HIGH SCHOOL BIOETHICS PROJECT

ETHICS OF VACCINATIONS

OVERVIEW

The invention of the vaccine is unarguably one of the greatest medical achievements in the past century. Since the invention of vaccinations, the wide use of immunizations has drastically lowered the incidence of - and in some cases completely eradicated - infectious diseases that once took the lives of millions. Vaccines protect children and adults against a number of infectious and dangerous diseases, including measles, small pox, mumps, whooping cough, human papilloma virus (HPV), and the flu, among others.

Vaccinations not only provide a direct benefit to the person immunized, but also protect the community at large. When almost all members of a particular population are immunized, infectious diseases cannot take root. So, when a healthy child or adult refuses vaccinations, it puts others at risk and makes it more difficult to fully eradicate the disease. How should doctors respond to their patients' refusals of vaccines? Should we have laws that penalize those who refuse vaccinations? This is the main ethical dilemma we face with regard to vaccinations: is it ethically permissible for the government to mandate vaccinations, even when parents or individuals refuse vaccinations? Do the benefits of vaccinations for public health justify overriding individual liberty and autonomy?

CONTENTS

LEARNING OUTCOMES

1. Think critically about the moral and ethical implications of both allowing the refusal of vaccinations, and mandating vaccinations.
2. Understand the ethical underpinnings of laws surrounding vaccination in the United States
3. Consider the trade-offs that occur between personal liberty and autonomy and the promotion of public health

PROCEDURES AND ACTIVITIES

This unit uses a student-centered and interactive approach to teaching. Activities are designed to allow for a maximum degree of student participation and collaboration. Each activity is marked as an individual-, partner-, or group activity, or as a teacher-directed class discussion.

The following icons are used to designate the different types of activities:

Individual Activity

Partner Activity

Group Activity

Teacher-Directed Class Discussion

1. INTRODUCTION TO TOPIC

Gauge students' prior knowledge of vaccines. Have they received vaccines? What diseases have vaccines? When have they heard about vaccines in the media? Do they know how vaccines work?

Frontline has produced a fun classroom activity for learning about how vaccines work. See their lesson plan for the movie *The Vaccine War* here: http://www.pbs.org/wgbh/pages/frontline/teach/vaccine/lesson.html The activity has students watch a segment of the documentary and then mimic in class how infectious disease spreads. Students see vividly that vaccinating most of the population (in this case, the class) decreases transmission.

Vaccines work by stimulating a person's immune system to produce antibodies that fight a specific antigen, thus enabling the patient to build immunity to the disease without actually being infected. The stimulation works by "tricking" the immune system into thinking it has been infected by injection of a dead virus, or a weakened version of the virus also known as an "attenuated virus." Those who are vaccinated will not become ill, even if they are exposed to the disease years later.

Most healthy children and adults can receive vaccinations with low risk. Healthy children and adults typically have strong enough immune systems to produce antibodies when injected with the vaccine. Newborns, the elderly, and those who are immune-compromised, however, are not strong enough to fight off even the weakened virus present in vaccines. There is a risk that they might develop disease symptoms following exposure to the attenuated virus in vaccines. For that reason, some people who are immune-compromised do not receive vaccines.

To provide the best protection from infectious diseases, most members of a community must be vaccinated. "Herd immunity" is the special term for when enough members of a community are vaccinated to protect even those who are not vaccinated, e.g. newborns and the immune-compromised. The idea is that enough people will be vaccinated, so the infectious virus will have nowhere to incubate. No one will spread the disease to the unvaccinated. Herd immunity means that the majority of the population (the herd) has acquired immunity to an antigen, therefore protecting those who are not immune, and thus drastically decreasing the risk of outbreak. For most diseases, herd immunity is achieved when the proportion of the population vaccinated is at least 90 percent.

When the number of people who decline or refuse vaccinations increases, it becomes impossible to reach herd immunity. Then, infectious disease agents can lurk in the population, threatening not only those who have chosen not to vaccinate but also those who cannot receive vaccinations, e.g. newborns and the immune-compromised. Thus, when healthy people refuse vaccinations, they put not only themselves but also the most vulnerable members of society at risk.

