VACCINATION AND PRIMARY CARE:

EXAMINING HISTORY AND PROGRESSING TOWARD HEALTH EQUITY

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CONTENTS

FOREWORD

by

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Primary care plays a critical role in vaccination, an important public health strategy that has saved more human lives than any other medical invention in history. The number of people who experience the devastating effects of preventable infectious diseases like measles, diphtheria, and whooping cough is at an all-time low. Indeed, vaccines have proven so successful, their use has been expanded beyond infectious disease into the realms of cancer and chronic illness prevention. Yet negative attitudes toward vaccines persist, particularly after the controversies surrounding COVID-19 vaccination. The historic mistrust of medicine in marginalized communities has also contributed to the reluctance for vaccination. Vaccine hesitancy – the delay in acceptance or refusal of vaccination despite availability of vaccination services – is complex and associated with a number of factors; it has also been declared by the WHO as one of the top ten global health threats. Primary care is in a unique position to mitigate the reasons for vaccine hesitancy, and to promote vaccine equity in communities disproportionately at risk for COVID-19 and other illness. This bibliography is focused on vaccination and primary care in the United States through the lens of history and health equity.

→ **Major causes of vaccine hesitancy.** Communities with high rates of vaccine hesitancy express concerns about the following: vaccine safety, efficacy, and side effects; distrust in health care and government institutions; direct and indirect costs of health care; and perceptions about risks and harms of the vaccine versus risks and harms of the infection. Factors such as age, race, gender, religious and cultural beliefs, political beliefs, and socioeconomic status also contribute to vaccine hesitancy.

→ **Vaccine hesitancy has a long history, but is increasing in a digital, politicized era.** Many of the factors that lead to vaccine hesitancy have not significantly changed over time. Rather, they have morphed to fit the societal dynamics of the era. For example, anti-vaccination concerns and campaigns are centuries old, but during

While the federal government coordinated distribution of vaccines to states through Operation Warp Speed, state and local health departments were primarily responsible for managing the distribution and administration of vaccines based on the size of their population. Eligibility for vaccination was defined by phase as determined by each state (with technical guidance from the CDC), roughly consistent with this timeline.

Phase 1: healthcare workers and residents of long-term care facilities (mid-Dec, 2020)

Phase 2: essential workers and individuals aged 75 and older (Jan, 2021)

Phase 3: individuals aged 65-74 and those aged 16-64 with underlying medical conditions (March, 2021)

Phase 4: All individuals age 16 and older (April, 2021)
Children aged 12 and older (May, 2021)

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the COVID-19 pandemic, anti-vaccination messages were broadly amplified through social media and quickly shared online. One of many impacts is that post-pandemic, vaccination rates for children worldwide declined in 2023 and have not recovered to pre-pandemic levels, currently leaving 2.7 million kids unvaccinated or under-vaccinated, according to the World Health Organization.

→ **COVID-19 vaccine dissemination and primary care.** Primary care practices play a major role in vaccination dissemination across the globe. However, in the early phases of COVID-19 vaccination – when speed, scale, safety, and security were the most urgent public priorities – vaccine administration was provided by public health departments, hospitals, mass vaccination sites, and pharmacies. Simultaneously, many primary health care providers worked non-stop caring for patients with COVID-19, often with dwindling supplies of Personal Protective Equipment (PPE), while primary care practices struggled to keep their doors open during lockdown. Clinicians were forced to quickly adapt to changing circumstances necessitated by the Public Health Emergency (PHE) to prioritize urgent patient care, but often at the expense of caring for those with chronic conditions or serious illness and at the expense of preventive care, like childhood vaccination.

→ **Trusting primary care relationships can mitigate vaccine hesitancy, but the U.S. lacks sufficient access to primary care.** Local primary care physicians are critically important in helping address vaccine hesitancy, especially in communities where there is high historic mistrust. In the face of misinformation and disinformation, public trust – already waning before the pandemic – frayed the social contract between public health and government officials. Eventually even trust between providers and their patients was strained, especially for those without pre-existing relationships. When primary care providers are part of public engagement and education efforts, they can help explain the risks and benefits of vaccination. This is especially so at a local/community level where they are the trusted voices for health. Primary care to population ratios are currently insufficient to match the demand for trusted sources of information from the healthcare system.

→ **Strong partnerships between primary care & public health are crucial to overcoming hesitancy. These partnerships are particularly crucial for ensuring:**

↳ **Equitable Vaccine Delivery:** Such partnerships can help effectively address health disparities and improve equitable vaccination uptake in underserved populations, especially by featuring trusted primary care providers local to the community. Getting input from family members in the design of intervention and provider communication training can help increase the likelihood of vaccination. These partnerships also can help with

↳ **Swift, tailored communication to correct misinformation.** Primary care leaders need to be swift and intentional to correct misinformation online, and novel digital tools and applications may be useful in this effort. They also suggest that the cooperation of social media platforms is paramount in terminating the spread of misinformation. It is clear that tailoring is necessary for different population groups as well as different vaccines, as reasons for hesitancy vary across each.

