The Correlation Between Vaccine Hesitancy and Privilege: Exploring the degree to which education and income foster resistance to vaccination efforts

Sophie Goldenberg
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The Correlation Between Vaccine Hesitancy and Privilege:

Exploring the degree to which education and income foster resistance to vaccination efforts

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Medicine, Health, and Society: Global Health
Abstract

Vaccine hesitancy is a public health issue of growing concern. Extensive pre-existing literature offers several explanations and conflicting viewpoints regarding reluctance toward vaccinations. However, minimal research has been done exploring the upstream social determinants driving vaccine hesitancy. Utilizing academic and gray literature and interviews with experts in the field, this study addresses this gap in knowledge with the research question: To what extent does privilege impact vaccine hesitancy and resistance? Vaccine hesitancy appears globally and is particularly concerning given the re-emergence of vaccine-preventable diseases (VPDs). Additionally, due to inconsistent causes, vaccine hesitancy is difficult to combat. In referencing the history of the anti-vaccination movement and clearly defining social determinants of health (SDH), this study provides clear evidence that suggests a relationship between vaccine hesitancy and privilege, defined as educational achievement and socio-economic status (SES).

Nevertheless, the association between the two is difficult to define given the dichotomous presentation of both low and high privilege with increased vaccine hesitancy. Perhaps knowledge of the relationship of vaccine reluctance with the two extremes of privilege can pave the way for future research into the understanding of this phenomenon.

Keywords: vaccine hesitancy, privilege, education, income
Acknowledgments

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Introduction

Smallpox is the first – and only – successfully eradicated human disease. Public health interventions and increased knowledge surrounding the variola virus (which causes smallpox) largely contributed to this effort. Nevertheless, this major feat could not have been accomplished without the successful development and implementation of a vaccine. In 1796, Edward Jenner revolutionized medicine with his discovery of disease immunity following deliberate exposure. Jenner was not the first individual to suggest inoculation, nor was he the first to demonstrate its success. In fact, the earliest vaccination efforts are linked to ancient China. Nevertheless, due to globalization and persistence, Jenner’s privately published booklet outlining these findings ultimately aided in founding the field of immunology (Riedel, 2005).

Since Edward Jenner’s smallpox vaccine, numerous additional vaccinations have been developed, tested, and refined to safely combat a plethora of pathogens. Most immunizations have proven effective in largely preventing the development of a particular disease or ailment. While no other human disease has been universally eliminated, vaccines have significantly impacted public and global health, namely through their contribution to the reduction of mortality rates for numerous diseases, such as polio. Nevertheless, no vaccine is without risk, which may include side effects, adverse reactions, or incomplete immunity. As such, widespread vaccine use, especially when mandated, has repeatedly been met with opposition.

The anti-vaccination movement, which pre-dated Edward Jenner’s smallpox vaccine, demonstrates a general hesitancy toward vaccinations. During the late 18th century, the initial controversy was often a reflection of general medical distrust, concerns about safety or sanitation, and religious beliefs. The ideology gained support, eventually resulting in the development of the Anti-Vaccination League in England in 1853. The movement has since
VACCINE HESITANCY AND PRIVILEGE

extended beyond Europe and become a global phenomenon. In some instances, reduced vaccination rates have resulted in large-scale disease outbreaks. For example, measles returned to the United States in 2013 after its successful elimination in 2000 (“The Anti-Vaccination Movement,” 2016). In 2019, the World Health Organization (WHO) identified vaccine hesitancy as one of ten major threats to global health, particularly due to its correlation with a greater prevalence of vaccine-preventable diseases (VPDs). While vaccine hesitancy is not the sole reason for these increases, VPDs are resurging in countries that previously had few cases (Ten Threats to Global Health in 2019, n.d.). The ongoing SARS CoV-2 pandemic has demonstrated the contemporary controversy and sustained relevance regarding vaccine hesitancy.

The reasons behind vaccine hesitancy vary drastically. In some circumstances, opting out of routine vaccinations is an uninformed or misguided decision. Media, particularly the internet and social media platforms, can be a highly utilized resource for gaining information on vaccine-related matters, despite uncertainty regarding its credibility. Furthermore, historical, political, and socio-cultural contexts can influence an individual’s decision to vaccinate themselves or their children. In other instances, mistrust in the medical system, religious beliefs, past experiences, or political perspectives may stimulate vaccine hesitancy (Dubé et al., 2013). While there are numerous deliberate causes behind the anti-vaccination movement, perhaps more nuanced, unconscious factors, such as privilege, contribute to vaccine hesitancy.

The purpose of this paper is to explore the role that privilege plays in vaccine hesitancy and subsequent adherence to public health and safety efforts. The primary research question is: To what extent does privilege impact vaccine hesitancy and resistance? This report will clearly define relevant terms, such as vaccine hesitancy, privilege, and social determinants of health (SDH). In answering the primary research question, this report will also explore the history
behind vaccinations and the onset of their resistance, potential solutions for increased opposition to vaccinations, and counterarguments, including the portrayal of privilege as an unrelated indicator of vaccine hesitancy.

**Research Methodology**

This qualitative study is the culmination and analysis of extensive research and two formal interviews with experts knowledgeable in vaccinology and vaccine hesitancy. The data for this research was collected to obtain knowledge and expertise regarding vaccine hesitancy and its potential correlation to privilege. Furthermore, a literature review offered essential background information regarding the history of vaccine hesitancy, SDH, and a definition of privilege.

