**The Calamitous Pandemic: How to Achieve Herd Immunity for COVID-19 Through Vaccine Uptake**

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*\**This paper intends to serve as a period-in-time take on the COVID-19 pandemic, with a particular focus on achieving herd immunity through vaccine uptake. It is acknowledged that substantial advancements have been made since such time as the paper was written and that information is not current through 2022. The paper represents information spanning from the beginning of the COVID-19 pandemic at the start of 2020 through February 2021.

1. **Introduction**

Extremely fatal and highly infectious, the Coronavirus disease [“COVID-19”] pandemic has threatened the United States since before the WHO’s characterization of the virus as a pandemic in March 2020.[[1]](#footnote-1) Herd immunity is the only solution to stopping the spread of the virus and saving lives, with millions infected and thousands of deaths.[[2]](#footnote-2) Herd immunity is “a reduction in the risk of infection with a specific communicable disease (such as measles or influenza) that occurs when a significant proportion of the population has become immune to infection (as because of previous exposure or vaccination) so that susceptible individuals are much less likely to come in contact with infected individuals.”[[3]](#footnote-3) Herd immunity can be reached naturally, through recovery from the virus, or artificially, through vaccination.[[4]](#footnote-4) It was initially estimated that approximately 50-66% of the population in the United States would have to be immunized, either naturally or artificially, to achieve herd immunity,[[5]](#footnote-5) though Dr. Fauci[[6]](#footnote-6) and others have estimated that it may even take up to 90% of the population to reach herd immunity.[[7]](#footnote-7) But the exact percentage of the population needed to achieve herd immunity is unquantifiable and emphasizes the level of uncertainty. Even if the United States achieves herd immunity through vaccination, a further consideration relates to how long such immunity would last—leading to further questions regarding a need for a second vaccination, or even a yearly vaccination to uphold the immunity.[[8]](#footnote-8) Leaving herd immunity up to chance of exposure and resulting antibody resistance is risky, given the high infection rate and death toll. Achieving herd immunity in the United States, through vaccine uptake, given the level of uncertainty of achieving such a result, warrants several considerations: Access, Production, Affordability, Acceptance, and Activation. The goals of access, production, affordability, acceptance, and activation are “dimensions which could influence vaccine uptake”[[9]](#footnote-9) and should be considered in pursuit of herd immunity for COVID-19 through vaccination.

Section II of this Comment introduces the Coronavirus and background information on the current status of the United States given the virus. Section III of this Comment discusses access to vaccinations in the United States regarding areas of the country known as vaccine deserts, challenges with adults reaching vaccination, and lack of state’s infrastructure to disperse the vaccination properly. The analysis in section IV encompasses the challenges that individuals or groups face when there may be inadequate production of vaccines. Section V discusses the acceptance of the vaccination, meaning how receptive the population is to receiving the vaccination. Section VI discusses the affordability of the vaccination and how to cover and how it will impact different demographics. Compulsory vaccination is called into question under activation, how the population will be influenced to choose to receive the vaccination, and is discussed in Section VII. Finally, Section VIII will conclude the comment with suggestions regarding the United States’ best course of action to ensure vaccine uptake and the most efficient way to achieve herd immunity to COVID-19.

1. **COVID-19 Pandemic**

A novel coronavirus (COVID-19), not previously detected in humans, arose out of China

in 2019.[[10]](#footnote-10) The virus is predominantly spread person to person, with an infection and first symptoms timeline of one to fourteen days.[[11]](#footnote-11) The Basic Reproductive Rate (R0), meaning the average number of people infected by one person, is two to four people.[[12]](#footnote-12) Additionally, as of late January 2021, the case fatality ratio (CFR) in the United States is 1.7%[[13]](#footnote-13), indicating the percentage of instances where the illness is fatal.[[14]](#footnote-14)

 The Pfizer-BioNTech vaccine was the first COVID-19 vaccination used across the United States, initially providing 100 million vaccinations. In late December 2020, Pfizer agreed to supply the United States with 100 million more.[[15]](#footnote-15) Moderna, the creator of the second vaccine given authorization by the U.S. Food and Drug Administration, mR2NA-1273, will also be supplying the United States with 200 million doses of their vaccine, meaning 200 million Americans total will be able to receive the vaccination between the two.[[16]](#footnote-16) As of January 4, 2021, 4.5 million Americans had been vaccinated, a slower roll-out than expected by U.S. officials.[[17]](#footnote-17) The first priority group for vaccination, recommended by the CDC, was frontline healthcare workers as well as long-term care residents and staff, and the second intended to be those 75 and older and essential workers (such as grocery store staff).[[18]](#footnote-18) But states differed in how they handled such recommendations and went forward with their own discretionary roll-outs.[[19]](#footnote-19) On January 12, 2021, the Department of Health and Human Services called for all those 65 and over and people with underlying health conditions to be vaccinated, but most states lack sufficient supplies to implement this recommendation.[[20]](#footnote-20)

