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Addressing Vaccine Hesitancy in the Age of Measles Resurgence: A Mini-Review

Sallam M[1,2]*, Al-Baidhani S[1] and Sallam M[3-6]

[1]Department of Pathology, Microbiology and Forensic Medicine, School of Medicine, The University of Jordan, Jordan

[2]Department of Clinical Laboratories and Forensic Medicine, Jordan University Hospital, Amman, Jordan

[3]Department of Pharmacy, Mediclinic Parkview Hospital, United Arab Emirates

[4]Department of Management, Mediclinic Parkview Hospital, United Arab Emirates

[5]Department of Management, School of Business, International American University, USA

[6]College of Medicine, Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU), United Arab Emirates

***Corresponding author:** Malik Sallam. MD, PhD. Department of Clinical Laboratories and Forensic Medicine, Jordan University Hospital, Queen Rania Al-Abdullah Street-Aljubeiha/P.O. Box: (13046), Amman, Jordan, Email: malik.sallam@ju.edu.jo

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Abstract

In 2025, the United States is experiencing its most significant measles resurgence since the disease was declared eliminated in 2000. As of June 2025, the Centers for Disease Control and Prevention (CDC) reported 1,168 confirmed cases across 34 jurisdictions, with 96% of cases occurring in unvaccinated individuals or those with unknown vaccination status. This surge correlates with a decline in measles-mumps-rubella (MMR) vaccination coverage, which has fallen below the 95% threshold necessary for herd immunity in many communities. This narrative-based mini-review aimed to examine the complex drivers of vaccine hesitancy, emphasizing the role of misinformation and conspiracy theories propagated through digital platforms. These narratives exploit cognitive biases and erode public trust in health institutions, leading to parental vaccine hesitancy and decreased vaccine uptake. The review incorporates behavioral science insights to understand how social identity, risk perception, and information processing contribute to vaccine refusal. Effective interventions must address these psychological and sociocultural factors. Strategies include empathetic communication by healthcare providers, culturally tailored public health messaging, and community engagement initiatives that involve trusted local leaders. Additionally, implementing "pre-bunking" techniques—proactively exposing individuals to refuted misinformation—can build cognitive resilience against false narratives. To counteract the spread of vaccine misinformation, collaboration between public health authorities and digital platforms is essential to monitor and mitigate the dissemination of false information. Policy measures should also consider tightening exemption criteria to maintain high vaccination coverage. Rebuilding public trust in vaccines requires a comprehensive approach that combines scientific evidence with culturally sensitive communication and community involvement. Such efforts are critical to safeguarding public health and preventing the resurgence of vaccine-preventable diseases like measles.

Keywords: Vaccine Hesitancy; Measles Resurgence; Misinformation; Childhood Immunization; Behavioral Interventions; Public Trust

Abbreviations

CDC: Centers for Disease Control and Prevention; MMR: Measles-Mumps-Rubella; WHO: World Health Organization's.

Introduction

Vaccination stands as one of the most valued achievements in modern science—unmatched in its proven role to prevent infectious diseases, save lives, and reduce health care burdens and costs [1-3]. The impact of vaccination can be appreciated by the sustained absence of once-prevalent infectious diseases such as the global eradication of smallpox and the near-elimination of poliomyelitis exemplifying vaccination success [4]. Yet, as declining immunization rates now precipitate the return of measles in the U.S., history reminds us that progress, when neglected, is rarely permanent [5].

As measles—a disease declared eliminated in the U.S. in 2000—re-emerges in the U.S. among other countries [6-10], we are reminded that vaccination success can wither under the weight of misinformation and conspiracy ideas [11-14]. A significant threat to the success of vaccination programs is vaccine hesitancy; a phenomenon that has shifted from the margins to the mainstream, driven by digital misinformation, ideological polarization, and complex sociocultural dynamics [15-21].

At its core, vaccine hesitancy might be viewed as a manifestation of a corrosion of trust in institutions, science, and collective responsibility [20,22]. Nowhere is this more dangerous than in childhood vaccination, where parental decisions ripple far beyond the individual to affect the health and well-being of entire communities [23-25].

As of June 2025, the Centers for Disease Control and Prevention (CDC) reports 1,168 measles cases across 34 U.S. jurisdictions, most in children, most among the unvaccinated [26,27]. The culprit in this outbreak was not viral mutation, nor international travel, but a collapse in vaccination coverage [11,28]. Thus, this narrative style mini-review aimed to examine the roots and reach of vaccine hesitancy with an interdisciplinary emphasis [29,30]. Specifically, the review aimed to dissect the misinformation milieu, and explore behavioral interventions grounded not in abstraction, but in cognitive psychology and sociocultural engagement.

The Epidemiologic Backdrop: Measles Resurgence and the Consequences of Vaccine Hesitancy

Measles is among the most contagious pathogens known to humankind, with a basic reproduction number (R0) as high as 18 [31]. Thus, measles requires vaccination coverage of over 95% to maintain herd immunity [32]. However, CDC data from 2023 and 2024 show that measles, mumps, and rubella (MMR) vaccine coverage among kindergartners has declined from 94.5% pre-pandemic to 90.3% in 2023, falling even lower in states with philosophical or religious exemptions [33].

These numbers, often dismissed as marginal, are in fact epidemiologically catastrophic as shown in a recent modelling study by Kiang et al. that estimated 11.1 million cases of measles over 25 years in a scenario with a 10% decline in MMR vaccination [34].

In early 2025, an outbreak in southern Texas spread among 74 unvaccinated children, many of whom were below school age [35]. This outbreak was part of a larger resurgence centered in Gaines County, where low vaccination rates—particularly among certain communities—contributed to rapid transmission [36-38].

By May 2025, Texas reported over 700 measles cases, with two confirmed deaths among unvaccinated school-aged children [26]. Notably, 96% of those infected were unvaccinated or had unknown vaccination status, underlining the critical importance of maintaining high immunization coverage to prevent such outbreaks [35]. National immunization data in the U.S. indicated that MMR vaccine coverage among U.S. kindergartners declined to 93.1% in 2022–2023, with at least 10 states falling below 90% [33]. This reduced childhood vaccine coverage in the U.S. reflects COVID-19 pandemic-related disruptions as well as a sustained rise in vaccine hesitancy [39-42]. This resurgence of measles in the U.S. illustrates how even modest declines in vaccine coverage—driven in large part by hesitancy—can rapidly erode herd immunity and trigger severe, preventable outbreaks of infectious diseases [43-45].

Vaccine Hesitancy: Psychological, Sociocultural, and Epistemic Foundations of a Growing Public Health Threat

Vaccine hesitancy is often the product of a rational decision-making process distorted by misinformation, socio-cultural influence, and reduced trust [17,19,46,47]. Understanding vaccine hesitancy as a phenomenon requires comprehensive frameworks that assess the psychological, social, economic, and cultural factors as shown in Figure 1 [48-54]. The World Health Organization's (WHO) 3C model—Complacency, Convenience, and Confidence—offers a helpful framework [20]. Among these factors, it is the collapse of confidence that particularly undermines childhood immunization [55,56].

