were not. This correlation held true across all demographic and psychosocial factors, both in unadjusted and adjusted prevalence ratios. In summary, the study highlights a concerning increase in parental hesitancy towards pediatric COVID-19 vaccines, alongside fluctuating routine childhood immunizations hesitancy, and reveals distinct sociodemographic patterns for each type of hesitancy. A strong positive correlation between hesitancy for both vaccine types suggests that interventions aimed at increasing vaccine confidence, shaping social norms, and facilitating behavior change through parent-provider interactions could promote pediatric vaccination rates for both COVID-19 and routine immunizations.

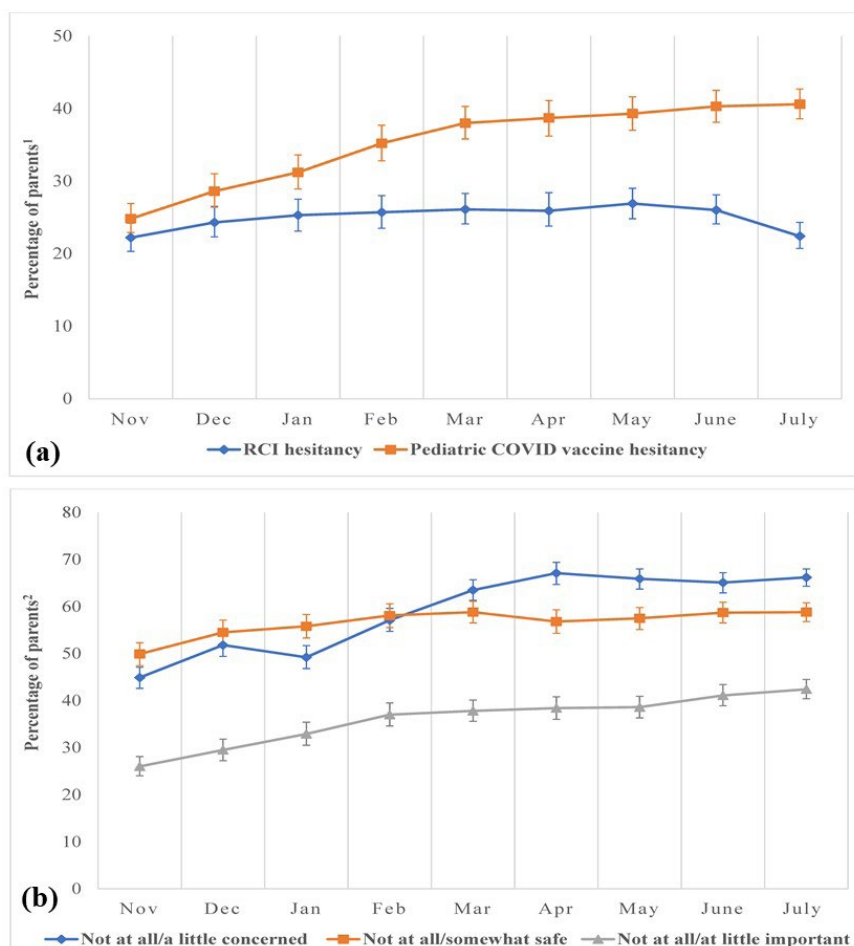


Figure 3: Prevalence of (a) hesitancy and (b) perceptions towards pediatric COVID-19 vaccines and routine childhood immunizations as reported by parents of children aged 5 to 11 years, November 2021 to July 2022, National Immunization Survey [101].

Conclusion

Pediatric vaccine hesitancy and refusal cannot be adequately understood—or effectively addressed—through communication alone. This review makes clear that while clinician–caregiver dialogue remains necessary, it is far from sufficient. Vaccine decision-making is embedded

within broader social realities shaped by structural inequities, systemic and structural racism, historical injustice, cultural and religious worldviews, socioeconomic constraints, and unequal access to care. Treating hesitancy as a deficit of knowledge or a failure of persuasion ignores the lived experiences that rationally inform parental skepticism and ultimately limits the impact of public health interventions.