This is the main ethical dilemma we face with regard to vaccinations: is it ethically permissible for the government to mandate vaccinations, even when parents or individuals refuse vaccinations? Do the benefits of vaccinations for public health justify overriding individual liberty and autonomy?

Some argue that forcing a parent to vacci-

nate his/her child against their own religious and philosophical beliefs is going too far; it infringes on parents' rights to make decisions regarding their child's well being. But, when parents refuse vaccinations, they render not only their own children, but also other children and the immune-compromised susceptible to infectious diseases, and possibly death.

In recent years, the debate between the anti-vaccine establishment, often called "anti-vaxxers" and those who are pro-vaccine has come to a head. Both sides use emotionally charged language to convince others to join their side. In this module, we lay out competing concerns in an emotionally neutral context that encourages more productive public discussion and deliberation.

2. VACCINES IN THE MEDIA

A. Vaccines and the Link to Autism

In 1998, *The Lancet*, a British medical journal, published a study by Dr. Andrew Wakefield that suggested that autism in children was caused by the combined vaccine for measles, mumps and rubella – MMR for short. In 2010, *The Lancet* retracted the study following a review of Dr. Wakefield's scientific methods and financial conflicts. Various studies failed to reproduce Dr. Wakefield's finding. A 1999 study of 498 children published in *The Lancet* did not support a causal association between MMR and autism. A 2002 study of 535,544 children vaccinated in Finland showed no association between MMR vaccination and encephalitis, aseptic meningitis or autism. Another 2002 study, which looked at 537,303 children born in Denmark, provided "strong evidence against the hypothesis that MMR vaccination causes autism," the authors wrote. Despite these and other challenges to the study, Dr. Wakefield's research had a strong effect on many parents. Vaccination rates in the U.K. plummeted after the publication of that paper, and the study helped launch an anti-vaccine movement in the U.S

The scientific results clearly demonstrate the lack of a causal relationship between vaccinations and autism. And yet, in a National Consumers League survey conducted in 2014, one-third of parents with children under the age of 18 and 29 percent of adults overall believe that vaccinations can cause autism.

Some of the biggest celebrity names, including Jenny McCarthy & Jim Carrey and 2016 presidential candidate Donald Trump, have used their fame and influence to urge parents not to vaccinate their children. Countless blogs, books, tweets, and websites tell parents that if they want to be good moms and dads, they should never vaccinate their children, that the government is lying, and to use parental instincts to protect their children. There are even some physicians who believe in the link and are using it to dissuade their patients from receiving vaccinations. The unfounded link of vaccines to autism just won't die.

B. Measles Outbreak in Disneyland

The majority of measles cases diagnosed in 2015 have been tied to the outbreak in Disneyland, California. What began in December as a single case lead to at least 117 people contracting measles across the United States. The United States had more cases of measles in the first month of 2015 than the number that is typically diagnosed in a full year, according to the New York Times. The outbreak likely started from a traveler who became infected overseas with measles, then visited the amusement park while infectious; however, no source was identified. Analysis by the Center for Disease Control showed that the measles virus type in this outbreak (B3) was identical to the virus type that caused the large measles outbreak in the Philippines in 2014.

After the outbreak, the California Department of

Public Health released the following statement:

> " In December 2014, a large outbreak of measles started in California when at least 40 people who visited or worked at Disneyland theme park in Orange County contracted measles; the outbreak also spread to at least half a dozen other states. On April 17, 2015, the outbreak was declared over, since at least two 21-day incubation periods (42 days) have elapsed from the end of the infectious period of the last known outbreak-related measles case. Measles is a highly contagious viral disease. It is widespread in many parts of the world, including Europe, Africa, and Asia. Measles begins with a fever that lasts for a couple of days, followed by a cough, runny nose, conjunctivitis (pink eye), and a rash... Children routinely get their first dose of the MMR (measles, mumps, rubella) vaccine at 12 months old or later. The second dose of MMR is usually administered before the child begins kindergarten but may be given one month or more after the first dose. For anyone planning to travel internationally, the California Department of Public Health (CDPH) strongly encourages all Californians to make sure they are protected against measles and other dangerous diseases before they go abroad. "