↳ **Effective community engagement.** Because primary care clinicians have longitudinal trusting relationships with their patients, primary care is uniquely positioned to help mitigate the factors that drive vaccine hesitancy.

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↳ **Pandemic preparedness & effective distribution.** Vaccine distribution is significantly enhanced in jurisdictions where priority is placed on establishing policies and processes for pandemic preparedness and having well-established and coordinated information systems. This includes equipping primary care providers with appropriate education and training, and including them in effective communications strategies. These challenges demonstrate the need for systemic health care reform that integrates clinical care and public health.

→ **More research is needed.** Although the body of research on vaccination is large, it is clear that more empirical evidence is needed to inform best practices in equitable vaccine delivery through primary care-public health partnerships, and to enhance the impact of primary care-led vaccine distribution efforts to reduce vaccine hesitancy, and improve adoption and equity.

METHODS

This annotated bibliography explores the historical to contemporary role of primary care in equitable vaccine delivery and in reducing hesitancy, focusing on recent contributions to the literature. With the assistance of an expert in library sciences, we first identified candidate articles in PubMed, OVID, and Medline databases, using a serially refined search and the terms "primary care," "vaccine hesitancy," "vaccine delivery," and "vaccine distribution history." We screened the initial results for relevance to our aims using a title and abstract screening, then limited our search to articles published in the last 5 years, providing 104 results. Further screening based on full paper review, eliminating articles not central to our aims, such as those focused on vaccine technology, diminished our article pool to the 21 summarized in the bibliography. Of particular interest were articles focused on vaccine hesitancy and administration in primary care settings. A second search strategy, using the search terms for "vaccination," "health equity," "health disparity," and "primary health care," yielded 351 papers. After title and abstract screening, then a secondary full article screen that eliminated article not central to our aims, we narrowed our cohort to 23 papers. We have summarized and annotated 14 deemed the most seminal to our aims, while still using the others to corroborate themes in our summary above.

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ANNOTATED BIBLIOGRAPHY OF KEY ARTICLES

A Historical Perspective on the Role of Primary Care in Vaccination

The selected articles below explore the historical role of primary care in vaccination and vaccine hesitancy. Several papers highlight strategies to reduce vaccine hesitancy including: tailoring communication frameworks to address specific concerns; increasing the prominence of primary care providers in vaccine distribution and administration efforts; and ensuring convenient easy access to vaccines. Because primary care clinicians have longitudinal trusting relationships with their patients, primary care is uniquely positioned to help mitigate the factors that drive vaccine hesitancy.

Vaccine Hesitancy in the U.S.: History & Policy

1. Nuwarda RF, Ramzan I, Weekes L, Kayser V (2022) *Vaccine Hesitancy: Contemporary Issues and Historical Background.* Vaccines (Basel). Sep 22;10(10):1595. doi: 10.3390/vaccines10101595. PMID: 36298459; PMCID: PMC9612044.

Nuwarda et. al. provide a comprehensive review of vaccine hesitancy and how it fits in the modern context. In addition to the rising anti-vaccine movement, political influences, cultural and religious beliefs, the ability to interpret scientific information, and personal experiences with the health care system all contribute to vaccine hesitancy. This review also examines drivers of vaccine hesitancy in different regions of the world, comparing vaccination challenges in countries with different socio-economic populations. In high-income countries (HICs), concerns about vaccine safety and efficacy are most common, whereas in low- and middle-income countries (LMICs), cultural and religious beliefs, negative historical experiences with foreign medicine and vaccination campaigns, as well as issues within healthcare systems are more common. Other factors that are common in both categories include distrust in medical companies and the government, conspiracy theories, and social media misinformation. Authors argue for more research into factors that can mitigate vaccine hesitancy.

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2. Turner PJ, Larson H, Dubé È, Fisher A (2021) *Vaccine Hesitancy: Drivers and How the Allergy Community Can Help*. J Allergy Clin Immunol Pract. Oct;9(10):3568-3574. doi: 10.1016/j.jaip.2021.06.035. Epub 2021 Jul 6. PMID: 34242848; PMCID: PMC8416028.

This review highlights the history surrounding vaccine hesitancy, a phenomenon that existed in 18th century Europe, and though it has evolved, the authors argue that it has not changed much. Over the past 200 years, safety concerns, trust in health care systems and providers, complacency with a low risk of illness, religious beliefs, inconvenience, and costs (both direct and indirect) have contributed to vaccine hesitancy. Given that these same drivers of vaccine hesitancy exist for COVID-19, the authors suggest that health care providers have an even more crucial role to play in helping address reasons for non-vaccination by tailoring interventions to the position of individual patients on the vaccine acceptance continuum. They also recommend addressing vaccine hesitancy among health care workers, providing tailored information and reassurance to both individuals and groups of individuals who may have understandable concerns.

3. Marshall GS (2019) *Vaccine Hesitancy, History, and Human Nature: The 2018 Stanley A. Plotkin Lecture*. J Pediatric Infect Dis Soc. Mar 28;8(1):1-8. doi: 10.1093/jpids/piy082. PMID: 33513237.

