Spring 5-2022

An Examination of Historical Health Disparities of the Black Population in America, and Their Effects on Contemporary Health Disparities in COVID-19 Vaccine Hesitancy

Sophia-Evelyne Blake Nehama

An Examination of Historical Health Disparities of the Black Population in America, and Their Effects on Contemporary Health Disparities in COVID-19 Vaccine Hesitancy

An honors thesis presented to the
Department of Public Health,
University at Albany, State University of New York
in partial fulfillment of the requirements
for graduation with Honors in Public Health
and
graduation from The Honors College

Sophia-Evelyne Blake Nehama

Research Mentor: John Justino, M.S.
Research Advisor: Ashley M. Fox, Ph.D.
Research Advisor: Beth J. Feingold, Ph.D.

May 2022

Abstract

The COVID-19 pandemic has highlighted the significant health disparities that the African American population faces in comparison to White Americans. The Tuskegee Syphilis study is often cited to support the theory that medical mistrust is responsible for these disparities despite conflicting opinions that medical distrust is not the main reason for disparities. This study examines the effects that historical health disparities in Black populations have on contemporary vaccine hesitancy. An analysis of recent sources, including peer reviewed historical analysis and news articles with accredited sources was used to make up the entirety of the literary review. For data on contemporary vaccine disparities, articles were retrieved through PubMed, with key words being "African-American" "Health disparities" and "Vaccine Disparities." Articles were chosen within the past five years to assess current vaccine disparities, and articles with data from roughly 10 years and 20 years prior were used to establish trends in vaccine hesitancy across racial and ethnic groups. Linear regression analysis of survey data was present in all articles in which data was collected. This study found a long history of medical racism; distrust in healthcare systems, providers, and the government; and a lack of outreach to inform Black communities were the main causes of vaccine disparities. Examples such as the Tuskegee Syphilis study are often used to oversimplify the causes of hesitancy in Black communities, and as a result the main reasons for vaccine hesitancy is not addressed on an individual or policy level. Instead of oversimplifying the cause of medical disparities and distrust to singular historical events, public health researchers must focus on a broader set of reasons for vaccine hesitancy through communication with Black communities in order to create effective strategies to eliminate health disparities in vaccination. Additionally, addressing broader systematic disparities within the medical field towards Black communities will be far more effective at combating vaccine hesitancy in the long term.

Keywords: *Tuskegee syphilis, Health disparities, COVID-19, Vaccine hesitancy*

Acknowledgements

I have many people to thank for the existence of this thesis. Professor John Justino, the Interim Undergraduate Program Director, who took on the new experience of guiding a student through writing an honors Thesis paper. I would also like to thank him for inspiring me to pursue working with the Peace Corps. He helped connect me with Dr. Beth Feingold and Dr. Ashley Fox who, along with Professor Justino helped me to specify the topic of my thesis and create a structure plan and outline for my thesis. Dr. Feingold was on sabbatical this semester, so her help was highly appreciated. Dr. Fox was extremely helpful in the formation of the thesis style and purpose.

I would like to acknowledge my best friend Alex, who offered tremendous support, as well as coffee, that was integral to my ability to complete this paper.

Lastly, I would like to acknowledge my parents for their encouragement and support throughout the entirety of my education. If it wasn't for them, I would not be where I am today.

List of Figures

Table of Contents

I. Introduction

Vaccine hesitancy has a long history in the U.S. across all demographics. The COVID epidemic laid this truth, and the health disparities in the U.S. medical system, bare. During the height of the pandemic, the Black population suffered the one of highest mortality rate, estimates indicate three or four times higher than the rate among their White counterparts. Initially, Black populations showed a much lower vaccination rate than the White population. Though the gap is still bigger than other ethnic groups, the vaccination rate of the Black population picked up significantly faster as the pandemic moved on relative to the vaccination rate of other vaccine resistant subpopulations (Ford et al., 2022).

Academics, community activists, medical professionals, and media pundits were quick to focus on two historical incidents. The first being the Tuskegee Syphilis study, a horrific and senseless government experiment done to Black men in Alabama for 40 years. Hundreds of poor, Black men were followed to see the progression of the syphilis disease. These men were denied knowledge of their ailment, as well as the standard treatment for syphilis, penicillin. Additionally, they were actively discouraged from finding other medical professionals to treat them (Gamble, 1997).

The second incident revolves around the most used cell line in medical research that is still in use today, the *HeLa* cell line. Henrietta Lacks was a patient at John Hopkins medical hospital in 1952, being treated for cervical cancer. Lacks' cancer cells were harvested by Dr. Howard Jones during a biopsy and sent to the lab of Dr. George Gey without the permission of Lacks or her family. Dr. Gey had been collecting samples from every patient possible regardless of race or economic status, a practice that by today's standards would be considered unethical due to the lack of informed consent. Henrietta Lacks was unique in that her cell line, nicknamed HeLa cells, was

the only cell line collected that did not die within a short time span. The publication of the book, *The Immortal Life of Henrietta Lacks* by Rebecca Skloot, brought attention to the story, and by extension, the exploitation of Black people's autonomy in medical settings (Butanis, 2022).

Though the Tuskegee and Lacks incidents were referenced by some respondents surveyed as a part of the reasoning for refusing the vaccine, they were not the main reasons leading to vaccine hesitancy. It has been easier for institutions to accredit the medical racism from these two historical incidents as the main reason for mistrust among African Americans. This simplified belief has resulted in an inability to completely understand the disparate health systems and barriers that Black people need to navigate. This, in turn, creates a higher rate of negative outcomes in treatment, reinforcing mistrust. In many ways, academics, the medical community, the government, and the pharmaceutical industry create a self-fulfilling prophecy by not focusing on pertinent healthcare issues for African Americans. Instead of working twice as hard to rebuild trust in the community by meeting their needs, it's easier to point to communal mistrust fueled by those two incidents (DemBosky, 2021).

This paper will go through the history of both vaccine hesitancy in the US and the medical racism that has long impacted the Black community. It examines the historical effects of health disparities, and what their connections are, if any, to why the Black population is far more affected by the contemporary disparities in our healthcare system, especially when it came to the initial distribution of the COVID-19 vaccine and treatment of those affected. Finally, it will examine how the disparities related to COVID have reinforced beliefs of inequity among Black communities.

II. Literature Review

2.1 The History of Vaccine Hesitancy in the United States

The total death of the population from infectious diseases is often an important indicator of a population's health. Preventative measures developed over the 20th century, such as good hygiene and vaccination, have significantly lowered death rates from infectious diseases over the past century (Jones et al., 2012). Yet, even in the case of deadly and contagious diseases, populations often do not take steps in preventative care that are suggested by health professionals. One of these preventative measures, vaccinations, are highly effective yet often under the most scrutiny (Hussain et al., 2018).

During the COVID-19 pandemic, Americans were given some of the earliest access to vaccines, but as always, there was vaccine hesitancy across all demographics, with the Black population having by far the highest hesitancy rates. The question is: why? Mistrust in the healthcare system, a consequence of medical racism, was offered up by experts as one of the main reasons, rather than listening to what the communities were saying (DemBosky, 2021).

Vaccine hesitancy has a long history in the United States, going back to the colonial era. In 1721, a smallpox epidemic raged through Boston, after the failure to quarantine a ship of infected sailors. Smallpox outbreaks were known to the region, but this one was the deadliest. By the time this wave overtook the city of 11,000, over half the population (an estimated 6,000 people). became ill and roughly 850 people succumbed to the disease (Niederhuber, 2014).