The evidence reviewed demonstrates that communication-focused strategies, when deployed in isolation, tend to produce modest and uneven gains, often benefiting already-advantaged populations while leaving disparities intact. In contrast, approaches that acknowledge historical mistrust, confront structural barriers, and engage communities as partners—rather than passive recipients of information—show greater promise for achieving durable and equitable improvements in vaccine uptake. Trust, once lost through decades of institutional failure and injustice, cannot be rebuilt at the bedside alone; it requires visible, sustained reforms that improve access, accountability, and representation within health systems.

Moving forward, a paradigm shift is required. Public health practice must integrate structural competency into vaccine policy, clinical training, and implementation science. This includes investing in community-based and culturally informed interventions, dismantling logistical and economic barriers to immunization, and embedding anti-racist frameworks into program design and evaluation. Future research should prioritize multi-level interventions, develop unified theoretical models that link social determinants to vaccine behavior, and rigorously assess real-world effectiveness across diverse pediatric populations.

Ultimately, achieving equitable pediatric vaccine coverage is not a matter of better messaging, but of better systems. Addressing the root causes of hesitancy—rather than its surface expressions—is both a scientific necessity and a moral imperative if preventable childhood diseases are to be controlled without perpetuating existing health inequities.

Acknowledgements

None.

Conflict of Interest

None.

References

- Galagali PM, Kinikar AA, Kumar VS (2022) Vaccine hesitancy: obstacles and challenges. *Curr Pediatr Rep* 10: 241-248. <https://doi.org/10.1007/s40124-022-00278-9>
- Singh P, Dhalaria P, Kashyap S, Soni GK, Nandi P, et al. (2022) Strategies to overcome vaccine hesitancy: a systematic review. *Syst Rev* 11: 1-13. <https://doi.org/10.1186/s13643-022-01941-4>
- Olusanya OA, Bednarczyk RA, Davis RL, Shaban-Nejad A (2021) Addressing parental vaccine hesitancy and other barriers to childhood/adolescent vaccination uptake during the coronavirus (COVID-19) pandemic. *Front Immunol* 12: 1-7. <https://doi.org/10.3389/fimmu.2021.663074>
- Nuwarda RF, Ramzan I, Weekes L, Kayser V (2022) Vaccine hesitancy: contemporary issues and historical background. *Vaccines* 10: 1595. <https://doi.org/10.3390/vaccines10101595>
- Higgins DM, O'Leary ST (2024) A world without measles and rubella: addressing the challenge of vaccine hesitancy. *Vaccines* 12: 694. <https://doi.org/10.3390/vaccines12060694>
- Obohwemu K, Christie-de Jong F, Ling J (2022) Parental childhood vaccine hesitancy and predicting uptake of vaccinations: a systematic review. *Prim Health Care Res Dev* 23: 1-14. <https://doi.org/10.1017/s1463423622000512>
