Should States Mandate Vaccinations?

By Travis Cohee

Introduction

Vaccines are prevalent in our society. They exist to prevent and eradicate harmful and deadly diseases. As a society, we have learned to accept these medical interventions as necessary to our survival. They seem to saturate the medical industry and ignite social controversy. The moment a person is born in the United States, vaccines play a vital role in their life. From birth to age eighteen, the average American child is given seventy doses of sixteen different vaccines, sixty nine percent of which are given before the age of six (CDC, schedule). In addition, adults regularly receive booster shots and other various vaccinations such as for the flu among a multitude of others that are routinely created to combat new and existing threats. Each vaccine is produced by a private manufacturer and must be approved for safety by the Food and Drug Administration (FDA), and each one has the potential to cause a broad range of adverse reactions from minor discomfort, to lifelong injury, disability, and even death. Whether you are a parent, professional, college student, or whoever you are in the United States, at some point, you will be faced with the decision to vaccinate.

Throughout our nation's history, infectious diseases such as smallpox have claimed the lives of many. Through each outbreak our governments were faced with decisions that would affect public health and civil liberties. These decisions ultimately led to compulsory vaccination legislation. In order to preserve and protect the population from future outbreaks with catastrophic levels of mortality rates, each state mandates which vaccines and when they should be administered to children. The mandates require children receive certain vaccinations in order to attend public school and child care facilities. It also applies to military enrollment and by some employers such as health care professionals and the federal government. The required vaccines are taken from the recommendations of the Centers for Disease Control and Prevention (CDC). Within the CDC, a panel of experts in the fields of medicine and public health make up the Advisory Committee on Immunization Practices (ACIP) which advises the CDC on which recommended vaccines they believe will effectively control vaccine-preventable diseases within the United States. Under the ACIP's guidance, the CDC created a list of vaccines that each child, federal employee, or service member should receive and a schedule as to when and how often those shots should be administered (CDC). The states take those recommendations and apply them to their mandates.

Any mandate issued by a state infringes upon an individual's freedom on some level. As a population living in a civilized society, we allow the reduction of certain freedoms for the safety of the community. Accordingly, the states justify the mandates under the pretension that the benefits to the many outweigh the risks to the few and therefore serve and uphold the concept of the *greater good*. In the case of vaccinations, the justification of using the greater good principle becomes problematic because the evidence that vaccines indeed provide the greater good is unclear and has yet to be conclusive enough to validate the use of a principle that carries the significant influence to the compulsory law (Habakus, Holland; Tate 84). Vaccination mandates are an anomaly among others in that they in essence require or force harm to the few in order for the many. As a result, their legality and ethical standing are the topic of debate between those who believe in the benefits of vaccinations and those who question their safety and efficacy.

Peppered throughout this paper will be terms that may require some formal definition and thus I have included the ones I think are most in need of defining in the appendix section of this paper. Others may arise throughout the text that may not be listed in the appendix and will be properly defined in the paper, either formally or by context. In addition, due to the very large amount of ingredients in vaccines, a list has been included in the appendix that the reader can refer to if need be.

Significance

This issue of state vaccination mandates affects many people directly and indirectly. There are many voices that cry out against each other making a nonpartisan assessment a hurdle to overcome. The people directly affected are parents, children, military personnel, and federal employees. Those indirectly affected are the FDA, CDC, Public school system, child care facilities, and the manufacturers of the vaccines. With any issue, there will be others who are affected yet these I believe will represent the major players involved in our topic.

Parents in the United States have certain rights in regards to the health and well being of their children. Since children under the age of 18 are typically considered too young by the state to make decisions concerning medical interventions, parents are responsible for those actions and choices. Any medical intervention carries with it benefits and risks, each of which must be weighed and rationalized for a person to make an informed consent. A mandate enforcing medical interventions inherently undermines the ability to make an informed choice. It is these choices and ethical implications that parents face which cause a deep divide between proponents and opponents to the law. There are parents concerned for the well being of their children who may be at risk from an infectious disease and feel that unvaccinated children increase that risk. On the other side there are parents who choose not to vaccinate because they are more concerned of the health risk involved with the ingredients that are in vaccines rather than the disease.

Vaccines have health risks other than the risk of simply not working and causing an individual to be susceptible to the disease it's supposed to prevent. The ingredients within the vaccines also pose the risk of harm to the human body. For anyone receiving a vaccination, multiple things are injected into the bloodstream in addition to the active ingredient, such as antibiotics, preservatives like mercury, and adjuvants consisting of aluminum (another known neurotoxin) and DNA harvested from aborted fetuses (Offit, Jew 1394). For such persons, their health is at risk, either with the vaccine working to protect them from a disease, or with the ingredients actually causing a disease, permanent harm, or death. Proponents of vaccine mandates believe those risks are minimal while opponents believe they pose more risk than the disease themselves. The opponents feel it is essential for the benefits and risks associated with administering multiple vaccines simultaneously be evaluated and analyzed under extreme scrutiny through a nonpartisan lens.

A majority of people, the government included, feel that by not fully vaccinating the population, the risk for infectious disease outbreaks will rise, costing many lives and dollars worth of medical expenses to treat. Others feel vaccines cause more damage both to the public health and in monetary terms due to the overwhelming amount of reported side effects and lawsuits surrounding the adverse reactions to vaccines. One side sees stricter mandates as the solution, while the other side believes in the exact opposite. Some questions that must be asked and answered are:

1. Are the FDA and CDC fulfilling their responsibility for regulating matters of health for this country in their recommendations and licensure approvals, or are they failing to uphold that responsibility?
2. Do mandates protect the public health from disease risk and if so act ethically in the process?
3. Are mandates causing more harm than good by limiting parental autonomy and placing vulnerable persons at risk?

Ultimately, these questions exist under the umbrella of the main question this paper will attempt to dissect and answer: Should states mandate vaccinations?

Secondary Issues and Scope

There are some non prominent issues related to vaccine mandates. These secondary issues are medical neglect, media bias, blanket trust in vaccine manufacturers and governmental regulatory agencies, social labeling, risks of losing intellectual credibility, and various limitations where vaccines are a prerequisite, i.e. travel to certain foreign countries.

In the state of Texas, healthcare and social workers have strict requirements to report any medical neglect which is where medical treatment or intervention is withheld from someone in need of it. Every citizen is required by law to report medical neglect if witnessed. Parents who opt out of vaccinating their children risk being reported to the authorities if the person reporting feels the parents are medically neglecting their children. The same applies to adults in charge of their elderly family members who may refuse certain vaccinations based on CDC recommendations. Some people feel that all vaccinations are beneficial in every circumstance and may report what they feel to be medical neglect.

This type of mentality is fueled and sustained through an overabundance of pro-vaccination rhetoric throughout our society. From the time a person is young, they are told over and over again in the certitude of vaccines by people in positions of power and trust. Influential agencies from news media outlets, governmental bodies, billboards, doctor's offices, commercials, popular television sitcoms, public school literature, to celebrities voicing their opinion not only plants but also waters the cultural norm's view concerning vaccines. There is also a trust that is established within the culture towards the government regulatory agencies involved, manufacturers of the vaccines, and in the medical community. Is this influential opinion and trust in vaccines warranted and based on facts or is there something more political involved behind the campaign to believe in vaccines? Unfortunately, when people start to go against the cultural norm and question its veracity, they also risk losing credibility within that population.

These same factors can also apply to the pro-vaccination choice group as well. There are organizations that range from intellectual to overzealous and they too run the risk of not accepting any of the information given to them due to a strong distrust towards the source of where the information came from. They too can run the risk of misleading the public with character attacks on the pro-vaccine side. This can be just as unhealthy to the influence these organizations have among those willing to stray from the norm because it can compromise the integrity of critical nonpartisan thinking towards the subject.

Assumptions

The general public trusts the FDA and CDC's authority that all vaccines work to prevent infectious diseases and are safe and reliable. Generally, most people would say they trust their doctor and have faith in the FDA to do their job in keeping everyone safe from drugs that have not yet proven to be safe. In addition, the general population has the understanding that there is adequate scientific data proving without a doubt both the safety and effectiveness of vaccines and debunks any evidence to the contrary. They also assume that vaccines are the only way to boost or create immunity in order to prevent or fight infectious diseases. The flu shot is a great example of this. Every year around the holiday season, people are bombarded with advertisements from the local pharmacy, employers, and news articles hailing the necessity for flu shots. People are under the assumption that if they don't get the flu shot, they will get the flu and that by getting the flu shot, they are completely protected from it. Also, many people are unaware of their right to say no to vaccinations through certain exemptions.

One of the biggest assumptions I have come across so far in my research is that vaccines are the sole cause for the reduction and elimination of infectious diseases historically and presently. For example, it is a common assumption that the polio vaccine in the 1950s and 1960's was solely responsible for stopping the polio outbreak at the time when in fact the reduction is mainly attributed to a reclassification of the disease and by means of how it was reported (Hiding Polio quotes). It is now known that many polio vaccines actually induced polio paralysis. I will go into more detail about this later in the paper. It is examples such as this that call into question the credibility of vaccine campaigns in our history.