Herd immunity numbers are estimates, though Dr. Fauci has said that it may take as much as 90% immunity to stop the virus.[[21]](#footnote-21) To reach such a level of immunity, with a population of roughly 330 million, [[22]](#footnote-22) will be quite a challenge for the United States, even with President Biden’s further efforts to order more vaccinations,[[23]](#footnote-23) as well as other vaccines in the pipelines that may be granted authorization soon; for example, the Johnson & Johnson vaccine.[[24]](#footnote-24) The challenge will come from not only having enough vaccinations, but access to such vaccinations and getting individuals to want to get the vaccine in the first place.

1. **Access**

Access is “the ability of individuals to be reached by, or to reach, recommended vaccines.”[[25]](#footnote-25) Locations that have inadequate access to vaccinations can be referred to as “vaccine deserts,” similarly to the concept of food deserts that lack adequate access to food.[[26]](#footnote-26) Vaccine desertsare believed to be locations that have minimal access to vaccinations.[[27]](#footnote-27) Immunization expert L.J. Tan used food deserts to analogize the concept of vaccine deserts, stating, “We need to ensure we are getting a COVID-19 vaccine to locations that are accessible to minority populations and disparate, underprivileged populations.”[[28]](#footnote-28) Equitable access is a necessity to establishing herd immunity to COVID-19; though the specific number for herd immunity is unquantifiable, there is minimal likelihood that the portion of the population needed to reach herd immunity would be able to receive the vaccination without proper access.

Vaccine deserts, as discussed by L.J. Tan, tend to consist of minority and underprivileged populations. Children who may not be up-to-date with their vaccinations are part of such populations.[[29]](#footnote-29) “These children are more likely to be economically disadvantaged, belong to larger families, and face practical or logistical access.”[[30]](#footnote-30) Such disadvantages in vaccine deserts may include lack of transportation, the need to travel far distances to get the vaccination, limited money, or lack of information regarding the vaccine.[[31]](#footnote-31) Disadvantaged groups face such access barriers that will likely hinder herd immunity for COVID-19. Potential systematic solutions to the challenges of vaccine deserts or limited access to vaccination, for both children and adults, are hospital-based opportunistic immunization,[[32]](#footnote-32) and increases in vaccination locations such as pharmacies, grocery stores, or temporary pop-up vaccination stations.[[33]](#footnote-33) Systematic solutions to individuals having a lack of access seem to be coming into fruition, with states like NJ using the Meadowlands as a mass vaccination site.[[34]](#footnote-34) The economic and information challenges that play a role in access will be discussed in later sections.

To address adult vaccination access specifically, the U.S. Department of Health and Human Services (“HHS”) created the National Adult Immunization Plan (“NAIP”).[[35]](#footnote-35) The NAIP introduces four objectives to address adult vaccination access challenges: “Reduce financial barriers for individuals who receive recommended adult vaccines; Assess and improve understanding of providers’ financial barriers to delivering vaccinations, including stocking and administering vaccines; Expand the adult immunization provider network; Ensure a reliable supply of vaccines and the ability to track vaccine inventories, including during public health emergencies.”[[36]](#footnote-36) The NAIP’s objectives will likely play a key role in addressing access challenges to a COVID-19 vaccination, particularly the fourth objective on ensuring a reliable supply of vaccinations during public health emergencies. The Department of Health and Human Services (HHS) outlined the vaccine distribution process, stating that the locations receiving the vaccines for optimal vaccination speed are hospitals, large clinics outpatient, pharmacies, long term care facilities, doctor’s offices, Indian health services, public health clinics, mobile units, homebound, and other federal entity sites.[[37]](#footnote-37) Whether such sites and states have the resources then to get the vaccine into the arms of Americans is another discussion.

An unexpected challenge of access to the vaccination is the lack of proper federal planning in how states would disperse the vaccination once they received it.[[38]](#footnote-38) The distribution of vaccines to the states appears effective, but the challenge has been states actually getting out the vaccines to individuals.[[39]](#footnote-39) The access difficulty is states lacking proper resources and infrastructure to get the vaccine into people’s arms.[[40]](#footnote-40) If states lack the resources to disperse the vaccination, individuals in need of the vaccine cannot receive it, as it remains locked in a freezer with a time-constrained shelf-life.