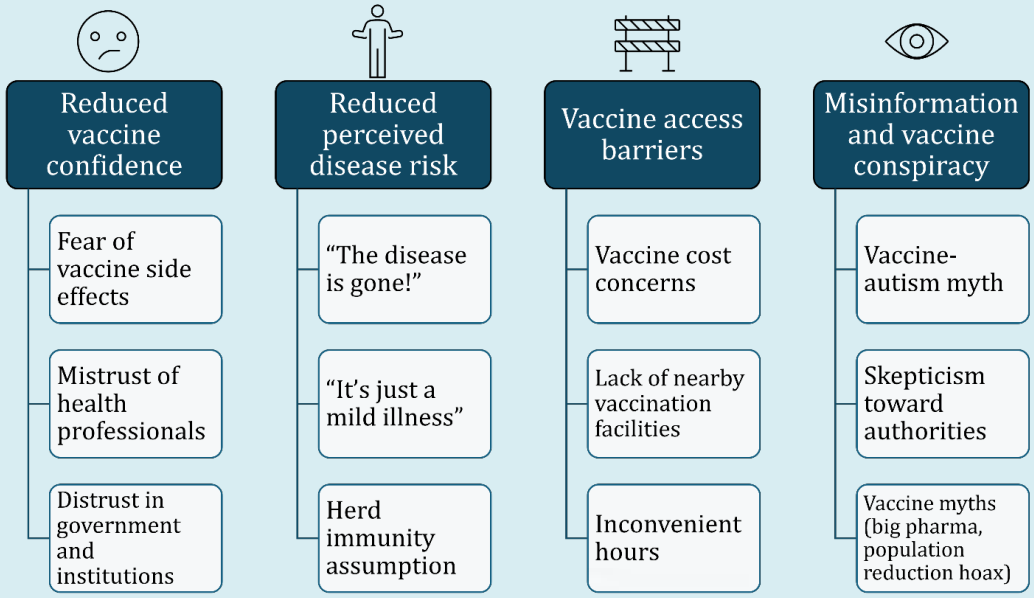

Figure 1: The psychological, social, economic, and cultural factors associated with vaccination hesitancy.

Complacency thrives in the shadow of success in infectious disease containment as follows. In high-income countries, diseases such as measles, diphtheria, and poliomyelitis have become distant memories, their devastation known only through textbooks or grandparents' stories [57,58]. This absence of direct experience has shifted parental concern away from disease prevention and toward vaccine side effects despite being rare or unfounded [23,59,60]. The psychological calculation is understandable; when the perceived threat of disease disappears, any risk, however minimal, appears excessive [50]. Yet this complacency ignores that the very absence of these diseases is the direct result of sustained population immunity achieved through vaccination coverage [61].

In high-income countries, where access and infrastructure rarely present obstacles, convenience plays only a modest role in vaccine uptake as opposed to low- and middle-income settings [62]. The true challenge lies elsewhere—more insidious, more potent. The surge in vaccine hesitancy is not born from ignorance but from a distortion of information channels [63-66]. Social media and digital platforms such as YouTube, TikTok, and Facebook facilitated the spread of misinformation [67-69]. For example, complex immunological concepts, which demand intellectual engagement and deep understanding, were flattened into viral content that is emotionally charged and dangerously persuasive in these platforms [70-73]. The power of a single mother on TikTok claiming that her child regressed after a routine vaccination far outweighs the weight of a thousand peer-reviewed papers in the court of public opinion [74]. These narratives do not wear the anti-science costume but cloak themselves in intuition, maternal instinct, and a compelling desire to protect children [75]. And therein lies their insidious strength—they do not reject science outright; they supplant it with something that feels more immediate and real [76,77].

Beneath the storm of misinformation lies a deeper crisis; that of confidence. Confidence in the institutions meant to safeguard public health, science, medicine, and government has eroded [78-80]. When authorities deliver inconsistent messages, or when they appear beholden to political agendas or pharmaceutical interests, public trust fractures [81-83]. This was evident during the COVID-19 pandemic, where shifting guidance on masks and vaccines—however rooted in evolving evidence—appeared to many as arbitrariness or deceit [13,84,85]. In that epistemic vacuum, conspiracy theories did not merely proliferate—they flourished, offering not just answers, but meaning, identity, and control [86-88].

Now, we consider the case of the measles outbreaks in the U.S.—a disease once nearly eradicated, rebounding in communities where distrust of vaccines aggravates [28,89]. The distrust can be attributed to failure of science communication, engagement, of credibility [90-92]. Facts alone will not suffice. To restore public confidence, we must acknowledge the human dimension of this challenge. Transparency must replace opacity; consistency must replace confusion; humility must replace paternalism [56,93]. To prevail, health professionals and scientists must engage as partners and build the trust upon which all public

health ultimately rests [94]. In sum, vaccine hesitancy is not a knowledge deficit but a complex problem of confidence, fuelled by misinformation and eroded trust. This requires scientific refutation as well as empathetic, culturally aware engagement.

The Misinformation Milieu: Digital Amplification, Narrative Power, and the Crisis of Public Trust

In the current peculiar era of scientific abundance and digital chaos, we confront a phenomenon no less formidable than the viruses we once feared; a misinformation pandemic and the so-called "infodemic" [95-98]. The infectious agents of the infodemic are not microbes but memes; its vectors are not travelers, but algorithms [99,100]. The anti-vaccine movement, long relegated to the margins of public discourse, has mutated [101]. It is no longer isolated, but now it functions as a transnational, networked efforts [102-104]. The anti-vaccine movement use social platforms with manipulation of narrative, targeting the very concept of public trust [105].

It is important to state that vaccine resistance is no novel phenomenon post-COVID-19 pandemic [106]. The suspicion was always there—embedded in political ideology, religious doctrine, and communal memory [107]. What is different now is not the existence of vaccine resistance, but the machinery that amplifies it; the global, instantaneous reach of digital platforms [15,75]. In the contemporary digital environment, vaccine misinformation has been amplified by algorithmic systems that prioritize engagement over accuracy, resulting in the widespread dissemination of emotionally charged content [71,108]. These narratives frequently center on alleged adverse effects of vaccines, perceived infringements on personal autonomy, and unverified claims of collusion between governmental agencies and pharmaceutical companies [77,109]. Their persuasive power lies not in evidentiary rigor, but in their ability to evoke strong emotional responses through anecdotal storytelling, visual immediacy, and rhetorical simplicity [110-112]. This mode of vaccine information communication stands in stark contrast to the deliberative processes of scientific consensus, which require systematic investigation and deep insightful interpretation [74].

The differential appeal of these competing forms of knowledge production creates an asymmetry. While scientific evidence is inherently complex and often probabilistic, misinformation offers accessible, definitive, and emotionally resonant explanations, particularly in moments of societal uncertainty [113,114]. These narratives operate as cognitive heuristics—simplified mental models that provide clarity in the face of ambiguity [115,116]. Importantly, vaccine hesitancy seldom arises in isolation. It is frequently embedded within broader worldviews characterized by skepticism toward pharmaceutical industry motives, concern about government overreach, and mistrust of mainstream media [117-119]. In this context, parental refusal of vaccines including the MMR vaccines may be better understood as an expression of a deeper, systemic disillusionment with public institutions [47,60,120]. This reframing has critical implications for public health strategy.