History and Background

In order to better understand the mandates, we must first look at the history of infectious diseases and of the vaccine development to prevent and eradicate them. To do this properly, I feel it is imperative that I present first and foremost the facts involved because in my research, I have found that both sides see many of the same historical details but interpret them differently. Great volumes of work have been written exhaustively detailing the many events and influences that play a role in this extremely complex history. To best utilize the space requirement of this paper and lest risk the reader's attention to sway from the page; I will attempt to narrow the material as best I can. In doing so there are inevitably a great many details that will be left out, however, if one feels so inclined to delve further into them, the aforementioned volumes of works can usually be found at public libraries and await you with open pages.

The first vaccine developed was for smallpox. Smallpox is a contagious disease caused by the variola virus. Several outbreaks of smallpox occurred in the seventeenth, eighteenth, and nineteenth centuries causing numerous deaths worldwide (Case, Chung 58). In, 1980, the World Health Organization (WHO) made a statement claiming the complete eradication of the disease through aggressive vaccination programs (Archives of WHO).

The first successfully developed vaccine is credited to Edward Jenner, although, he was not the first person to try vaccination against smallpox using the cowpox virus. A few people had tried several years earlier. From 1770-1791, farmers Jensen and Peter Plett, pharmacist Benjamin Jesty, and a Mrs. Rendall all tried to use cowpox as a vaccine against smallpox. It is assumed that these attempts were unsuccessful (Craig, History Repeats Itself) because little is known of the results. At the time, vaccination against smallpox was believed to be accomplished by injecting a person with the liquid from

a pustule of a person infected with cowpox. Jenner hypothesized that a person who had been infected with cowpox could not get infected with smallpox. His theory was influenced by rumors he had heard from various dairymaids. Dairymaids would contract cowpox on their hands from handling the infected utters of cows and since some would not get infected with smallpox through exposure, immunity was assumed. He tested his hypothesis on an eight year old boy names James Phipps on May 14, 1796. It is recorded that James Phipps was successfully immune to the smallpox disease as a result from the vaccination (Bystrianyk, Humphries) although much of the rest of his life is unknown.

Jenner continued testing his vaccine on several others and recording the results in his writing called, *An Inquiry into the Causes and Effects of the Variolae Vaccinae, a Disease Discovered in some of the Western Countries, especially Gloucestershire, and Known by the Name of Cowpox.* Veterinarians and other physicians at the time disagreed with Jenner's hypothesis because of the many people who had contracted smallpox despite already having had cowpox (Creighton 57). His paper on cowpox submitted to the Royal Society was rejected. The Royal Society refused to publish Jenner's findings in the *Philosophical Transactions,* a scientific journal at time (Creighton 57). After several other attempts to get his work published among his peers, he decided to publish it himself.

Despite his setbacks and inability to get his papers peer reviewed, Jenner approached King George III with what he believed to be the solution to smallpox. Convinced of Jenner's findings (and perhaps desperate for a solution), King George III had parliament give Jenner a hefty sum of money, the equivalent of half of million dollars in today's currency, as a reward for his findings and a means to continue his work. This is how the mass population became introduced to the idea of vaccinations. It wouldn't take long until major outbreaks would occur and parliament would begin to issue mandates in an effort to stop smallpox, however, as we are about to see, the results of these mandates are very intriguing.

The first Mandate to occur in England was the Vaccination Act of 1853 which required smallpox vaccinations across England to be administered to children within three months of birth. Despite the strict mandate, outbreaks occurred in 1857, 1858, 1859, and then again in 1863, 1864, and 1865. To combat these outbreaks, further restrictions to the 1853 mandate were enacted in 1867. It is interesting that even with mass vaccination campaigns throughout England, outbreaks continued to occur, again in 1870, 1871, and 1872. In 1871 legislation passed for more stringent vaccination requirements (Craig, 2010). From data compiled, smallpox cases and deaths actually increased after each compulsory mandate was established and actively enforced (Craig, 2010).

From parents to physicians, people were starting to see various adverse reactions to the vaccines in their children and became outraged at the fact they were forced to succumb their healthy children to a procedure that could produce dangerous outcomes. The fines, imprisonment, and harsh tactics used by the government to enforce compliance to the law coupled with the fact that people were not seeing vaccinations causing a decline in smallpox outbreaks or in the mortality rate from the disease spurred the anti-vaccine movement of their day. This movement became headed by William Tebb who sought to repeal the Acts of 1853, 1867, and 1871 due to their infringement of each citizen's liberty and parental rights (Durbach). Tebb eventually formed the London Society for the Abolition of Compulsory Vaccination (LSACV) along with bookseller William White and pharmaceutical chemist William Young in 1880. LSACV was one of many anti-vaccine organizations at the time but quickly became very prominent amongst them and later dissolved into the National Anti-Vaccination League in 1896 (Durbach, 200).

While England was dealing with smallpox mandates and outbreaks in the nineteenth century, America was also facing the same issues. Smallpox outbreaks were common in the eighteenth and nineteenth centuries. As a result, Massachusetts became the first state to enact a mandate requiring vaccinations for smallpox in 1809. Later in 1855, it increased the mandate to include admission into the public school system. Other states did not start introducing laws mandating vaccines until the twentieth

century. Vaccine production and diversity began to increase in the twentieth century in order to meet the needs and demands of current mandates and tackle new diseases such as measles, polio, chickenpox, pertussis, diphtheria, mumps, rubella, tetanus, hepatitis and many more.

In a country founded upon civil liberties, opposition to vaccination mandates began when people felt their civil liberties and health were put at an unjustified risk. Regardless of some objections to the mandates, there have been numerous court decisions in the twentieth century upholding the constitutionality of the mandates (Malone, Hinman 271). The cornerstone court case for the constitutionality of the state to exercise its police power to enforce vaccination mandates was *Jacobson v. Massachusetts* in 1905 (197 U.S. at 25, 25 S.Ct. at 361). The U.S. Supreme Court ruled in favor of mandatory vaccination over civil liberties secured under the Fourteenth Amendment in the U.S. Constitution citing:

"*…the liberty secured by the Constitution of the United States to every person within its jurisdiction does not impart an absolute right in each person to be, at all times and in all circumstances, wholly freed from restraint. There are manifold restraints to which every person is necessarily subject for the common good. On any other basis organized society could not exist with safety to its members."* (197 U.S. at 26, 25 S.Ct. at 361).

Essentially, the court agreed that civil liberties are upheld by the constitution so long as they do not infringe upon the liberties of others or place the public in harm's way. Major court cases since have cited the ruling of this case as justification in upholding state level vaccination mandates. Other prominent cases are *Zucht v. King* in 1922 and *Maricopa County Health Department v. Harmon* in 1987 (Malone, Hinman 272). As the twentieth century progressed and other infectious diseases such as polio, chickenpox, pertussis and measles began to spread, more and more states responded with vaccination mandates for school admission for each of these diseases.

All states recognize there is an unavoidable risk of harm vaccines may have on some people therefore, all states allow for a medical exemption to the mandates. All states except Mississippi and California allow for a religious exemption and seventeen states allow an exemption for philosophical reasons. The severity and strictness of requirements to obtain these exemptions vary by state. Though there are exemptions to the compulsory vaccination requirements, few are sought out due to ignorance of their existence or because of the complexity to obtain one. The amount of vaccines required today has skyrocketed from just twenty five years ago prompting parents to begin questioning their necessity and safety. There is an exponential increase in other health issues in children today contributing to the rise of parents and medical professionals questioning the safety of vaccines (Van Cleave, 2010). The people who question vaccines are often labeled as "anti-vaccine".

Dr. Paul Offit attributes the birth of modern day anti-vaccine movement to the public's scare and concerns over the DPT (diphtheria, pertussis, tetanus) vaccine after an investigative documentary, *DPT: Vaccine Roulette* aired on national television citing several personal cases of severe adverse reactions to the vaccine (Offit, 2). As a result of public concerns, three parents of vaccine damaged children, Barbara Loe Fisher, Kathi Williams, and Jeff Schwarts formed the National Vaccine Information Center (NVIC) which advocates for safety and efficacy in vaccines. The NVIC played a key role in drafting the legislation known as the National Childhood Vaccine Injury Act (NCVIA) in 1986. The Act required doctors and hospitals to provide patients with information regarding the benefits and risks and to report any injuries or deaths resulting from vaccines. A database to report adverse reactions known as the Vaccine Adverse Event Reporting System (VAERS) was set up and is managed by both the CDC and the FDA.

Another result of the NCVIA was the establishment of a separate court system to handle claims made against vaccine manufacturers through the U.S. Court of Federal Claims. Prior to the NCVIA, many

vaccines manufacturers were getting sued and paying large settlements due to damages their product caused. This discouraged vaccine manufactures from continuing production determining vaccines were no longer profitable if they were under so many litigation claims which put their profitability at stake. As a result, congress stepped in to enact what is known as the *vaccine court*. This court was established to transfer the burden of liability from the vaccine manufacturers and to award financial compensation to people who are damaged by a vaccine (Shah 202). The Vaccine Injury Compensation Program (VICP) was born through this court and issues the awards, the max being $250,000. Since its enactment, the court has awarded over 2 billion dollars in claims (VICP 2013). In this *vaccine court*, plaintiffs present their case and claims to a S*pecial Master* in charge of the case for review (US Court of Federal Claims 2013). Due to limitations and constraints, many cases are not heard or are in a long line of waiting. There are only a small number of approved adverse reactions to vaccines the court will award compensation for. Awards are paid through taxes placed on vaccines.