This study incorporates primary and secondary sources into the literature review and analysis. The academic, peer-reviewed literature was obtained through online databases, such as Google Scholar and the Vanderbilt University Library. Search terms regarding “vaccine hesitancy” and “privilege” proved to be the most effective. The content of this literature ranged from an overview of vaccine hesitancy and its potential correlation with various aspects of privilege to specific geographic or socio-economic case studies. Gray literature was primarily derived from organizations promoting vaccine education and administration.

Interviews were conducted with professionals well-versed in vaccine hesitancy. Several leading experts in the topic matter were contacted as potential interviewees via email. Names and contact information for potential interviewees were obtained through research and academic articles. Contact was not limited to a particular global region due to the possibility of virtual interviews. Interviewees were ultimately selected based on their availability. All interviews were
conducted virtually, via Zoom, due to the geographic locations of the interviewees. Verbal consent was obtained from all individuals participating in this study.

Given his career-long involvement in vaccine hesitancy, Dr. Robert Jacobson was selected as an interviewee. He is the medical director of the Population Health Science Program at Mayo Clinic’s Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery in Rochester, Minnesota. His current work focuses on interventions for vaccine delivery at a population level. Dr. Jacobson’s research predominantly seeks to increase vaccine uptake, specifically in the United States. One aspect of his research involves the specific rhetoric used in vaccine recommendations and how it may impact adherence.

A second interview was conducted with Dr. Matthew Browne. Dr. Browne is a professor of psychology at Central Queensland University in Australia. While much of his research focuses on gambling and addiction, he is interested in why people believe the things they do. As such, several of his academic publications and podcast episodes focus on drivers of vaccine hesitancy. Much of the interview focused on his previous research evaluating the overlap of privilege with vaccine hesitancy in specific Australian regions. Dr. Browne offered additional insight on general trends of vaccine skepticism globally.

Ethical considerations were implemented throughout the duration of this study. Works referenced in this paper were properly cited. Furthermore, this study obtained Human Subject Review from the School for International Training’s Internal Review Board in Nyon, Switzerland. Data collection and analysis were not permitted before the project was approved. No children or vulnerable populations were included in this study. Interviewees were explicitly presented with their rights including privacy, anonymity, and confidentiality. Matters regarding
the approval of quotes and the destruction of any recordings and transcriptions were discussed. There are no conflicts of interest to declare.

This study did pose some difficulties and limitations. One major difficulty was the non-response of potential interviewees. Given the contemporary relevance of this topic, particularly considering the SARS-CoV-2 pandemic, relevant professionals who did reply had limited or no availability for an interview. Subsequently, no professionals from Switzerland or Europe were interviewed. However, the use of interviewees from different continents added dimension and diversity to the study. Additionally, the information obtained from the few interviews was not sufficient without the support of peer-reviewed literature and other secondary sources. Time was a significant limitation for this project. This topic is extensive and growing in relevance. As such, this study is non-exhaustive and simply serves as a review of available information and a starting point for future research. Furthermore, available literature tends to present information regarding vaccine hesitancy with a bias toward vaccinations. Additionally, both interviewees presented clear pro-vaccinated sentiment, which is also evident in their research. As such, the presented information may lack complete neutrality.

Literature Review

History of Vaccine Hesitancy and the Anti-Vaccination Movement

It is not uncommon to discover that a favorite public figure – celebrity, athlete, or politician – is vaccine-hesitant. Despite the recent uptick in its popularity, anti-vaccination sentiment preceded the development of modern immunizations. The first recorded onset of the movement was in France in 1763. Gatti, an Italian doctor, introduced Parisians to inoculation. However, due to improper adherence to quarantine measures, the health and safety of other
community members were placed at risk. As such, the French Parliament banned further inoculation in Paris. Despite these governmental actions, inoculation gained popularity and eventually led to Edward Jenner’s smallpox vaccine in 1796. Following The Vaccination Act of 1853 in England, which mandated smallpox vaccination for all infants within three months of birth, the Anti-Vaccination League developed. As those in opposition – and the Anti-Vaccination League – spread across the globe, various demonstrations, court battles, and even angry mobs sought to eliminate vaccine mandates. (“The Anti-Vaccination Movement,” 2016).

During the 20th century, the efficacy and safety of numerous vaccinations were questioned. In 1955, the Cutter Laboratories in California inadvertently produced Salk polio vaccine doses containing the live virus. This incident resulted in vaccine administration which caused polio, as opposed to preventing the disease. As a result, many became wary of immunizations allegedly containing an inactivated virus. Furthermore, a 1974 report from London linked neurological conditions to the Diphtheria, Tetanus, and Pertussis (DTP) vaccine. Subsequently, global DTP vaccination rates plummeted, while respective epidemics increased (“The Anti-Vaccination Movement,” 2016). Andrew Wakefield’s 1998 article in The Lancet is perhaps of the most well-known arguments against vaccinations – specifically the Measles, Mumps, and Rubella (MMR) vaccine. Wakefield’s article falsified data to link the MMR vaccine with autism (and gastroenterology disease). Although the study has been discredited, The Lancet has retracted the article, and Wakefield’s medical license was revoked, this argument remains prominent among those who are vaccine-hesitant (McClure et al., 2017).