Cotton Mather, the Puritan minister more commonly associated with the Salem Witch trials, encouraged his congregation to get inoculated with smallpox. Mather's, through his slave Onesimus, was informed about the practice of inoculated. This being the process where part of a live virus is introduced to a living organism. Once inoculated, a person is likely to have a milder, less deadly form of the illness caused by the virus. After interviewing more slaves, and finding out that in Turkey, doctors observed that people with smallpox rarely were reinfected, Mather

concluded that if one introduced smallpox through a tiny incision, an acute localized infection occurred that was far less dangerous than a system wide infection and produced immunity from future smallpox infections (Niederhuber, 2014).

Mather's idea of inoculating people with the virus that caused so many deaths did not go over well. In fact, it came close to hysteria. One of the most vocal people in Boston against vaccines was Dr. William Douglass, one of the few Boston physicians with a medical degree. The reasons given were some that are still echoed today by some anti-vaccination groups, for example, that vaccines were against God's will. Others saw it as folklore, a story spread by African slaves. In reality, people were mostly afraid because vaccines had never been attempted before. The idea of infecting yourself and loved ones with a potentially deadly disease seemed counterintuitive (Niederhuber, 2014).

Cotton Mather, however, was not deterred. He enlisted the help of a physician named Zabadiel Boylston, and conducted what was in essence, the first clinical trial in the Colonies. An important note about these trials is that, initially, the vaccines were administered to slaves. Mather and Boylston kept careful data, had an experimental group and a control group, and were able to prove that though there was a risk of dying after inoculation, there was only a 2% mortality rate. This was in harsh contrast to those who were not inoculated, with a 14.8% mortality rate. It was still risky, but Cotton Mather used his prodigious talents as both writer and a preacher, to challenge the medical community, and convince people to risk it. As more people agreed to be vaccinated cases started to decrease (Niederhuber, 2014).

A major advancement in vaccination practices came when Edward Jenner perfected a precursor to the modern vaccine. In the late 1700s. Jenner did this through the use of a closely related, but much less dangerous cowpox virus. It was highly successful, and to this day, the

smallpox vaccine is still the only vaccine that has totally eradicated a disease. Still, Jenner's success did not stop a cartoon being published that portrayed humans sprouting cow-like features. The cartoon deals with the fear that somehow the vaccine will physically alter the recipient's makeup, much like the misinformation floating around social media that the mRNA vaccines would alter people's DNA.

Vaccines, for a long period after this, turned to protecting livestock, not humans. In the 1890s an antitoxin to treat diphtheria, a deadly disease caused by a bacterial infection, was developed. Though not a vaccine, the success of this intervention, which saved thousands of lives, resulted in the growth of the pharmaceutical industry and government oversight for it. Specifically, oversight came in the form of the Biological Controls Act of 1902, which was a direct response to a batch of the diphtheria serum made from a tetanus contaminated horse, which killed 22 children. Eventually this led to vaccines being regulated under the newly created Food and Drug Administration (Ault, 2021).

When the 1918 influenza epidemic occurred, doctors and scientists falsely concluded that it was a bacterial rather than a virus, that was causing the disease, and all efforts to develop a vaccine failed. It was not until the 1930s that they isolated the virus and were eventually able to make a vaccine for influenza in 1945. Jonas Salk, who worked on the influenza vaccine, later turned his attention towards creating a working polio vaccine. A very small study was done on children with polio and some healthy children in Pittsburgh. It was successful and within a year, the largest field trial with over 1.8 million children commenced. In the study, 650,000 children were given the vaccine and 1.2 million children received a placebo (Ault, 2021).

Salk refused to patent the vaccine, which led to six pharmaceutical companies being given the license to produce it. Democrats argued that the vaccine should be free to all, but President

Eisenhower's administration had no plan and his Secretary of Health, Education and Welfare, Ovetta Culp Hobby, argued it would lead to socialized medicine. High demand created a Black market where the vaccine, which was supposed to be priced at $2 (roughly $11 today). was selling for $20. A Black-market cost put it out of reach for many Americans, especially lower income African Americans. The government only stepped in after reports of children getting polio after being vaccinated started to emerge and the public began to worry. The government launched an investigation, and it was found one of the companies involved had not followed the vaccine's production protocol. Secretary Hobby stepped down and Eisenhower signed the Polio Assistance Vaccination Act of 1955, which funded nationwide polio vaccinations free of charge. Within a year, the 60,000 cases of polio dropped by half, by 1962, there were only 1,000 cases, and by 1979 Polio was eliminated in the US (Kurlander & Juhl, 2020).

By the early 1970s, topics around pandemics moved to trying to limit the damage a pandemic could cause, even if it meant a huge public expense, by focusing on large scale vaccination programs and investing in new vaccine production facilities and technologies. In countries with the capacity to invest in vaccine production, vaccines, for the most part, became widely accepted by the population. However, a big hiccup in vaccine development occurred in 1976, during a swine flu outbreak, which anecdotally speaking may have fueled a small anti-vaxxer movement, or at least did a lot of long-term damage to Americans getting their yearly flu shot. In the late winter of 1976, there was a several hundred-person influenza outbreak at Fort Dix in New Jersey, A young soldier died from the infection, and it was determined it was an influenza virus. The strain appeared to be highly transmissible and was related to the Spanish Flu of 1918. The U.S. Centers for Disease Control and Prevention (CDC). concluded that it was an even deadlier version of the Influenza Pandemic of 1918 and 80% of the country needed to be vaccinated

to avoid catastrophe. It was an election year, so Congress was more generous than usual, and agreed to fast track a vaccine to protect 230 million Americans (Dehner, 2010).

Due to the World Health Organization's (WHO). international role in the surveillance of influenza strains and providing the US seed strains to produce the vaccines, their recommendations always held a great amount of sway. WHO investigators advised a more measured approach in response to the Fort Dix outbreaks. This led to tension between WHO and the United States Public Health Service (USPHS). Interestingly, some WHO investigators agreed that a mass vaccination plan may be the safest route to go, given experiences with prior pandemics in 1957 and 1968, which moved too quickly for any of WHO's recommendations to work (Dehner, 2010).

The tension was only made worse when WHO released public statements saying that through early surveillance, if a pandemic broke out, it would be possible to keep it contained in the US, and that the country would have time to put into effect a mass vaccination program if needed, thereby limiting the damage worldwide. The USPHS saw this as unrealistic, having determined that in the unlikely event of an outbreak originating in the U.S., they could not contain it within the country, and there was no plan for the U.S. to protect the rest of the world.

Unlike COVID-19 vaccines, there was no new technology needed to produce the 1976 Swine Flu Vaccine. The biggest hold up was manufacturers fearing liability lawsuits, demanding special protection. Coincidentally, there was an outbreak of a respiratory disease in Philadelphia at a Legionnaire convention where 2,000 people had gathered. A few days after the convention, men who stayed at the hotel, or had been in the vicinity, began to get very sick and some even died of acute pneumonia in the lungs. Within two weeks, 182 men became ill, 130 were hospitalized, and 29 had died. While the CDC was trying to identify the pathogen, the media speculated that this was the first outbreak of the next great pandemic. Congress quickly pushed through the

liability protections and the vaccination plan proceeded. Mass vaccination sites were set up all over in the country and in three months, 40 million Americans were vaccinated. At the same time, the public took notice that the manufacturers of the vaccine were not responsible if anything went wrong and became hypervigilant for stories about side effects. This eroded their confidence even further. In October of 1976, three elderly people vaccinated in a clinic in Pittsburgh died. There was no connection found between the vaccine and any of the deaths, but the press covered it extensively, which led to the story becoming sensationalized (Dehner, 2010).