Today, there are many other groups opposed to vaccination mandates, question the safety and efficacy of vaccines, and are concerned about the conflicts of interest that are present within the government approval process. These groups comprise of parents, scholars, physicians, pediatricians, attorneys, journalists, and scientists from numerous fields associated with vaccines. These groups are commonly referred to as anti-vaccine; however, they see such a label as defamatory. With information so readily available and with news reports of disease outbreaks, bioterrorist threat possibilities, corruption within pharmaceutical companies, and a decline in overall trust in our government, a division between proponents of vaccines and those against has never been so wide or heated.

Parties to the Controversy (Arguments to the Parties)

In the debate centered on vaccination mandates, there are pro-vaccine (proponent) and pro-vaccine choice (opponent) viewpoints. Each side has valid arguments as to their position and even shares some common ground. For instance, each side desires a healthy society whose health policies have ethical and scientific foundations (Habakus, Holland xi). Fundamentally, they want the same thing in regards to optimum public health; however, they are polarized in their opinions for achieving it. While each side maintains numerous arguments for their position, I will attempt to concentrate on the most pertinent and influential. In this section, the arguments for each position will be presented and expanded upon in order to better understand why each viewpoint believes in their position.

The proponents feel vaccination mandates are necessary in order to ensure optimum public health protection from the threats and dangers of various infectious diseases that have historically wreaked havoc within the population. The American medical industry, governmental bodies, parents, and authors are clear and consistent with their position on vaccines and vaccination mandates. Prominent authors such as Dr. Paul Offit and Seth Mnookin play a critical role in voicing and reinforcing these views to the public. Due to the prominence and pervasiveness of the proponents' view I think it is necessary we delve into some of their main arguments in favor of compulsory vaccination requirements first.

Proponents' arguments:

Argument: *Vaccines prevent infectious disease by causing immunity in those vaccinated; therefore mass vaccination campaigns are responsible for the reduction and eradication of infectious diseases.*

Vaccines are designed to stimulate the body's immune response to pathogens by producing antigens against the infection. This is commonly believed to produce immunity to the infectious disease. From epidemiological studies by vaccine manufactures to historical documentation there is a mountain of data that suggests vaccines prevent infectious diseases and are the reason for their decline. According to a report in *Pediatrics,* "immunizations have reduced the incidence of vaccine-preventable disease by [more] than 95% for every pediatric vaccine recommended for routine use before 1990" (Gust 16). In its *Morbidity and Mortality Weekly Report*, the CDC lists immunizations as the number one public health achievement of the twentieth century (MMWR, 1999)

Vaccine preventable diseases such as smallpox and polio are believed to have either been eradicated or severely reduced by the introduction of vaccines and through the corresponding campaigns to induce the population to be inoculated (WHO, 190). Numerous studies show a dramatic decline in incidence and mortality rates when vaccines were introduced and enforced. Such strong supporting evidence for the proponent's view solidifies their resolve on the issue and they often dismiss claims and evidence contrary to their deeply held beliefs.

Argument: *Young children are the most susceptible and most likely to spread infectious disease, therefore, parents have a moral duty to vaccinate children in order to benefit and preserve the community.*

Several factors contribute to the spread of infectious diseases, a couple of which children are most susceptible. Some of these risks include a compromised, weakened, or underdeveloped immune system, and situations in which people are crowded together (Poland, Jacobson 860). Children are often placed in multiple social situations such as school, sports, and other various recreational activities. If a pathogen is present in a population, children can pick it up, carry it, and spread it quickly. Due to this, children can be the root cause of an outbreak that affects adults as well; therefore, parents have a social responsibility to make sure their children are immunized against various diseases that have the potential to spread. Not doing so raises the risk and potential of these diseases infecting those most vulnerable which can include both the immunized and unimmunized population.

Argument: *As the unvaccinated population increases the positive effects of herd immunity decreases, therefore, the unvaccinated pose a risk to both vaccinated and unvaccinated (not by choice but by circumstance, i.e. medical condition or high risk for adverse reaction).*

As the information age continues to advance and our access to information becomes easier and more readily available, people are reaching out seeking a better understanding of vaccine safety. Parents hear a news story or read an article about vaccines being responsible for various illnesses or even death and then actively engage in increasing their knowledge and awareness concerning vaccines in order to keep their children safe. As a result, more and more parents are choosing not to vaccinate their children. This decision contributes to a decline in herd immunity compromising the health of the community by leaving it more vulnerable to an outbreak. The unfortunate and ironic consequence of

parent's choosing not to vaccinate due to safety places the very children they want to protect from harm at risk. It is not just the unvaccinated that are put at risk. As vaccines are not a hundred percent effective, there are some who are vaccinated that can still get the diseases they are vaccinated against. Proponents feel that many parents are too often misled by what they call "anti-vaccine" propaganda.

Dr. Paul Offit's book *Deadly Choices: How the Anti-Vaccine Movement Threatens Us All* is dedicated entirely to this concept. Written in the prologue, Dr. Offit articulates this concern and questions the responsibility of the states:

"We've come to a crossroads. During the past two decades, as more states have allowed exemptions to vaccination, population immunity has broken down. And the questions have gotten harder. Should states continue to allow parents to opt out of vaccines? Or should they step in and take away that right?" (Offit x)

Argument: *Adverse reactions to vaccines are extremely rare; therefore, mandates are morally acceptable because the benefits to the whole greatly outweigh the risk for the few.*

There are no medical interventions that come without risk. Ever since the development of inoculations and vaccinations, there have been people who have suffered mild to severe reactions. Not everyone can be vaccinated either due to a preexisting medical condition that would cause a reaction to the vaccine, allergies, or a compromised immune system. Sometimes a vaccine will cause harm with no warning or pre-existing restriction. The morally agreeable solution to dovetail a mandate would be to allow a medical exemption to cover those who are unable to receive a vaccine.

The FDA reviews the safety trials from the vaccine manufacturers before approving a vaccine to be placed on the market and will not give an approval if it feels the vaccine will cause more harm than benefit. If a vaccine was not safe enough or if it caused more harm than good, the FDA would not approve it and would not be on the market.

Argument: *Vaccine mandates ensure herd immunity and optimum health protection against infectious diseases through constitutionally legal measures; therefore they are necessary for the greater good of public health.*

In an article in the journal *Pediatric Adolescent Health Care,* the authors' state: "…compulsory vaccination has played an important role in achieving and sustaining high immunization coverage in the United States." The authors go on to further state:

"Complacency, therefore, cannot be an option, as the societal emphasis in the United States on individual choice creates the potential for the public to lose sight of the importance of public health, and the role of school mandates in controlling and eradicating infectious disease." (Opel, Marcuse 46).

From the proponents' point of view, mandates are the instrument that ensures parents are contributing to the overall good of the public's health. Without such compulsory measures, there may be a high proportion of parents choosing not to vaccinate, putting the majority at risk.

Conclusion to proponent's arguments

As we can see, those in favor of vaccination mandates believe they are essential and necessary for fighting and preventing infectious diseases. This view is seasoned with utilitarian principles and justification. While it does recognize that causalities will inevitably occur through adverse events, it asserts that these incidents are rare enough to validate the necessity to protect the community. Parents or other adults who choose not to vaccinate their kids or themselves are acting immorally because their decision minimizes the greater good in favor of their beliefs or preferences. Exemptions to the mandates other than for medical reasons do not go far enough because it offers a way out of complying with the mandates. Proponents would like to see these exemptions removed entirely.

Opponents' Arguments:

The opponents to vaccination mandates value individual liberty along with free and informed consent in regards to medical intervention. They further believe parents should be allowed to make informed decisions regarding medical treatments that affect the long-term health of their children. The pro-vaccine choice side questions the safety and efficacy of vaccines and sees a very different perspective of its medical history. They have noticed an increase in chronic childhood conditions such as asthma, autism, and behavioral conditions parallel the increase in the amount of vaccines children receive, wonder if a correlation exist, and engage in scientific research to obtain answers to the many questions and concerns they have. Decades of research into the past and present have revealed several inconsistencies to the common held beliefs of vaccines that the proponents' vehemently push and defend. The answers they have found and the many questions still left unanswered call into question the very foundation on which the vaccine mandates lay. Let's review some common arguments from their stance. Granted, as with the proponent side, the arguments coming from the opposition are many, we will focus on a select few that I think represent the core of our particular issue.