Many contemporary concerns regarding vaccinations closely parallel those of initial hesitancies, despite the refinement of immunizations and the introduction of new medical technologies. The most prominent arguments include the necessity and safety of vaccines, the
science behind them, and compulsory policies. Initial critics suggested that vaccines caused more harm than they prevented. Due to successful vaccination campaigns, many lack contemporary familiarity with VPDs. As such, the benefits of vaccines are muddled, while perils are evident (M. Browne, personal communication, April 20, 2022). Therefore, the need for vaccines remains contested. Furthermore, regulations mandating vaccination have consistently been met with opposition. In the United States, one case made its way to the Supreme Court, the highest legislative authority in the country. The 1905 *Jacobson v. Massachusetts* case upheld the government’s jurisdiction in mandating vaccines (Schwartz, 2012). During the 2019 SARS-CoV-2 outbreak, nearly 100 years later, attempts to mandate vaccination were resisted.

The movement against vaccinations appears to be straightforward; individuals opt to vaccinate (themselves or their children), or they refuse to do so. However, vaccine hesitancy functions on a continuum. While some refuse vaccinations altogether, a larger proportion of the population expresses concerns or doubts, instead choosing to delay or omit specific vaccinations (McClure et al., 2017). The population can generally be divided into four groups: vaccine seeking, vaccine complacent, vaccine-hesitant, and vaccine-resistant. Those who are vaccine seeking and resistant are the two extremes. Those who are vaccine complacent are not against vaccinations, rather they seek them at their own convenience or with strong urging from trustworthy sources. Individuals who are vaccine-hesitant are not actively against vaccines, nor do they necessarily doubt science. Instead, they are ambivalent. Ultimately, vaccine seeking, vaccine complacent, and vaccine-hesitant individuals comprise the vast majority of the population (R. Jacobson, personal communication, April 26, 2022). For example, in the United States, only 0.7% of children under three years of age were completely unvaccinated against any
disease (R. M. Jacobson et al., 2015). As such, it is important to identify an explicit distinction between those who are vaccine-hesitant and those who refuse vaccination in all its forms.

In 2012, the WHO’s Strategic Advisory Group of Experts on Immunization (SAGE) Working Group on Vaccine Hesitancy (WG) was tasked with developing a definition for vaccine hesitancy. After deliberation and refinement, the WG released the definition:

Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence. (MacDonald, 2015)

The WG incorporated the “3 Cs” model into this definition, attempting to summarize the overarching complexities of vaccine decision-making. While confidence demonstrates overall trust in vaccines, those who create them, and those who promote them, complacency elicits perceived risks associated with vaccination uptake and VPDs. Finally, convenience encompasses a variety of factors. To a degree, convenience embodies the physical ability to obtain a vaccination, including geographic, timeliness, and language constraints and barriers (MacDonald, 2015). In the case of COVID-19, two additional “Cs” have been included in the model: calculation and collective responsibility. Calculation elicits an individual’s engagement in and consideration of research weighing all the benefits and risks. Collective responsibility regards the willingness to protect others through vaccinating themselves (Robson, 2021). All five of these factors (confidence, complacency, calculation, convenience, and collective responsibility) are important determinants in an individual’s decision to vaccinate against any disease.
Communication is an additional consideration in defining vaccine hesitancy. Technological advancements have made communication faster and more effective. While poor communication may fail to provide adequate information about the health benefits of vaccinations, the oversaturation of media may also lead to increased hesitancy. The initial spread of the anti-vaccination movement was spread through face-to-face, verbal communication. Nowadays, websites, blogs, and email lists quickly connect individuals and allow them to openly share their experiences and theories. Furthermore, a multitude of resources, both factually correct and those based on misinformation, are readily available through the internet and social media. Subsequently, it has become difficult to distinguish between reputable and untrustworthy sources (Schwartz, 2012).

**Social Determinants of Health and Defining “Privilege”**

SDH are the upstream, non-medical factors that ultimately impact health, functioning, and quality of life. In simpler terms, SDH are the antecedents of the causes of health outcomes. According to the WHO, “They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life,” (Social Determinants of Health, n.d.). SDH differ from health determinants, such as governmental policies, and biological or genetic factors. Some examples of SDH include income, education, gender (in)equity, food (in)security, neighborhood conditions, and access to safe drinking water (NEJM Catalyst, 2017). Though SDH do not necessarily seem connected to health, they are of the most influential factors. Research has repeatedly revealed SDH to account for 30-55% of health outcomes (Social Determinants of Health, n.d.).
Beyond impacting health outcomes, SDH are also linked to health equity. The 2005-2008 WHO Global Commission on SDH was developed to identify and find solutions for SDH that were negatively impacting countries with poor health outcomes. This commission viewed health holistically, regarding the entire world, as opposed to focusing solely on the “Global North” or “Global South.” The Global Commission on SDH explicitly states:

The poor health of the poor, the social gradient in health within countries, and the marked health inequities between countries are caused by the unequal distribution of power, income, goods, and services, globally and nationally, the consequent unfairness in the immediate, visible circumstances of peoples lives … and their chances of leading a flourishing life. (The Commission on Social Determinants of Health, 2008, p. 1)