Effective responses to vaccine misinformation cannot rely solely on the provision of accurate information [121]. While fact-based counter-messaging remains essential, it must be embedded within a broader framework that addresses the social, historical, and psychological dimensions of trust [122]. Research has shown that vaccine acceptance is strongly associated with perceived credibility and alignment of values than with knowledge alone [123,124]. Therefore, rebuilding vaccine confidence requires an approach that includes transparent communication, consistency in public health messaging, and sustained, culturally sensitive engagement with communities [125,126]. As measles re-emerges in settings where it was once controlled, the need to restore confidence in vaccination becomes urgent [127,128]. Public health communication must evolve to encompass strategies that prioritize empathy, credibility, and partnership [129]. Addressing vaccine hesitancy in the digital age necessitates an interdisciplinary innovative response—one that integrates epidemiology with behavioral science, strategic communication, and ethical public engagement to rebuild the fractured trust upon which effective immunization programs depend [130-132]. Combating vaccine misinformation in the digital age demands more than fact-checking; it requires a trust-centered, knowledge-based public health response that is interdisciplinary, emotionally intelligent, and grounded in community engagement.

Understanding and Countering Vaccine Hesitancy: Behavioral, Social, and Ethical Pathways to Rebuilding Trust

The resistance to vaccination, often mistaken for ignorance or defiance, is in fact deeply rooted in the human mind [66]. It is not simply that people misunderstand the science; rather, the way our cognitive system interprets risk makes such misunderstandings almost inevitable [133,134]. Behavioral science offers crucial insight here, revealing how ancient heuristics, once adaptive for survival, now skew perceptions in ways that hinder public health [135,136]. For example, the availability heuristic can play a role where a rare vaccine side effect (e.g., an episode of anaphylaxis) is magnified in the public imagination once dramatized in media or shared virally on social platforms [137-139]. It acquires psychological weight disproportionate to its statistical rarity. A single case, especially when framed with emotion and

imagery, overwhelms a thousand safe vaccinations in the mind of a concerned parent [140,141].

Closely related is the omission bias, the tendency to prefer harms caused by inaction over those caused by action [142]. Many parents would rather accept the risk of measles than feel personally responsible for a perceived vaccine injury, however unlikely [141]. In their calculation, doing nothing feels safer than doing something—even if the science strongly suggests otherwise [143,144]. Layered upon this is confirmation bias; once an individual has embraced the belief that "vaccines are dangerous," they become selectively attentive to information that supports that belief and dismissive of anything that contradicts it [145].

On the other hand, vaccine hesitancy is not merely a cognitive distortion; it is also a social phenomenon [19]. Beliefs are rarely formed in isolation. They are constructed and sustained within communities, shaped by cultural identity, religious values, and political ideology [146]. In some cases, rejecting vaccines is less about fear and more about belonging—an expression of solidarity with a particular group or worldview [147]. This is why correcting misinformation cannot rely on facts alone. It must also speak to the social value of belief [148,149]. Addressing these challenges requires an informed approach that blends behavioral insights with biomedical evidence as shown in (Figure 2) [130,150].

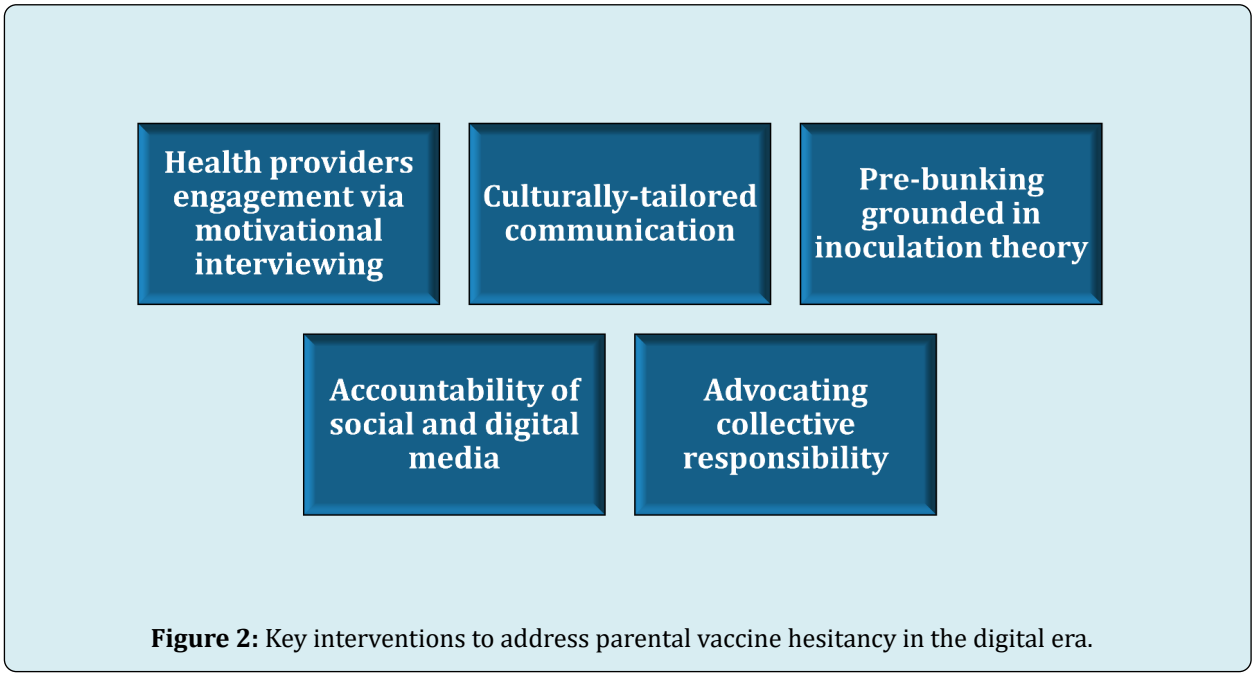

Figure 2: Key interventions to address parental vaccine hesitancy in the digital era.

First, healthcare providers' communication should be reimagined, since the recommendation of a trusted healthcare professional is a predictor of vaccine acceptance [151]. Yet when that advice is delivered in a top-down, authoritarian manner it often backfires [78]. Studies increasingly support the effectiveness of motivational interviewing, a patient-centered communication strategy that emphasizes empathy, curiosity, and collaborative decision-making [152-155]. When providers listen without judgment and engage parents in a narrative dialogue, they foster trust rather than resistance.

Second, cultural competence must become the cornerstone of vaccine messaging. One-size-fits-all approaches are ineffective in a pluralistic society. Interventions must be tailored to reflect the language, values, and belief systems of specific communities via community-led, culturally embedded message delivery as a durable path forward [156]. Third, pre-bunking grounded in inoculation theory should be invested in [157]. Just as vaccines introduce harmless antigens to prime the immune system, exposing individuals to weakened forms of misinformation can build psychological resilience [158]. Fourth, digital platforms must be held accountable. Current efforts at content moderation are sporadic and insufficient. While some platforms demote or label anti-vaccine content, enforcement is uneven, and algorithms continue to prioritize engagement over accuracy [65,159]. Public health must advocate for algorithmic transparency, and must also proactively seed social media with engaging, accurate narratives that compete with misinformation on equal environment [75,160]. Finally, it is important to contend with the legal and ethical dimensions of vaccine policy. The tension between individual liberty and communal health is longstanding, but in the context of infectious disease, it is ethically untenable to treat vaccination as a purely personal choice [161-163]. In the U.S.,

the States with lenient exemption laws consistently exhibit lower vaccination rates and higher outbreak incidence [164,165]. Respect for autonomy must be balanced with the collective right to health [166]. Vaccine refusal, unlike most other health decisions, endangers others—especially those who cannot be vaccinated for medical reasons [167]. Public health, therefore, must not only inform—it must protect. In this moment of measles resurgence and rising skepticism, the public health tools must be as sophisticated as the challenges faced. The response to vaccine hesitancy must be interdisciplinary, evidence-based, and rooted in a profound understanding of the human condition. Only then can we rebuild the trust on which the success of all immunization efforts depends.