Dr. Marshall – a professor of pediatrics – offers a comprehensive, engaging, and multi-faceted lecture about the history of vaccine hesitancy in the US, how human nature and policies affect public attitudes about vaccination, and practical advice for health care providers and public health to increase support for vaccination.

4. Epling JW (2020) *Vaccine Policy in the United States*. Prim Care. Sep;47(3):539-553. doi: 10.1016/j.pop.2020.05.011. Epub 2020 May 28. PMID: 32718449 .

Dr. Epling outlines the US regulatory agencies that guide vaccine development, oversight, and vaccine-related public health law, with a focus on primary care delivery of vaccines. The article describes the roles of: the Advisory Committee on Immunization Practices (ACIP) which is supported by the Center for Disease Control & Prevention (CDC); the National Vaccine Program (VVP) located within the Office of Assistant Secretary for Health); the Food and Drug Administration (FDA); and the Vaccine for Children (VFC) programs. The author describes the effectiveness of vaccine mandates, and also state immunization information systems (IIS), and suggests they are in need of improved integration with electronic health records to be of greater usefulness to providers. Finally, the article outlines the role that Clinical Specialty Societies play in vaccine policy, underscoring that "the voice of primary care is increasingly needed in this area. Primary care clinicians can provide important knowledge, perspective, and advocacy for sound vaccination policy to improve our current system."

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5. Aggarwal M, Kokorelias KM, Glazier RH, et al (2023) *What is the role of primary care in the COVID-19 vaccine roll-out and the barriers and facilitators to an equitable vaccine roll-out? A rapid scoping review of nine jurisdictions*. BMJ Open;13:e065306. doi: 10.1136/bmjopen-2022-065306

This rapid scoping review examined the role of primary care in the COVID-19 vaccine roll-out in Australia, Hong Kong, Germany, France, Israel, Singapore, Spain, the United States, and the United Kingdom. In almost all jurisdictions, hospitals were the first point of vaccine distribution, and while not all primary care providers were included at the beginning of the vaccine roll-out, most jurisdictions included them over time. The barriers to the roll-out of vaccines included personal, organizational, and contextual factors. The vaccine roll-out strategy was facilitated by establishing policies and processes for pandemic preparedness, well-established and coordinated information systems, primary care interventions, adequate supply of providers, education and training of providers, and effective communications strategy. The author suggests that more empirical evidence is needed on the impact of a primary care-led vaccine distribution approach on vaccine hesitancy, adoption and equity.

Addressing Misinformation with Effective Communication

6. Garett R, Young SD (2021). *Online misinformation and vaccine hesitancy*. Transl Behav Med. Dec 14;11(12):2194-2199. doi: 10.1093/tbm/ibab128. PMID: 34529080; PMCID: PMC8515268.

Garett and Young describe how misinformation about the COVID-19 pandemic distributed via social media has contributed to vaccine hesitancy, namely by circulating unsubstantiated claims. The authors underscore the need for public health experts, the medical community, and vaccine advocates to be swift and intentional to correct misinformation online, and novel digital tools and applications may be useful in this effort. They also suggest that the cooperation of social media platforms is paramount in terminating the spread of misinformation.

7. Kalra S, Verma M, Agrawal N (2022) *Vaccine hesitancy in primary care: Building bridges by understanding barriers*. J Pak Med Assoc. Dec;72(12):2565-2566. doi: 10.47391/JPMA.22-117. PMID: 37246693.

The authors emphasize the importance of primary care provider communication in addressing vaccine hesitancy among patients. They share a framework and key messages for primary care providers to use when discussing COVID-19 vaccination with patients, using the mnemonic NARCO: Need for vaccine, Advantages, Risks, Cost, Overall risk/reward. They highlight the importance of using motivational strategies targeted to the public as well as addressing the specific issues that cause vaccine hesitancy in individual patients.

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8. Fernandes C A, Wang D, Domachowske JB, Suryadevara M (2023). *Vaccine knowledge, attitudes, and recommendation practices among health care providers in New York State*. Hum Vaccin Immunother. Dec 31;19(1):2173914. doi: 10.1080/21645515.2023.2173914. Epub 2023 Feb 7. PMID: 36749617; PMCID: PMC10026857.

This study of 500 primary care providers (PCPs) examined provider knowledge of vaccines and attitudes toward vaccine-hesitant patients. Eighty one percent of PCPs reported encountering vaccine-hesitant patients daily or weekly, yet only 41% expressed confidence in their communication with vaccine-hesitant patients. PCPs were more likely to recommend vaccination if they initiated the discussion and reviewed vaccines at each encounter.

9. Henrikson NB, Opel DJ, Grothaus L, Nelson J, Scrol A, Dunn J, Faubion T, Roberts M, Marcuse EK, Grossman DC (2015) *Physician Communication Training and Parental Vaccine Hesitancy: A Randomized Trial*. Pediatrics. Jul;136(1):70-9. doi: 10.1542/peds.2014-3199. Epub 2015 Jun 1. PMID: 26034240.