This final report essentially reveals the various manners in which SDH can both positively and negatively impact health. The positive associations between SDH and beneficial and detrimental health outcomes create extensive inequity. For example, income is an important SDH. Those with higher incomes are afforded a higher quality of care through entities, such as better insurance coverage, access to the best practitioners, and increased out-of-pocket treatment options. Furthermore, income directly impacts and enables other SDH. Individuals of higher socioeconomic status (SES) are more likely to have access to adequate transportation, higher quality education, and nutritious, well-balanced foods. These positive trends are a stark contrast to the negative impact that SDH may have on overall health outcomes. An individual of lower SES may live or work in an environment that is polluted, have few, if any, resources to invest in healthy behaviors, such as exercise, or be unable to access annual physicals. Therefore, the presence of SDH yields great inequity in health outcomes between those who are impacted positively and negatively.
For this specific study, privilege will be defined in terms of education and socio-economic status (SES). Education and income (measured as SES) are two important and interconnected SDH. Frequently, these determinants are closely linked, as education level and quality of educational institutions tend to further advance an individual’s economic attainment. For example, an individual with a university-level degree will typically reach a higher income than one who did not obtain a high school diploma. Conversely, students of higher SES have been demonstrated to have higher academic achievement. While there are exceptions, vast research, and experimentation have confirmed this positive association (Broer et al., 2019). Subsequently, the overlap between these two measures of privilege makes them ideal identifiers of the potential correlation with vaccine hesitancy.

Analysis

Presence and Impact of Vaccine Hesitancy

Vaccine hesitancy appears across the globe without clear association with a specific race, religion, or community. Nevertheless, it poses a threat to the overall public and global health (Dubé et al., 2014). Vaccine hesitancy – which often predicts under- and delayed childhood vaccination – is a complicated behavior that can be influenced by a variety of highly variable determinants. Despite extensive research conducted on the topic, there is no singular factor that uniformly influences vaccine hesitancy across global populations (Larson et al., 2014).

Figure 1 graphs the child vaccination rates for DTP and measles across 44 countries. The included countries represent all continents (excluding Antarctica) and a variety of developmental stages and wealth ranges. Only one of the 44 countries (Hungary) has obtained a universal rate of
vaccination. Deviation from complete coverage can be caused by numerous factors, including vaccine hesitancy (OECD, 2022).

As evident in Figure 2, Europe’s sentiment toward vaccine safety is relatively negative. France and Bosnia & Herzegovina are two countries disagreeing most with sentiments regarding vaccine safety. A 2016 survey among over 65,000 individuals in 67 countries revealed that 41% and 36% of respondents from France and Bosnia & Herzegovina, respectively, responded negatively to vaccine-safety-related sentiment. The prevalence of these responses is particularly stark when compared with the global average of 13%. Nevertheless, vaccines are widely available and accessible in many European countries. The high hesitancy in the region does not enforce the ideology that low vaccination uptake corresponds to insufficient or inadequate resources (Larson et al., 2016).
Figure 2. Global response "tend to disagree" or "strongly disagree" responses to the statement "Overall I think vaccines are safe" (Larson et al., 2016).

Vaccine-hesitant individuals are protected, to a degree, by herd immunity, which is developed through adherence to vaccination recommendations. Herd immunity occurs when a large percentage of a population is protected against a specific pathogen. Individual protection against VPDs typically includes three doses of DTP and one dose of the measles vaccine. Global herd immunity against outbreaks of VPDs requires 95% coverage. However, as resistance to vaccines persists, herd immunity becomes more difficult to attain, as the necessary level of immunity is not being achieved. For example, since 2010 global vaccination coverage has remained stagnant at approximately 86% and is not sufficient to create a global herd immunity (20 Million Children Miss out on Lifesaving Measles, Diphtheria and Tetanus Vaccines in 2018,
2019). Furthermore, in referencing Figure 1, many of the listed countries have not obtained herd immunity, as one or both graphed vaccination rates are below 95%.

When individuals without a specific vaccination cluster together, a pocket of under-immunization is created. Subsequently, these areas are more likely to present with cases of VPDs (R. M. Jacobson et al., 2015). Measles outbreaks can serve as an indicator of gaps in vaccination due to the disease’s highly contagious nature. Complications associated with measles infection include pneumonia, hearing loss, brain damage, and mortality (Malaysia: Addressing Vaccine Hesitancy, 2016). When measles outbreaks occur in the world’s poorest countries, whose inhabitants are at disproportionate marginalization and risk, the health outcomes are often the most severe. Conversely, measles cases in privileged settings are not of the same concern, given the accessibility and availability of lifesaving treatment and care (20 Million Children Miss out on Lifesaving Measles, Diphtheria and Tetanus Vaccines in 2018, 2019). Therefore, since the harmful effects of the measles (and other VPDs) are not perceived as threatening in these areas, the necessity of vaccinations is less apparent (M. Browne, personal communication, April 20, 2022).

Case Study: Malaysia

As vaccine hesitancy increases, the greatest threat is the reintroduction of VPDs into regions that have significantly limited or eliminated them. The national vaccination coverage for young children has exceeded 90% in Malaysia. This achievement is largely due to the Malaysian National Immunization Program, which provides vaccination against twelve major childhood diseases in all government clinics and hospitals across the country, free of charge. Nevertheless, between 2013 and 2018, measles cases in Malaysia rose 892% (from 195 to 1,934 cases). To an
extent, the high measles prevalence can be attributed to an influx of migrants. However, the measles cases among non-immunized individuals rose during this same period from 125 to 1,467 cases, respectively (Wong et al., 2020). Furthermore, official reports reveal a drastic upsurge in parents refusing vaccinations for their children. Between 2013 and 2015, the rate of vaccine non-acceptance rose by nearly 175%; from 470 to 1,292 children, respectively (Malaysia: Addressing Vaccine Hesitancy, 2016).