Argument: *It is a fundamental human right for an individual to make a free and informed consent regarding any medical intervention because of the implied risk to the person's life and health these interventions have. The current compulsory vaccination laws do not allow informed consent, therefore, violate this fundamental human right.*

From the opposition's viewpoint, the proportion of severe adverse events that occur from vaccinations is much higher than what the proponents' state. From 2010-2012, there were 83,918 adverse reactions to vaccines reported to VAERS (VAERS data, 2013). It is believed that the number of adverse events reported is considerably less compared to the actual adverse events that occur because the majority goes unreported. Another contributing factor for this belief is that former FDA Commissioner Dr. David Kessler states in a report that the percentage of doctors reporting adverse reactions to prescription drugs is less than one percent (Kessler 2765). In 2000, the FDA reported that around 100,000 deaths occur annually due to adverse reactions to FDA approved prescription drugs (U.S. Food and Drug Administration, 2010). If these numbers represent only a small percentage of actual reactions to prescription drugs, then factoring in all of the ones that go unreported, the actual numbers could reach up into the millions annually. Since vaccines are considered a pharmaceutical drug, this applies to vaccines as well. If only a small percentage of adverse reactions are reported, then the actual numbers are substantially higher than what the public is made to believe.

With little public knowledge of this information are people truly able ascertain the true risk involved? In order for a person to make an informed consent, they must be presented with enough nonbiased information to do so. With vaccines, as any medical intervention, safety is of the upmost importance, yet the safety data reported in the media, given at doctor's offices or hospitals, and even in the manufacturer's *vaccine information statement* (VIS) do not accurately reflect the actual risk involved. There are hundreds upon hundreds of published studies, scientific research, and peer reviewed journals that are in contrast to the proponent's view. The public is not fully informed and therefore cannot make a truly informed decision for this particular medical intervention. Human rights research scholar Mary Holland writes:

"Vaccination choice is a fundamental right because it implicates our most precious rights – to life, liberty, and security of person… It is unjustifiable, however, for the state to deprive individuals of accurate information and then to coerce them to accept potentially life-threatening medical interventions. Compulsory state vaccination policies violate the rights to liberty and security of person, and when vaccinations result in death, such policies violate the right to life." (Habakus, Holland 11-12)

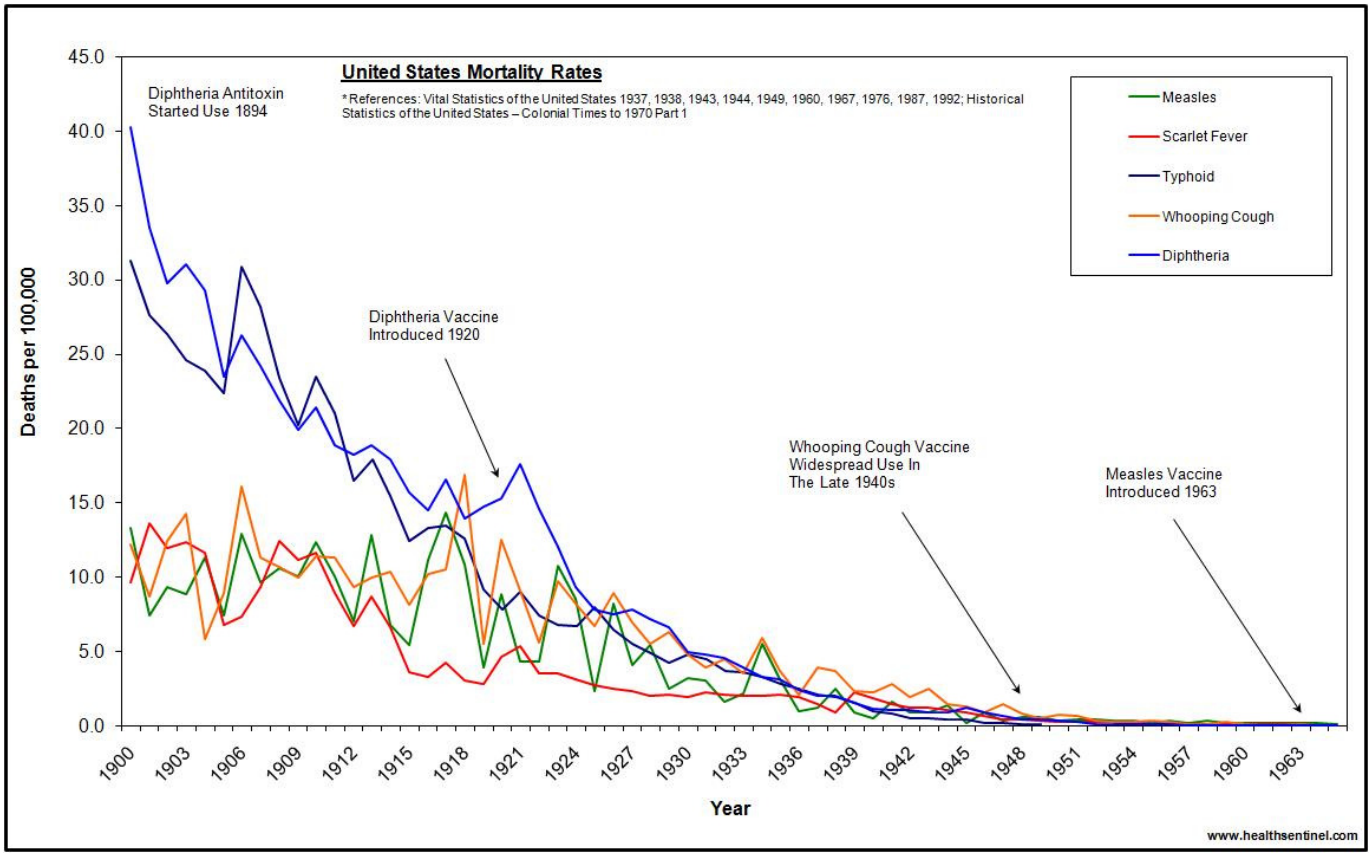
Argument: *Vaccines do not cause lifelong immunity (hence the need for boosters) or are guaranteed to produce immunity, therefore, compulsory vaccination will not ensure herd immunity.*

Contrary to what Edward Jenner believed, vaccines do not produce lifelong immunity or is immunity even guaranteed. A population will not know if its members are immune until they are presented with the pathogen, such as an outbreak. Even where outbreaks occur, immunity does not reflect vaccination rates. There are several examples of measles or pertussis outbreaks among fully vaccination populations. In March through April of 1984, a measles outbreak occurred in a Massachusetts high school. The high school had a documented immunization rate of 98% (Nkowane 434). In 2010, California experienced high levels of whooping cough (pertussis) among vaccinated populations. In fact, according to a study conducted by the Watchdog Institute in collaboration with a local news agency KPBS, more than two thirds of the population that caught the pertussis virus were fully vaccinated against it (Faryone, Crowe). In 1963, when the measles vaccine became available, a new strain of measles emerged called "Atypical Measles" (AMS) which had a higher mortality rate. Outbreaks of this deadlier strain of measles were occurring in fully vaccinated populations (Scheibner, 2013).

There are many more of these incidences, so many in fact that some experts believe rises in outbreaks parallel the waning of immunity. An academic journal titled *Implications of Vaccinations and Waning Immunity* revealed through mathematical modeling that vaccines can have the unexpected consequence of reducing the body's natural ability to boost immunity against the pathogen over time (Heffernan, Keeling). The authors of the study further note this waning of immunity over time can create worse outbreaks in highly vaccinated populations as the immunity of those populations decreases over time. If vaccines are not producing a high enough immunity rate among the vaccinated population, then are they ensuring strong enough herd immunity?

Argument: *Herd immunity is an unproven theory and is not achieved by high vaccination rates; therefore, it is invalid to use the theory of herd immunity as justification for compulsory vaccination.*

Herd immunity should not be used as a justification for compulsory vaccination because there is not adequate evidence proving high vaccination rates guarantee herd immunity. It is commonly stated by the pro-vaccine side that high immunity caused by vaccines are the reason for the decline in infectious diseases and will show statistics indicating this position. The opposition's side believes the statistics that show disease incident rates decline after vaccine introduction are limited in scope because they typically do not include other factors for disease decline. Disease decline can be attributed to many factors: the cyclical nature of outbreaks (they occur every so often naturally), improvements to sanitation, water purification, hygiene, refrigeration, and overall better living conditions (Sharpe 24). In fact many of the diseases we have vaccines for were well into decline prior to the introduction of the vaccine. Looking at data compiled in the chart below courtesy of healthsentinel.com, vaccines are shown towards the bottom of the graph.



This graph clearly displays the decline in the mortality rate for measles, whooping cough, and diphtheria. An interesting note from this graph is that it shows scarlet fever, a disease in which a vaccine was never created for, naturally declining in concurrence with the others. This can indicate other factors were present to assist in the decline.

Argument: *The governmental bodies responsible for ensuring the safety and efficacy of the vaccines that are made available to the public are also profiting from those vaccines, therefore, conflicts of interest severely compromise the integrity of these regulatory agencies and the products they inspect.*

Conflicts of interest are present within current vaccination policy making from governmental approval to safety review and recommendations. Governmental bodies in charge of safety approval and oversight also work in tandem with the vaccine manufacturers and are financially rewarded with royalties through patent holdings for vaccines they approve for market use and recommend for state mandates. Further conflicts of interest can be seen in a revolving door policy between pharmaceutical companies (vaccine manufacturers) and government positions. For example, Dr. Julie Gerberding was the director of the CDC from 2002 to 2008 and became president of the vaccine division for Merck, a large pharmaceutical company, in 2009 (Mercola, 2012). Another example is Elias Zerhouni, director of the National Institute of Health (NIH) from 2002-2008, went on to head the Research and Development department of French pharmaceutical company Sanofi in 2011 (Elias, 2013).