Conclusion

We are living through a paradox; at a time of unparalleled scientific advancement, trust in science is declining. The reemergence of measles in 2025 in the U.S. is not a failure of immunology but of sociology and communication. Vaccine hesitancy, driven by misinformation, now represents one of the greatest threats to child health in the developed world. Public health must evolve. This requires a shift from information transmission to meaning-making, from paternalism to partnership, and from reactive to anticipatory communication. Only through a fusion of science, empathy, and cultural literacy can we hope to rebuild the public trust upon which vaccination depends.

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Conflict of interest

The authors declare they have no competing interests.

Author contributions

Conceptualization: Malik Sallam
Data Curation: Malik Sallam, Saja Al-Baidhani, Mohammed Sallam
Investigation: Malik Sallam, Saja Al-Baidhani, Mohammed Sallam
Methodology: Malik Sallam, Saja Al-Baidhani, Mohammed Sallam
Project administration: Malik Sallam
Supervision: Malik Sallam
Visualization: Malik Sallam
Writing – Original Draft Preparation: Malik Sallam
Writing – Review & Editing: Malik Sallam, Saja Al-Baidhani, Mohammed Sallam

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Availability of Data

The data presented in this study are available in the References section.

Further Disclosure

None.

References

1. World Health Organization (WHO) (2025) Global immunization efforts have saved at least 154 million lives over the past 50 years. WHO.
2. Nandi A, Shet A (2020) Why vaccines matter: understanding the broader health, economic, and child development benefits of routine vaccination. Hum Vaccin Immunother 16(8): 1900-1904.
3. Rodrigues CMC, Plotkin SA (2020) Impact of Vaccines; Health, Economic and Social Perspectives. Front Microbiol 11: 1526.
4. Montero DA, Vidal RM, Velasco J, Carreno LJ, Torres JP, et al. (2023) Two centuries of vaccination: historical and conceptual approach and future perspectives. Front Public Health 11: 1326154.
5. Mathis AD, Raines K, Filardo TD, Wiley N, Leung J, et al. (2025) Measles Update - United States, January 1-April 17, 2025. MMWR Morb Mortal Wkly Rep 74(14): 232-238.
6. Avila-Aguero ML, Camacho-Badilla K, Ulloa-Gutierrez R (2015) Measles outbreaks: what does it represent for the elimination strategy in the region of the Americas? A call for the action. Expert Rev Vaccines 14(8): 1043-1045.
7. Centers for Disease Control and Prevention (CDC) (2004) Progress toward measles elimination--region of the Americas, 2002-2003. MMWR Morb Mortal Wkly Rep 53(14): 304-306.

8. Varner C (2025) Pregnant and bearing the burden of measles outbreaks in Canada. Cmaj 197(22): E627-E628.

9. Errichiello G, Tengattini F, Gioacchini S, Leva MFD, Graziano S, et al. (2025) Subacute sclerosing panencephalitis as a re-emerging condition due to low vaccination coverage: a case-series. Ital J Pediatr 51(1): 173.

10. Winter AK, Fox SJ (2025) Measles is resurging in the Americas and the world is watching. Nat Rev Microbiol.

11. Kuppalli K, Perl TM (2025) Measles in Texas: waning vaccination and a stark warning for public health. Lancet Infect Dis 25(5): 485-487.

12. Sallam M, Kareem N, Alkurtas M (2024) The negative impact of misinformation and vaccine conspiracy on COVID-19 vaccine uptake and attitudes among the general public in Iraq. Prev Med Rep 43: 102791.

13. Zimmerman T, Shiroma K, Fleischmann KR, Bo Xie b, Jia C, et al. (2023) Misinformation and COVID-19 vaccine hesitancy. Vaccine 41(1): 136-144.

14. Broniatowski DA, Jamison AM, Johnson NF, Velasquez N, Leahy R, et al. (2020) Facebook Pages, the "Disneyland" Measles Outbreak, and Promotion of Vaccine Refusal as a Civil Right, 2009-2019. Am J Public Health 110(S3): S312-S318.

15. Garett R, Young SD (2021) Online misinformation and vaccine hesitancy. Transl Behav Med 11(12): 2194-2199.

16. Jennings W, Stoker G, Bunting H, Valgarosson VO, Gaskell J, et al. (2021) Lack of Trust, Conspiracy Beliefs, and Social Media Use Predict COVID-19 Vaccine Hesitancy. Vaccines (Basel) 9(6): 593.

17. Keselman A, Smith CA, Wilson AJ, Leroy G, Kaufman DR (2022) Cognitive and Cultural Factors That Affect General Vaccination and COVID-19 Vaccination Attitudes. Vaccines (Basel) 11(1): 94.

18. Wróblewski M, Meler A (2024) Political polarization may affect attitudes towards vaccination. An analysis based on the European Social Survey data from 23 countries. Eur J Public Health 34(2): 375-379.

19. Dubé E, Laberge C, Guay M, Bramadat P, Roy R, et al. (2013) Vaccine hesitancy: an overview. Hum Vaccin Immunother 9(8): 1763-1773.

20. MacDonald NE (2015) Vaccine hesitancy: Definition, scope and determinants. Vaccine 33(34): 4161-4164.

21. Sallam M (2021) COVID-19 Vaccine Hesitancy Worldwide: A Concise Systematic Review of Vaccine Acceptance Rates. Vaccines (Basel) 9(2): 160.

22. Welch EW, Johnson TP, Chen T, Ma J, Islam S, et al. (2023) How Scientists View Vaccine Hesitancy. Vaccines (Basel) 11(7): 1208.

23. Gowda C, Dempsey AF (2013) The rise (and fall?) of parental vaccine hesitancy. Hum Vaccin Immunother 9(8): 1755-1762.

24. Smith SE, Sivertsen N, Lines L, De Bellis A (2023) Pushed to the Fringe - The Impact of Vaccine Hesitancy on Children and Families. Compr Child Adolesc Nurs 46(4): 262-276.

25. Damnjanović K, Graeber J, Ilić S, Lam WY, Lep Z, et al. (2018) Parental Decision-Making on Childhood Vaccination. Front Psychol 9: 735.

26. Centers for Disease Control and Prevention (CDC) (2025) Measles Cases and Outbreaks. CDC.

27. Taylor L, Measles (2025) 31 US states affected as WHO warns of global rise. Bmj 389: r1083.

28. Bednarczyk RA, Sundaram ME (2025) The Continued Risk of Measles Outbreaks in the United States Resulting From Suboptimal Vaccination Coverage. Public Health Reports.