Misinformation about the swine flu vaccine outbreak and response flowed. Many saw this as a grab for money by the vaccine producers. This caused several states to suspend their programs. People, seeing no outbreak, and the horrendous and inaccurate media coverage of the deaths, stopped getting vaccinated. In fact, outside of Fort Dix, there were no reported cases of Swine Flu in the entire country. Prominent scientists started to question the large expense of the vaccination program when public health resources in this country were already very limited. Later, as the months went on, roughly 450 people came down with a rare neurological disorder called Guillian-Barre that was directly associated with the vaccine (Dehner, 2010).

Historians will try to figure out how much the “The Swine Flu Fiasco “contributed to the anti-vaccination movement. While it may not have affected the movement much, it did erode some people’s confidence in the government’s ability to predict if a pandemic was really happening. People started to question whether an annual flu shot was necessary and whether they could trust the science (Dehner, 2010).

Vaccine hesitancy, in and of itself, was not a wider medical problem until 1996 with the publication written by Andrew Wakefield claiming causation between the measles, mumps and rubella (MMR). vaccine and the development in autism in children. The study was debunked, and

it was found that it was funded by litigants against vaccination manufactures. Wakefield was subsequently stripped of his medical license, but his unfounded publication had caused irreparable damage. In the US, following the publishing of the study, there was a 2% decrease in MMR vaccinations. The hesitancy to have children receive the MMR vaccine has led to multiple measles outbreaks, the most notable one being at the Disneyland resort in California in 2015 (Hussain et al., 2018).

Andrew Wakefield and other anti-vaccination activists continue to target communities in the US, including both the Somalis in Minnesota and the Ultra-Orthodox Hasidic communities in NYC. Both groups, as a result, have had measles outbreaks and have shown vaccine hesitancy to the COVID-19 vaccine (de Freytas-tamura, 2019; Dyer, 2017).

2.2 The Black Genocide Theory and Vaccine Hesitancy in Black Communities

Vaccine hesitancy within the Black community has been heavily influenced by medical disparities and mistrust. A big part of the way this mistrust spread throughout the community was the conspiracy theory of Black genocide, which emerged in the 1950s. In December 1951, the Civil Rights Congress, represented by William Patterson, flew to the United Nations (UN). in Paris, and presented a remarkable petition arguing that the US government was in violation of the Genocide Convention that was adopted only a few years before in response to the Holocaust. It argued that the US had failed to uphold its own Constitution, by committing genocidal acts upon the African American population, and should be punished (Glenn, n.d.).

The petition, a 200-page document, entitled *We Charge Genocide: The Historic Petition to the United Nations for the Relief of the Crime of The United States Against the Negro People*, presented 152 killings and 344 other violent crimes committed in the United States between 1945-

1952 as evidence. The evidence came from the Black press and other organizations like the ACLU, the Urban League, and labor unions. The petition argued that the disparity between African Americans and Whites in housing, healthcare, education, and jobs resulted in an eight-year difference in life expectancy and it was signed by 94 prominent civil rights activists (Patterson, 1970).

The petition and the group's goals were well received in the European press, yet it was ignored by the American Press. The UN, dealing with a Cold War, did not acknowledge receiving the petition. The Civil Rights Congress was attacked for its association with the Communist Party and was disavowed by other civil rights groups. Additionally, the State Department revoked Mr. Patterson's passport, restricting his ability to travel internationally.

The Black genocide argument gained attention with the Vietnam War. African Americans were overrepresented demographically among combat troops. This was because they were not able to get the same disqualifications as White Americans, most likely as a result of Black people rarely holding seats on the draft boards that made the decisions on war disqualifications (Glenn, n.d.)..

In the 1970s, the Black genocide theory also became entangled with Planned Parenthood clinics. The Black Power movement, a non-monolithic movement that centered around liberation and self-dependency, included subgroups of activists that promoted the idea that the federal government was involved in efforts to reduce the Black population. A particular focus was Planned Parenthood clinics in low-income areas. This caused a lot of friction between the men and the women within those movements. In addition, the Black Panthers, a prominent organization of the Black power movement in the 1970s, using the rhetoric of the Black genocide, led efforts to lobbying to get Sickle Cell research and treatment funded by the Nixon administration. The money from that large initial investment is all but gone today, which has played out in the community

affected by this terrible disease. Sickle cell suffers have little resources and many are treated in emergency rooms, which routinely deny them the pain management they need in an acute attack, even though federal guidelines have exempted them from standard opiate restrictions or state policies (Gold, 2017; Waxman & Aneja, 2021).

It did not help that the HIV/AIDS crisis within Black communities occurred at the same time as the crack cocaine epidemic. Conspiracy theories credited the United States Central Intelligence Agency (CIA). with purposely exposing Black neighborhoods to crack cocaine. These coinciding factors strengthened Black genocide conspiracy theories, with the government being the main villain (Delaval, n.d.).

Rumors about HIV/AIDS were common in the beginning of the crisis, reflecting the high levels of anxiety at the time, driven by the lack of knowledge about the disease. Rumors such as "only gay men can get AIDS" or "you can pick AIDS up from toilet bowl seats" were common. One of the more sinister rumors was that the CIA created the HIV virus to kill Black people. Rumors surrounding HIV/AIDS fell away as the scientific community gained more knowledge, combined with strong social activism by groups affected by AIDS. Not only that, but the Gay community also put their trust in the medical community. With knowledge, came a decrease in anxiety, and the rumors for the most part went away. The exceptions were certain rumors in the Black community that still circulated. Specifically, the rumors that promoted the belief that AIDS was a government plot to commit a Black genocide through the virus. These rumors indicated more than a distrust of the medical community, but also of the U.S. government. Unlike other groups affected by HIV/AIDS, where education and treatments have reduced the spread and have extended life, transmission rates among Black Americans remain persistently high (Heller, 2015).

This has happened because scientific information enabled education that changed behaviors and reduced spread in other groups. This method only works if those involved trust the source of the information. Persistent conspiracy rumors that the government created it, especially to enact a Black genocide, makes that difficult (Heller, 2015).

It's hard to disprove rumors because they don't have an original source that can be traced. New research on rumors recognizes that there may be more to them than the usual explanation of a paranoid personality. They are one of the strategies that disempowered groups use to make sense of, and resist, widely accepted worldviews that do not reflect their lives. These rumors become a "counter-knowledge." The fact that these rumors of a government sponsored Black genocide, with gay men being a secondary marginalized group targeted, have survived over twenty years, when most other groups no longer believe in them, is a measure of distrust. This should not be looked at as someone simply being uneducated or ignorant, in fact, variations of the Black genocide theory often are promoted by highly educated African Americans. They are a direct result of the social realities and lived experiences, which in the case of African Americans, includes a very long history of abuse by government actors (Heller, 2015).

The deeply rooted nature of these beliefs complicates changing harmful and/or risky behaviors. An example of this is in a study seeking to understand these conspiracy theories by looking at an uptake of condoms distributed by the government. Black participants said government condoms could not be trusted, citing those distributed by the New York City Department of Health. This was, in part, based on the belief that the government was poking holes in them to aid in the transmission of AIDS. Latinos, on the other hand, had no issues with government distributed condoms, but thought the government needed to provide more sexual

education classes in schools, indicating that they were more trusting of the government as a source of education (Heller, 2015).