This randomized trial explored maternal vaccine hesitancy at birth and six months after, with clinics being randomized to a group that received specialized communication training or to a control group that did not receive the training. Fifty six clinics and 347 mothers were enrolled, with 30 clinics (reaching 67% of eligible physicians) randomly selected for the intervention group and 26 clinics in the control group. Maternal vaccine hesitancy declined from 9.8% at baseline to 7.5% at follow-up in the intervention group and from 12.6% to 8.0% in the control group. The intervention had no statistically significant effect, suggesting the need for more research to identify physician communication strategies that are effective at reducing parental vaccine hesitancy in primary care settings.

10. Cox JE, Bogart LM, Elliott MN, Starmer AJ, Meleedy-Rey P, Goggin K, Banerjee T, Samuels RC, Hahn PD, Epee-Bounya A, Allende-Richter S, Fu CM, Schuster MA (2022) *Improving HPV Vaccination Rates in a Racially and Ethnically Diverse Pediatric Population. Pediatrics*. Oct 1;150(4):e2021054186. doi: 10.1542/peds.2021-054186. PMID: 36127315.

Within a racially and ethnically diverse population, the authors found that a multilevel intervention was associated with increased HPV vaccine uptake. Over the course of seven years, HPV vaccine initiation by age 9 years increased from 1% to 52%, and vaccine completion by 13 years, increased from 37% to 77%. Qualitative input from family members was key in designing the intervention, and provider communication training helped increase the likelihood of patients getting vaccinated. Initiation of the vaccine at age 9 and clinic wide vaccine protocols were seen as key to sustaining improvements.

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Determinants of Hesitancy

11. Tsui J, Vincent A, Anuforo B, Btoush R, Crabtree BF (2021) *Understanding primary care physician perspectives on recommending HPV vaccination and addressing vaccine hesitancy*. Hum Vaccin Immunother. Jul 3;17(7):1961-1967. doi: 10.1080/21645515.2020.1854603. Epub 2021 Jan 13. PMID: 33439768; PMCID: PMC8189098.

Tsui et. al. conducted qualitative interviews with family medicine and pediatric physicians from primary care settings affiliated with a large academic hospital in New Jersey about HPV vaccination. All physicians expressed strong support for HPV vaccination and reported that 10-30% of parents were against HPV vaccination. To combat vaccine hesitancy, many physicians said that they vaccinated their own children, used data or professional authority to address safety concerns, normalized the vaccine, and linked HPV to cervical cancer.

12. Aw J, Seng JJB, Seah SSY, Low LL (2021) *COVID-19 Vaccine Hesitancy-A Scoping Review of Literature in High-Income Countries*. Vaccines (Basel). Aug 13;9(8):900. doi: 10.3390/vaccines9080900. PMID: 34452026; PMCID: PMC8402587.

This comprehensive review examines 97 studies of COVID-19 vaccine hesitancy in high-income countries – most of the studies were conducted in North America (43.3%) and Europe (34.0%). In contrast to lower-income countries, high-income countries have been found to have higher rates of COVID-19 vaccine hesitancy; nearly half of studies reported vaccine hesitancy of 30% or more. Overall, COVID-19 vaccine hesitancy remains a highly prevalent problem in high income countries or regions. Individuals who were younger, females, non-Whites, and have a lower education or income levels, were more prone to vaccine hesitancy. Authors suggest that trust at different systems levels seem to play an important role in modifying vaccine hesitancy as well. Other commonly studied factors associated with vaccine hesitancy included a history of not receiving influenza vaccination, a lower self-perceived risk of contracting COVID-19, a lesser fear for health outcomes or COVID-19, not believing in the severity of COVID-19, having concerns about the rapid development of COVID-19 vaccines as well as disbeliefs in the safety and effectiveness of the vaccines. Policymakers and public health leaders need to be cognizant of these determinants of vaccine hesitancy when formulating policies related to COVID-19 vaccination and public health messages.

13. Sieber WJ, Achar S, Achar J, Dhamija A, Tai-Seale M, Strong D (2022) *COVID-19 vaccine hesitancy: Associations with gender, race, and source of health information*. Fam Syst Health. Jun;40(2):252-261. doi: 10.1037/fsh0000693. Epub 2022 Apr 21. PMID: 35446060.

Sieber et. al. surveyed over ten thousand primary care patients in a large southern California health system regarding their attitudes toward the COVID-19 vaccine (22% response rate). Results showed that while 78% of participants "strongly" believed vaccines generally are a good way to protect from illness, only about half of the patients that responded were willing to get the vaccine. Younger patients and patients of color were less likely to get vaccinated against COVID-19. Additionally, a key finding was that patients who relied on

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social media, faith-based organizations, or family/friends for their health information were less likely to get vaccinated. Authors recommend targeting those patients who report reliance on nontraditional health information sources to be approached by primary care teams, including behavioral health providers, to address vaccine hesitancy.