29. Motevalli M (2025) Comparative Analysis of Systematic, Scoping, Umbrella, and Narrative Reviews in Clinical Research: Critical Considerations and Future Directions. International Journal of Clinical Practice.

30. Ferrari R (2015) Writing narrative style literature reviews. Medical Writing 24(4): 230-235.

31. Guerra FM, Bolotin S, Lim G, Heffernan J, Deeks SL, et al. (2017) The basic reproduction number (R(0)) of measles: a systematic review. Lancet Infect Dis 17(12): e420-e428.

32. Gambrell A, Sundaram M, Bednarczyk RA (2022) Estimating the number of US children susceptible to measles resulting from COVID-19-related vaccination coverage declines. Vaccine 40(32): 4574-4579.

33. Seither R, Yusuf OB, Dramann D, Calhoun K, Kasujja AM, et al. (2024) Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten - United States, 2023-24 School Year. MMWR Morb Mortal Wkly Rep 73(41): 925-932.

34. Kiang MV, Bubar KM, Maldonado Y, Hotez PJ, Lo NC (2025) Modeling Reemergence of Vaccine-Eliminated

Infectious Diseases Under Declining Vaccination in the US. Jama.

35. World Health Organization (WHO) (2025) Disease Outbreak News: Measles - United States of America. WHO.

36. Furlow B (2025) Measles outbreak challenges Trump's public health vision. Lancet Respir Med.

37. Dyer O (2025) Measles: Texas outbreak spreads to New Mexico. Bmj 388: r357.

38. Hulland EN, Charpignon ML, Berkane T, Majumder MS (2025) Underimmunisation during the 2025 Texas measles outbreak. Lancet Infect Dis 25(6): 607-609.

39. Hill HA, Yankey D, Elam-Evans LD, Mu Y, Chenet M, al. (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(38): 844-853.

40. Cagnotta C, Lettera N, Cardillo M, Pirozzi D, Matamoros DC, et al. (2025) Parental vaccine hesitancy: Recent evidences support the need to implement targeted communication strategies. J Infect Public Health 18(2): 102648.

41. Ruiz JB, Bell RA (2022) Parental COVID-19 Vaccine Hesitancy in the United States. Public Health Rep 137(6): 1162-1169.

42. Phadke VK, Bednarczyk RA, Salmon DA, Omer SB (2016) Association Between Vaccine Refusal and Vaccine-Preventable Diseases in the United States: A Review of Measles and Pertussis. Jama 315(11): 1149-1158.

43. Lewandowsky S (2025) Public health suffers when those in power dismiss knowledge. Science 388: 6751.

44. Hewitt GL, Obeid A, Fischer PR (2025) Measles outbreaks in the United States in 2025: Practice, policy, and the canary in the coalmine. New Microbes New Infect 65: 101591.

45. O'Leary K (2025) Measles to become endemic in the USA if vaccination rates continue to fall. Nat Med: 35.

46. Larson HJ, Gakidou E, Murray CJL (2022) The Vaccine-Hesitant Moment. N Engl J Med 387(1): 58-65.

47. Nurmi J, Jaakola J (2023) Losing trust: Processes of vaccine hesitancy in parents' narratives. Soc Sci Med 331: 116064.

48. Rizzo M, Gattino S, Trombetta T, Calandri E, De Piccoli N (2024) Psychosocial dimensions of vaccine hesitancy: A systematic review. Journal of Community Psychology 52(7): 857-876.

49. Krastev S, Krajden O, Vang ZM, Juarez FPG, Solomonova E, et al. (2023) Institutional trust is a distinct construct related to vaccine hesitancy and refusal. BMC Public Health 23(1): 2481.

50. Betsch C, Schmid P, Heinemeier D, Korn L, Holtmann C, et al. (2018) Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. PLoS One 13(12): e0208601.

51. Geiger M, Rees F, Lilleholt L, Santana AP, Zettler I, et al. (2022) Measuring the 7Cs of Vaccination Readiness. Hogrefe Publishing 38: 261-269.

52. Vlasak D, Dinero RE, Roitman NA (2023) Vaccine hesitancy at both ends of the socioeconomic spectrum: a new paradigm for understanding the role of systemic inequity. Journal of Public Health and Emergency 7: 1-7.

53. Mahameed H, Al-Mahzoum K, AlRaie LA, Aburumman R, Al-Naimat H, et al. (2023) Previous Vaccination History and Psychological Factors as Significant Predictors of Willingness to Receive Mpox Vaccination and a Favorable Attitude towards Compulsory Vaccination. Vaccines (Basel) 11(5): 897.

54. Mohammed I, Widome R, Kuramoto S, Muscoplat MH, Searle KM (2025) Racial, Ethnic, and Sociodemographic Disparities in the Uptake of the MMR Vaccine Among Minnesota Children. Behav Med pp: 1-11.

55. Eagan RL, Larson HJ, de Figueiredo A (2023) Recent trends in vaccine coverage and confidence: A cause for concern. Hum Vaccin Immunother 19(2): 2237374.

56. Badur S, Ota M, Öztürk S, Adegbola R, Dutta A (2020) Vaccine confidence: the keys to restoring trust. Hum Vaccin Immunother 16(5): 1007-1017.

57. Kasstan-Dabush B, Flores SA, Easton D, Bhatt A, Saliba V (2024) Polio, public health memories and temporal dissonance of re-emerging infectious diseases in the global north. Soc Sci Med 357: 117196.

58. Labos C (2024) Measles are back; blame complacency. Montreal Gazette, Canada.

59. Milionis C, Ilias I, Tselebis A, Pachi A (2023) Psychological and Social Aspects of Vaccination Hesitancy-Implications for Travel Medicine in the Aftermath of the COVID-19 Crisis: A Narrative Review. Medicina (Kaunas) 59: 10.

60. Barakat M, Abdaljaleel M, Atawneh N, Alkhazaleh R, Aburumman D, et al. (2023) Pervasive Parental Hesitancy and Resistance towards Measles Rubella Vaccination in Jordan. Vaccines (Basel) 11(11): 1672.

61. Galagali PM, Kinikar AA, Kumar VS (2022) Vaccine Hesitancy: Obstacles and Challenges. Current Pediatrics Reports 10(4): 241-248.

62. Fox AM, Choi Y, Lin L (2023) Substantial Disparities In COVID-19 Vaccine Uptake and Unmet Immunization Demand in Low- And Middle-Income Countries. Health Aff (Millwood) 42(12): 1697-1705.

63. Bianchi FP, Tafuri S (2023) Spreading of misinformation on mass media and digital platforms regarding vaccines. A systematic scoping review on stakeholders, policymakers, and sentiments/behavior of Italian consumers. Hum Vaccin Immunother 19(2): 225939.

64. Gao J, Raza SH, Yousaf M, Shah AA, Hussain I, et al. (2023) How Does Digital Media Search for COVID-19 Influence Vaccine Hesitancy? Exploring the Trade-off between Google Trends, Infodemics, Conspiracy Beliefs and Religious Fatalism. Vaccines (Basel) 11(1): 114.

65. Roman A, Recio M, Gonzalez MV (2023) Influence of Media Information Sources on Vaccine Uptake: The Full and Inconsistent Mediating Role of Vaccine Hesitancy. Computation 11(10): 208.