- Crosby LE, Real FJ, Cunningham J, Mitchell M (2023) Overcoming vaccine hesitancy using community-based efforts. *Pediatr Clin North Am* 70: 359-370. <https://doi.org/10.1016/j.pcl.2022.11.012>
- Dagovetz M, Momchilov K, Blank L, Khorsandi J, Rizzo A, et al. (2025) Global COVID-19 vaccination challenges: inequity of access and vaccine hesitancy. *J Med Surg Public Health* 6: 100197. <https://doi.org/10.1016/j.jglmedi.2025.100197>
- Dhama K, Sharun K, Tiwari R, Dhawan M, Emran TB, et al. (2021) COVID-19 vaccine hesitancy—reasons and solutions to achieve a successful global vaccination campaign to tackle the ongoing pandemic. *Hum Vaccin Immunother* 17: 3495-3499. <https://doi.org/10.1080/21645515.2021.1926183>
- Omer SB, Benjamin RM, Brewer NT, Buttenheim AM, Callaghan T, et al. (2021) Promoting COVID-19 vaccine acceptance: recommendations from the Lancet Commission on Vaccine Refusal, Acceptance, and Demand in the USA. *Lancet* 398: 2186-2192. [https://doi.org/10.1016/s0140-6736\(21\)02507-1](https://doi.org/10.1016/s0140-6736(21)02507-1)
- Cooper S, Wiysonge CS (2023) Towards a more critical public health understanding of vaccine hesitancy: key insights from a decade of research. *Vaccines* 11: 1155. <https://doi.org/10.3390/vaccines11071155>
- Brakel LA, Foxall GR (2022) Vaccine refusal: a preliminary interdisciplinary investigation. *Front Public Health* 10: 1-14. <https://doi.org/10.3389/fpubh.2022.917929>
- Njororai FJ, Amulla W, Nyaranga CK, Cholo W, Adekunle T (2024) A qualitative exploration of factors associated with COVID-19 vaccine uptake and hesitancy in selected rural communities in Kenya. *COVID 4*: 715-730. <https://doi.org/10.3390/covid4060048>
- Dang JH, Gori A, Rios L, Rolon AM, Zhang J, et al. (2024) “You don’t know if it’s the truth or a lie”: exploring human papillomavirus (HPV) vaccine hesitancy among communities with low HPV vaccine uptake in Northern California. *Vaccines* 12: 372. <https://doi.org/10.3390/vaccines12040372>
- Olsson H, Galesic M (2024) Analogies for modeling belief dynamics. *Trends Cogn Sci* 28: 907-923. <https://doi.org/10.1016/j.tics.2024.07.001>
- Slatten BC, Cambrice FG, Omowale SS (2025) COVID-19 vaccine hesitancy among black women in the US. *JAMA Netw Open* 8: 1-12. <https://doi.org/10.1001/jamanetworkopen.2024.53511>
- Cassidy C, Langley J, Steenbeek A, Taylor B, Kennie-Kaulbach N, et al. (2021) A behavioral analysis of nurses’ and pharmacists’ role in addressing vaccine hesitancy: scoping review. *Hum Vaccin Immunother* 17: 4487-4504. <https://doi.org/10.1080/21645515.2021.1954444>
- Dutta T, Agle J, Meyerson BE, Barnes PA, Sherwood-Laughlin C, et al. (2021) Perceived enablers and barriers of community engagement for vaccination in India: Using socioecological analysis. *PLoS One* 16: 1-26. <https://doi.org/10.1371/journal.pone.0253318>
- Etowa J, Beauchamp S, Fseifes M, Osandatuwa G, Brenneman P, et al. (2024) Understanding low vaccine uptake in the context of public health in high-income countries: a scoping review. *Vaccines* 12: 269. <https://doi.org/10.3390/vaccines12030269>