14. Cadeddu C, Castagna C, Sapienza M, Lanza TE, Messina R, Chiavarini M, Ricciardi W, de Waure C (2021) *Understanding the determinants of vaccine hesitancy and vaccine confidence among adolescents: a systematic review*. Hum Vaccin Immunother. Nov 2;17(11):4470-4486. doi: 10.1080/21645515.2021.1961466. Epub 2021 Sep 2. PMID: 34473589; PMCID: PMC8828162.

Cadeddu et. al. performed a systematic review of the determinants of vaccine hesitancy among adolescents aged 10-19. Authors used the "3Cs" model of complacency (perceived risk of contracting the disease), convenience (perceived level of access to vaccinations), and confidence (trust in the effectiveness and safety of vaccines, the system that delivers them and the motivations of the policy-makers who decide on the recommended vaccines). Higher knowledge of vaccine-preventable diseases, higher confidence in vaccines, and being involved in a shared decision-making process were all associated with higher vaccine uptake by adolescents. Authors noted that adolescents trust more family physicians or other medical professionals and parents than social media, and previous research suggests that educating students through school-based educational programs, represents one of the best practices to promote vaccine awareness among adolescent populations. All of these aspects should be considered when tailoring interventions for adolescents.

15. Novilla MLB, Goates MC, Redelfs AH, Quenzer M, Novilla LKB, Leffler T, Holt CA, Doria RB, Dang MT, Hewitt M, Lind E, Prickett E, Aldridge K (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). May 2;11(5):926. doi: 10.3390/vaccines11050926. PMID: 37243030; PMCID: PMC10224336.

The authors performed a quantitative systematic review of 115 articles regarding parental hesitancy to the MMR vaccine. Although the major reason for vaccine hesitancy included fear of autism, vaccine hesitancy to MMR and other childhood vaccines clustered in middle- to high-income areas among highly educated mothers who preferred internet/social media narratives over physician-based vaccine information. This cohort had low parental trust, low perceived disease susceptibility, and were skeptical of vaccine safety and benefits. Authors suggest that combating MMR vaccine misinformation and hesitancy will require intersectoral and multifaceted approaches at various socioecological levels to address the social drivers of vaccine behavior.

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16. Whaley M, Axon DR (2022) *Factors associated with pneumococcal vaccine uptake among vulnerable older adults in the United States primary care setting*. Vaccine. Nov 8;40(47):6756-6766. doi: 10.1016/j.vaccine.2022.10.002. Epub 2022 Oct 11. PMID: 36229283.

Whaley and Axon examined factors linked to pneumococcal vaccine uptake among vulnerable older adults (age 50 and older) in primary care settings. Factors that increased pneumococcal vaccine included having received influenza and herpes zoster vaccinations, a previous diagnosis of diabetes, visiting their doctor at least once in the past year, and getting a colonoscopy. These findings demonstrate that the odds of getting a pneumococcal vaccine is related to getting other vaccines or specific preventive screenings.

17. Reece S, CarlLee S, Scott AJ, Willis DE, Rowland B, Larsen K, Holman-Allgood I, McElfish PA (2023) *Hesitant adopters: COVID-19 vaccine hesitancy among diverse vaccinated adults in the United States*. Infect Med (Beijing). Jun;2(2):89-95. doi: 10.1016/j.imj.2023.03.001. Epub 2023 Mar 25. PMID: 38013742; PMCID: PMC10038887.

The authors surveyed vaccinated adults in the United States regarding their vaccine-hesitant attitudes, distinguishing vaccine hesitancy (an attitude) from vaccination status (a behavior) and recognizes individuals who are "hesitant adopters" (ie, individuals who were both hesitant and vaccinated). This is one of the first studies examining hesitancy among vaccinated individuals in a diverse sample of US adults. A slight majority of respondents were "not at all hesitant" to receive the vaccine, whereas all other respondents reported some level of hesitancy. Younger people, women, and Black or Native American respondents were more likely to be vaccine hesitant. Interestingly, those who had a primary care provider had higher odds of being more vaccine hesitant than those who did not. Authors suggest that this unexpected finding could represent a phenomenon where a patient's behavior, but not attitude, is influenced by their primary care physician and emphasizes the importance of distinguishing vaccine hesitancy from vaccine status.

18. Lo C, Chiu L, Qian A, Khan MZ, Alhassan HA, Duval AJ, Chan AT (2022) *Public Health Association of Primary Care Physicians Per Capita With COVID-19 Vaccination Rates Among US Counties.* JAMA Netw Open 2022 Feb 1;5(2):e2147920. doi:10.1001/jamanetworkopen.2021.47920DOI: *10.1001/jamanetworkopen.2021.47920*

In this cross-sectional study, authors found that the number of PCPs per 100,000 population was independently associated with higher COVID-19 vaccination rates in the US. Survey data suggest that a substantial portion of the unvaccinated population would be willing to get vaccinated if they had greater access to accurate information and receive encouragement from a trusted source. Primary care physicians can reach such individuals through direct engagement or alliances with community health workers, community centers, and mass-vaccination sites. Findings suggest that PCPs play a critical role in ensuring vaccine acceptance, especially in resource-limited and vaccine hesitant regions, potentially through counseling and building local community trust and partnerships before they had access to vaccines.