In addition to the resurgence of VPDs, Malaysia is now struggling with the necessary response to its subsequently impending crisis. Health professionals have attempted to identify potential solutions without avail. Some advocate for compulsory vaccinations. However, critics claim it would reinforce many of the sentiments that align with vaccine hesitancy. Data from 2016 attributed vaccine non-uptake to accessibility issues and personal reasons. For example, individuals residing in remote or isolated areas may be difficult to access. The Aborigine population is an instance of an unvaccinated community due to this reasoning. Alternately, legislation mandating vaccinations could also ostracize individuals concerned that vaccines are non-Halal. Malaysia is a majority Muslim country, and no vaccine has been fully certified as Halal by the country’s Islamic council. Alternate propositions include the creation of a computerized vaccination registry, the vaccination of children of migrants, and the implementation of supplementary immunization activity. While these interventions may mitigate the rise in VPDs, they may not combat the country-specific causes behind vaccine hesitancy (Wong et al., 2020).

Ultimately, this case study reveals the potential risk vaccine hesitancy poses to overall society. Currently, the Malaysian government and health professionals are faced with difficult decisions in combatting the rise in vaccine hesitancy and the increased prevalence of VPDs.
However, in a context-specific setting, the rise in Malaysian VPDs reveals the cultural nuances that drive vaccine hesitancy and ultimately contribute to the receptiveness of interventions.

*Efforts to Increase Vaccine Uptake*

As demonstrated in the Malaysian case study, mitigation efforts for vaccine hesitancy must regard contextual and cultural variances within the targeted country. No evidence-based approach exists that is universal. Historically, some interventions have backfired and, ultimately, strengthened hesitancy and resistance. As such, efforts to increase vaccine acceptance must be carefully considered before implementation (R. M. Jacobson et al., 2015).

The United States and Luxembourg are two countries in which vaccinations are typically administered in medical facilities, as opposed to schools or work offices. Evidently, the educational efforts utilized in this system (e.g., within waiting rooms, brochures, and public service announcements) have proven ineffective. Furthermore, maintaining vaccinations within doctors’ offices limits accessibility to those who adhere to routine checkups. In the United States, insurance coverage is also a significant barrier. In such instances, expanding vaccination accessibility to public and well-trafficked areas, such as schools and work offices, may increase vaccine uptake (R. Jacobson, personal communication, April 26, 2022).

Confusing recommendations may also contribute to vaccine hesitancy. The language utilized in encouraging vaccinations often poses it as a choice. As such, individuals are more inclined to question the recommendation, as it lacks clarity. For example, when a health professional announces, “You are due for …” it equates to a strong recommendation. Alternately, statements, such as “What are your thoughts on…” are weak, as they make a negative response reasonable (R. Jacobson, personal communication, April 26, 2022). While the
latter offers an opportunity for communication, the lack of assurance from a seemingly reputable source is concerning and may create additional hesitancy. Furthermore, multiple studies have demonstrated presumptive, as opposed to participatory, approaches to provider-parent vaccine conversations are the most effective approach for vaccine acceptance (McClure et al., 2017). Extensive research demonstrates the role that language plays in vaccine hesitancy. While deliberate word choice or phrasing can decrease hesitancy, the presentation of information in foreign languages may also make an impact. For bilingual individuals, one language may be associated with greater public trust. Subsequently, even if the information received is equivocal, the perception of it may be changed. Communication, which essentially is the manner in which information is transmitted and obtained, is a critical aspect of increasing trust and reducing vaccine hesitancy (Witynski, 2022).

Since no clear strategy to combat hesitancy exists, perhaps the transmission of knowledge among those involved in the administration of immunization is of the most important interventions. The causes and prevalence of vaccine hesitancy are context-specific. Therefore, health care providers and those associated with immunization programs must know how to properly identify and address them (Dubé et al., 2014). At a population level, notions such as transparency in vaccine policy and equipping vaccination administrators with the necessary tools to properly communicate with vaccine-hesitant individuals may also aid in increasing the overall vaccine uptake (Dubé et al., 2013). Nevertheless, this aspect of vaccine hesitancy requires further research and experimentation to uncover effective mitigation strategies.
Contribution of Increased Privilege to Vaccine Hesitancy

Low vaccine uptake is not necessarily strongly correlated to the inaccessibility, unavailability, or abundance of immunizations. According to Larson et al. (2016), “Countries with the highest levels of schooling and good access to health services are associated with lower rates of positive sentiment, pointing to an emerging inverse relationship between vaccine sentiments and socio-economic status.”

Studies in high-income countries are showing trends in which vaccine hesitancy is most prevalent among individuals who are in the upper-middle class and highly educated (Swiss TPH, 2021). Furthermore, the most highly educated individuals (Masters/Ph.D.) report similar sentiment regarding vaccine importance to those with little-to-no education. As such, vaccine hesitancy cannot reflect minimal knowledge or health literacy (Larson et al., 2016).

Immunization managers, who are responsible for overseeing immunization programs at state and national levels, tended to agree that non-compliant individuals were of high education levels, well-informed, and interested in health-related issues. This observation was obtained during a global study, revealing that this association is not limited to a specific geographic region (Dubé et al., 2014).

Case Study: Southeastern France

France is an interesting case study, particularly given the high skepticism of vaccine safety. Perhaps some of the hesitancy is correlated with French vaccine scares within the past few decades. For example, during the 1990s, media reports advertised a link between hepatitis B vaccination and multiple sclerosis. In addition to the hepatitis B immunization, the H1N1, HPV, and DTP vaccinations have been the rhetoric of controversy in France. According to the French
official immunization schedule, all children should be vaccinated against eleven diseases (Peretti-Watel et al., 2019).