California was especially vulnerable to the outbreak because some neighborhoods and schools there had alarmingly high rates of non-vaccination. 131 Californians contracted measles. Many of them were not immunized against measles. Some cited personal reasons for refusing shots, and others were too young to get the vaccine. The measles outbreak of 2015 sparked a renewed interest over the debate about mandatory vaccinations. Laws surrounding vaccination in California were subsequently changed in the summer of 2015. We discuss these changes in the section below.

C. Contagion: Vaccines in the Movies

The movie Contagion, directed by Steven Soderbergh, is the story of healthcare professionals, government officials and everyday people who find themselves in the midst of a worldwide epidemic as the Center for Disease Control works to find a cure.

The New York Times has created a study guide for the movie: "When Contagion Spreads: Crowdsourcing Disease Outbreaks"

If you decide to show the movie, we strongly suggest doing their "Warm-Up" activity before showing the movie.

3. VACCINE LAWS IN THE US

There are no federal laws in the United States regulating vaccinations. Laws concerning vaccinations are passed at the state level. Laws differ from state to state.

States enforce laws concerning vaccines by mandating that students receive vaccines as a condition of enrolling in schools or preschools. In most states, parents must provide documentation – usually with a doctor's signature – that their small child has received certain vaccines, such as chicken pox, whooping cough, measles, mumps and rubella before their children can enter school.

States allow exemptions to this law in special cases. There are three kinds of exemptions: (1) medical exemptions, (2) religious exemptions, and (3) philosophical exemptions. Some parents apply for their children to be exempt from vaccine mandates. This allows their child to enroll in schools and pre-schools even though they have not been vaccinated. It's worth noting that some private schools do not enforce vaccine laws, meaning that children can enroll even if they are not vaccinated.

Medical exemptions to vaccine mandates are provided to those who, for some medical reason, cannot receive vaccinations. Children (and adults) with compromised immune systems qualify for medical exemptions.

Religious exemptions are offered to parents who, for religious reasons, will not vaccinate their children. **Section 4** below canvasses religious perspectives on vaccines. Those who avail themselves of religious exemptions cite the protection of religious liberty in the Constitution as the justification for their refusal. The U.S. government cannot force citizens to say or do things that are contrary to their religious convictions. How to apply for religious exemptions varies from state to state. Some states require parents to have a letter signed by their pastor or religious leader; others take parents at their word. It is well documented that vaccination rates increase as it becomes harder to apply and obtain a religious exemption to vaccine mandates.

Philosophical exemptions are offered to parents who lack a religious or theological reason for vaccine refusal, but who are opposed on other grounds. Only some states view philosophical exemptions as acceptable grounds for vaccine refusal. An example of a philosophical exemption is a vegan parent who opposes vaccination because the vaccine was created using porcine (pig) cells or contains fragments of porcine cells. A vegan parent might wish to raise her child in accordance with the same lifestyle; injecting her child with fragments of porcine cells defies that lifestyle. As with religious exemptions, how parents apply for and obtain philosophical exemptions varies from state to state.

All states view medical exemptions as an acceptable and legal ground for vaccine refusal.

As of 2015, three states see medical exemption as the *only* legitimate ground for vaccine refusal. Minnesota, West Virginia and California do not offer religious or philosophical exemptions to vaccine mandates.

In the state of California, the law mandating vaccinations was passed in the summer of 2015, ensuring that all children in public and private school systems had received all required vaccinations. If a parent refuses to vaccinate their child, the family is then required by law to homeschool their child. By not vaccinating their child, the family can no longer utilize the public school system guaranteed under the Constitution, which may or may not put a financial burden on the family, limiting those who have religious and/or personal objections to vaccinations to refuse vaccinations and abide by their morals only if they are in the financial place to do so. Requiring vaccinations may force some individuals to act contrary to his or her own belief.