1. **Production**

Reliable supply of vaccinations during COVID-19 stems from production. Production of vaccines is another concern under the umbrella of access. Inadequate production of vaccines could lead to a shortage and thus reduce the vaccines made available, likely further disadvantaging those that had minimal access to begin with. The vaccine production market is experiencing growth due to a rising number of diseases, including COVID-19.[[41]](#footnote-41) This rise in the vaccine production market does not necessarily equate to the result of adequate amounts of vaccines that will be needed for COVID-19 herd immunity. COVID-19 vaccine production is being done on a global scale with concerns of inadequate production; the United States is only a portion of the world and faces similar concerns of falling short of enough vaccinations.[[42]](#footnote-42) If initial expert projections of at least roughly 60% of the United States population needing immunity to affect herd immunity, then the current 100 million vaccinations that the HHS states will be ready by March-April 2021 to cover “every American who wants a vaccine” will not be sufficient to achieve that end,[[43]](#footnote-43) especially given Dr. Fauci’s latest projection of 90%. “If production is not ramped up sufficiently, the country risks a repeat of the supply shortages that have plagued widespread COVID-19 testing” and further delays the desired goal of herd immunity.[[44]](#footnote-44) Vaccine production increases are possible, according to experts, by “getting more out of existing production lines, but major manufacturing capacity increases will take eight to 12 months.”[[45]](#footnote-45)

Large pharmaceutical companies are attempting to ramp up production manufacturing for the COVID-19 vaccination, BioNTech specifically, which joined Pfizer in purchasing a new production plant in Germany to “produce tens of millions more vaccine doses per month.”[[46]](#footnote-46) Specifically, the plant that is projected to be fully functional by the beginning of 2021 is estimated to produce 750 million more doses per year and 60 million more per month.[[47]](#footnote-47) “BioNTech plans to be able to produce 250 million doses of its vaccine candidate, BNT162, at the site in the first half of 2021.”[[48]](#footnote-48) The plan is for BioNTech and Pfizer to “deliver part of the first 100 million available doses to the United States,” raising further concerns in the pursuit of herd immunity.[[49]](#footnote-49) Such initiatives, taken by BioNTech and Pfizer, are steps in the right direction but are still falling short of the efforts needed in COVID-19 vaccine production to reach herd immunity. All 400 vaccines from Pfizer and Moderna are due to be delivered to the United States by the end of July 2021.[[50]](#footnote-50) Though the United States renegotiated to have 100 million more vaccinations from Pfizer and 200 million coming from Moderna, the 200 total vaccinations between both [each vaccine requires two shots, meaning if there are 400 vaccinations, 200 million people would receive the vaccine], would vaccinate approximately 60% of the U.S. population, assuming every individual that can, receives one. President Joe Biden also invoked usage of the Defense Production Act (“DPA”), signing an executive order that directed agencies to use all available authorities, specifically the DPA, to “accelerate manufacturing, delivery, and administration” to assist with the shortage of critical supplies needed for the COVID-19 pandemic.[[51]](#footnote-51)

Additional problems exist in production. Transportation of the COVID-19 vaccination, to not only the United States but the rest of the world, is what has been referred to as an “unprecedented” challenge.[[52]](#footnote-52) WHO’s Director of Department of Immunization stipulated that the most challenging part of the vaccination process was not the actual production of the vaccine itself, but the transportation and delivery of the vaccine.[[53]](#footnote-53) For example, the major challenge of transporting the Pfizer vaccination is that it must remain at a temperature of minus 94 degrees Fahrenheit, requiring “speed in moving but it also requires a sort of minimizing the number of hand-offs because it has a limited shelf-life.”[[54]](#footnote-54) The process necessitates airline companies, working together with the vaccine producers, in addition to UPS and FedEx, to ensure that all those in the United States, regardless of location, receive their vaccination.[[55]](#footnote-55) The tight-knit unit of transporters appears to be confident that no matter where an individual is in the United States, they will have access to their vaccination, which is an integral piece of the vaccine uptake and herd immunity puzzle, as discussed above.[[56]](#footnote-56)

1. **Acceptance**

Acceptance of vaccinations is integral in achieving herd immunity; without acceptance, the population will remain largely unvaccinated, leaving herd immunity up to general exposure, stated earlier, as quite risky. Acceptance is defined as “the degree to which individuals accept, question, or refuse vaccination.”[[57]](#footnote-57) Discussing vaccine acceptance may lead some to believe those opposed to vaccination are strictly anti-vaxxers.[[58]](#footnote-58)  Twenty states, as of 2019, had proposed legislation to broaden non-medical exemptions and force doctors to provide more information on the dangers of vaccinations.[[59]](#footnote-59)  “Between 2011 and 2017, researchers identified 92 bills\* introduced across the country as legislation that would make it easier to get exemptions from vaccine requirements, according to a recent study published in the American Journal of Public Health.”[[60]](#footnote-60) Though most states do not grant philosophical objections to vaccinations, the anti-vaccination movement will certainly push back against mandated COVID-19 vaccines.[[61]](#footnote-61)