20. Vallis M, Bacon S, Corace K, Joyal-Desmarais K, Sheinfeld Gorin S, et al. (2021) Ending the pandemic: how behavioural science can help optimize global COVID-19 vaccine uptake. *Vaccines* 10: 7. <https://doi.org/10.3390/vaccines10010007>
21. Kyei GK, Kyei EF, Ansong R (2025) Determinants of HPV vaccine uptake in women in the United States: a scoping review of socioecological influences. *Policy Polit Nurs Pract* 26: 256-272. <https://doi.org/10.1177/15271544251364251>
22. Cole WM, Schofer E, Velasco K (2023) Individual empowerment, institutional confidence, and vaccination rates in cross-national perspective, 1995 to 2018. *Am Sociol Rev* 88: 379-417. <https://doi.org/10.1177/00031224231162869>
23. Fancher S, Wyatt T (2025) Bridging vaccine access and attitudes: an integrative review of U.S. school-based vaccination programs. *J Sch Nurs* 41: 752-767. <https://doi.org/10.1177/10598405251388489>
24. Acharya S, Aechtner T, Dhir S, Venaik S (2025) Vaccine hesitancy: a structured review from a behavioral perspective (2015–2022). *Psychol Health Med* 30: 119-147. <https://doi.org/10.1080/13548506.2024.2417442>
25. Kühlbrandt C, McGowan CR, Stuart R, Grenfell P, Miles S, et al. (2023) COVID-19 vaccination decisions among Gypsy, Roma, and Traveller communities: a qualitative study moving beyond “vaccine hesitancy”. *Vaccine* 41: 3891-3897. <https://doi.org/10.1016/j.vaccine.2023.04.080>
26. Braveman PA, Arkin E, Proctor D, Kauh T, Holm N (2022) Systemic and structural racism: definitions, examples, health damages, and approaches to dismantling. *Health Aff* 41: 171-178. <https://doi.org/10.1377/hlthaff.2021.01394>
27. Dillard V, Moss J, Padgett N, Tan X, Kennedy AB (2021) Attitudes, beliefs and behaviors of religiosity, spirituality, and cultural competence in the medical profession: a cross-sectional survey study. *PLoS One* 16: 1-18. <https://doi.org/10.1371/journal.pone.0252750>
28. Tuckerman J, Kaufman J, Danchin M (2022) Effective approaches to combat vaccine hesitancy. *Pediatr Infect Dis J* 41: e243-e245. <https://doi.org/10.1097/inf.0000000000003499>
29. Strengthening Confidence in Vaccines, Demand for Immunization and Addressing Vaccine Hesitancy. UNICEF. [<https://www.unicef.org/eca/reports/strengthening-confidence-vaccines-demand-immunization-and-addressing-vaccine-hesitancy>] [Accessed September 14, 2026]
30. O’Leary ST, Opel DJ, Cataldi JR, Hackell JM (2024) Strategies for improving vaccine communication and uptake. *Pediatrics* 153: 1-24. <https://doi.org/10.1542/peds.2023-065483>
31. Efthymiou A, Kalaitzaki A, Kondilis B, Rovithis M (2024) Health literacy continuing education courses and tools for healthcare professionals: a scoping review. *Gerontol Geriatr Educ* 45: 212-247. <https://doi.org/10.1080/02701960.2022.2156865>
32. Chike-Harris KE, Durham C, Logan A, Smith G, DuBose-Morris R (2021) Integration of telehealth education into the health care provider curriculum: a review. *Telemed E Health* 27: 137-149. <https://doi.org/10.1089/tmj.2019.0261>
33. Henry BW, Block DE, Ciesla JR, McGowan BA, Vozenilek JA (2017) Clinician behaviors in telehealth care delivery: a systematic review. *Adv Health Sci Educ Theory Pract* 22: 869-888. <https://doi.org/10.1007/s10459-016-9717-2>
34. Pereira VC, Silva SN, Carvalho VK, Zanghelini F, Barreto JO (2022) Strategies for the implementation of clinical practice guidelines in public health: an overview of systematic reviews. *Health Res Policy Syst* 20: 1-21. <https://doi.org/10.1186/s12961-022-00815-4>