All other U.S. states currently allow either religious or philosophical exemptions, or both.

By yourself, look up the laws regulating vaccines in your state and/or neighboring states. Note whether the state allows religious or philosophical exemptions, or both. How do parents apply for exemptions in each case? Classify the process of obtaining an exemption as "easy" "medium" or "hard." How does the rate of vaccination differ from state to state based on his classification? Compare and contrast state policies.

4. RELIGIOUS PERSPECTIVES

Most states view religious beliefs as legitimate grounds for vaccine refusal. Why might a particular religion oppose vaccination? Below find brief summaries from Wombwell, et. al. (2015). See the paper for further explanation.

Ask students to research one religion's perspective on vaccinations and explain why it

either supports or opposes vaccination. This may require doing some research on how vaccines are developed and manufactured. Does the faith studied have a genuine religious reason for opposing vaccination? For those religious individuals who oppose vaccinations, how might vaccines be developed or manufactured differently to avoid the conflict between vaccination and religion?

Judaism:
Judaic beliefs stand firmly on the idea that all must be done to preserve health, and the human body. For that reason, when a measles outbreak occurred in Antwerp, Belgium among an Orthodox community, those interviewed by authorities said the refusal of vaccination was not due to religious beliefs, instead due to fears of side effects or allergies to the vaccination itself.

Hinduism:
Hinduism says that divinity permeates all things, including plants and animals, and places special emphasis on the sanctity of the bovine (cow) species. There may be concerns with the use of cows in the creation of the vaccine. Additionally, Hindus, in general, are opposed to abortion. Measles vaccines are typically combined with the rubella vaccine, which was initially derived from cell lines obtained from aborted fetal tissue.

Roman Catholicism:
Involvement with vaccines initially derived from aborted fetal tissue carries differing moral weight for consumers, marketers, and vaccine producers. For some Roman Catholics, the use of vaccines developed using cell lines from aborted fetal tissue constitutes a "passive cooperation" with moral wrongdoing. As such, Catholics have an ethical obligation to promote development of an alternative live rubella vaccine and the support of the Church to make conscientious objections to vaccines with which there are moral problems. Catholics are encouraged to support development of vaccines derived from non-aborted tissue sources. As a way to reduce tension between religious conviction and public health, the Church advises Catholics to obtain the MMR vaccine for their children because of the protective effects of the vaccine but they are obligated to lobby for development of a morally acceptable alternative.

Protestantism:
Like Roman Catholics, Protestant Christians do not tend to have objections to the use of the rubella vaccine except for possible concerns with components of the vaccine originating from aborted fetal tissue. Specific Protestant denominations may have additional unique concerns. For instance, Christian Scientists believe disease is not caused by a biological pathogen, but rather spiritual distancing from God, and so diseases should be treated with prayer. As such, they may have a fundamental issue with vaccines in general, including but not specific to the measles vaccine. In addition, Dutch reformed congregations believe vaccines prevent an individual from fully relying on God for their health. Again, this may lead to a general, but not specific refusal of vaccines due to religious reasons.

Amish:
In recent years, Amish communities throughout the US have experienced outbreaks of disease due to a lack of vaccination and community immunity. Immunizations are not prohibited by Amish communities, however there are large segments of the Amish population that do not receive immunizations due to poor access to health care and concerns about vaccine safety. According to one study, only 4-6% of Amish people who objected to vaccination did so on religious grounds.

Islam:
Both theological and social issues may be present for Muslims regarding certain vac-

cines, primarily those derived using porcine (pig family) elements. Theological issues may include use of porcine components, while social issues may include concerns for safety. The Qur'an and Islamic tradition indicate certain animal products are absolutely forbidden. In 1995, the Islamic Organization for the Medical Sciences issued a statement saying that it was permissible to ingest products derived using porcine elements because the transformation purified them. Despite this, there remains controversy, and beliefs about vaccines vary among Islamic individuals.