As of November 2020, roughly two-thirds of Americans were unwilling to receive a COVID-19 vaccine, where one-fourth said they never intend to receive the vaccination and 44% said they would wait to see how the first round of vaccination goes.[[62]](#footnote-62) The national vaccine refusal rate was approximately 3.3%, indicating that around a two-thirds COVID-19 vaccine refusal rate does not consist of an anti-vaccination majority; the COVID-19 vaccination refusal is far larger than the anti-vaxxer movement.[[63]](#footnote-63) As the Pfizer and Moderna vaccines continue their rollout, vaccine hesitancy numbers have declined.[[64]](#footnote-64)

There is a difference between anti-vaccination and vaccine hesitancy.[[65]](#footnote-65) The WHO defines vaccine hesitancy as “a delay in acceptance or refusal of available vaccines.”[[66]](#footnote-66) “Those who are vaccine hesitant aren’t necessarily against getting vaccines—they literally are hesitant to do so. Anti-vaxxers, on the other hand, refuse vaccines. Hesitant individuals may change their mind if they gain higher trust and better understanding of vaccines.”[[67]](#footnote-67) Due to “obvious signs of vaccine hesitancy” in the United States around receiving a COVID-19 vaccination, doctors warn “if we do not start building vaccine literacy and restoring public trust in science today, we cannot hope to contain this pandemic.”[[68]](#footnote-68) It has proven to be the case that hesitant individuals may change their mind with gaining trust and better understanding of the vaccine, as the vaccine hesitancy rates regarding a COVID-19 vaccination appear to have dropped from 2/3 of Americans saying they would likely not receive a COVID-19 vaccination, to about ¼ of Americans saying such.[[69]](#footnote-69) This drop comes as the vaccine roll-out began and continues.

Warranting an even further discussion is “widespread distrust in an eventual COVID-19 vaccine among Black Americans”[[70]](#footnote-70) as polls indicate Black Americans “are the most hesitant” about getting a COVID-19 vaccine among racial and ethnic groups.[[71]](#footnote-71) Merely 50% of Black Americans, contrasted to 76% of whites, said they would receive a COVID-19 vaccination in a study conducted of 800 likely voters in the November 2020 elections.[[72]](#footnote-72) The Tuskegee syphilis study, formally known as the Tuskegee Study of Untreated Syphilis in the Negro Male, [[73]](#footnote-73) is just one example of a “long history of racism impacting the access and quality of the health care they receive” are major contributions to the hesitation and distrust.[[74]](#footnote-74) Because of this, it is “not surprising that Black Americans distrust government-led efforts to combat the coronavirus.”[[75]](#footnote-75) Hesitancy by Black Americans is rooted in minority groups’ distrust of vaccinations and other large healthcare programs. The Chief Clinical Officer at Chicago’s Loretto Hospital was quoted saying, “I’ve heard Tuskegee more times than I can count in the past month . . . .”[[76]](#footnote-76) A recent study offered evidence that a pneumococcal disease vaccine removed racial differences in infection rates and there is optimism that a COVID-19 vaccination could produce a similar effect.[[77]](#footnote-77) This result is contingent on wide distribution of the vaccine to minorities and increased education about the vaccination targeted at such demographics.[[78]](#footnote-78)

The anti-vaccination movement, widespread lack of acceptance and vaccine hesitancy of a coronavirus vaccine, and further distrust in minority demographics, create large barriers for vaccine uptake. Day-to-day levels of acceptance and sentiment towards the vaccination fluctuate. There will always be skeptics to any vaccination, including COVID-19. However, the closer the United States can get to the initial estimated herd immunity range of 50-66% vaccination, the higher likelihood of herd immunity. Access, production, acceptance, affordability, and activation are all necessary components to vaccine uptake and achieving herd immunity. As the COVID-19 vaccinations continue to be dispersed throughout the United States, whether these are being reached or handled will become clearer.

1. **Affordability**

A coronavirus vaccination is essential to herd immunity, but without affordability of the vaccination, many Americans would remain unvaccinated. Affordability is defined as “the ability of individuals to afford vaccination, both in terms of financial and non-financial costs (e.g., time).”[[79]](#footnote-79) Americans can receive a COVID-19 vaccination free of charge, as the vaccine doses are purchased using taxpayer dollars.[[80]](#footnote-80) However, vaccination providers can charge an administration fee for the shot.[[81]](#footnote-81) Though, this charged administration fee can be reimbursed by the patient’s public or private insurance company.[[82]](#footnote-82) For uninsured patients, the Health Resources and Services Administration’s Provider Relief Fund will reimburse.[[83]](#footnote-83) The current sentiment is that “no one can be denied a vaccine if they are unable to pay the vaccine administration fee.”[[84]](#footnote-84) As noted above, the pandemic constantly changes over-time, and it is possible that if vaccination for COVID-19 will be a yearly necessity or even multiple times per year, the United States may not be able to continue offering free vaccinations. Because of this, a discussion around alternative avenues for vaccine payment is warranted.