In 2014, Peretti-Watel et al. conducted a comparative, interview-based study in Southeastern France. This research sought to identify the variances in child vaccination sentiment among individuals of varying socio-demographic statuses. Participants, who were parents of young children, were recruited through two nursery schools to interview for this study. These schools were selected given the drastic socio-demographic variances between their communities. The Gooseberry School was a poor, suburban public school, with many students coming from single-parent, unemployed, and migrant households. Alternately, Blackberry School was a downtown-based, private school located in a more affluent area. This study included 25 interviews, twelve of whom were mothers from the Gooseberry School and thirteen of whom were parents from Blackberry School (eleven mothers and two fathers). While this study is not necessarily reflective of all French parents’ positions regarding vaccine hesitancy, it has the potential to evaluate the role that privilege may play. Furthermore, at the time the interviews were conducted, the French official immunization schedule mandated vaccination against three diseases (diphtheria, tetanus, and polio), while eight additional were recommended (measles, mumps, rubella, Haemophilus influenzae, hepatitis B, pertussis, pneumococcus, and meningococcus). In 2018, vaccination for all eleven of these diseases became mandatory (Peretti-Watel et al., 2019).

As demonstrated in Table 1, the participants whose children attended Gooseberry School consistently had higher vaccination rates than their Blackberry School counterparts. While all the children at Gooseberry School were vaccinated against DTP and MMR, only nine and ten from Blackberry School were vaccinated, respectively. Furthermore, the vaccination rate against
VACCINE HESITANCY AND PRIVILEGE

hepatitis B is stark, with 83.3% and 46.2% of students immunized at Gooseberry School and Blackberry School, respectively. Gooseberry School’s protection against hepatitis B is nearly double that of Blackberry School, both from a percentage and numerical standpoint (Peretti-Watel et al., 2019).

Table 1. Study results from 2014 reveal a potential correlation between school enrollment, parents’ educational achievement, and child’s immunization status (Peretti-Watel et al., 2019)

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<thead>
<tr>
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<th>Gooseberry School</th>
<th>Blackberry School</th>
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<tr>
<td>Parents’ educational level</td>
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<td>0/24</td>
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<td>23/24</td>
</tr>
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<td>Child’s immunization status</td>
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<td></td>
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<td>9/13</td>
</tr>
<tr>
<td>MMR</td>
<td>12/12</td>
<td>10/13</td>
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<tr>
<td>Hepatitis B</td>
<td>10/12</td>
<td>6/13</td>
</tr>
<tr>
<td>Meningococcus</td>
<td>8/12</td>
<td>7/13</td>
</tr>
</tbody>
</table>

Despite the discrepant immunization rates, many parents – from both schools – expressed doubts and hesitancy toward specific vaccinations. Very few of the participants’ children had received all required and recommended vaccines and many reported delayed vaccinations. Parents who lived through the controversial hepatitis B vaccination campaign during the late twentieth century reported their personal experiences impacted their decision not to vaccinate their children against hepatitis B. Many of the causes of vaccine hesitancy were similar between
the two groups of participants: personal experience and fear of side effects. However, participants with children attending the more affluent Blackberry School also regarded the necessity for vaccinations, along with their invasive and unnatural nature. Comparatively, the parents from the Gooseberry School appeared to know little of specific vaccines, beyond their names (Peretti-Watel et al., 2019).

Though the two groups possessed similarly hesitant sentiments regarding vaccinations, it is evident that fewer vaccinations were administered to participants’ children at the Blackberry School. While there is no apparent reasoning for this trend, it is possible that participants at Gooseberry School were more likely to vaccinate their children despite enduring doubts and hesitancy. Social pressure can contribute to a parent’s decision to vaccinate their child. For example, doctors and nurses, who are viewed as trustworthy professionals, may urge parents to vaccinate their children. Additionally, Western ideals may label parents as “bad” through their rejection of perceived health-promoting activities for their children (Deml et al., 2022). Subsequently, parents may make vaccination decisions to avoid judgment or unsolicited input, rather than following their personal beliefs. Furthermore, these discrepancies may correlate with the degree of privilege possessed by the participants:

Parents with a higher socioeconomic status were able to engage more resources and use a wider repertoire of actions, and they also displayed greater health literacy. From this perspective, vaccine hesitancy illustrates how “the sphere of responsible mothering” expands, and how mothers who lack money, time and other resources struggle to conform to contemporary risk culture. (Peretti-Watel et al., 2019)

Since the more affluent parents addressed vaccine hesitancy with greater resources, such as fully developed knowledge of the topic matter and increased financial flexibility, perhaps their
arguments were met with more reverence and credibility. Alternately, privileged families may be able to select a health care provider based on their beliefs and trust, as opposed to the most cost-effective option or insurance coverage (Deml et al., 2022). Nevertheless, this case study of two Southeastern French nursery schools reveals evidence of a potential negative correlation between privilege and vaccine acceptance. However, it continues to pose a question regarding the association of vaccine hesitancy with privilege because the parents from both schools relayed similar sentiments of skepticism.