Conflicts of interest are also present between pharmaceutical companies and medical journals. Many medical journals receive 97-99% of their advertising revenue from pharmaceutical companies (Washington 2011). Billions of dollars from pharmaceutical companies pour into political campaigns as well pushing heavy influence on our policy makers. To explore in depth the extent of the conflicts of interest within this issue, I highly recommend reading Gayle DeLong's paper titled "*Conflicts of Interest in Vaccine Safety Research*" published in the *Accountability in Research Journal*. The extent of these conflicts of interest seriously call into question the objectivity and credibility between our medical industry and governmental regulatory agencies charged with protecting the public health.

Argument: *Compulsory vaccine mandates operate under the utilitarian principle of "the greater good for the greatest number." The government has yet to provide proof that this principle has indeed been met; therefore this principle cannot be used as justification for vaccination mandates.*

From 1954 to 1963, approximately 98 million Americans received a polio vaccine that contained simian virus 40 (SV40), a carcinogen now known to cause various types of cancer (Bookchin, Schumacher). In the 1950's, America was facing a polio epidemic. At the time polio vaccination campaigns were ubiquitous in America operating under the premise of eliminating polio from existence through lifesaving vaccines. These vaccines were bolstered as necessary for eradicating polio, saving countless of lives from the debilitating effects of polio. States adopted this vaccine into their mandates to ensure their part in eliminating this disease. Unfortunately, many of the first polio vaccines actually caused polio, induced paralysis, or resulted in death (ACCV, 14-16). Furthermore, it is argued that the drastic elimination of the polio virus after the introduction of the vaccine was not due to the vaccine but rather due to a reclassification of the polio virus (Hiding Polio quotes, 2013).

During times of public health crises, actions taken by the state for the sake of the greater good may not actually fulfill that pursuit as illustrated in the polio epidemic. If our government is going to mandate its citizens to engage in medical interventions that have inherent risk to cause more harm to an individual than the intervention is supposed to prevent, then the burden to provide adequate proof the greater good is upheld lies with the government enforcing such policies. This is currently not case. No long-term studies of vaccinated and unvaccinated populations have occurred, nor have the long term side effects from the vaccine ingredients been studied or proven safe, especially when multiple injections are administered simultaneously.

Also, to trust the government with defining what the greater good is can be frightening. The modern eugenics movement of the early twentieth century is a sobering reminder of this. In the early twentieth century, the idea of breeding the human species a certain way for the purpose of eliminating

birth defects and creating purer humans was the heart of eugenics and the idea became widely accepted among the general public. The government believed eugenics served the greater good by greatly reducing or eliminating disabilities within our society through various birth control efforts. This acceptance was not restricted to just the United States. In fact, the Nazis were big fans of eugenics and took the United States' general acceptance of it further by engaging in genocide against races deemed unfit for reproduction (Habakus, Holland 71).

Conclusion to proponent's arguments

All in all, the opponents to vaccination mandates would like to see those mandates eliminated because they feel the states' powers to enforce medical procedures that cause harm violate human rights. Exemptions to the mandates do not go far enough because they could be taken away. The primary solution would be to remove mandates entirely.

Position Thesis and Justification

My research into this topic has been arduous. The amount of information available is overwhelming. From my research and analysis of both positions, I concur with the pro-choice side in the abolishment of state vaccine mandates because such laws violate fundamental human rights such as the right to life, liberty, and parental autonomy. The exemptions available for opting out of compliance with the mandates are not enough to protect civil liberties in this area because they are not viewed by the state as a right and can be removed at any time.

The ethical theories and ideas of John Locke and Jean-Jacques Rousseau are instrumental in influencing our constitutional laws and policies, both past and present. Locke and Rousseau believe humans were created equal and live in a state of nature where they are equally free. Their idea of the state of nature differs from Thomas Hobbs' view because their state of nature is not a state of chaos but rather a state of complete liberty in which people are free to make their own choices so long as their choices do not infringe upon the same liberties of others (Ursery 40). In order for these unspoken contracts to be enforced, a separate entity created by a community in agreement should exist to uphold these contracts through the means of exercising justice. The role of our state government is this entity that our community of citizens created to uphold and enforce justice in order for us to live in a community where we have equal opportunities to thrive.

According to Locke, God gives us morality through what he calls the *Law of Nature* which governs the *State of Nature* and in essence describes how we all belong to God by means of His creation. Through this *Law of Nature* we are given inherent freedoms and equalities within the *State of Nature*. In his *Second Treatise of Civil Government* Locke states that harming one another's "life, health, liberty, or possessions" would go against what is God's creation and property and as such, considered morally wrong (Locke, sect 6). I believe compulsory vaccination laws violate a person's life, liberty, and health in accordance to these ethical principles.

Life

Our current laws and societal view of harm towards innocent people reflect the value we have on life and our desire to preserve it. As a rational society with morals, we find abhorrence to any inhumane acts towards children, especially acts of abuse or murder. Why do we feel a deeper empathy for these children who have undergone atrocities at the hands of someone else? I believe it is because we know they are the most vulnerable within our society and unable to protect themselves against forces much more powerful than they are. We also feel a particularly deep desire to see justice upheld when these atrocities happen. Unfortunately, compulsory vaccination mandates allow for nefarious acts towards our children to occur.

Regardless of whether or not vaccines have any benefit, the fact that they cause harm on some level is indisputable. The degree of the harm induced varies yet each and every one is capable of causing a debilitating condition or death. It is highly unethical for a government to force a medical intervention that can cause healthy children to die. There are no tests to determine who will have an adverse reaction to a vaccine. It is a high stakes gamble that the government forces its citizens to participate in. The justification for this lies within the perceived notion that the greater good to the community of citizens is being upheld because while some children may die as a result of an adverse reaction, those deaths are far fewer than the deaths that could occur from a potential disease outbreak. Using this logic, both the government and the disease that *could* occur are both responsible for the deaths of children. One can be held accountable to ethical standards while the other cannot. The government justifies its position by claiming compulsory vaccinations prevent more death from potential disease outbreaks than the amount of deaths from adverse reactions to the vaccines. The ethical validity of this position is highly questionable given the continuous growth of evidence that disproves it.

Health

Vaccines can also cause damage to our health ranging from temporal to permanent. Mandates forcing physical harm upon even one child should be deemed immoral. Even if the purpose is to protect the many at the expense of a few, in the case of vaccines, it is immoral because neither the child nor the parent has consented to become the sacrificial subject. As the number of recommended vaccinations increase, so does the incidence rate of childhood chronic conditions such as asthma, obesity, and behavioral or learning problems (Van Cleave 623). Many believe a correlation exists, even though more published research is needed for the mainstream to acknowledge any validity in it. The non-active ingredients in vaccines have not been tested for safety when combined nor has there been a study on the long term health effects these ingredients have on the body. Separately, mercury, aluminum, and formaldehyde are known toxins to the human body, however little is known of their effects when combined with each other and with other the other ingredients found in vaccines (Palevsky, 2009).

Pediatrician Dr. Lawrence Palevsky articulates this concern in an article titled, *Aluminum and Vaccine Ingredients: What Do We Know? What Don't We Know?* In this article he writes:

"There are multiple articles in the medical literature demonstrating how chronic illnesses like allergies, asthma, eczema, lupus, inflammatory bowel disease, ADD/ADHD and autism all exhibit a skewed production and over-activity of the TH2 arm [cells adjuvants target in order to produce antibodies] of the immune system." (Palevsky, 2009).

The medical journals referred to in that quote can be found in the works cited section of Dr. Palevsky's article. It is highly probable that the ingredients in vaccines are causing lifelong illnesses which in some incidences are worse than the disease it's meant to prevent. If a mandate issued for the purpose of protecting the community against one disease, yet through the forced medical intervention causes another disease or illness; can it then remain justified in its ethical integrity?

Liberty

Lastly, vaccination mandates in their current form remain an assault on the civil liberties we have as citizens of the United States. The majority of persons on the receiving end of a vaccination are unable to make a truly informed consent when deciding whether or not to vaccinate. The information parents are given at the hospital or doctor's office concerning the side effects of vaccines are completely biased in favor of the vaccine manufacturer and do not accurately represent the safety ramifications present and documented. For example, vaccine manufactures do not use a traditional "placebo" in their safety trials. Instead of using a saline/water based solution for a placebo in their sample groups, many manufacturers will use another vaccine that does not contain the active ingredient of the one of which they are testing. Adverse events occur within each sample group and the deviations in those occurrences between the groups are measured. If there is not a huge difference between the groups, it is assumed that the active ingredient is not the culprit of the adverse events and therefore is deemed safe. The general public is not really aware of this even though this information can be found in the manufacturer's vaccine insert. Vaccine inserts list the outcomes of their safety trial and disclose a lot of information but are done in a technical way making it difficult for the common person unfamiliar with medical jargon to comprehend. Most people do not take the time to read these inserts because a lot of it is difficult to decipher. Instead they trust their doctors know enough about the safety to make that decision for them. If the public is not fully informed about the risks involved, then they are unable to exercise their right to make a free and informed choice in medical treatment.