In terms of financial costs, “affordable vaccine access today is made possible through a handful of federal and state policies and programs” for most Americans.[[85]](#footnote-85) Several of these programs include Medicare, Vaccines for Children (VFC), the Affordable Care Act (ACA), and the Coronavirus Aid, Relief, and Economic Security (CARES) Act.[[86]](#footnote-86) Medicare, Part B specifically, covers medically necessary services and preventative services.[[87]](#footnote-87) The covered preventative services will consist of health care services that “prevent illness (like the flu) or detect it at an early stage, when treatment is most likely to work best.”[[88]](#footnote-88) An additional program is VFC, which “provides childhood vaccines at no cost to over 40 million children who are Medicaid-eligible, uninsured, underinsured, American Indian or Alaska Native.[[89]](#footnote-89) VFC has contributed to large vaccine uptake in children and extensive reduction in vaccine-preventable diseases.[[90]](#footnote-90)

The ACA, another program impacting vaccination, “requires that all vaccines recommended by the Advisory Committee on Immunization Practices (ACIP) be covered without cost sharing by non-grandfathered commercial health insurance plans and Medicaid expansion programs.”[[91]](#footnote-91) The caveat to this requirement is that Americans in traditional Medicaid programs “are subject to variable vaccine coverage across states.”[[92]](#footnote-92) CARES addressed the coverage and affordability of a COVID-19 vaccination for it is classified as a preventative health service, meaning that “health plans” will cover the price at no additional cost to Americans.[[93]](#footnote-93) To offer no additional cost for the vaccination requires the COVID-19 vaccination be “recommended by the U.S. Preventive Health Services Taskforce and the Centers for Disease Control and Prevention’s Advisory Committee on Immunization Practices (ACIP)” and the follow up to this being health plans have 15 days to cover it. [[94]](#footnote-94) There are, however, gaps in coverage to CARES; “the CARES Act only applies to individual and employer-sponsored health plans regulated by the Affordable Care Act (ACA), as well as traditional Medicare.”[[95]](#footnote-95) The VFC is also left out.[[96]](#footnote-96) The coverage gaps within the CARES Act will leave individuals in the United States without affordable access to the COVID-19 vaccination if the government stops offering it for free.[[97]](#footnote-97)

Lack of healthcare coverage has risen since 2017.[[98]](#footnote-98) 27.5 million Americans were uninsured during 2018, according to data from the U.S. Census Bureau.[[99]](#footnote-99) Additionally, further data identified that one in eight Americans lived below the poverty line.[[100]](#footnote-100) The millions of uninsured Americans, especially those uninsured living below the poverty line, will face severe affordability challenges with a COVID-19 vaccination if, down the line, multiple vaccinations would be required to hold on to herd immunity. If the United States can no longer offer the vaccination free-of-charge after one, two, or even three rounds, many Americans may face challenges in affording follow-up vaccinations to remain safe from the virus.

The second, non-economic, component of vaccine affordability is time. Americans are experiencing long vaccine lines, non-functioning websites, and misunderstandings around how and where they can register.[[101]](#footnote-101) The current reality of this initial vaccine rollout of 2021 is that many wait on lines up to as long as eight hours and those unfamiliar with technology attempting to register for their vaccination; these challenges play an essential role in whether individuals can “afford” all the time they are spending on such efforts.[[102]](#footnote-102) Whether it be an 80-year-old woman calling the health department hotline fifty times attempting to get vaccinated after being told she was not qualified[[103]](#footnote-103) or individuals waiting hours on long lines outside vaccine clinics, the reality is setting in that states (as discussed above) are unprepared for an efficient vaccine rollout, leading to many affording quite a bit of time in their attempt to be vaccinated.[[104]](#footnote-104) The problem is that many Americans work jobs that do not afford them the time to wait hours in line; they have families they must take care of and cannot make fifty phone calls to health services; they cannot wait on crashed websites until they are up and running to register for their vaccine. Though the economic component to affordability may be satisfied for the time being, the time component of affordability remains problematic, while states attempt to vaccinate as many as possible, while “ensuring that people at most risk are at the front of the line.”[[105]](#footnote-105) However, measures are being taken to cut down on the time individuals will have to afford to receive their COVID-19 vaccine by corporate appointment arenas, such as Eventbrite, Survey Monkey, Google, and Apple, prioritizing vaccine uptake.[[106]](#footnote-106)

1. **Activation/Compulsory Vaccination**

Activation is the “degree to which individuals are nudged towards vaccination uptake.[[107]](#footnote-107) One method, amongst others, of activation to achieve vaccine uptake and herd immunity is mandatory or compulsory vaccination.[[108]](#footnote-108) Another method in moving individuals towards acceptance of receiving a vaccine is to persuade them that vaccination is in their best interest. Mandatory vaccinating under State police power rests on precedent from 1905.[[109]](#footnote-109)