Case Study: Australia

The correlation between privilege and vaccine hesitancy has been explored in various Australian regions. Extensive research has mapped out vaccination coverage and identified regional vaccination trends and patterns. Within the country, under-immunization and VPD outbreaks appear to cluster geographically. The Australian national aspirational coverage target for VPD immunity has been set to 95% by the government. Though significant strides in immunization coverage have been made, clusters of low vaccination rates and vaccine resistance are impeding the attainability of this goal. Logistical and accessibility issues contribute, to an extent, to lowered vaccination rates. However, of greater concern are the increasing number of those who are vaccine-hesitant or refusing (Bryden et al., 2019).

Utilizing the 2016 Australian Census of Population and Housing, Bryden et al. (2019) conducted an ecological study, analyzing the overlay of communal-level vaccination data with socio-demographic variables. As demonstrated in Table 2, the data provide evidence that postcodes with lower vaccination rates had a high classification of privilege (as demonstrated by completion of post-secondary education, high weekly incomes, and white-collar jobs – except for
the unemployment indicator). In a general, purely data-based sense, postcodes with relatively greater privilege demonstrated a great inclination away from vaccination, while those that were relatively more disadvantaged demonstrated higher vaccination rates. Given the format of this study, inferences cannot be made regarding individual behavior making regarding vaccination. Subsequently, the data provided offers a reflection of general, group applicable trends. As such, information regarding the direct drivers of vaccination is unavailable (Bryden et al., 2019).

Table 2. Relevant area-based socio-demographic variables for, on average, more of the target population (Bryden et al., 2019).

<table>
<thead>
<tr>
<th>Postcodes with Lower Vaccination Rates</th>
<th>Postcodes with Higher Vaccination Rates</th>
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<tbody>
<tr>
<td>With a bachelor’s degree level or higher as their highest level of education;</td>
<td>Having only completed year 10, 11, or 12 as their highest level of education;</td>
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<tr>
<td>Being unemployed; having an occupation as a manager, professional;</td>
<td>With an occupation as a technician or trade worker, community and personal service worker, clerical and administrative worker, sales worker, machinery operator and driver, laborer;</td>
</tr>
<tr>
<td>With a weekly income of $2000-3000; with a very high personal weekly income ($3000 and over).</td>
<td>With a lower personal weekly income (&lt;$1000; and $1000-2000).</td>
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</table>

To identify potential reasons for vaccine hesitancy among individuals with higher SES, Swaney & Burns (2019) conducted interviews with parents (eleven) and health care providers (seven) in Perth, Australia in 2017. Participation inclusion was based on an annual gross combined income greater than $125,000 AUD. Given the small sample size and qualitative nature of this research, the results are not representative of all Perth residents, nor are they an accurate depiction of all individuals of high SES (Swaney & Burns, 2019).
Similar sentiments expressed throughout the interviews were categorized in a theoretical model with four themes: education, health control, vaccine risk, and trust. Parents expressed beliefs that their higher education enhanced their health literacy and ability to make sound, logical medical-related decisions. Another expressed explanation lay within an individual’s ability to control their health. Healthism, which is this notion that prioritizes individual health, largely disregards social responsibility and herd immunity. As such, vaccinations are viewed solely through a self-centric lens, instead of acknowledging the role of the community in disease prevention and spread. Furthermore, interviewees portrayed a low perception of risk “because they live in Australia, and in particular, Perth,” (Swaney & Burns, 2019). Subsequently, greater fear was demonstrated for vaccine side effects than VPD infection. Finally, the parents displayed mistrust in the information they receive regarding vaccination. Instead, they desired information that was more personalized and emotive. However, despite expressing these sentiments regarding ineffective information, the interviewees remained steadfast in their ability to make the best vaccination decisions for their children (Swaney & Burns, 2019). This research ultimately reveals potential drivers behind lowered vaccination rates in Perth, Australia, and perhaps contributes to the country’s difficulty in achieving its vaccination coverage goal.

**Privilege as a Confounding Variable**

Both income and education have frequently been identified as significant determinants of vaccine hesitancy. Privilege has been demonstrated to have an inverse relationship with vaccine acceptance. However, often simultaneously, the relationship is positive. “Vaccine hesitancy determinants like education and socio-economic status do not influence hesitancy in only one
direction” (MacDonald, 2015). Strictly speaking, vaccine hesitancy is evidently caused by income and educational attainment, both high and low.

In a systematic review of published literature between 2007 and 2012, Larson et al. uncovered both levels of income and education to be influential determinants of vaccine hesitancy. Of the 76 included studies, eight and six regarded income and education, respectively. Furthermore, these were two of the three contextual influences mentioned in the systematic review (the third being communication and media environment). Nevertheless, the results associated with both education and income were inconsistent. In China, Lebanon, and Israel higher education was presented as an indication of vaccine hesitancy. Alternately, in Greece, The Netherlands, and Pakistan it was viewed as a promoter of vaccination. While literature varied between countries, contradictory results were produced within a given country, too. For example, two included studies from the United States revealed conflicting evidence, as one suggested high SES as a barrier to vaccination, while the other low SES. Despite the evidence available for the extremes of the continuum of income, middle-level income was identified as a non-significant influence on vaccine hesitancy (Larson et al., 2014).

Given the discrepant representations of privilege as a factor of vaccine hesitancy, perhaps it must be considered an independent or confounding variable. According to Larson et al., “The reasons why these factors were influential are not always explained, and when they are, other influencing factors are usually cited” (2014). Subsequently, these aspects of privilege cannot be considered in isolation. As such, perhaps privilege does not directly impact vaccine hesitancy, instead only bolstering the true determinants.