The Black genocide theory was reinforced by the crack epidemic. In 1996, a series of articles that appeared in the San Jose Mercury News accused the CIA of selling drugs to the Black community in Los Angeles to raise funds for the Contras. This perceived linkage arose from an internal CIA memo that acknowledged past hiring of pilots for arms sales who worked for drug cartels and called for more careful vetting of the pilots hired. This, among other things, was seen as the smoking gun needed by groups to argue that the CIA was directly involved in the crack cocaine drug trade that ravaged Black communities throughout the United States. Investigations cleared the CIA of this plot, mostly accusing them of bad hiring practices, but the doubts persisted (Delaval, n.d.).

2.3 The Tuskegee Syphilis Study

The seminal article on the subject, *Under the Shadow of Tuskegee: African Americans and Health Care*, was written by Dr. V.N. Gamble, during the HIV/AIDS crisis. At the time, many African Americans were opposed to needle exchange programs. They thought the exchange programs would spread the disease and even speculated that the programs were part of a genocide plot. Black communities didn't want these programs, fearing they would be used as guinea pigs. Gamble argued that even though the Tuskegee Syphilis Study is pointed to almost as a singular reason for this distrust, a singular historical event was unlikely to be the reason for medical distrust. She made a compelling argument that the distrust was already embedded in the community before the Tuskegee Syphilis Study, and that those reasons for the mistrust were still very much present in the biomedical community (Gamble, 1997).

Dr. Gamble proceeded to lay out the history of exploitation for medical reasons of African Americans during slavery, describing heatstroke experiments that were akin to atrocities committed during the Holocaust. She discussed the work of Dr. Simms, the father of modern gynecology, and his repair of the fistula, a life changing procedure, on Black slaves first, without the use of anesthesia. While not much is known about how much Black subjects were used after emancipation, the Ku Klux Klan (KKK) spread stories of kidnapping Blacks up north, for medical experimentation and cadavers, possibly to terrify the recently freed Black population and keep them from migrating north. The grave robbing of Black cadavers for medical school was also a known practice in the period following the Civil War (Gamble, 1997).

At the turn of the century, African American physicians started to argue for the creation of all-Black hospitals, arguing that only they could provide ethical care for their patients. They accused hospitals, especially southern ones, of not only segregating Black patients, but practicing experimental procedures on them. In Tuskegee, nine years before the Tuskegee Syphilis Study, a veteran's hospital became the fighting ground for these beliefs. Supporters of the veteran's hospital being all-Black argued that Black doctors and nurses would give these men the best care. There were fears that the hospital would become a dumping ground for White southern mediocre doctors who would kill and use their patients for medical experimentations. Black physicians were eventually able to operate the hospital, but this did not stop the hospital from partake in the Tuskegee Syphilis Study in 1932. The experimentation on Black patients by the government, through a Black-operated hospital, makes clear the systematic medical racism that historically existed, and currently exists, within healthcare systems (Gamble, 1997).

There were other efforts by Black physicians in the 1920s and 30s for them to oversee studying diseases thought to affect Black people at greater rates. Their rationale being the

community's fears of White researchers that did not seem to care about their subjects. The motives of these “Nordic” investigators seemed to be for their own benefit and came with heavy internal prejudices (Gamble, 1997).

The Tuskegee experiment was not needed to highlight the health disparities and mistrust of the medical system controlled by White people, and these concerns were held not only by patients, but by Black doctors as well (Gamble, 1997). One blatant example of this medical racism before the Tuskegee Syphilis study was the polio epidemic that peaked in the 1940s. Much like COVID-19, the majority of Polio cases, roughly 95%, present as asymptomatic. In fact, less than 1% of polio cases led to the most severe form of polio, paralytic poliomyelitis. Even so, Polio was known as “the wrath of God” and the quarantining of children exposed led to panic and anxiety among parents. When the Polio vaccine became available, reported cases of the virus in America decreased from 58,000 to 5,600 in a single year. Much like the hesitancy seen in the COVID-19 pandemic, there were concerns about the safety of the vaccine. The Oral Polio Vaccine (OPV) had a weakened live virus of polio, which led to some wild virus cases associated with higher rates of paralytogenicity. This became a challenge to eliminating polio (Mehndiratta et al., 2014).

Due to medical racism, polio was seen as a predominantly “White disease.” Many believed that “civilized” White bodies were more “complex and delicate,” and therefore more vulnerable to the disease. In actuality, low rates of reported polio in Black Americans at the time was more likely due to environmental and socio-economic issues. As a result of segregated health settings, there was limited access to hospitals, doctors, and well-trained Black medical professionals. Due to unsanitary conditions, there was a likelihood of mild child infections that led to immunity, and by extension, lower cases in Black communities. Civil rights activism towards tearing down medical segregation brought light to the dismissal of Black polio cases. With the demand of equal

medical care for all races, Black children were made part of the 1954 Salk vaccine trial (Mehndiratta et al., 2014).

This is not to say that the Tuskegee Syphilis Study did not have a deep effect on the Black population. After the disclosure of the experiment in 1972 to the public, there was a 22% decrease in routine medical care for Black men in Macon County, Alabama, and an overall spike in the post-1972 age adjusted mortality by four log points. In summary, the mistrust of the healthcare system may have reduced the life of elderly Black men in the 1980s by 1.5 years (Aslan & Wannamaker, 2018).

III. Results & Analysis

3.1. Contemporary vaccine disparities

Currently, there is enough supply of the COVID-19 vaccine to vaccinate all adult Americans. Despite this, a large majority of Americans do not want to be vaccinated. A meta-analysis took data from Public Health department websites, the American Community Survey, and the Household Pulse Survey. In total the meta-analysis examined data from 756 counties across the US, with a sample size of 51.5% of the American population. Confounding variables such as socio-economic status, political ideology, and education were looked at in coordination with race using an ordinary least squares regression model. This was done to see where disparities were in the US and why they were occurring (Agarwal et al., 2021).

The results of the data showed a 16% lower vaccination rate among counties with most Black residents versus counties that had a majority of White residents. The raw data does follow trends, but looking at distribution rates, there is a much higher rate of COVID-19 vaccines in Black counties that peaks at roughly 20%. Interestingly, in Black counties, the initial vaccination rates were much higher than in White counties. Over time, vaccination rates slowed down considerably

faster in Black counties. This eventually led to a higher overall vaccination rate in White counties. On average once Black counties reached a 30% vaccination rate, distribution of vaccines rapidly decreased, effectively stopping at a roughly 45% county vaccination rate. White counties, while following a similar trend, peak at a 30% vaccination rates, but decline far less rapidly and end at a roughly 80% vaccination rate (Refer to Figure 1.) (Agarwal et al., 2021).