35. Mohammed AB, Zegeye RT, Dawed HA, Tessema YM (2024) Implementation of problem-based learning in undergraduate medical education in Ethiopia: an exploratory qualitative study. *Adv Med Educ Pract* 15: 105-119. <https://doi.org/10.2147/amep.s443384>
36. Torab-Miandoab A, Samad-Soltani T, Jodati A, Rezaei-Hachesu P (2023) Interoperability of heterogeneous health information systems: a systematic literature review. *BMC Med Inform Decis Mak* 23: 1-13. <https://doi.org/10.1186/s12911-023-02115-5>
37. Lip A, Pateman M, Fullerton MM, Chen HM, Bailey L, et al. (2023) Vaccine hesitancy educational tools for healthcare providers and trainees: a scoping review. *Vaccine* 41: 23-35. <https://doi.org/10.1016/j.vaccine.2022.09.093>
38. Kaushik A, Fomicheva J, Boonstra N, Faber E, Gupta S, et al. (2025) Pediatric vaccine hesitancy in the United States—the growing problem and strategies for management including motivational interviewing. *Vaccines* 13: 115. <https://doi.org/10.3390/vaccines13020115>
39. Cagnotta C, Lettera N, Cardillo M, Pirozzi D, Catalán-Matamoros D, et al. (2025) Parental vaccine hesitancy: recent evidences support the need to implement targeted communication strategies. *J Infect Public Health* 18: 102648. <https://doi.org/10.1016/j.jiph.2024.102648>
40. Mitchell PG, Hammershaimb EA, Cataldi JR (2025) Building vaccine confidence through empathy and evidence-based communication. *J Hosp Med* 20: 1342-1347. <https://doi.org/10.1002/jhm.70116>
41. Talking with Vaccine Hesitant Parents. American Academy of Pediatrics. 2025. [<https://www.aap.org/en/patient-care/immunizations/communicating-with-families-and-promoting-vaccine-confidence/talking-with-vaccine-hesitant-parents>] [Accessed September 14, 2026]
42. Goje O, Kapoor A (2024) Meeting the challenge of vaccine hesitancy. *Cleve Clin J Med* 91: S50-S56. <https://doi.org/10.3949/ccjm.91.s1.08>
43. Szilagyi PG, Humiston SG, Stephens-Shields AJ, Localio R, Breck A, et al. (2021) Effect of training pediatric clinicians in human papillomavirus communication strategies on human papillomavirus vaccination rates: a cluster randomized clinical trial. *JAMA Pediatr* 175: 901-910. <https://doi.org/10.1001/jamapediatrics.2021.0766>
44. National Academies of Sciences, Engineering, and Medicine (2021) The Critical Public Health Value of Vaccines: Tackling Issues of Access and Hesitancy: Proceedings of a Workshop. National Academies Press, Washington.
45. Cherven B, Klosky JL, Keith KE, Hudson MM, Bhatia S, et al. (2023) Reasons for refusal of the human papillomavirus vaccine among young cancer survivors. *Cancer* 129: 614-623. <https://doi.org/10.1002/cncr.34521>
46. Newman PA, Reid L, Tepjan S, Fantus S, Allan K, et al. (2022) COVID-19 vaccine hesitancy among marginalized populations in the U.S. and Canada: protocol for a scoping review. *PLoS One* 17: 1-13. <https://doi.org/10.1371/journal.pone.0266120>
47. Newman PA, Dinh DA, Nyoni T, Allan K, Fantus S, et al. (2025) COVID-19 vaccine hesitancy and under-vaccination among marginalized populations in the United States and Canada: a scoping review. *J Racial Ethn Health Disparities* 12: 413-434. <https://doi.org/10.1007/s40615-023-01882-1>
48. AlShurman BA, Butt ZA (2023) Proposing a new conceptual syndemic framework for COVID-19 vaccine hesitancy: a narrative review. *Int J Environ Res Public Health* 20: 1561. <https://doi.org/10.3390/ijerph20021561>
49. Campbell J, Kaur A, Gamino D, Benoit E, Amos B, et al. (2023) Individual and structural determinants of COVID-19 vaccine uptake in a marginalized community in the United States. *Vaccine* 41: 5706-5714. <https://doi.org/10.1016/j.vaccine.2023.07.077>