Beyond privilege, many other factors may influence and drive vaccine hesitancy. From a psychological standpoint, vaccine hesitancy considers aspects of risk-taking. For example, risk-
taking is elevated among young men. Therefore, regions with greater proportions of young men may experience heightened levels of vaccine hesitancy (M. Browne, personal communication, April 20, 2022). More contemporarily, political viewpoints have also contributed to vaccine resistance. In the United States, especially regarding the COVID-19 vaccine, vaccine hesitancy and anti-vaccination sentiment have closely aligned with political beliefs and party alignment.

Alternately, vaccine hesitancy is an individualistic notion, particularly given the reliance upon herd immunity for protection. As such, the individualistic or collectivist nature of a specific country may also impact the prevalence of vaccine hesitancy (M. Browne, personal communication, April 20, 2022). In independent societies, decision-making can, to a degree, be callous. Healthy individuals without increased morbidity who choose not to vaccinate are not necessarily putting themselves in danger. However, there is a lack of regard for communal responsibility (R. Jacobson, personal communication, April 26, 2022). Healthism is another prominent cause of vaccine hesitancy, as demonstrated in the Australian case study, particularly in individualistic settings. Individuals adhering to healthism saturate themselves in health information and execute the best health practices. Subsequently, these parents prefer to evaluate the safety and risk of vaccines through their attainment of information, often appearing more hesitant. Since healthism tends to incorporate the natural attainment of immunity, such as that through breastfeeding, practicing parents may also seek alternative medicines in lieu of routine vaccinations (SwissTPH, 2021).

**Conclusion**

Vaccine hesitancy is a complex, multi-faceted public health concern. Though under-vaccination is not a new phenomenon, it threatens to reintroduce successfully eliminated VPDs.
Despite low-risk perceptions associated with VPDs, their reemergence can create dire circumstances, particularly in poorer regions. Given the disproportionate impact of reduced vaccine acceptance, the question of the degree to which privilege, which has been defined as high educational levels and SES, contributes to vaccine-hesitant sentiment arises. While high levels of privilege do indeed correlate to vaccine hesitancy, so too do low levels of privilege. Therefore, while some relationship between the two factors is evident, there is not necessarily enough evidence to identify privilege as causal.

Even before Edward Jenner’s revolutionary smallpox inoculation, skepticism and outright rejection of this preventative measure were apparent. The history of vaccinations, and the concurrent development and strengthening of anti-vaccination movements, remain relevant in understanding the motivations behind and considerations of vaccine hesitancy. Initial critics of vaccinations were wary of the efficacy and science behind them. Andrew Wakefield’s falsified publication in *The Lancet* is perhaps the landmark argument against vaccinations. Though the link between the MMR vaccine and autism has been discredited, many continue to question the safety of vaccinations.

Today, vaccine hesitancy appears across the world. As its presence has continued to increase, under-vaccination has become of dire concern. VPDs are reappearing in countries and regions where they had previously been eradicated. Given the unfamiliarity with some VPDs, individuals miscalculate the true risk they pose. Subsequently, VPDs will be returning to places that are ill-equipped to manage the fallout. Thus far, the weakening of herd immunity and VPD outbreaks, along with subsequently increased mortalities have been attributed to vaccine hesitancy. Though vaccine hesitancy appears universally, it is influenced by many nuanced factors. As such, no simple evidence-based solution exists to mitigate skepticism toward
vaccinations. Future directions for research should consider mitigation strategies, both universally and in context-specific settings.

In many instances, the completion of post-secondary education (either at a bachelor’s or graduate level) and high income have been tied to the heightened prevalence of vaccine hesitancy. This trend is particularly evident in case studies of Southeastern France and Australia. Alternately, low SES and incomplete education have also been demonstrated to be a barrier to vaccination acceptance. Given the inconsistent role that privilege (or lack thereof) plays in vaccine hesitancy, some may argue against any relationship between the two. Furthermore, other factors, such as political polarization, the individualistic nature of a country, and risk-taking, may ultimately contribute to decisions regarding vaccinations and may prove worthy of future research.

In free countries, everyone possesses the ability to make independent decisions regarding any public health matter. While vaccination is one example, practices such as smoking cigarettes and seat belt use are also personal preferences. Nevertheless, these choices ultimately have a collective impact. Vaccination is simply one of many preventative public health interventions that are viewed controversially. Clear reasoning exists to explain why individuals opt in or out of specific interventions. However, the upstream factors, including privilege, which influence these decisions are less evident. Though this study may fail to support a defined causal relationship between privilege and vaccine hesitancy, it provides ample evidence to suggest the existence of some connection between the two. In instances of both low and high prevalence, the notion of privilege tends to produce heightened rates of vaccine hesitancy. Perhaps the future direction of this research may explore why the two extremes of privilege impact vaccine hesitancy in an opposite manner than its neutral counterpart.
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>DTP</td>
<td>Diphtheria, Tetanus, and Pertussis</td>
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<tr>
<td>MMR</td>
<td>Measles, Mumps, and Rubella</td>
</tr>
<tr>
<td>SAGE</td>
<td>Strategic Advisory Group of Experts on Immunization (WHO)</td>
</tr>
<tr>
<td>SDH</td>
<td>Social determinants of health</td>
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<tr>
<td>VPD</td>
<td>Vaccine-preventable disease</td>
</tr>
<tr>
<td>WG</td>
<td>Working Group on Vaccine Hesitancy (SAGE)</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Bibliography

20 million children miss out on lifesaving measles, diphtheria and tetanus vaccines in 2018.

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