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COVID-19 Vaccine: Uniquely Distrusted?

19. Johnson KD, Akingbola O, Anderson J, Hart J, Chapple A, Woods C, Yeary K, McLean A (2021) *Combatting a "Twin-demic": A quantitative assessment of COVID-19 and influenza vaccine hesitancy in primary care patients*. Health Promot Perspect. May 19;11(2):179-185. doi: 10.34172/hpp.2021.22. PMID: 34195041; PMCID: PMC8233667.

This study examined patient likelihood to be vaccinated against COVID-19 and influenza. Within the sample, 67% of patients were vaccine-hesitant toward the COVID-19 vaccine, but just 19.3% of patients were vaccine-hesitant toward the influenza vaccine. These findings highlight that the reasons for being vaccine-hesitant may differ between vaccinations. Many participants had specific concerns with the COVID-19 vaccine such as side effects and a fear of acquiring the infection, yet these concerns were not as prevalent with the influenza vaccine. Patients who intended on getting the COVID-19 vaccine were less likely to be African American. Authors suggest that given the degree of hesitancy against COVID-19 vaccination, a multifaceted approach to facilitate vaccine uptake that includes vaccine education, behavioral change strategies, and health promotion, is paramount.

The Role of Trust

20. Ie K, Kushibuchi M, Tsuchida T, Motohashi I, Hirose M, Albert SM, Kimura M (2023) *The relationship between having a usual source of primary care and COVID-19 parental vaccine hesitancy: A nationwide survey among Japanese mothers*. J Gen Fam Med. Apr 11;24(4):215-222. doi: 10.1002/jgf2.623. PMID: 37484125; PMCID: PMC10357099.

Ie et. al. surveyed 4,516 mothers in Japan regarding COVID-19 vaccine hesitancy for their children. After adjusting for potential confounders, mothers who had a usual source of primary care were 10% less likely to be vaccine-hesitant than those who did not. This study suggested that having a usual source of primary care may contribute to lower parental COVID-19 vaccine hesitancy. However, the high vaccine hesitancy rate, even among mothers with a usual source of primary care, warrants healthcare providers to be equipped to help parents make informed decisions about vaccination through the continuity of care.

21. Jasuja GK, Meterko M, Bradshaw LD, Carbonaro R, Clayman ML, LoBrutto L, Miano D, Maguire EM, Midboe AM, Asch SM, Gifford AL, McInnes DK, Elwy AR (2021) *Attitudes and Intentions of US Veterans Regarding COVID-19 Vaccination*. JAMA Netw Open. Nov 1;4(11):e2132548. doi: 10.1001/jamanetworkopen.2021.32548. Erratum in: JAMA Netw Open. 2021 Dec 1;4(12):e2141483. PMID: 34730819; PMCID: PMC8567110.

Jasuja et. al. surveyed US veterans to determine their attitudes toward vaccine hesitancy. Compared with the general population, veterans are at high risk for COVID-19 and have a complex relationship with the government. This potentially affects their attitudes toward receiving COVID-19 vaccines. Seventy one percent of veterans in this sample self-reported being vaccinated against COVID-19. Major reasons for not getting vaccinated included skepticism of its efficacy, side effects, preference for natural immunity, preference to wait due to its novelty, and distrust in the healthcare system. The authors suggest that targeting veterans' concerns around the adverse effects and safety of COVID-19 vaccines through conversations with trusted Veterans Health Administration health care providers is key to increasing vaccine acceptance.

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UNDERSTANDING VACCINE HESITANCY THROUGH A LENS OF INEQUITY

Vaccination Inequities, Mistrust and Systemic Racism

There are several studies exploring disparities in vaccine access and uptake among different racial and ethnic groups. They demonstrate how systemic racism and social determinants of health perpetuate vaccine inequities and highlight the complex nature of these intersectional factors, spanning racism, housing, transportation, access to medical services, and community engagement. Historical injustices of racial and ethnic groups have led to significant mistrust in the U.S. healthcare system among marginalized communities. The research explores the impact of this mistrust on vaccine hesitancy and the importance of leveraging trusted health communicators and targeted interventions to improve access to vaccination in medically underserved areas.

22. Koppaka R, Wharton M, Lindley MC, Kohli J, Morita J (2023) *Increasing equity in adult immunization through community-level action*. Health Affairs Scholar 1(6):qxad071. doi:10.1093/haschl/qxad071

This paper addresses the systemic inequities and disparities, specifically amongst racial and ethnic groups, in relation to adult immunization. National data exemplifies the emergence of similar disparities during early COVID-19 vaccination efforts. The authors emphasize some of the targeted interventions implemented by the Centers for Disease Control and Prevention (CDC) to address these disparities; the CDC's efforts included pilot programs to improve vaccine uptake, addressing misinformation with national organizations, and developing a comprehensive model for vaccination efforts. These efforts, focused on social determinants and individual beliefs, involved extensive community engagement, which this paper concludes by emphasizing its importance in addressing adult immunization disparities.