50. Cha E, Vyas V, King KD, Reifferscheid L, MacDonald SE (2023) Inclusion of intersectionality in studies of immunization uptake in Canada: a scoping review. *Vaccine* 41: 3710-3717. <https://doi.org/10.1016/j.vaccine.2023.04.073>
51. Blasioli E, Mansouri B, Tamvada SS, Hassini E (2023) Vaccine allocation and distribution: a review with a focus on quantitative methodologies and application to equity, hesitancy, and COVID-19 pandemic. *Oper Res Forum* 4: 1-32. <https://doi.org/10.1007/s43069-023-00194-8>
52. Vázquez-Vera H, León-Gómez BB, Borrell C, Jacques-Aviñó C, López MJ, et al. (2023) Inequities in the distribution of COVID-19: an adaptation of WHO's conceptual framework. *Gac Sanit* 36: 488-492. <https://doi.org/10.1016/j.gaceta.2021.10.004>
53. Javed Z, Haisum Maqsood M, Yahya T, Amin Z, Acquah I, et al. (2022) Race, racism, and cardiovascular health: applying a social determinants of health framework to racial/ethnic disparities in cardiovascular disease. *Circ Cardiovasc Qual Outcomes* 15: 72-86. <https://doi.org/10.1161/circoutcomes.121.007917>
54. Majee W, Anakwe A, Onyeaka K, Harvey IS (2023) The past is so present: understanding COVID-19 vaccine hesitancy among African American adults using qualitative data. *J Racial Ethn Health Disparities* 10: 462-474. <https://doi.org/10.1007/s40615-022-01236-3>
55. Siu JYM, Cao Y, Shum DH (2022) Perceptions of and hesitancy toward COVID-19 vaccination in older Chinese adults in Hong Kong: a qualitative study. *BMC Geriatr* 22: 1-16. <https://doi.org/10.1186/s12877-022-03000-y>
56. Whitman KL, Jayakumar UM (2023) Structural competency: a framework for racial justice intervention in student affairs preparation and practice. *Educ Sci* 13: 75. <https://doi.org/10.3390/educsci13010075>
57. Zhang Q, Zhang R, Wu W, Liu Y, Zhou Y (2023) Impact of social media news on COVID-19 vaccine hesitancy and vaccination behavior. *Telemat Inform* 80: 101983. <https://doi.org/10.1016/j.tele.2023.101983>
58. Towfighi A, Boden-Albala B, Cruz-Flores S, El Husseini N, Odonkor CA, et al. (2023) Strategies to reduce racial and ethnic inequities in stroke preparedness, care, recovery, and risk factor control: a scientific statement from the American Heart Association. *Stroke* 54: e371-e388. <https://doi.org/10.1161/str.0000000000000437>
59. Downey MM, Thompson-Lastad A (2023) From apathy to structural competency and the right to health: an institutional ethnography of a maternal and child wellness center. *Health Hum Rights* 25: 23-38.
60. Jang M (2023) Why do people use telemedicine apps in the post-COVID-19 era? Expanded TAM with e-Health literacy and social influence. *Informatics* 10: 85. <https://doi.org/10.3390/informatics10040085>
61. Moujahid C, Turman JE Jr, Houradi H, Amahdar L (2024) Scoping review to identify social determinants of maternal health in Morocco. *Int J Soc Determinants Health Health Serv* 54: 151-162. <https://doi.org/10.1177/27551938231217589>
62. Enyinnaya JC, Anderson AA, Kelp NC, Long M, Duncan CG (2024) The social ecology of health beliefs and misinformation framework: examining the impact of misinformation on vaccine uptake through individual and sociological factors. *Vaccine* 42: 455-463. <https://doi.org/10.1016/j.vaccine.2024.01.001>
63. Pardo C, Watson B, Pinkhasov O, Afable A (2024) Social determinants of perinatal mental health. *Semin Perinatol* 48: 151946. <https://doi.org/10.1016/j.semperi.2024.151946>
64. Taylor M, Hilario CT, Ben-David S, Dimitropoulos G (2024) A social determinants perspective on adolescent mental health during the COVID-19 pandemic. *COVID* 4: 1561-1577. <https://doi.org/10.3390/covid4100108>