* 1. **Compulsion as a Means of Activation**

*Jacobson v. Massachusetts*, decided by the Supreme Court of the United States in 1905, questioned the police power of states to utilize compulsory vaccinations.[[110]](#footnote-110) Jacobson refused vaccination and was criminally charged for neglecting to obtain the Smallpox vaccination.[[111]](#footnote-111) The law stated that anyone over the age of twenty-one, with the exception of children who received a doctor’s note stating their inability to receive such vaccination, had to be vaccinated or revaccinated if they had not been after March 1, 1897 for Smallpox, in an attempt to exterminate the disease in Cambridge, Massachusetts.[[112]](#footnote-112) The Court confirmed that this type of legislation was within the bounds of State police power and the State “must be held to embrace, at least, such reasonable regulations established directly by legislative enactment as will protect the public health and the public safety.”[[113]](#footnote-113) Given the nature of the case—a breakout of an illness—the court found that out “of paramount necessity, a community has the right to protect itself against an epidemic of disease which threatens the safety of its members.”[[114]](#footnote-114) States do not need to provide exemptions with the exception of those whose health will decrease as a result of the vaccination.[[115]](#footnote-115)

* 1. **Modern *Jacobson* Application**

*Phillips v. City of New York*,[[116]](#footnote-116) involved two cases consolidated into one; children whom were excluded from school because of a chicken pox outbreak, of which classified as a vaccine-preventable illness that allowed the school districts to exclude vaccine-exempted students from attending school and another child who sought a religious exemption from school vaccinations.[[117]](#footnote-117) The two plaintiffs joined their complaints to state that the “State’s [New York] mandatory vaccination requirement and the regulation permitting temporary exclusion of exempted schoolchildren during a disease outbreak were unconstitutional.”[[118]](#footnote-118) Being a more recent case than 1905 and 1922, *Phillips* emphasizes a recent example of how courts are still refusing to stray from *Jacobson* precedent regarding not only State police power to enact compulsory vaccination, but rejecting any form of anti-vaccination claim, insisting that if the legislature does not include such information regarding health risks and chooses to pass legislation mandating vaccines, then the court will not step in and override their decision to mandate those vaccines. In regards to the Plaintiff who sought religious exemption for their child, the Magistrate judge provided in a report that, “plaintiff's testimony that she did not adopt her views opposing vaccination until she believed that immunization jeopardized her daughter's health is compelling evidence that plaintiff's refusal to immunize her child is based on medical considerations and not religious beliefs.”[[119]](#footnote-119) This case affirmed the notion that exemptions for mandatory vaccinations based on safety may not be justifiable.[[120]](#footnote-120) The court said that *Jacobson* does not control the Free Exercise of religion claim but that a parent "cannot claim freedom from compulsory vaccination for the child more than for himself on religious grounds.[[121]](#footnote-121) The right to practice religion freely does not include liberty to expose the community or the child to communicable disease or the latter to ill health or death."[[122]](#footnote-122) The court further stated, “New York could constitutionally require that all children be vaccinated in order to attend public school. New York law goes beyond what the Constitution requires by allowing an exemption for parents with genuine and sincere religious beliefs.”[[123]](#footnote-123)

States can pass compulsory vaccination laws without offering any exemption, except for those whose health would be harmed by a particular vaccine.[[124]](#footnote-124) 2019 brought an outbreak of measles.[[125]](#footnote-125) Mayor Bill DeBlasio, on Tuesday April 9, 2019, declared a public health emergency in New York City and mandated a measles vaccination for the “ultra-Orthodox Jewish community,” in the Williamsburg section of Brooklyn, where more than two-hundred fifty individuals had gotten Measles since September 2018.[[126]](#footnote-126) As a result, the Mayor ordered mandatory Measles vaccinations within the specific community, stating, “the 212,000 people living, working or [attending school in four Williamsburg ZIP codes](https://nypost.com/2019/04/13/brooklyns-measles-epidemic-driving-bitter-divide-in-jewish-orthodox-community/) get vaccinated or face a $1,000 fine.”[[127]](#footnote-127) This mandate led five parents to anonymously file suit in the Brooklyn Supreme Court that the mandate went beyond the power of the Department of Health and Mental Hygiene and Commissioner Dr. Oxiris Barbot and that the reasons for the mandate are “insufficient to justify these drastic emergency measures.”[[128]](#footnote-128) The legal justification proffered by the Mayor and his staff, that stated “The U.S. Supreme Court has upheld the right of states and localities to mandate vaccines to stop outbreaks,” referring to the cases previously discussed in this section, held *Jacobson* precedent.[[129]](#footnote-129) The Brooklyn Superior Court Judge Knipel dismissed the parents’ claims that the Measles outbreak lacked the severity to warrant the mandatory vaccination.[[130]](#footnote-130) This justification provided by Judge Knipel is integral to the *Jacobson* justification of a State or locality, proving that the mandate does not go beyond the “necessities of the case,” and is warranted due to a desire to protect the health and safety of the population.[[131]](#footnote-131)