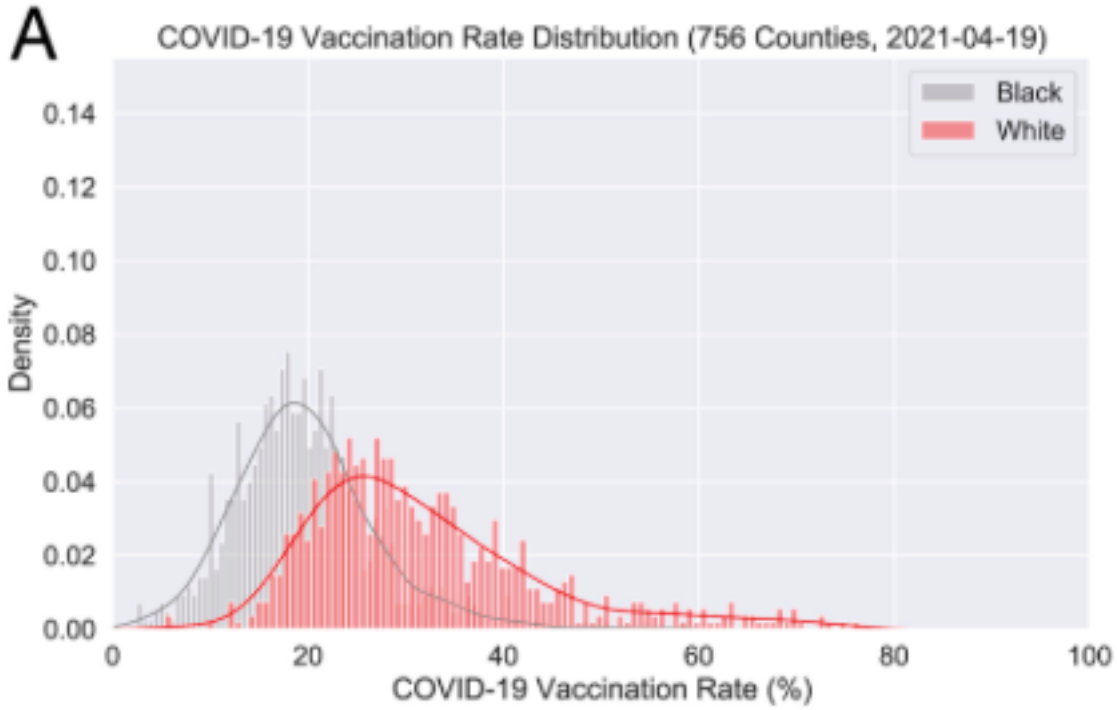

Figure 1. COVID-19 Vaccination Rate Distribution

Distribution of county-level COVID-19 vaccination rates by race (19 April 2021) (Agarwal et al., 2021)

The study used data from 756 counties, which comprised over 170.6 million Americans, representing 51.5% of America. The graph above a distribution of COVID-19 vaccines on a county level by race (Agarwal et al., 2021).

To find the reason for lower vaccination rates, race was measured alongside certain variables within each county including median income, median income disparity, high school

graduation rate, high school disparity, health facilities per capita, COVID-19 cases per capita, home IT (a measure of access to the internet and electronic devices such as computers and mobile phones) rates, home IT disparity, urban settings, rates of vehicle ownership, political ideology, segregation index, and racial bias. Three of these variables were found to have a negative association with COVID-19 vaccines. Only median income, political ideology, and the proportion of Black residents in each county correlated significantly to lower vaccination rates. Higher high school graduation rates in a county were the main indicator for higher COVID-19 vaccination rates. When looking at the flu vaccine, disparities are far less noticeable than COVID-19 vaccine disparities, but there was still a 18.8% disparity rate in influenza vaccines between White Counties and Black counties. Median income does positively effect vaccination rates, while political ideology does so negatively. However, both indicators are far less pronounced then in the case of COVID-19 (Refer to Figure 2.) (Agarwal et al., 2021).

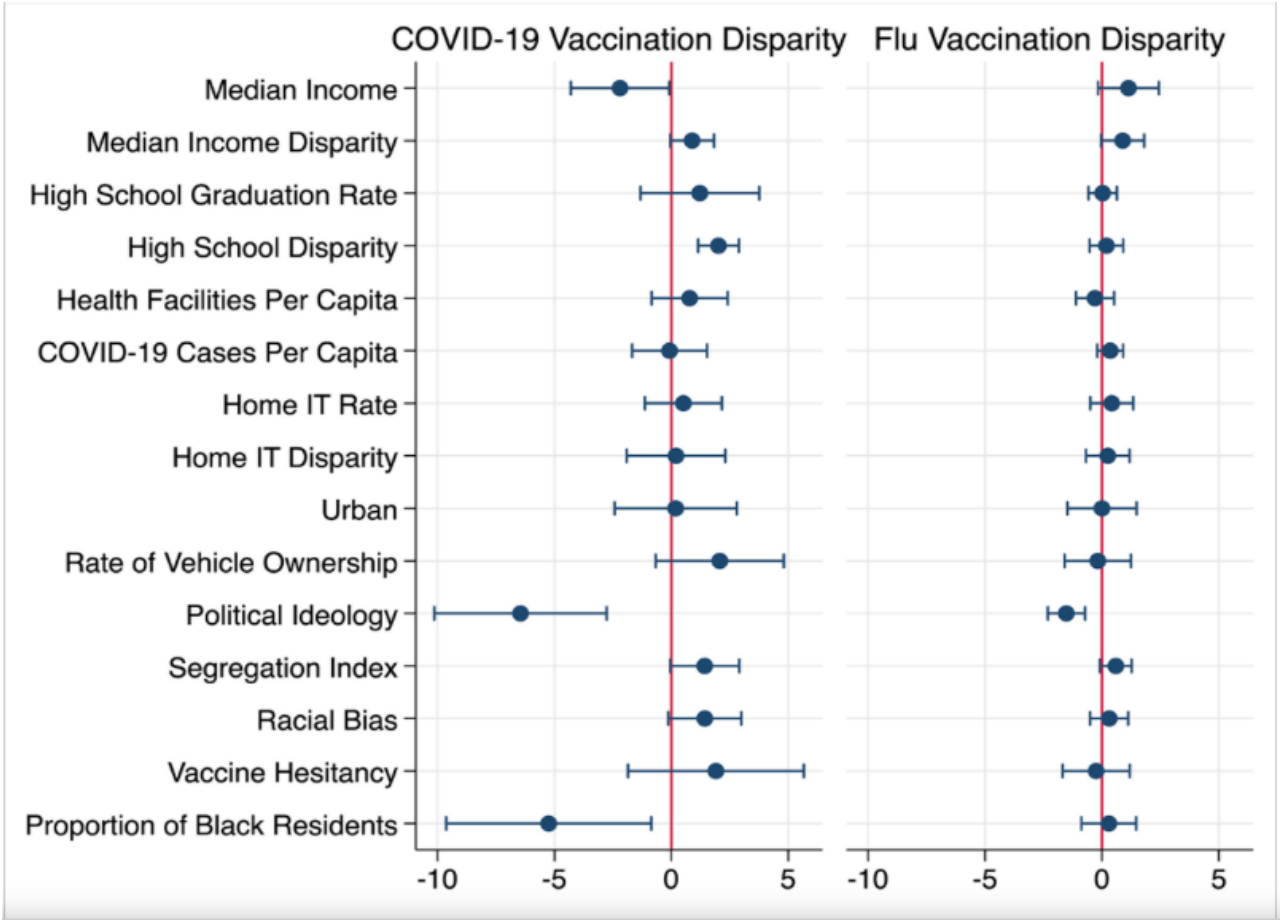

Figure 2. COVID-19 Vaccination Disparity VS. Flu Vaccination Disparity

Contrast of regression coefficients for indicators of social determinants of health for COVID-19 and flu vaccine disparities

The study used data from 756 counties, which comprised over 170.6 million Americans, representing 51.5% of America. The graph above represents a linear regression used to determine indicators for COVID-19 and flu vaccine disparities (Agarwal et al., 2021).

Trends of Black populations having lower vaccination rates are not isolated to the Agarwal study. A study that analyzed the 2012 National Health Survey looked at vaccine rates in five racial and ethnic groups for five different vaccines: influenza, tetanus, pneumococcal (two vaccines), human papilloma virus, and zoster vaccines. The study found that with little exception, vaccination

rates for non-Hispanic Black, Hispanic, and non-Hispanic Asians were lower than in non-Hispanic White groups. In almost all vaccine cases, Hispanic and non-Hispanic Black groups had the lowest vaccination rates, while non-Hispanic White and non-Hispanic Asians had the highest rates. When considering the age, sex, education, health insurance, standard place of care, and number of physician visits per year, these ethnic and racial disparities decreased, though they were still noticeable. The implication of these results is that, while these factors do have effects on racial vaccination disparities, there are other factors that affect vaccination disparities as well (Lu et al., 2015).