65. Richman AR, Schwartz AJ, Maness SB, Sanchez L, Torres E (2025) Exploring vaccine hesitancy, structural barriers, and trust in vaccine information among populations living in the rural Southern United States. *Vaccines* 13: 699. <https://doi.org/10.3390/vaccines13070699>
66. Oliver K, Raut A, Pierre S, Silvera L, Boulous A, et al. (2022) Factors associated with COVID-19 vaccine receipt at two integrated healthcare systems in New York City: a cross-sectional study of healthcare workers. *BMJ Open* 12: 1-10. <https://doi.org/10.1136/bmjopen-2021-053641>
67. Hildreth JE, Alcendor DJ (2021) Targeting COVID-19 vaccine hesitancy in minority populations in the US: implications for herd immunity. *Vaccines* 9: 489. <https://doi.org/10.3390/vaccines9050489>
68. Njoku A, Joseph M, Felix R (2021) Changing the narrative: structural barriers and racial and ethnic inequities in COVID-19 vaccination. *Int J Environ Res Public Health* 18: 9904. <https://doi.org/10.3390/ijerph18189904>
69. Shelton RC, Adsul P, Oh A (2021) Recommendations for addressing structural racism in implementation science: a call to the field. *Ethn Dis* 31: 357-364.
70. Abdul-Mutakabbir JC, Simiyu B (2022) Exploring the intersection of racism, antimicrobial resistance, and vaccine equity. *Antimicrob Steward Healthc Epidemiol* 2: 1-5. <https://doi.org/10.1017/ash.2022.283>
71. Abdul-Mutakabbir JC, Simiyu B, Walker RE, Christian RL, Dayo Y, et al. (2022) Leveraging Black pharmacists to promote equity in COVID-19 vaccine uptake within Black communities: a framework for researchers and clinicians. *J Am Coll Clin Pharm* 5: 887-893. <https://doi.org/10.1002/jac5.1669>
72. Dong L, Bogart LM, Gandhi P, Aboagye JB, Ryan S, et al. (2022) A qualitative study of COVID-19 vaccine intentions and mistrust in Black Americans: recommendations for vaccine dissemination and uptake. *PLoS One* 17: 1-19. <https://doi.org/10.1371/journal.pone.0268020>
73. Wilson RF, Kota KK, Sheats KJ, Luna-Pinto C, Owens C, et al. (2023) A scoping review of factors used to explain disparities in COVID-19 vaccination intentions and uptake among people of color—United States, December 1, 2020–April 30, 2021. *medRxiv*. <https://doi.org/10.1101/2023.01.12.23284499>
74. Jindal M, Hua MJ, Hartstein M, Martin M (2023) Trustworthiness, not trust: how systemic racism impacts COVID-19 vaccine receipt. *Health Equity* 7: 380-383. <https://doi.org/10.1089/heq.2022.0145>
75. Bishop-Royse J, Gutierrez-Kapheim M, Silva A, Lomahan S, Jindal M, et al. (2025) Trust and trustworthiness: considerations for COVID-19 vaccine receipt in the Chicago metropolitan area. *J Community Health* 50: 395-405. <https://doi.org/10.1007/s10900-024-01424-8>
76. Comfort M, Ali R, Lorrivick J, Hemberg J, Goode LSA, et al. (2025) The complexities of 'trust' in the context of COVID-19 vaccination choices among Black women in Alameda County, CA. *Crit Public Health* 35: 1-12. <https://doi.org/10.1080/09581596.2025.2486498>
77. Jones HA, Campbell JM, Benoit E, Cheng AL, Windsor L (2025) Medical trustworthiness and COVID-19: examining health beliefs and vaccine uptake in disinvested black communities. *J Racial Ethn Health Disparities* 2025: 1-13. <https://doi.org/10.1007/s40615-025-02742-w>
78. Kibongani Volet A, Scavone C, Catalán-Matamoros D, Capuano A (2022) Vaccine hesitancy among religious groups: reasons underlying this phenomenon and communication strategies to rebuild trust. *Front Public Health* 10: 1-3. <https://doi.org/10.3389/fpubh.2022.824560>
79. Begum T, Efstathiou N, Bailey C, Guo P (2024) Cultural and social attitudes towards COVID-19 vaccination and factors associated with vaccine acceptance in adults across the globe: a systematic review. *Vaccine* 42: 125993. <https://doi.org/10.1016/j.vaccine.2024.05.041>