Solution

The government is not protecting the health of its citizens when it forces medical interventions that cause severe harm upon those citizens, some would argue more harm than it is supposedly preventing. Those opposed to vaccination mandates continue to uncover data and facts that contradict our society's current view and trust towards vaccines. We as a community of rational and moral beings must begin to question the validity and credibility of the information we are given by the pro-vaccine side. Change must occur in our current mandates although that change cannot begin until the public is more informed.

The long term solution to the issue is for the mandates to be abolished. In order to get there, the public must have equal access to credible information without the influence of those with vested or financial interest in vaccines. The inconsistencies and unethical dimensions of the vaccination topic need to be brought into the public view by organizations they trust. Grassroots organizations can play a key role in this however it is not enough. The mainstream media has the biggest influence on shaping public opinion. There needs to be more non-biased mainstream media coverage on the vaccination topic and investigative journalist should explore the holes in the current system from the government level to corporate interest and fraud.

In addition, based on the evidence of numerous conflicts of interest and questionable scientific data used to justify compulsory vaccines, the Office of Inspector General should launch investigations and audits into the Department of Health and Human Services (HHS) and several of its agencies including the CDC and FDA. The results of the audit should be presented to Congress for review and changes to eliminate these unethical practices should follow. Through the publishing of the audits and investigations, the American people can be better informed and erect grassroots campaigns to approach our lawmakers with enough data and evidence to justify the eradication, or at the very least, modification of the current legislations.

Conclusion:

State instituted vaccination mandates continue to be a heated topic of debate because of what is at stake: human lives. People are either dependent on the state enforcing the public to get vaccines as life saving agents or they are forced to risk permanent harm as a result of an adverse reaction. The mounting evidence from doctors, scholars, attorneys, historians, parents, and investigative journalism, countering the pro-vaccine claims begs a rational, critical thinking society to question the veracity of the norm. Not doing so, we as a rational society, trade reason and justice for the simplicity of ignorance. At the very least, our society should halt vaccination mandates until either side of the debate can be silenced by the power of truth.

Works Cited

Ahmed, Faruque, et al. "Methods for Developing Evidence-Based Recommendations by the Advisory Committee on Immunization Practices (ACIP) of the U.S. Centers for Disease Control and Prevention (CDC)." *Vaccine* 29 (2011): 9171-76. Print.

Archives of the WHO. World Health Organization, n.d. Web. 28 Oct. 2013. <http://www.who.int/archives/fonds_collections/bytitle/fonds_6/en/>.

Barreto, Mauricio L., Maria Glria Teixeira, and Eduardo Hage Carmo. "Infectious Diseases Epidemiology." *Journal of Epidemiology & Community Health* 60.3 (2006): 192-95. Print.

Bedford, Helen, and David Elliman. "Concerns About Immunisation." *BMJ: British Medical Journal* 320 (2000): 240-43. Print.

Bertram, Christopher, "Jean Jacques Rousseau", *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), URL = http://plato.stanford.edu/archives/win2012/entries/rousseau/>.

Bookchin, Debbie, and Schumacher, Jim. "The Virus and the Vaccine: The True Story of a Cancer-Causing Monkey Virus, Contaminated Polio Vaccine, and the Millions of Americans Exposed." New York: St. Martin's Press, (2004). Print

Bystrianyk, Roman, and Suzanne Humphries. "Vaccination: A Mythical History." *International Medical Council on Vaccination* (2013): n. pag. Print.

Case, Christine L., and King-Thom Chung. "Montagu and Jenner: The Campaign Against Smallpox." *SIM News 47*, no. 2 (1997): 58-60. Print

Chen, Robert T., and Beth Hibbs. "Vaccine Safety: Current and Future Challenges." *Pediatric Annals* 27.7 (1998): 445-55. Print.

Craig, Jennifer. "History Repeats Itself: Lessons Vaccinators Refuse to Learn." *International Medical Council on Vaccination* (2012): n. pag. Print.

Creighton, Charles. " Jenner and Vaccination: a Strange Chapter of Medical History." *Swan Sonnerschein & Co.* (1889). Reprinted by General Books, 2009: Print <http://www.whale.to/vaccines/creighton_b.html#CHAPTER_2._>

DeLong, Gayle. "Conflicts Of Interest In Vaccine Safety Research." *Accountability In Research: Policies And Quality Assurance* 19.2 (2012): 65-88. *Philosopher's Index*. Web. 28 Oct. 2013.

Durbach, Nadja. "Tebb, William (1830–1917)." *Oxford Dictionary of National Biography*, Oxford University Press, May 2006 <http://www.oxforddnb.com/view/article/74781>

Dyer, Clare. "Vaccine Manufacturers Cannot Be Sued Over Design Defects, US Supreme Court Rules." *BMJ (Clinical Research Ed.)* 342.(2011): d1292. *MEDLINE*. Web. 28 Oct. 2013.

"Elias Zerhouni, MD." *Sanofi*. Sanofi, 20 Sept. 2013. Web. 15 Nov. 2013. <http://en.sanofi.com/investors/corporate_governance/corporate_management/bio_zerhouni.aspx>.

Field, Robert I., and Arthur L. Caplan. "Evidence-Based Decision Making for Vaccines: The Need for an Ethical Foundation." *Vaccine* 30.6 (2012): 1009-13. Print.

Grady, Christine. "Ethics of Vaccine Research." *Nature Immunology* 5.5 (2004): 465-68. Print.

Gust, Deborah A., et al. "Underimmunization Among Children: Effects of Vaccine Safety Concerns on Immunization Status." *Pediatrics* 114.1 (2004): e16-e22. Print.

Habakus, Louise Kuo, M.A., and Mary Holland, J.D., eds. *Vaccine Epidemic: How Corporate Greed, Biased Science, and Coercive Government Threaten Our Human Rights, Our Health, and Our Children*. New York: Skyhorse Publishing, 2011. Print.

HAERTLEIN, LAUREN L. "Immunizing Against Bad Science: The Vaccine Court And The Autism Test Cases." *Law & Contemporary Problems* 75.2 (2012): 211-232. *Legal Collection*. Web. 28 Oct. 2013.

Heffernan, J.M., and M.J. Keeling. "Implications of Vaccination and Waning Immunity." *The Royal Society* 276 March (2009): 2071-2080. Print

Heller, Tom. "Ethical Debate: Vaccination Against Mumps, Measles, And Rubella: Is There A Case For Deepening The Debate? How Safe Is MMR Vaccine?" *BMJ: British Medical Journal* 323 (2001): 838-39. Print.

Herper, Matthew. "Former NIH Director To Lead Sanofi's Labs." *Forbes*. Forbes, 14 Dec. 2010. Web. 15 Nov. 2013. <http://www.forbes.com/sites/matthewherper/2010/12/14/former-nih-director-to-lead-sanofis-labs/>.

Hiding Polio quotes. Whaleto, n.d. Web. 24 Oct. 2013. <http://www.whale.to/vaccine/polio1.html>.

Horwin, Michael E. "Simian Virus 40 (Sv40): A Cancer Causing Monkey Virus From FDA-Approved Vaccines." *Albany Law Journal Of Science & Technology* 13.(2003): 721. *LexisNexis Academic: Law Reviews*. Web. 28 Oct. 2013.

"Immunization Schedules." *Centers for Disease Control and Prevention.* N.p., 29 Jan. 2013. Web. 13 Sept. 2013. <http://www.cdc.gov/vaccines/schedules/index.html>.

Keelan, Jennifer, and Kumanan Wilson. "Balancing Vaccine Science and National Policy Objectives: Lessons From the National Vaccine Injury Compensation Program Omnibus Autism Proceedings." *American Journal of Public Health* 101.11 (2011): 2016-21. Print.

Kessler, David A. "Introducing MEDWatch: A New Approach to Reporting Medication and Device Adverse Effects and Product Problems." *The Journal of the American Medical Association* 269.June (1993): 2765-68. Print.

King, Martin Luther, Jr. "Why I Am Opposed to the War in Vietnam." Sermon at the Ebenezer Baptist Church. 30 Apr. 1967. Speech.

Kirby, David. *Evidence of Harm: Mercury in Vaccines and the Autism Epidemic: A Medical Controversy*. New York: St. Martin's Griffin, 2006. Print.

Locke, John. *Second Treatise of Government*. Salt Lake City: Project Gutenberg, 2005. *PDF* file.

Malone, K. M., and A. R. Hinman. "Vaccination Mandates: The Public Health Imperative and Individual Rights." *Law in Public Health Practice*. Ed. R. A. Goodman, M. A. Rothstein, and R. E. Hoffman. New York: Oxford University Press, 2003. 262-84. Print.