Importantly, the study did find some indicators of higher vaccine rates independent of race. For instance, previous studies referenced in the Lu et al. found that older White Americans are less averse to standard influenza and pneumococcal vaccination then older Black Americans. However, when the offer to be vaccinated becomes the standard, these ethnic and racial disparities decrease. In other words, the individual interactions between patients and health providers can have a large effect of ethnic and racial differences (Lu et al., 2015).

3.2. Contemporary Vaccine Disparities in Black Populations

For the last 20 years, African Americans have consistently ranked the lowest in vaccination rates of any racial/ethnic group in America, with sparing exceptions. In 2002, a study was done using equivalency testing from data collected by the National Immunization Survey for vaccinations from the age of 19-35 in 2000. The study used White Americans, who are the largest group and most often have the highest vaccination rates, as the control group to be compared too. The study looked for a confidence interval of 95%. If zero wasn't in the confidence interval, it implied a statistically significant difference in vaccine rates between racial/ethnic groups. Out of

the six vaccines studied, African Americans ranked routinely lower, with the largest difference between Black vaccinations and White vaccination rates being a 5%-10% difference in coverage for the fourth DTP vaccine. The only except to this was the varicella vaccination. This was a rather interesting result as there are often closer vaccine rates in Hispanic and Black populations than in Hispanic and White populations. White populations generally share closer vaccination rates with Asian Americans, more so than with any other racial or ethnic group. Even with a lack of disparities in the Varicella vaccine between White and Black Americans, Black vaccination rates were still lower than every other minority group (Barker, 2002).

The National Immunization Survey data from 2010-2016 was used to study racial/ethnic vaccine trends among adolescents. The study used "binary logistic regression models to adjust for sex, age, health insurance, physician visit in the previous 12 months, vaccination facility type, poverty status, maternal education level, children in the household, maternal marital status, maternal age, and census region of residence." This adjustment was done as an attempt to eliminate as many confounding variables as possible. This study also used confidence intervals, comparing minority vaccination rates to White vaccination rates. In 2010, White adolescents had the lowest rate of influenza vaccination, and Black adolescents had the highest influenza vaccination rates. In 2011, Hispanic adolescents had the highest rate of vaccination and Black adolescents had the lowest rates. This trend continued (except in 2013) until the Hispanic adolescent vaccine rates leveled out to the same as the White adolescent vaccine rate. The Black adolescent vaccine rate remained far below both (Refer to Figure 3; Webb et al., 2018).

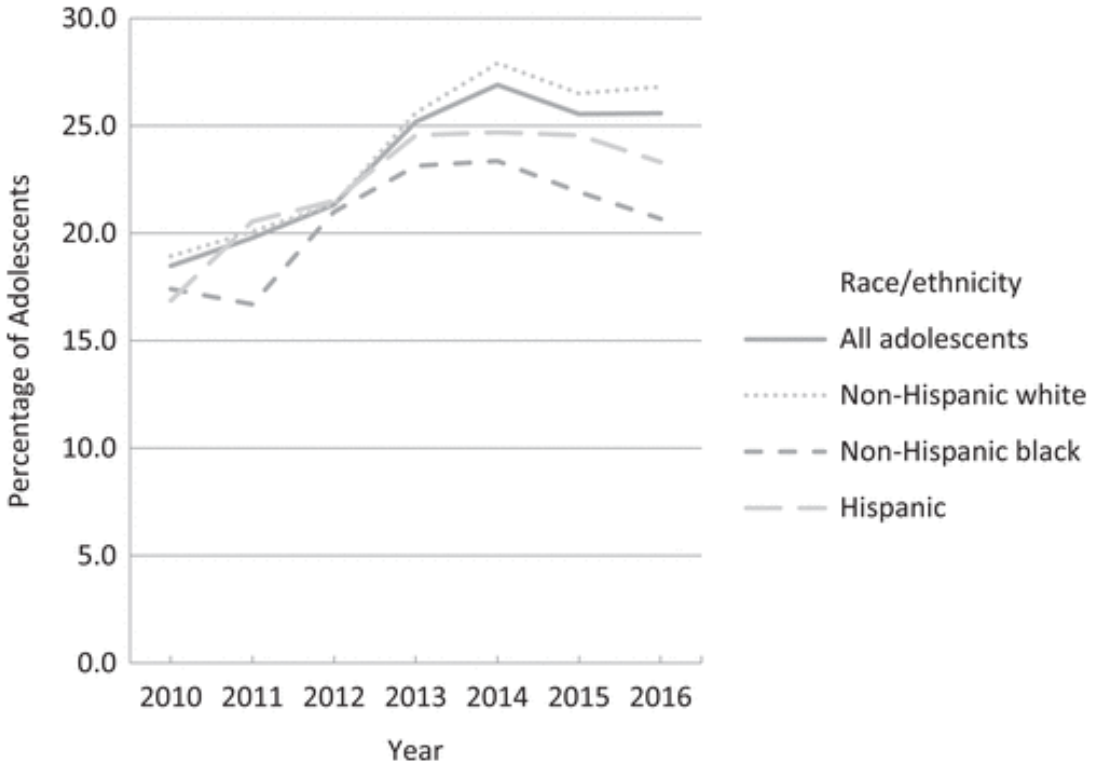

Figure 3. Influenza Vaccination Rates of Non-Hispanic White, Non-Hispanic Black, and Hispanic Adolescents Aged 13-17

The study sample comprised 117,273 adolescents, of whom 85,444 were non-Hispanic White, 12 414 were non-Hispanic Black, and 19, 415 were Hispanic. Retrieved from (Webb et al., 2018).

A multivariable logistic regression analysis was used to study the vaccine rates for several vaccines in adults in 2015, using data from the 2012 National Health Survey. The general trend followed that of the 2002 study, in which Asian Americans vaccination rates closely resembled White vaccination rates, apart from pneumococcal and tetanus vaccines in groups older than 65 years of age. Hispanic and Black population vaccination rates stayed closer in comparison, except for the HPV vaccine (Lu et al., 2015).

3.3. Vaccine Hesitancy in the COVID-19 Pandemic

Despite the long history of vaccine hesitancy among all groups in the US, Black vaccine hesitancy regarding vaccine disparities has been singled out during the COVID-19 response (Yuko, 2021). The most likely reason for the Black community being singled out in the press for being the most vaccine hesitant is due to an early survey in the pandemic by Pew Research Center in November 2020. African Americans had the same valid concerns that crossed every demographic group: nervousness of the speed in which the vaccine was developed, the use of a new technology that involved your body's genetic material, and that the vaccine's development was supported by politicians they did not trust (Funk & Tyson, 2020).

A study done by the Kaiser Family Foundation group in 2020, showed that only 15% of Black Americans said they would never get the COVID-19 vaccine, which was about the same as most other demographics. In addition, rates of hesitancy were possibly not that different when other factors came into play, such as age and location. Black individuals were initially very hesitant, but eventually many did come around a lot faster to believing that the vaccine had a protective value, unlike their far more reluctant White counterparts (Hamel et al., 2020).