80. Rus M, Grosej U (2021) Ethics of vaccination in childhood—a framework based on the four principles of biomedical ethics. *Vaccines* 9: 113. <https://doi.org/10.3390/vaccines9020113>
81. Addressing Vaccine Hesitancy Through Pediatric Immunization Training. American Medical Compliance. 2025. [<https://americanmedicalcompliance.com/general/addressing-vaccine-hesitancy/>] [Accessed September 14, 2026]
82. Goruntla N, Akanksha K, Lalithasudha K, Pinu V, Jinka D, et al. (2023) Prevalence and predictors of vaccine hesitancy among mothers of under-five children: a hospital-based cross-sectional study. *J Educ Health Promot* 12: 1-9. https://doi.org/10.4103/jehp.jehp_687_22
83. Hong S, Son Y, Lee M, Lee JH, Park J, et al. (2024) Association between sociodemographic factors and vaccine acceptance for influenza and SARS-CoV-2 in South Korea: nationwide cross-sectional study. *JMIR Public Health Surveill* 10: 1-16. <https://doi.org/10.2196/56989>
84. Thorakkattil SA, Abdulsalam S, Karattuthodi MS, Unnikrishnan MK, Rashid M, et al. (2022) COVID-19 vaccine hesitancy: the perils of peddling science by social media and the lay press. *Vaccines* 10: 1059. <https://doi.org/10.3390/vaccines10071059>
85. França AP, Domingues CMAS, Domingues RAS, Barata RB, da Glória Teixeira M, et al. (2025) Vaccine hesitancy in the vaccination of children in Brazil. *Vaccine* 53: 126905. <https://doi.org/10.1016/j.vaccine.2025.126905>
86. Faria LB, França AP, Moraes JCD, Donalisio MR (2025) Vaccination barriers in Brazil: exploring hesitancy, access, and missed opportunities in a cohort of children (2017–2018)—National Vaccination Coverage Survey results (2020–2021). *Vaccines* 13: 516. <https://doi.org/10.3390/vaccines13050516>
87. Pabon-Rodriguez FM (2024) Exploring social determinants of childhood vaccination based on the National Immunization Surveys Data. medRxiv. <https://doi.org/10.1101/2024.10.18.24315767>
88. Hill HA (2024) Decline in vaccination coverage by age 24 months and vaccination inequities among children born in 2020 and 2021—National Immunization Survey-Child, United States, 2021–2023. *MMWR Morb Mortal Wkly Rep* 73: 844-853. <https://doi.org/10.15585/mmwr.mm7338a3>
89. Prall SP (2024) Quantifiable cross-cultural research on medical mistrust is necessary for effective and equitable vaccination in low-and middle-income countries. *J Epidemiol Glob Health* 14: 1771-1777. <https://doi.org/10.1007/s44197-024-00319-0>
90. Decoteau CL, Sweet PL (2024) Vaccine hesitancy and the accumulation of distrust. *Soc Probl* 71: 1231-1246. <https://doi.org/10.1093/socpro/spad006>
91. Fisher CB, Gray A, Sheek I (2021) COVID-19 pediatric vaccine hesitancy among racially diverse parents in the United States. *Vaccines* 10: 31. <https://doi.org/10.3390/vaccines10010031>
92. Edwards JG, Cheston CC, Kelly CA, Brewster RC, Williams AR, et al. (2022) A community-based COVID-19 vaccine education initiative. *Pediatrics* 150: 1-8. <https://doi.org/10.1542/peds.2022-057374>
93. Koskan A, Larkey L, Todd M, Kim SW (2024) Protocol for a community-based digital storytelling pilot intervention to reduce Hispanic parents' vaccine hesitancy to immunize their children against COVID-19. *PLoS One* 19: 1-12. <https://doi.org/10.1371/journal.pone.0299787>
94. Enlow PT, Thomas C, Osorio AM, Lee M, Miller JM, et al. (2024) Community partnership to co-develop an intervention to promote equitable uptake of the COVID-19 vaccine among pediatric populations. *Del J Public Health* 10: 1-16. <https://doi.org/10.32481/djph.2024.03.06>
95. Andigema AS, Cyrielle NNT (2024) Addressing vaccine hesitancy: a review of factors contributing to vaccine refusal and effective communication strategies for promoting vaccine acceptance.
96. Collier AF, Schaefer KR, Uddin A, Noonan C, Dillard DA, et al. (2023) COVID-19 vaccination in urban American Indian and Alaska Native children: parental characteristics, beliefs and attitudes associated with vaccine acceptance. *Vaccine X* 15: 100406. <https://doi.org/10.1016/j.jvax.2023.100406>
97. Dhaliwal BK, Seth R, Thankachen B, Qaiyum Y, Closser S, et al. (2023) Leading from the frontlines: community-oriented approaches for strengthening vaccine delivery and acceptance. *BMC Proc* 17: 1-12. <https://doi.org/10.1186/s12919-023-00259-w>
98. Whelan SO, Moriarty F, Lawlor L, Gorman KM, Beamish J (2021) Vaccine hesitancy and reported non-vaccination in an Irish pediatric outpatient population. *Eur J Pediatr* 180: 2839-2847. <https://doi.org/10.1007/s00431-021-04039-6>
99. Hough-Telford C, Kimberlin DW, Aban I, Hitchcock WP, Almquist J, et al. (2016) Vaccine delays, refusals, and patient dismissals: a survey of pediatricians. *Pediatrics* 138: e20162127. <https://doi.org/10.1542/peds.2016-2127>
100. Cag Y, Al Madadha ME, Ankarali H, Cag Y, Onder KD, et al. (2022) Vaccine hesitancy and refusal among parents: an international ID-IRI survey. *J Infect Dev Ctries* 16: 1081-1088. <https://doi.org/10.3855/jidc.16085>
101. Olusanya OA, Masters NB, Zhang F, Sugerman DE, Carter RJ, et al. (2024) Sociodemographic trends and correlation between parental hesitancy towards pediatric COVID-19 vaccines and routine childhood immunizations in the United States: 2021–2022 National Immunization Survey-Child COVID module. *Vaccines* 12: 495. <https://doi.org/10.3390/vaccines12050495>