23. Dada D, Djiometio JN, McFadden SM, et al. (2022) *Strategies That Promote Equity in COVID-19 Vaccine Uptake for Black Communities: a Review*. J Urban Health. 99(1):15-27. doi:10.1007/s11524-021-00594-3

In this rapid review, authors analyzed why Black communities in the U.S. faced a disproportionate burden of COVID-19's impact, yet their vaccine uptake consistently trailed behind other demographic groups. Key findings of this health disparity included: the need to address mistrust and vaccine hesitancy by acknowledging the historical and systemic injustices and racism in the health care system; recognizing trusted sources of health communications including Black physicians and local healthcare providers addressing concerns in Black communities; improving access to vaccines by targeting medical deserts; building equity initiatives by increasing funding for equity-focused initiatives with support at local, state, and national levels; and lastly, increasing evidence-based research on Black health disparities to increase targeted efforts.

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24. Jean-Jacques M, Bauchner H.(2021) *Vaccine Distribution—Equity Left Behind?* JAMA. 325(9):829-830. doi:10.1001/jama.2021.1205

In this editorial, the authors discuss the need to address the concerns associated with COVID-19 vaccination programs for those 65 and older without prioritizing accessibility disparities that influence vaccine uptake. They specifically comment on the digitization of health care, transportation, and trust in vaccine safety and efficacy are major factors in the unequal distribution of vaccines for those in the highest risk category for severe illness and death from the virus.

25. Warren RC, Forrow L, Hodge DA, Sr., Truog RD (2020) *Trustworthiness before Trust — Covid-19 Vaccine Trials and the Black Community*. N Engl J Med;383: e121 DOI: 10.1056/NEJMp2030033

This perspective piece discusses the low participation of Black Americans in the COVID-19 vaccine trials despite their disproportionate burden of the virus. A major barrier the authors focus on is vaccine mistrust rooted in historical exploitation by the medical community. Recommendations to overcome this mistrust should not solely fall on the black community but on health care providers and community collaboration. These recommendations include enhancing the transparency within the informed consent process to ensure fair vaccine access to disadvantaged communities.

26. Thompson HS, Manning M, Mitchell J, et al (2021) *Factors Associated With Racial/Ethnic Group–Based Medical Mistrust and Perspectives on COVID-19 Vaccine Trial Participation and Vaccine Uptake in the US*. JAMA Network Open. 4(5):e2111629. doi:10.1001/jamanetworkopen.2021.11629

In this study, authors investigate the relationship between race/ethnicity and the rejection of participating in COVID-19 vaccine trials and vaccine uptake in the US, focusing on the role of medical mistrust. The study consisted of 1,835 adults in the state of Michigan and found that Black participants exhibited the highest levels of medical mistrust and reluctance to participate in trials or accept the vaccine. They addressed the historical and contemporary experiences of racism to understand experiences of racism better and build trust in promoting vaccination amongst marginalized groups. This study provides insight into interventions that can mitigate mistrust in vaccination, especially among marginalized communities, by emphasizing the benefits and importance of race-concordant care.

27. Peña JM, Schwartz MR, Hernandez-Vallant A, Sanchez GR (2023) *Social and structural determinants of COVID-19 vaccine uptake among racial and ethnic groups*. J Behav Med. 46(1-2):129-139. doi:10.1007/s10865-023-00393-y

This study explores the social determinants of COVID-19 vaccine uptake across various racial and ethnic groups. Multiple populations including those with access to a primary care provider were more likely to be vaccinated while Black and Latino populations and those experiencing high levels of health inequalities were less likely to receive the vaccine. Challenges for these unvaccinated groups stemmed from issues including transportation access, appointment scheduling, and misunderstandings about medical eligibility. The study emphasized the need for targeted public health interventions that address and mitigate structural inequalities.

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Primary Care's Role in Addressing Equitable Vaccine Distribution & Overcoming Distrust

28. Sirkin JT, Flanagan E, Tong ST, et al (2023) *Primary Care's Challenges and Responses in the Face of the COVID-19 Pandemic: Insights From AHRQ's Learning Community*. The Annals of Family Medicine. 21(1):76-82. doi:10.1370/afm.2904

In this study, the Agency for Healthcare Research and Quality (AHRQ) brought together a "learning community" to participate in eight virtual sessions over 11 months to discuss topics including public health and primary care integration, addressing misinformation, and clinical wellness. The study involved over 250 participants from 40 states and representing over 200 primary care organizations. Participants involved included clinicians, policy makers, primary care advocates, and quality improvement professionals. Insights from the community highlighted how the COVID-19 pandemic disrupted health care delivery, primary care specifically, and iterated the importance of strengthening primary care-public health partnerships in order to properly address healthcare disparities for patients.