In fact, the biggest reasons given by Black participants for hesitancy was fear of side effects and the newness of the vaccine, which were not unreasonable. The most common reason cited by White Republicans, the largest vaccine hesitant group in the survey, was that they did not think that contracting COVID-19 was that dangerous (equating it to a bad cold or the flu). Political party, geographical location (rural), age and occupation were just as likely indicators for refusing the COVID-19 vaccine as being Black (Hamel et al., 2020).

A study of the state of COVID-19 vaccination hesitancy in the state of Arkansas found that vaccine hesitancy was present in 50% of Black participants within their study, an extreme disparity

when the vaccine hesitancy rate in Hispanic participants was 19.18% and the vaccine hesitancy rate in White participants was 18.37%. Those with vaccine hesitancy were up to five times less afraid of contracting COVID-19 and were far less confident in the effectiveness of the vaccine than non-vaccine hesitant participants. These responses, combined with the knowledge that Black participants are much more likely to be vaccine hesitant, is distressing and helps to explain why Black Americans carry a disproportionate burden of COVID-19 hospitalizations and deaths (Willis et al., 2021).

While most results of the study served to verify previous research and hypotheses on vaccine hesitancy, the correlation between education and vaccination was surprising. While four-year degree holders were the least likely to have vaccine hesitancy (16.23%), participants with some college education or a technical degree were most likely to be vaccine hesitant (32.17%), even more so than people with a high school degree or less (27.20%) (Willis et al., 2021).

3.4. Causes of Vaccine Disparities in Black Populations

While COVID-19 vaccine disparities are obvious, public health researchers are having trouble determining if African Americans are getting vaccinated for COVID-19 less than or equal to White Americans. COVID-19 vaccines are easily accessible to most Americans in the areas studied, leaving researchers to hypothesize on the reasons for vaccine disparity, with significantly different opinions.

The Willis Study suggests that the vaccine disparities of COVID-19 are heavily based in cultural distrust. The study finds that the higher rate of vaccine hesitancy in Black participants is a result of the historical experimentation and medical bias that has been inflicted onto the Black community. Since the Willis study correlated vaccine hesitancy with lower vaccine confidence

and a less likely chance of getting vaccinated, medical bias and distrust is the root of vaccine discrepancies in Black vaccination rates (Willis et al., 2021).

Agarwal et al (2021) found that lack of vaccination was foremost a socioeconomic and political issue. Median income was also a highly rated indicator of vaccine hesitancy, as a difference of $10,000 (the difference between the 75th percentile of median income and the 50th percentile) led to a 1.3% drop in COVID-19 vaccination disparities. Counties with lower graduation rates had a reported 2.7% decrease in COVID-19 vaccination disparities. Political ideology was strongly associated with drops in vaccination rates; for every 2.5% increase in a county's number of republican residents there was a percentage point drop in vaccine uptake. Considering that, according to the National Center for Education Statistics (2021), in the 2018-2019 school year, Black students had an adjusted cohort graduation rate of 80% in comparison to the 86% average of all race and ethnicities, it would make sense that low vaccine rates are a symptom of larger disparities between Black and White Americans (Coe - Public High School Graduation Rates, 2021) (Agarwal et al., 2021).

Another hypothesis is not that Black Americans are resistant to vaccination, but they're less likely to seek out vaccinations then White Americans. The gaps for seeking out these vaccines were perhaps knowledge and education based. Previous studies have found less awareness of shingles and human papillomavirus (HPV) vaccines in ethnic and racial minorities, as opposed to White populations. Similarly, previous studies suggest that physician endorsement and contact (which includes an increased number of doctors' visits within 12-month span, discussions about vaccinations and recommendations, as well as reminders to get vaccinated) have also been shown to reduce vaccine disparities (Lu et al., 2015).

Studies aside, very few deals with the rollout of the vaccine and the real questions that the Black community brought up in town halls. Black communities were overwhelmingly worried about side effects, including whether there were Black people enrolled in the clinical trials, if the trials consider diseases like sickle cell, if fertility was affected, and if the vaccine could potentially alter DNA, bringing harm to the community. Another common worry was if politics under an administration they did not trust played a role in the speed they were developed. These were well thought out fears and echoed past concerns observed since the 17th century (DemBosky, 2021).

During the early stages of the COVID-19 pandemic, when vaccines were not available, communities of color were far more likely to be in essential jobs that required interaction with the public and co-workers. These communities are also more likely to live in multi-generational homes. All of these are high risk factors for contracting COVID-19, especially with no vaccine protections. Wealthier White people were more likely to have jobs where they could remotely work at home, giving them a better chance to ride out the pandemic in relative safety (DemBosky, 2021).

Additionally, there was a lack of tests all around, however those that were available, through kits and mass vaccination sites, were far more likely to reach members of better off communities, which used cars as their main mode of transportation. Vaccines, whether due to geography, local politics, access to a computer and the internet, or access to a community-based primary care provider, first went to more affluent communities. These access issues were made worse by some members of White communities traveling to underserved communities to receive COVID-19 testing and vaccines. These realities disparaged many from even attempting to make a vaccine appointment. When devising a plan in a low-income area of San Francisco, it became evident early on to the clinicians that there were racial disparities in who was getting vaccinated

and that this was also going on nationwide. The first thing that the clinicians looked at was the reliance on web-based scheduling for testing and vaccine appointments (Balakrishnan, 2022).

IV. Conclusion

It's true that Black and Latino communities in the U.S. were far more vaccine hesitant at first, with many members of these groups taking a position to "wait and see." The same occurred with every demographic, although it was more prominent among minority communities. Even so, it was by no means the only reason for lower vaccination rates among these groups.

The government, public health officials, and the medical establishment need to acknowledge that African Americans don't have to look to Tuskegee or Henrietta Lacks to find negative experiences with their healthcare systems. Dr. Lisa Fitzpatrick, a Washington D.C. infectious disease specialist, worries about the media's focus on the Tuskegee Syphilis study as the reason for medical distrust. The health disparities and mistrust were already present before the Tuskegee Syphilis Study and focusing exclusively on the study oversimplifies the problem and ignores the systematic issues, health disparities and mistrust that were present before Tuskegee (Yuko, 2021). Dr. Marcella Nunez-Smith, chair of the Biden-Harris Task Force warned of getting "so lost in conversation about vaccine hesitancy, that we forget about the structural barriers that do exist" (Young, 2021).

The African American community has every right to moral outrage and to continually remind others of what occurred in Tuskegee and with Lacks, but when the medical community and activists invoke these incidents as the primary reasons for vaccine reluctance or the lack of participation in vaccine clinical trials, it shifts the blame away for the contemporary failures of the healthcare system and policy makers, and instead places it onto African American communities themselves.

In town halls and on surveys, the Tuskegee Syphilis Study was not the major reason that people did not get vaccinated. Over-reliance on these historical events lead to a lack of effort on the part of pharmaceutical researchers and policy makers to gain the trust of the African American community. The assumption is that the community will never trust them, so they shouldn't waste the time and effort on building the trust.

Studying and deeply examining the reasons and demographics of the least likely to get vaccinated across race is essential to creating effective public health policies designed to encourage the public to get vaccinated and take necessary health measures. More importantly, doing so can help address broader racial disparities in the U.S. health field. With the identification of the actual factors and motivation for vaccine hesitancy specific to African Americans, we can create policies and programs that alleviate vaccine disparities and wider health disparities within the health field.