Mercola, Joseph. "Collusion Between Pharmaceutical Industry and Government Deepens." *Mercola.com*. Dr. Joseph Mercola, 2 Aug. 2012. Web. 14 Nov. 2013. <http://articles.mercola.com/sites/articles/archive/2012/08/02/merck-flu-vaccine-conflicts.aspx#_edn6>.

"Minutes from Meeting." Advisory Commission on Childhood Vaccines (ACCV) Meeting and Conference Call. 9 Mar. 2006. Print.

Mnookin, Seth. *The Panic Virus: The Story Behind the Vaccine-Autism Controversy*. New York: Simon & Schuster, 2011. Print.

Nkowane, Benjamin M., et al. "Measles Outbreak in a Vaccinated School Population: Epidemiology, Chains of Transmission and the Role of Vaccine Failures." *American Journal of Public Health* 77.4 (1987): 434-38. Print.

Offit, Paul A., and Rita K. Jew. "Addressing Parents' Concerns: Do Vaccines Contain Harmful Preservatives, Adjuvants, Additives, or Residuals?" *Pediatrics* 112.6 (2003): 1394-401. Print.

Offit, Paul A., M.D. *Deadly Choices: How The Anti-Vaccine Movement Threatens Us All.* New York: Basic Books, 2011. Print.

Opel, Douglas J., and Edgar K. Marcuse. "Historical, Legal, and Social Aspects of School Immunization Mandates." *Current Problems in Pediatric and Adolescent Health Care* March (2010): 41-46. Print.

Palevsky, Lawrence B. "Aluminum and Vaccine Ingredients: What Do We Know? What Don't We Know?" *Pathways to Family Wellness* Spring 2009: n. pag. Print.

Poland, Gregory A., and Robert M. Jacobson. "The Clinician's Guide to the Anti-Vaccinationist' Galaxy." *Human Immunology* 73.8 (2012): 859-66. Print.

Salmon, Daniel A., et al. "Compulsory Vaccination and Conscientioius or Philosophical Exemptions: Past, Present, and Future." *The Lancet* 367.Feb (2006): 367+. Print.

Scheibner, Viera. "Measles Vaccines Part I: Ineffectiveness of Vaccination and Unintended Consequences." *International Medical Council on Vaccination* (2013): n. pag. Print.

Shah, Nitin. "When Injury Is Unavoidable: The Vaccine Act's Limited Preemption Of Design Defect Claims." *Virginia Law Review* 96.(2010): 199. *LexisNexis Academic: Law Reviews*. Web. 28 Oct. 2013.

Sharpe, Robert. *The Cruel Deception*. Wellingborough: Thorsons Publishing Group, 1988. Print.

Swendiman, Kathleen S. *Mandatory Vaccinations: Precedent and Current Laws*. Research rept. no. 7-5700. N.p.: Congressional Research Service, 2011. Print.

"Ten Great Public Health Achievements--United States, 1900-1999." *MMWR: Morbidity & Mortality Weekly Report* 48.12 (1999): 241. *Academic Search Complete*. Web. 28 Oct. 2013.

Ursery, Danney. *Moral Reasoning*. V6.0 ed. Austin: St. Edwards University, 2010. Print.

U.S. Food and Drug Administration. U.S. Department of Health & Human Services, 3 Feb. 2010. Web. 14 Nov. 2013. <http://www.fda.gov/Drugs/DevelopmentApprovalProcess/DevelopmentResources/DrugInteractionsLabeling/ucm114848.htm>.

Vaccine Injury Compensation Program (VICP). National Vaccine Information Center, n.d. Web. 28 Oct. 2013. <http://www.nvic.org/injury-compensation.aspx>.

Vaccine Program/Office of Special Masters. U.S. Court of Federal Claims, n.d. Web. 28 Oct. 2013. <http://www.uscfc.uscourts.gov/vaccine-programoffice-special-masters>.

Van Cleave, JeanneGortmaker, Steven L.Perrin, James M. "Dynamics Of Obesity And Chronic Health Conditions Among Children And Youth." *JAMA: Journal Of The American Medical Association* 303.7 (2010): 623. *MasterFILE Premier*. Web. 28 Oct. 2013.

Washington, Harriet. “Flacking for Big Pharma: Drugmakers Don’t Just Compromise Doctors; They Also Undermine the Top Medical Journals and Skew the Findings of Medical Research.” *American Scholar* 80 (2011): 22-34. <http://theamericanscholar.org/flacking-for-big-pharma/>

"VAERS Data." *Vaccine Adverse Event Reporting System*. VAERS, 13 Oct. 2013. Web. 15 Nov. 2013. <http://vaers.hhs.gov/data/data>.

Appendix A

Definitions

Infectious Disease: According to a journal of epidemiology, infectious disease is defined as "an illness caused by a specific *infectious agent* or its toxic product that results from transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector or inanimate environment." (Barreto 192)

Inoculation: According to Webster's collegiate dictionary, inoculation refers to "the introduction of a pathogen or antigen into a living organism to stimulate the production of antibodies" (Webster's 624). [Also used synonymously with *variolation* when referring to smallpox]

Vaccine: Derived from the Latin word for cow – *vacca*. A preparation of killed microorganisms, living attenuated organisms, or living fully virulent organisms that is administered to produce or artificially increase immunity to a particular disease. According to the CDC, a vaccine is "a product that produces immunity". In theory, this should protect an individual from the disease.

Vaccination: According to the CDC, vaccination is an "injection of a killed or weakened infectious organism in order to prevent the disease." This is the process by which the vaccine is administered.

Immunization: According to the CDC, immunization is "the process by which a person or animal becomes protected against a disease. This term is often used interchangeably with vaccination or inoculation."

Herd Immunity: According to the Oxford dictionary, herd immunity is the "general immunity to a pathogen in a population based on the acquired immunity to it by a high proportion of members over time." The theory of herd immunity states that if there is a large enough population who are immune to a particular disease, the relatively small portion of the population that are within which are not immune are protected from that disease as a result of the majority's immunity. The percentage of the population that is necessary to achieve herd immunity varies depending on the infectiousness of the pathogen but can be anywhere from eighty to ninety percent (Malone, Hinman 264). This is one of the major arguments for the necessity of the mandates.

Adjuvants: Are substances added to vaccines to stimulate or enhance the body's immune response to an antigen. Webster's dictionary defines it as "an ingredient that modifies the action of the principal ingredient" or "is something that enhances the effectiveness of medical treatment (Webster's 57).

Appendix B

Vaccine	Contains	Source: Manufacturer's P.I. Dated
Adenovirus	sucrose, D-mannose, D-fructose, dextrose, potassium phosphate, plasdone C, anhydrous lactose, micro crystalline cellulose, polacrilin potassium, magnesium stearate, cellulose acetate phthalate, alcohol, acetone, castor oil, FD&C Yellow #6 aluminum lake dye, human serum albumin, fetal bovine serum, sodium bicarbonate, human-diploid fibroblast cell cultures (WI-38), Dulbecco's Modified Eagle's Medium	March, 2011
Anthrax (Biothrax)	aluminum hydroxide, benzethonium chloride, formaldehyde, amino acids, vitamins, inorganic salts and sugars	December, 2008
BCG (Tice)	glycerin, asparagine, citric acid, potassium phosphate, magnesium sulfate, Iron ammonium citrate, lactose	February, 2009
DT (Sanofi)	aluminum potassium sulfate, peptone, bovine extract, formaldehyde, thimerosal (trace), modified Mueller and Miller medium	December, 2005
DTaP (Daptacel)	aluminum phosphate, formaldehyde, glutaraldehyde, 2-Phenoxyethanol, Stainer-Scholte medium, modified Mueller's growth medium, modified Mueller-Miller casamino acid medium (without beef heart infusion)	July, 2011
DTaP (Infanrix)	formaldehyde, glutaraldehyde, aluminum hydroxide, polysorbate 80, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium	November, 2011
DTaP (Tripedia)	sodium phosphate, peptone, bovine extract (U.S. sourced), formaldehyde, ammonium sulfate, , aluminum potassium sulfate, thimerosal (trace), gelatin, polysorbate 80 (Tween 80), modified Mueller and Miller medium, modified Stainer-Scholte medium	December, 2005
DTaP-IPV (Kinrix)	formaldehyde, glutaraldehyde, aluminum hydroxide, Vero (monkey kidney) cells, calf serum, lactalbumin hydrolysate, polysorbate 80, neomycin sulfate, polymyxin B, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium	November, 2011
DTaP-HepB-IPV (Pediarix)	formaldehyde, gluteraldehyde, aluminum hydroxide, aluminum phosphate, lactalbumin hydrolysate, polysorbate 80, neomycin sulfate, polymyxin B, yeast protein, calf serum, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium, Vero (monkey kidney) cells	November, 2011
DTaP-IPV/Hib (Pentacel)	aluminum phosphate, polysorbate 80, formaldehyde, gutaraldehyde, bovine serum albumin, 2-phenoxethanol, neomycin, polymyxin B sulfate, Mueller's Growth Medium, Mueller-Miller casamino acid medium (without beef heart infusion), Stainer-Scholte medium (modified by the addition of casamino acids and dimethyl-beta-cyclodextrin), MRC-5 (human diploid) cells, CMRL 1969 medium (supplemented with calf serum).	July, 2011
Hib (ActHIB)	ammonium sulfate, formalin, sucrose, Modified Mueller and Miller medium	May, 2009
Hib (Hiberix)	formaldehyde, lactose.	December, 2010
Hib (PedvaxHIB)	aluminum hydroxphosphate sulfate.	December, 2010