29. Kassler WJ. (2021) *Is There a Future for Primary Care?* Am J Public Health. 111(4):606-608. doi:10.2105/AJPH.2021.306181

This commentary discusses the weaknesses the COVID-19 pandemic revealed in our health care and public health systems and emphasized the urgent need for reform in these fields. Specifically, this health emergency revealed the critical need for improvement in primary care, public health, and health equity, iterating that this requires addressing the underlying causes of poor health, underfunding, and other systemic issues. To achieve this, recognizing the importance of primary care and integrating public health practices into primary care services to more effectively respond to health crises and address health disparities.

30. Crane JT, Pacia D, Fabi R, Neuhaus C, Berlinger N (2022) *Advancing COVID Vaccination Equity at Federally Qualified Health Centers: a Rapid Qualitative Review*. J GEN INTERN MED. 37(4):1012-1013. doi:10.1007/s11606-021-07273-8

This article discusses the role of Federally Qualified Health Centers (FQHCs) in promoting equitable access to COVID-19 vaccination with a focus in underserved communities. The study involved qualitative interviews with PCPs and support staff in two FQHCs to document the strategies used by these individuals in enhancing vaccine access and fostering trust. Strategies of enhancing vaccine access included offering flexible appointments, transportation assistance, and collaboration with community organizations. Strategies to foster trust included leveraging the existing patient-provider relationships during appointments. Findings suggested that FQHCs offer a critical role in providing equitable COVID-19 access through the utilization of fostering trust and overcoming barriers to care in vaccination efforts.

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31. Ratzan S, Schneider EC, Hatch H, Cacchione J (2021) *Missing the Point — How Primary Care Can Overcome Covid-19 Vaccine "Hesitancy."* New England Journal of Medicine. 384(25):e100. doi:10.1056/NEJMp2106137

In this perspective piece, authors discuss the need for primary care, patient's usual source of trusted care, to be included as part of federal and state vaccination strategies in order to mitigate vaccine hesitancy. Difficult cold-storage requirements, scarce supply, and urgency may have justified initial bypassing of outpatient practices but primary care clinicians are uniquely positioned to address patients readiness for vaccination and they are embedded in the communities where people live and work. Authors conclude with, "Planners should expand access by building flexibility into the sites, times, and methods for administering COVID-19 vaccines, engaging the most trusted purveyors of health care in many communities: the doctors, nurses, and community leaders who know how to create access, convey persuasive messages, and deliver care."

32. Badrfam R, Zandifar A. (2021) *Mass immunization and COVID-19: the need for continued primary health care.* East Mediterr Health J. 27(3):312-313. doi:10.26719/2021.27.3.312

This article emphasizes the crucial role of primary care in the context of mass immunization efforts during COVID-19. It stresses that primary care must support the demands of immediate vaccination during a health emergency while maintaining routine health services to prevent other health crises. The dual role is highlighted to emphasize the need for continued support in primary health care systems to maintain the health of their populations.

33. Harnden A, Lim WS, Earnshaw A. (2021) *COVID-19 vaccination programme: a central role for primary care*. Br J Gen Pract. 71(703):52-53. doi:10.3399/bjgp21X714929

By outlining the UK's COVID-19 vaccination programme, the authors note that primary care teams historically deliver large-scale immunization programs effectively in the UK. They highlight the need for a personalized care approach to develop relationships with patients and ensure high vaccine uptake, especially among vulnerable and underserved populations. This editorial emphasizes using primary care to mitigate inequalities exposed by the pandemic and remains optimistic about the capacity of primary care to successfully meet these challenges, a differing perspective compared to most U.S. studies.

34. Bhattacharya J. (2023) *Revitalizing primary care is the key to people's health in the post-COVID era.* Journal of Family Medicine and Primary Care. 12(5):807. doi:10.4103/jfmpc.jfmpc_621_23

Bhattacharya's article provides an overview of the benefits of primary care-focused health systems, finding that this includes better outcomes, increased equity, and saves costs. It emphasizes that despite these advantages, primary care remains underfunded in the United States and advocates for investing in and rebuilding primary care infrastructure. This work focuses on the ability to manage current and future health challenges, looking towards a preventative care model and that places importance on community-based health programs; bridging together public health and primary care infrastructure.

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35. Newton WP, Baxley E, Magill M (2021). *Learning From COVID-19: System Blindness to Primary Care. The Annals of Family Medicine*. 19(3):282-284. doi:10.1370/afm.2705

This article highlights how the COVID-19 pandemic emphasized the longstanding inequities in health care, specifically affecting low-income communities and overlooking the potential of primary care in the pandemic response. While primary care delivers a majority of health care services like vaccinations and routine care, the field had to rapidly adapt during the pandemic by shifting to virtual care and coping with the lack of PPE allocated to them. The authors argue that systemic biases in favoring corporatized health care over patient-centered primary care undermine trust patients have with their PCPs in addressing vaccine hesitancy. The authors call for stronger primary care integration and adequate funding to better serve community needs and retain vaccine trust in primary care.

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VACCINATION AND PRIMARY CARE:

EXAMINING HISTORY AND PROGRESSING TOWARD HEALTH EQUITY

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