One year later, the Supreme Court of the United States reached two decisions regarding COVID-19 under *Jacobson* precedent. *In re Abbott*, 954 F.3d 772, 777-78 (5th Cir. 2020) arose out of the COVID-19 pandemic when the Governor of Texas, in an attempt to “preserve critical medical resources,” issued executive order GA-09 that postponed non-essential surgeries from March 22, 2020 to April 21, 2020.[[132]](#footnote-132) *Jacobson* emphasized that the police power for States to enact such laws is justified given a climate of a health crisis in order to protect the citizenry.[[133]](#footnote-133) The *In re Abbott* court discussed how the TRO stated that the COVID-19 pandemic is the “worst public health emergency in over a century.”[[134]](#footnote-134) *Jacobson* introduced a broad view of State police power regarding compulsory vaccinations, finding that provided the vaccination is “enacted to protect the public, health, the public morals or the public safety” and has a “substantial relation” to that public health and safety, the act is not unconstitutional.[[135]](#footnote-135)

The second COVID-19 case, *Southbay United Pentecostal Church v. Newsom*, 140 S. Ct. 1613 (2020), led California to enact a stay-at-home order to assist in preventing the spread of the virus.[[136]](#footnote-136) The Southbay United Pentecostal Church challenged this stay-at-home order seeking injunctive relief to be able to hold in person services.[[137]](#footnote-137) In Justice Roberts’ concurring opinion, he justifies California’s stay-at-home order including places of religious worship by stating, “our Constitution principally entrusts ‘the safety and the health of the people’ to the politically accountable officials of the States ‘to guard and protect,’” citing *Jacobson*.[[138]](#footnote-138) He goes further to say that, “when those officials ‘undertake to act in areas fraught with medical and scientific uncertainties,’ their latitude ‘must be especially broad.’”[[139]](#footnote-139) As stated previously, the broad latitude of *Jacobson* grants states quite a bit of breathing room to secure their version of protection. *Southbay* showcases that *Jacobson* precedent is not limited to compulsory vaccinations, but that a state may enact legislation of any kind that is within the purview of protecting the health and safety of the citizenry and does not exceed the necessities of the case or abuse discretion.[[140]](#footnote-140) Subsequent to the decision in *Southbay*, Justice Roberts joined the minority dissenters in *Roman Catholic Diocese of Brooklyn v. Cuomo* and responded to criticism by Justice Gorsuch for relying too heavily on Jacobson.[[141]](#footnote-141) Justice Gorsuch proposed that court decisions refrain from applying Justice Robert’s concurrence in *Southbay* as the justification for state police power during the pandemic and “resume applying the Free Exercise Clause.”[[142]](#footnote-142) The reign of COVID-19 allowed for California to utilize its police powers, justified through *Jacobson*, to pass stay-at-home orders, under the guise of protecting the public and reducing the spread of the illness.

* 1. **Mandatory COVID-19 vaccination**

Some have suggested that the solution to widespread lack of acceptance and vaccine hesitancy of a coronavirus vaccination would be to implement compulsory vaccination, even going as far as suggesting losing tax credits or nonessential governmental benefits for refusing the vaccine.[[143]](#footnote-143) Widespread distrust of vaccinations, previously discussed in Acceptance, will likely present challenges to a mandatory COVID-19 vaccination. Despite this, all 50 states have mandatory vaccinations for children.[[144]](#footnote-144) States differ, however, with whether they offer religious, medical, or philosophical exemptions.[[145]](#footnote-145) For example, Arizona offers religious and philosophical exemptions, whereas California offers neither religious or philosophical exemptions to their mandatory vaccinations.[[146]](#footnote-146) California, for example, removed all exemptions from mandatory vaccinations with Senate Bill 277 passed in 2015.[[147]](#footnote-147) The law says religious beliefs are personal beliefs and those cannot be used to put everyone else at risk.[[148]](#footnote-148) If this type of mentality introduced by California spreads to other states, there is potential that a mandatory COVID-19 vaccination would offer no exemptions except medical exemptions, outlined in *Jacobson*.