66. Fulawka K, Hertwig R, Pachur T (2024) COVID-19 vaccine refusal is driven by deliberate ignorance and cognitive distortions. NPJ Vaccines 9(1): 167.

67. Muhammed TS, Mathew SK (2022) The disaster of misinformation: a review of research in social media. Int J Data Sci Anal 13(4): 271-285.

68. Skafle I, Hansen A, Quintana DS, Wynn R, Gabarron E (2022) Misinformation About COVID-19 Vaccines on social media: Rapid Review. J Med Internet Res 24(8): e37367.

69. Alsanafi M, Salim NA, Sallam M (2023) Willingness to get HPV vaccination among female university students in Kuwait and its relation to vaccine conspiracy beliefs. Hum Vaccin Immunother 19(1): 2194772.

70. Domenico G, Nunan D, Pitardi V (2022) Marketplaces of Misinformation: A Study of How Vaccine Misinformation Is Legitimized on Social Media. Journal of Public Policy & Marketing 41(4): 319-335.

71. Sallam M, Mahzoum K, Alkandari L, Shabakouh A, Ali A, et al. (2025) Descriptive analysis of TikTok content on vaccination in Arabic. AIMS Public Health 12(1): 137-161.

72. Abdaljaleel M, Barakat M, Mahafzah A, Hallit R, Hallit S, et al. (2024) TikTok content on measles-rubella vaccine in Jordan: A cross-sectional study highlighting the spread of vaccine misinformation. Narra J 4(2): e877.

73. Lee SK, Sun J, Jang S, Connelly S (2022) Misinformation of COVID-19 vaccines and vaccine hesitancy. Scientific Reports 12(1): 13681.

74. Ali K, Li C, Zain K, Muqtadir SA (2022) The effects of emotions, individual attitudes towards vaccination, and social endorsements on perceived fake news credibility and sharing motivations. Computers in Human Behavior 134: 107307.

75. Rodrigues F, Ziade N, Jatuworapruk K, Uribe CV, Khursheed T, et al. (2023) The Impact of Social Media on Vaccination: A Narrative Review. J Korean Med Sci 38(40): e326.

76. Yang Z, Luo X, Jia H (2021) Is It All a Conspiracy? Conspiracy Theories and People's Attitude to COVID-19 Vaccination. Vaccines (Basel) 9(10): 1051.

77. Taubert F, Hoeven G, Schmid P, Gerdes P, Betsch C (2024) Conspiracy narratives and vaccine hesitancy: a scoping review of prevalence, impact, and interventions. BMC Public Health 24(1): 3325.

78. Bardosh K, Figueiredo A, Arie R, Jamrozik E, Doidge J, et al. (2022) The unintended consequences of COVID-19 vaccine policy: why mandates, passports and restrictions may cause more harm than good. BMJ Glob Health 7(5).

79. Souvatzi E, Katsikidou M, Arvaniti A, Plakias S, Tsiakiri A, et al. (2024) Trust in Healthcare, Medical Mistrust, and Health Outcomes in Times of Health Crisis: A Narrative Review. Societies 14(12): 269.

80. Halma MTJ, Guetzkow J (2023) Public Health Needs the Public Trust: A Pandemic Retrospective. BioMed 3(2): 256-271.

81. Singh Y, Eisenberg MD, Sood N (2023) Factors Associated With Public Trust in Pharmaceutical Manufacturers. JAMA Netw Open 6(3): e233002.

82. Platt JE, Jacobson PD, Kardia SLR (2018) Public Trust in Health Information Sharing: A Measure of System Trust. Health Serv Res 53(2): 824-845.

83. Sallam M, Al-Sanafi M, Sallam M (2022) A Global Map of COVID-19 Vaccine Acceptance Rates per Country: An Updated Concise Narrative Review. J Multidiscip Healthcare 15: 21-45.

84. Escandón K, Rasmussen AL, Bogoch II, Murray EJ, Escandon K, et al. (2021) COVID-19 false dichotomies and a comprehensive review of the evidence regarding public health, COVID-19 symptomatology, SARS-CoV-2 transmission, mask wearing, and reinfection. BMC Infect Dis 21(1): 710.

85. Rubin A, Pedroni M (2024) Trust, Information and Science during the COVID-19 Pandemic: Revisiting the Conceptual Framework of Vaccine Hesitancy and Refusal. Polis (Italy) 3: 345-384.

86. Sallam M, Dababseh D, Yaseen A, AI-Haidar A, Taim D, et al. (2020) COVID-19 misinformation: Mere harmless delusions or much more? A knowledge and attitude cross-sectional study among the general public residing in Jordan. PLoS One 15(12): e0243264.

87. Gökalp A, Üztemur S, Huang PC, Kartol A, Tsai HC, et al. (2025) Pandemic or "Plandemic"?: The Mediating Role of Epistemic Justification Strategies in the Relationship Between COVID-19 Conspiracy Beliefs and COVID-19 Vaccine Conspiracy Beliefs. Brain Behav 15(1): e70275.

88. van Prooijen JW, Douglas KM (2018) Belief in conspiracy theories: Basic principles of an emerging research domain. Eur J Soc Psychol 48(7): 897-908.

89. Quinn SC, Jamison AM, Freimuth VS (2020) Measles outbreaks and public attitudes towards vaccine exemptions: some cautions and strategies for addressing vaccine hesitancy. Hum Vaccin Immunother. 16(5): 1050-1054.

90. Madorsky TZ, Adebayo NA, Post SL, O'Brian CA, Simon MA (2021) Vaccine Distrust: A Predictable Response to Structural Racism and an Inadequate Public Health Infrastructure. Am J Public Health. 111(S3): S185-S188.

91. Intemann K (2023) Science communication and public trust in science. Interdisciplinary Science Reviews 48(2): 350-365.

92. Roush K (2025) Policy Watch: Health Care Experts Remain Wary as Kennedy's Vision for Prevention and Health Promotion Unfolds. Am J Nurs 125(6): 14-15.

93. Louet H, Rausch C, Pitts P (2021) Vaccine Hesitancy: When Political Miscommunication Replaces Scientific Benefit/Risk Assessment. Journal of Commercial Biotechnology 26(3): 3-4.

94. Ozawa S, Stack ML (2013) Public trust and vaccine acceptance--international perspectives. Hum Vaccin Immunother 9(8): 1774-1778.

95. Shi R, Jia X, Hu Y, Wang H (2024) The media risk of infodemic in public health emergencies: Consequences and mitigation approaches. PLoS One 19(9): e0308080.

96. Traberg CS, Harjani T, Basol M, Biddlestone M, Maertens R, et al. (2023) Prebunking Against Misinformation in the Modern Digital Age. In: Purnat TD, Nguyen T, Briand S, eds. Managing Infodemics in the 21st Century: Addressing New Public Health Challenges in the Information Ecosystem. Springer.

97. (2023) WHO: World Health Organization. pp: 99-111.

98. Sundelson AE, Jamison AM, Huhn N, Pasquino SL, Sell TK (2023) Fighting the infodemic: the 4 i Framework for Advancing Communication and Trust. BMC Public Health 23(1): 1662.