Vaccine	Contains	Source: Manufacturer's P.I. Dated
Hib/Hep B (Comvax)	yeast (vaccine contains no detectable yeast DNA), nicotinamide adenine dinucleotide, hemin chloride, soy peptone, dextrose, mineral salts, amino acids, formaldehyde, potassium aluminum sulfate, amorphous aluminum hydroxyphosphate sulfate, sodium borate	December, 2010
Hep A (Havrix)	aluminum hydroxide, amino acid supplement, polysorbate 20, formalin, neomycin sulfate, MRC-5 cellular proteins	July, 2011
Hep A (Vaqta)	amorphous aluminum hydroxyphosphate sulfate, bovine albumin, formaldehyde, neomycin, sodium borate, MRC-5 (human diploid) cells	December, 2010
Hep B (Engerix-B)	aluminum hydroxide, yeast protein, phosphate buffers.	October, 2011
Hep B (Recombivax)	yeast protein, soy peptone, dextrose, amino acids, mineral salts, potassium aluminum sulfate, amorphous aluminum hydroxyphosphate sulfate, formaldehyde.	July, 2011
Hep A/Hep B (Twinrix)	formalin, yeast protein, aluminum phosphate, aluminum hydroxide, amino acids, phosphate buffer, polysorbate 20, neomycin sulfate, MRC-5 human diploid cells	November, 2011
Human Papillomavirus (HPV) (Cerverix)	vitamins, amino acids, lipids, mineral salts, aluminum hydroxide, sodium dihydrogen phosphate dehydrate, insect cell and viral protein..	July, 2011
Human Papillomavirus (HPV) (Gardasil)	yeast protein, vitamins, amino acids, mineral salts, carbohydrates, amorphous aluminum hydroxyphosphate sulfate, L-histidine, polysorbate 80, sodium borate.	March, 2011
Influenza (Afluria)	beta-propiolactone, thimerosol (multi-dose vials only), monobasic sodium phosphate, dibasic sodium phosphate, monobasic potassium phosphate, potassium chloride, calcium chloride, sodium taurodeoxycholate, neomycin sulfate, polymyxin B, egg protein	November 2011
Influenza (Fluarix)	sodium deoxycholate, formaldehyde, octoxynol-10 (Triton X-100), α-tocopheryl hydrogen succinate, polysorbate 80 (Tween 80), hydrocortisone, gentamicin sulfate, ovalbumin	April, 2011
Influenza (Fluvirin)	nonylphenol ethoxylate, thimerosal (multidose vial–trace only in prefilled syringe), polymyxin, neomycin, beta-propiolactone, egg proteins	May, 2011
Influenza (Flulaval)	thimerosal, α-tocopheryl hydrogen succinate, polysorbate 80, formaldehyde, sodium deoxycholate, ovalbumin	December, 2011
Influenza (Fluzone: Standard, High-Dose, & Intradermal)	formaldehyde, octylphenol ethoxylate (Triton X-100), sodium phosphate, gelatin (standard formulation only), thimerosal (multi-dose vial only) , egg protein	May, 2011
Influenza (FluMist)	ethylene diamine tetraacetic acid (EDTA), monosodium glutamate, hydrolyzed porcine gelatin, arginine, sucrose, dibasic potassium phosphate, monobasic potassium phosphate, gentamicin sulfate, egg protein	May, 2011
Japanese Encephalitis (Ixiaro)	aluminum hydroxide, Vero cells, protamine sulfate, formaldehyde, bovine serum albumin, sodium metabisulphite.	September, 2010
Meningococcal (MCV4-Menactra)	formaldehyde, phosphate buffers, Mueller Hinton agar, Watson Scherp media, Modified Mueller and Miller medium	November, 2011
Meningococcal (MCV4-Menveo)	formaldehyde, amino acids, yeast extract, Franz complete medium	March, 2011
Meningococcal (MPSV4-Menomune)	thimerosal (multi-dose vial only), lactose, Mueller Hinton agar, Watson Scherp media	January, 2009
MMR (MMR-II)	vitamins, amino acids, fetal bovine serum, sucrose, sodium phosphate, glutamate, recombinant human albumin, neomycin, sorbitol, hydrolyzed gelatin, chick embryo cell culture, WI-38 human diploid lung fibroblasts	December, 2010
MMRV (ProQuad)	sucrose, hydrolyzed gelatin, sorbitol, monosodium L-glutamate, sodium phosphate dibasic, human albumin, sodium bicarbonate, potassium phosphate monobasic, potassium chloride, potassium phosphate dibasic, neomycin, bovine calf serum, chick embryo cell culture, WI-38 human diploid lung fibroblasts, MRC-5 cells	August, 2011
Pneumococcal (PCV13 – Prevnar 13)	casamino acids, yeast, ammonium sulfate, Polysorbate 80, succinate buffer, aluminum phosphate	January, 2012

Vaccine	Contains	Source: Manufacturer's P.I. Dated
Pneumococcal (PPSV-23 – Pneumovax)	phenol.	October, 2011
Polio (IPV – Ipol)	2-phenoxyethanol, formaldehyde, neomycin, streptomycin, polymyxin B, monkey kidney cells, Eagle MEM modified medium, calf serum protein	December, 2005
Rabies (Imovax)	albumin, neomycin sulfate, phenol, MRC-5 human diploid cells	December, 2005
Rabies (RabAvert)	β-propiolactone, potassium glutamate, chicken protein, ovalbumin, neomycin, chlortetracycline, amphotericin B, human serum albumin, polygeline (processed bovine 14 gelatin)	October, 2006
Rotavirus (RotaTeq)	sucrose, sodium citrate, sodium phosphate monobasic monohydrate, sodium hydroxide, polysorbate 80, cell culture media, fetal bovine serum, vero cells *[DNA from porcine circoviruses (PCV) 1 and 2 has been detected in RotaTeq. PCV-1 and PCV-2 are not known to cause disease in humans.]*	September, 2011
Rotavirus (Rotarix)	amino acids, dextran, , sorbitol, sucrose, calcium carbonate, xanthan, Dulbecco's Modified Eagle Medium (DMEM) *[Porcine circovirus type 1 (PCV-1) is present in Rotarix. PCV-1 is not known to cause disease in humans.]*	February, 2011
Smallpox (Vaccinia – ACAM2000)	human serum albumin, mannitol, neomycin, glycerin, polymyxin B, phenol, Vero cells	August, 2007
Td (Decavac)	aluminum potassium sulfate, peptone, formaldehyde, thimerosal, bovine muscle tissue (US sourced), Mueller and Miller medium,	March, 2011
Td (Tenivac)	aluminum phosphate, formaldehyde, modified Mueller-Miller casamino acid medium without beef heart infusion	December, 2010
Td (Mass Biologics)	aluminum phosphate, formaldehyde, thimerosal (trace), ammonium phosphate, modified Mueller's media (containing bovine extracts)	February, 2011
Tdap (Adacel)	aluminum phosphate, formaldehyde, glutaraldehyde, 2-phenoxyethanol, ammonium sulfate, Mueller's growth medium, Mueller-Miller casamino acid medium (without beef heart infusion)	December, 2010
Tdap (Boostrix)	formaldehyde, glutaraldehyde, aluminum hydroxide, polysorbate 80 (Tween 80), Latham medium derived from bovine casein, Fenton medium containing a bovine extract, Stainer-Scholte liquid medium	January, 2012
Typhoid (inactivated – Typhim Vi)	hexadecyltrimethylammonium bromide, phenol, polydimethylsiloxane, disodium phosphate, monosodium phosphate	December, 2005
Typhoid (oral – Ty21a)	yeast extract, casein, dextrose, galactose, sucrose, ascorbic acid, amino acids	August, 2006
Varicella (Varivax)	sucrose, phosphate, glutamate, gelatin, monosodium L-glutamate, sodium phosphate dibasic, potassium phosphate monobasic, potassium chloride, sodium phosphate monobasic, EDTA, residual components of MRC-5 cells including DNA and protein, neomycin, fetal bovine serum, human diploid cell cultures	August, 2011
Yellow Fever (YF-Vax)	sorbitol, gelatin, egg protein	January, 2010
Zoster (Shingles – Zostavax)	sucrose, hydrolyzed porcine gelatin, monosodium L-glutamate, sodium phosphate dibasic, potassium phosphate monobasic, neomycin, potassium chloride, residual components of MRC-5 cells including DNA and protein, bovine calf serum	June, 2011

A table listing vaccine excipients and media *by excipient* can be found in: Grabenstein JD. *ImmunoFacts: Vaccines and Immunologic Drugs* – 2012 (37th revision). St Louis, MO: Wolters Kluwer Health, 2011.