The Equal Employment Opportunity Commission (“EEOC”) released guidelines regarding mandatory COVID-19 vaccinations in the workplace.[[149]](#footnote-149) The EEOC responded to several mandatory workplace vaccination questions, including how an employer would respond if a mandatory vaccination screened out an individual with a disability or if an individual had religious beliefs that lead them to decline receiving the vaccination.[[150]](#footnote-150) The EEOC stated a process for employers to follow in terms of employees with disabilities and a mandatory vaccination; it would begin with employers showing that the employee, without being vaccinated, poses a threat to the work environment.[[151]](#footnote-151) For individuals with religious beliefs, the EEOC said that the employer must provide a reasonable accommodation for the religious belief, so long as it does not create an undue hardship under Title VII.[[152]](#footnote-152) The EEOC further concluded that if an employee cannot get a COVID-19 vaccination for either disability or religious beliefs, and there is no reasonable accommodation to be made, “then it would be lawful for the employer to exclude the employee from the workplace.”[[153]](#footnote-153)

Workplace vaccination mandates was foreshadowed by California as the first state to enact legislation for mandatory vaccinations that was not for children.[[154]](#footnote-154) The bill prohibited day care and family day care centers/homes from hiring individuals who had not been immunized in compliance with the federal Centers for Disease Control and Prevention adult immunization schedule.[[155]](#footnote-155) The bill stated that a person, employed at a family day care home, had to be immunized against influenza, pertussis, and measles and that the influenza vaccination needed to be updated between August and December every year.[[156]](#footnote-156) As seen in *Jacobson*, the Commonwealth brought criminal charges against Jacobson for refusing the mandatory vaccination.[[157]](#footnote-157)

In 2020, with general fear around the safety of the vaccine and a portion of the population saying they would not get the vaccination, what would States be allowed to employ as far as repercussions for not receiving the vaccination?[[158]](#footnote-158) The step beyond mandating the vaccination in terms of enforcement and regulation has yet to come across the courts in the United States. Though *Jacobson* only presented one individual failing to receive the vaccination, with the level of uncertainty around the COVID-19 vaccination, a large number of individuals would likely refuse such a mandate.[[159]](#footnote-159) If a State were to implement a mandatory vaccination, it seems likely that they could utilize the monetary fine used by Jacobson, and more recently, Mayor De Blasio.[[160]](#footnote-160) A monetary fine for a COVID-19 vaccination would have to be high enough to strongly discourage individuals from failing to get the vaccination and simply paying the fine. If the goal is vaccine uptake to achieve herd immunity, a low one-time fine is not going to achieve the end result. The reality of a COVID-19 vaccination is that not only will individuals be hesitant due to the uncertainty, but individuals will expect exemptions whether religious, philosophical, or medical. Per *Jacobson*, states need only offer medical exemptions for individuals who are unfit to receive a vaccine in the event that their health would decline as a result.[[161]](#footnote-161) Given that 1/4 of the population does not trust the safety of the vaccination there will likely be pushback on the grounds of safety concerns. As seen in *Phillips*, requested exemptions on the basis of unsubstantiated health concerns about vaccines is not upheld by the courts as valid.[[162]](#footnote-162)

 Though Jacobson precedent established that mandatory vaccination is warranted during the time of a public health emergency, and COVID-19 certainly qualifies as such, a mandatory vaccination would be futile in the current climate. If the United States is expecting 200 doses of COVID-19 vaccinations, enough to vaccinate roughly 60% of the population, but the states lack the resources and infrastructure to get the vaccines out in a timely fashion, one would argue that turning it from optional to mandatory bears no weight on how quickly it is given out. Currently, vaccine hesitancy has gone down to about ¼ from 2/3, meaning individuals are gaining trust in the vaccine; majority of Americans appear to be willing to receive the vaccination, meaning COVID-19 is less in line with the *Jacobson* and company narratives. The solution to herd immunity lies in access, production, affordability, and acceptance. Though activation is important, without proper access, sufficient production, economic and timely affordability, and general acceptance, whether the vaccination is optional or mandatory is irrelevant.

1. **Conclusion**

The inability to pinpoint a specific percentage of the population that must be resistant to COVID-19 to achieve herd immunity creates challenges for assessing the most effective way to achieve the goal. Barriers in access, production, acceptance, affordability and activation act as road blocks in the pursuit of herd immunity that must be removed to save lives. Compulsory vaccination has previously been a state’s way to combat a public health concern, whether it was in 1905 or 2019 with Measles in Brooklyn. However, the reality of compulsory vaccination is that it is futile when acceptance levels are low and widespread. It is not recommended that states utilize their police powers to enforce compulsory COVID-19 vaccinations to increase vaccine uptake and aim for herd immunity, as it appears that a roll-out of the vaccination on a volunteer basis may be sufficient. Rates of hesitancy seem to be going down with the vaccine rollout, as well as the fact that without proper access, affordability, and production, in conjunction with acceptance, a mandatory COVID-19 vaccination is futile. Unfortunately, the COVID-19 fatality rates in the United States make reliance on voluntary vaccination challenging. If herd immunity is still not achieved after all those who wish to receive the vaccination do so, a compulsory vaccination may be advised. For now, the United States has some work to do.

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