99. Senft TM, Greenfield S (2023) People's Experience of Information Overload and Its Impact on Infodemic Harms. In: Purnat TD, Nguyen T, Briand S, eds. Managing Infodemics in the 21st Century: Addressing New Public Health Challenges in the Information Ecosystem. Springer.

100. (2023) WHO: World Health Organization. pp: 27-40.

101. Magarey RD, Chappell TM, Watson KP (2024) Investigating the Effects of Misinformation as Infopathogens: Developing a Model and Thought Experiment. Social Sciences 13(6): 300.

102. Harvey AM, Thompson S, Lac A, Coolidge FL (2019) Fear and Derision: A Quantitative Content Analysis of Provaccine and Antivaccine Internet Memes. Health Educ Behav 46(6): 1012-1023.

103. Hussain A, Ali S, Ahmed M, Hussain S (2018) The Anti-vaccination Movement: A Regression in Modern Medicine. Cureus 10(7): e2919.

104. Ortiz-Sanchez E, Velando-Soriano A, Pradas-Hernandez L, Roman KV, Jose L. Urquiza G et al. (2020) Analysis of the Anti-Vaccine Movement in Social Networks: A Systematic Review. Int J Environ Res Public Health 17(15): 5394.

105. Durmaz N, Hengirmen E (2022) The dramatic increase in anti-vaccine discourses during the COVID-19 pandemic: a social network analysis of Twitter. Hum Vaccin Immunother 18(1): 2025008.

106. Carpiano RM, Callaghan T, DiResta R, Brewer NT, Clinton C, et al. (2023) Confronting the evolution and expansion of anti-vaccine activism in the USA in the COVID-19 era. Lancet 401(10380): 967-970.

107. Kata A (2012) Anti-vaccine activists, Web 2.0, and

the postmodern paradigm--an overview of tactics and tropes used online by the anti-vaccination movement. Vaccine 30(25): 3778-3789.

108. Callender D (2016) Vaccine hesitancy: More than a movement. Hum Vaccin Immunother 12(9): 2464-2468.

109. Nuwarda RF, Ramzan I, Weekes L, Kayser V (2022) Vaccine Hesitancy: Contemporary Issues and Historical Background. Vaccines (Basel) 10(10): 1595.

110. Swinford D, Zadeh A (2025) COVID vaccine misinformation: Toward an integrated approach for predicting the cascade of disinformation. Information Services and Use.

111. Sallam M, Dababseh D, Eid H, Mahzoum K, Haidar A, et al. (2021) High Rates of COVID-19 Vaccine Hesitancy and Its Association with Conspiracy Beliefs: A Study in Jordan and Kuwait among Other Arab Countries. Vaccines (Basel) 9(1): 42.

112. Pokharel M, Lillie H, Nagatsuka K, Barbour J, Ratcliff C, et al. (2022) Social media narratives can influence vaccine intentions: The impact of depicting regret and character death. Computers in Human Behavior 141: 107612.

113. Wawrzuta D, Jaworski M, Gotlib J, Panczyk M (2021) Characteristics of Antivaccine Messages on Social Media: Systematic Review. J Med Internet Res 23(6): e24564.

114. Dhaliwal D, Mannion C (2020) Antivaccine Messages on Facebook: Preliminary Audit. JMIR Public Health Surveill 6(4): e18878.

115. Muros S, Gonzalez M, Curiel C (2024) Disinformation and Fact-Checking in the Face of Natural Disasters: A Case Study on Turkey–Syria Earthquakes. Societies 14(4): 43.

116. Vasudevan J, Alathur S (2022) Misinformation in Social Media During Disasters: A Case Study of the Flood in Kerala, India in 2018. International Journal of Information Systems and Social Change 13.

117. Cruys S, Bervoets J, Gadsby S, Gijbels D, Poels K (2024) Insight in the Conspiracist's Mind. Personality and Social Psychology Review 28(3): 302-324.

118. Gagliardi L (2025) The role of cognitive biases in conspiracy beliefs: A literature review. Journal of Economic Surveys 39(1): 32-65.

119. Feghaly E, Hanna V, Mohamad NK, Assaf MA, Sebastian J, et al. (2023) Trust in pharmaceuticals and vaccine hesitancy: exploring factors influencing COVID-19 immunization among Lebanese children aged 1 to 11 years. BMC Pediatr 23(1): 570.

120. Dowling M-E, Legrand T (2023) "I do not consent": political legitimacy, misinformation, and the compliance challenge in Australia's Covid-19 policy response. Policy and Society 42: 319-333.

121. Kenzie D, Anderson M (2024) Don't Read the Comments: Discourse About COVID-19 Vaccines in a State Health Department's Social Media Comments. Journal of Technical Writing and Communication.

122. Landicho-Guevarra J, Reñosa MDC, Wachinger J, Endoma V, Aligato MF, et al. (2021) Scared, powerless, insulted and embarrassed: hesitancy towards vaccines among caregivers in Cavite Province, the Philippines. BMJ Glob Health 6(9).

123. Ruggeri K, Vanderslott S, Yamada Y, Argyris YA, Većkalov B, et al. (2024) Behavioural interventions to reduce vaccine hesitancy driven by misinformation on social media. Bmj 384: e076542.

124. Duradoni M, Tosti AE, Colombini G, Masti F, Licata AL, et al. (2024) Promoters and Barriers of Vaccine Hesitancy. Psychological Reports.

125. Adhikari B, Yeong Cheah P, von Seidlein L (2022) Trust is the common denominator for COVID-19 vaccine acceptance: A literature review. Vaccine X 12: 100213.

126. Jheng Y-L, Van de Cruys S, De Brabandere L, Maertens K, Poels K (2025) Strategies to correct vaccine misinformation on social media for pregnant women and the impact of vaccine skepticism. Scientific Reports 15(1): 15216.

127. Gumasing MJJ (2025) Rebuilding Public Trust: Factors Influencing Dengue Vaccine Uptake in the Aftermath of the Dengvaxia Controversy in the Philippines: A Partial Least Structural Equation Modeling Approach. Vaccine 57: 127220.

128. Cooper S, Gadanya MA, Kaawa-Mafigiri D, Katoto PDMC, Sambala EZ, et al. (2024) Using social media to build confidence in vaccines: lessons from community engagement and social science research in Africa. Bmj 384: e075564.

129. Chen HL, Tang RB (2020) Measles re-emerges and recommendation of vaccination. J Chin Med Assoc 83(1): 5-7.

130. Larson H (2025) Vaccination: a changing political, scientific, and personal landscape. The Lancet Online first.

131. Adedokun T, Idowu-Collins P (2024) Communication Strategies for Healthcare Providers to Enhance Vaccine Discussions with Vaccine-Hesitant Patients. Interdisciplinary Journal of Sociality Studies 4: 1-16.

132. Williamson L, Glaab H (2018) Addressing vaccine hesitancy requires an ethically consistent health strategy. BMC Med Ethics 19(1): 84.

133. Tuckerman J, Kaufman J, Danchin M (2022) Effective Approaches to Combat Vaccine Hesitancy. Pediatr Infect Dis J 41(5): e243-e245.

134. Sallam M, Salim NA, Al-Tammemi AB, Fayyad DJ, Harapan H, et al. (2023) ChatGPT Output Regarding Compulsory Vaccination and COVID-19 Vaccine Conspiracy: A Descriptive Study at the Outset of a Paradigm Shift in Online Search for Information. Cureus 15(2): e35029.