References

Agarwal, R., Dugas, M., Ramaprasad, J., Luo, J., Li, G., & Gao, G. (2021). Socioeconomic privilege and political ideology are associated with racial disparity in COVID-19 vaccination. *Proceedings of the National Academy of Sciences*, *118*(33). https://doi.org/10.1073/pnas.2107873118

Alsan, M., & Wanamaker, M. (2018). Tuskegee and the health of Black men. *The Quarterly Journal of Economics*, *133*(1), 407–455. https://doi.org/10.1093/qje/qjx029

Ault, A. (2021). *History shows Americans have always been wary of vaccines*. Smithsonian.com. Retrieved April 13, 2022, from https://www.smithsonianmag.com/smithsonian-institution/history-shows-americans-have-always-been-wary-vaccines-180976828/

Balakrishnan, E. (2022). *When it comes to vaccine equity, San Francisco is an exception - not the rule*. Mission Local. Retrieved April 13, 2022, from https://missionlocal.org/2021/06/when-it-comes-to-vaccine-equity-san-francisco-is-an-exception-not-the-rule

Barker, L. E. (2002). Assessing equivalence: An alternative to the use of difference tests for measuring disparities in vaccination coverage. *American Journal of Epidemiology*, *156*(11), 1056–1061. https://doi.org/10.1093/aje/kwf149

Butanis, B. (2022). *The immortal life of Henrietta lacks.* Johns Hopkins Medicine. Retrieved April 17, 2022, from https://www.hopkinsmedicine.org/henriettalacks/immortal-life-of-henrietta-lacks.html

de Freytas-tamura, K. (2019, May 14). Despite measles warnings, anti-vaccine rally draws hundreds of Ultra-Orthodox Jews. *The New York Times*. Retrieved April 13, 2022, from https://www.nytimes.com/2019/05/14/nyregion/measles-vaccine-orthodox-jews.html

Dehner, G. (2010). Who knows best? National and international responses to pandemic threats and the "Lessons" of 1976. *Journal of the History of Medicine and Allied Sciences*, *65*(4), 478–513. https://doi.org/10.1093/jhmas/jrq002

Delaval, C. (n.d.). *Cocaine, conspiracy theories and the CIA in Central America.* Frontline PBS. Retrieved April 13, 2022, from https://www.pbs.org/wgbh/pages/frontline/shows/drugs/special/cia.html

DemBosky, A. (2021, March 25). It's not Tuskegee. Current medical racism fuels Black Americans' vaccine hesitancy. *Los Angeles Times*. Retrieved April 13, 2022, from https://www.latimes.com/science/story/2021-03-25/current-medical-racism-not-tuskegee-expls-vaccine-hesitancy-among-Black-americans

Dyer, O. (2017). Measles outbreak in Somali American community follows anti-vaccine talks. *The British Medical Journal*. https://doi.org/10.1136/bmj.j2378

Ford, T. N., Reber, S., & Reeves, R. V. (2022). *Race gaps in COVID-19 deaths are even bigger than they appear*. Brookings. Retrieved April 13, 2022, from https://www.brookings.edu/blog/up-front/2020/06/16/race-gaps-in-COVID-19-deaths-are-even-bigger-than-they-appear/

Funk, C., & Tyson, A. (2020). *Intent to get a COVID-19 vaccine rises to 60% as confidence in research and development process increases*. Pew Research Center Science & Society. Retrieved April 13, 2022, from https://www.pewresearch.org/science/2020/12/03/intent-to-get-a-COVID-19-vaccine-rises-to-60-as-confidence-in-research-and-development-process-increases/

Gamble, V. N. (1997). Under the shadow of Tuskegee: African Americans and health care. *American Journal of Public Health, 87*(11), 1773–1778. http://doi.org/10.2105/ajph.87.11.1773

Glenn, S. A. (n.d.). *"We charge genocide." The 1951 Black Lives Matter campaign*. Civil Rights and Labor History Consortium, University of Washington. Retrieved April 13, 2022, from https://depts.washington.edu/moves/CRC_genocide.shtml

Gold, J. (2017, December 30). *Sickle cell patients, families and doctors face a 'Fight for Everything'*. PBS. Retrieved April 13, 2022, from https://www.pbs.org/newshour/health/sickle-cell-patients-families-and-doctors-face-a-fight-for-everything

Hamel, L., Kirzinger, A., Muñana, C., & Brodie, M. (2020). *KFF COVID-19 vaccine monitor: December 2020*. KFF. Retrieved April 13, 2022, from https://www.kff.org/coronavirus-COVID-19/report/kff-COVID-19-vaccine-monitor-december-2020/

Heller, J. (2015). Rumors and realities: Making sense of HIV/AIDS conspiracy narratives and contemporary legends. *American Journal of Public Health*, *105*(1), e43-e50. https://doi.org/10.2105/ajph.2014.302284

Hussain, A., Ali, S., Ahmed, M., & Hussain, S. (2018). The anti-vaccination movement: A regression in modern medicine. *Cureus, 10*(7), e2919. https://doi.org/10.7759/cureus.2919

Jones, D. S., Podolsky, S. H., & Greene, J. A. (2012). The burden of disease and the changing task of medicine. *New England Journal of Medicine*, *366*(25), 2333–2338. https://doi.org/10.1056/nejmp1113569

Kurlander, C., & Juhl, R. P. (2020). *Lessons from how the polio vaccine went from the lab to the public that Americans can learn from today*. American Society for Biochemistry and Molecular Biology. Retrieved April 13, 2022, from https://www.asbmb.org/asbmb-today/science/092620/lessons-from-how-the-polio-vaccine-went-from-the-l

Lu, P.-jun, O'Halloran, A., Williams, W. W., Lindley, M. C., Farrall, S., & Bridges, C. B. (2015). Racial and ethnic disparities in vaccination coverage among adult populations in the U.S. *Vaccine*, *33*(Supplement 4), D83-D91. https://doi.org/10.1016/j.vaccine.2015.09.031

National Center for Education Statistics. (2021). *Public high school graduation rates*. https://nces.ed.gov/programs/coe/indicator/coi

Niederhuber, M. (2014). *The fight over inoculation during the 1721 Boston smallpox epidemic*. Science in the News. Retrieved April 13, 2022, from https://sitn.hms.harvard.edu/flash/special-edition-on-infectious-disease/2014/the-fight-over-inoculation-during-the-1721-boston-smallpox-epidemic/

Patterson, W. L. (1970). *We charge genocide*. International Publishers.

Waxman, O. B., & Aneja, V. (2021, February 25). What school didn't teach you about the Black panthers. *Time*. Retrieved April 13, 2022, from https://time.com/5937647/Black-panther-medical-clinics-history-school-COVID-19/

Webb, N. S., Dowd-Arrow, B., Taylor, M. G., & Burdette, A. M. (2018). Racial/ethnic disparities in influenza vaccination coverage among US adolescents, 2010-2016. *Public Health Reports*, *133*(6), 667–676. https://doi.org/10.1177/0033354918805720

Willis, D. E., Andersen, J. A., Bryant-Moore, K., Selig, J. P., Long, C. R., Felix, H. C., Curran, G. M., & McElfish, P. A. (2021). COVID-19 vaccine hesitancy: Race/ethnicity, Trust, and Fear. *Clinical and Translational Science*, *14*(6), 2200–2207. https://doi.org/10.1111/cts.13077

Young, S. (2021). *Black vaccine hesitancy rooted in mistrust, doubts*. WebMD. Retrieved April 13, 2022, from https://www.webmd.com/vaccines/COVID-19-vaccine/news/20210202/Black-vaccine-hesitancy-rooted-in-mistrust-doubts

Yuko, E. (2021, March 9). Why are Black communities being singled out as vaccine hesitant? *Rolling Stone*. Retrieved April 13, 2022, from https://www.rollingstone.com/culture/culture-features/COVID-19-vaccine-hesitant-Black-communities-singled-out-1137750/