135. Casigliani V, Menicagli D, Fornili M, Lippi V, Chinelli A, et al. (2022) Vaccine hesitancy and cognitive biases: Evidence for tailored communication with parents. Vaccine X 11: 100191.

136. Murphy J, Vallières F, Bentall RP, Shevlin M, McBride O, et al. (2021) Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. Nature Communications 12(1): 29.

137. Kirscht JP (1998) The Health Belief Model and Predictions of Health Actions. In: Gochman DS (Ed.), Health Behavior: Emerging Research Perspectives pp: 27-41.

138. Li L, Wood CE, Kostkova P (2022) Vaccine hesitancy and behavior change theory-based social media interventions: a systematic review. Transl Behav Med 12(2): 243-272.

139. Serpell L, Green J (2006) Parental decision-making in childhood vaccination. Vaccine 24(19): 4041-4046.

140. Lehmann BA, de Melker HE, Timmermans DRM, Mollema L (2017) Informed decision making in the context of childhood immunization. Patient Educ Couns 100(12): 2339-2345.

141. Azarpanah H, Farhadloo M, Vahidov R, Pilote L (2021) Vaccine hesitancy: evidence from an adverse events following immunization database, and the role of cognitive biases. BMC Public Health 21(1): 1686.

142. Gavaruzzi T, Caserotti M, Leo I, Tasso A, Speri L, et al. (2021) The Role of Emotional Competences in Parents' Vaccine Hesitancy. Vaccines (Basel) 9(3): 298.

143. Novilla MLB, Goates MC, Redelfs AH, Quenzer M, Novilla LKB, et al. (2023) Why Parents Say No to Having Their Children Vaccinated against Measles: A Systematic Review of the Social Determinants of Parental Perceptions on MMR Vaccine Hesitancy. Vaccines (Basel) 11(5): 926.

144. Yeung SK, Yay T, Feldman G (2022) Action and Inaction in Moral Judgments and Decisions: Meta-Analysis of Omission Bias Omission-Commission Asymmetries. Pers Soc Psychol Bull 48(10): 1499-1515.

145. Dubov A, Phung C (2015) Nudges or mandates? The ethics of mandatory flu vaccination. Vaccine 33(22): 2530-2535.

146. McGregor S, Goldman RD (2021) Determinants of parental vaccine hesitancy. Can Fam Physician 67(5): 339-341.

147. Malthouse E (2023) Confirmation bias and vaccine-related beliefs in the time of COVID-19. J Public Health (Oxf) 45(2): 523-528.

148. Carroll DR, Conroy SJ, Vamosiu A (2025) The importance of political and religious affiliation in explaining county-level COVID-19 Vaccine Hesitancy. Health Econ Rev 15(1): 29.

149. Marchlewska M, Hamer K, Baran M, Górska P, Kaniasty K (2022) COVID-19: Why Do People Refuse Vaccination? The Role of Social Identities and Conspiracy Beliefs: Evidence from Nationwide Samples of Polish Adults. Vaccines (Basel) 10(2): 268.

150. Ecker UKH, Prike T, Paver AB, Scott RJ, Swire-Thompson B (2024) Don't believe them! Reducing misinformation influence through source discreditation. Cognitive Research: Principles and Implications 9(1): 52.

151. Swire-Thompson B, Miklaucic N, Wihbey JP, Lazer D, DeGutis J (2022) The backfire effect after correcting misinformation is strongly associated with reliability. J Exp Psychol Gen 151(7): 1655-1665.

152. Marhánková JH, Kotherová Z, Numerato D (2024) Navigating vaccine hesitancy: Strategies and dynamics in healthcare professional-parent communication. Hum Vaccin Immunother 20(1): 2361943.

153. Dudley MZ, Schuh HB, Forr A, Shaw J, Salmon DA (2024) Changes in vaccine attitudes and recommendations among US Healthcare Personnel during the COVID-19 pandemic. NPJ Vaccines 9(1): 49.

154. Gagneur A, Gutnick D, Berthiaume P, Diana A, Rollnick S, et al. (2024) From vaccine hesitancy to vaccine

motivation: A motivational interviewing based approach to vaccine counselling. Hum Vaccin Immunother 20(1): 2391625.

155. Boness CL, Nelson M, Douaihy AB (2022) Motivational Interviewing Strategies for Addressing COVID-19 Vaccine Hesitancy. J Am Board Fam Med 35(2): 420-426.

156. Jamison KC, Ahmed AH, Spoerner DA, Kinney D (2022) Best shot: A motivational interviewing approach to address vaccine hesitancy in pediatric outpatient settings. J Pediatr Nurs 67: 124-131.

157. Cole J, Berman S, Gardner J, McGuire K, Chen AMH (2021) Implementation of a motivational interviewing-based decision tool to improve childhood vaccination rates: Pilot study protocol. Res Social Adm Pharm 17(3): 619-624.

158. Olson O, Berry C, Kumar N (2020) Addressing Parental Vaccine Hesitancy towards Childhood Vaccines in the United States: A Systematic Literature Review of Communication Interventions and Strategies. Vaccines (Basel) 8(4): 590.

159. Roozenbeek J, van der Linden S, Nygren T (2020) Prebunking interventions based on the psychological theory of "inoculation" can reduce susceptibility to misinformation across cultures. Harvard Kennedy School Misinformation Review.

160. Roozenbeek J, van der Linden S, Goldberg B, Rathje S, Lewandowsky S (2022) Psychological inoculation improves resilience against misinformation on social media. Sci Adv 8(34): eabo6254.

161. Nascimento IJB, Pizarro AB, Almeida JM, Muscat NA, Gonçalves MA, et al. (2022) Infodemics and health misinformation: a systematic review of reviews. Bull World Health Organ 100(9): 544-561.

162. Steffens MS, Dunn AG, Wiley KE, Leask J (2019) How organisations promoting vaccination respond to misinformation on social media: a qualitative investigation. BMC Public Health 19(1): 1348.

163. Bayer R (2007) The continuing tensions between individual rights and public health. Talking Point on public health versus civil liberties. EMBO Rep 8(12): 1099-1103.

164. Gruskin S, Mills EJ, Tarantola D (2007) History, principles, and practice of health and human rights. Lancet 370(9585): 449-455.

165. Kraaijeveld SR (2020) Vaccinating for Whom? Distinguishing between Self-Protective, Paternalistic, Altruistic and Indirect Vaccination. Public Health Ethics 13(2): 190-200.

166. Bednarczyk RA, King AR, Lahijani A, Omer SB (2019) Current landscape of nonmedical vaccination exemptions in the United States: impact of policy changes. Expert Rev Vaccines 18(2): 175-190.

167. Bradford WD, Mandich A (2015) Some state vaccination laws contribute to greater exemption rates and disease outbreaks in the United States. Health Aff (Millwood) 34(8): 1383-1390.

168. Nihlén Fahlquist J (2023) Taking Risks to Protect Others-Pediatric Vaccination and Moral Responsibility. Public Health Ethics 16(2): 127-138.

169. Flanigan J (2014) A Defense of Compulsory Vaccination. HEC Forum 26(1): 5-25.