Jehovah's Witnesses:
The Jehovah's Witness faith has a strong prohibition against transfusions of whole blood and the use of certain blood components to develop medicines or treat disease. By abstaining from blood, Witnesses express their faith that, "only the shed blood of Jesus can redeem them and save their life" (Wombwell et al. 2015, p. 601). Up until 1952, Jehovah's Witnesses were instructed not to receive vaccinations, as one of the leaders of the religion believed vaccination caused animal blood cells to be injected into humans. However, as technology advanced it become clear that was not the case. Since 1952, the official position of the Witnesses is neutrality, essentially leaving it up to individuals to decide wither or not to vaccinate.

Ask students to grapple with the following questions:

- How do we go about balancing religious liberty and public health?
- When is the abandonment of religious exemptions, therefore prioritizing public health, justified?
- Does this infringe on the right to religious freedom granted by the U.S. Constitution?

Students' reflections on these questions should prepare them for the move to the modern philosophical debate over vaccination. The primary ethical question is how to balance individual autonomy and the promotion of public health.

5. THE MODERN PHILOSOPHICAL DEBATE

Here we provide arguments for and against removing religious and philosophical exemptions from current vaccine regulations.

A. Autonomy & Liberty

Liberty protects the possibility of acting — or the fact of acting — in such a way as to take control of one's life and realize one's goals and live out values that are important to them.

Autonomy is the capacity to make choices that are consistent with one's values and goals. Autonomy means "self-rule;" and the autonomous person has the authority to control her activity and decide for herself how to lead her life. It is related to liberty insofar as liberty protects the expression of autonomy. We are free to live our lives as we see fit. Parental autonomy refers to parents' capacity to raise their child in a way that they see fit. Parents are free to decide to raise their child in accordance with a particular religious lifestyle, or in accordance with other lifestyle choices (such as veganism). U.S. and states' laws protect parental autonomy in most areas of life, however, a child cannot be subjected by a parent to a poor education, to communicable disease, to ill health, or to death. Child protective services steps in when a parent abuses a child, neglects to take care of them, or makes decisions that adversely affect the health of a child such as not treating a painful or curable illness. The decision to withhold medical care can amount to parental abuse or neglect even if the parent's reason is religious in nature. Refusing vaccinations, however, does not directly harm the individual child and therefore does not constitute as child neglect or abuse in the typical sense.

Some see mandatory vaccination as an infringement upon liberty and autonomy. Laws that mandate some act – such as vaccination – get in the way of deciding for oneself how to lead one's life. Moreover, getting vaccinated, as seen above in **Section 4**, may run counter to how one has decided to lead one's life, e.g. mandating a porcine-derived vaccine for those who vehemently oppose using pork products, whether for religious or other personal reasons. Allowing religious and philosophical exemptions to childhood vaccinations is a way of respecting liberty and parental autonomy.

B. Promoting Public Health: Utilitarianism

Utilitarianism is based on the ideology that actions are right to the extent that they produce the best consequences for the greatest number of people. Act utilitarianism looks at individual actions and considers: which of the actions available to me will have the best outcome. The "Greatest Happiness Principle" says that actions are right to the extent that they produce happiness and wrong to the extent that they produce the opposite. In contrast, rule utilitarianism asks: which rule, if followed by all, will have the best outcome for society? Individuals are then morally required to act in accordance with the rule, even if it makes them slightly worse off. For example, following the rule, "Don't lie!" makes us all better off; it produces the best outcome for society, even if telling the truth makes an individual worse off. It is better to tell the truth when you've forgotten to do your homework, even though it is tempting to make up another excuse instead.

Public health interventions, such as mandatory vaccination campaigns, are often justified by utilitarianism, specifically rule utilitarianism. Public health policies and interventions are justified on the basis that it produces the best results for society at large – providing the greatest benefit to the greatest number of people. Public health decisions made on the basis of overall statistics and demographic trends are ultimately better for each one of us, even if particular interventions may not directly benefit some of us.

Mandatory vaccination policies are by and large better than their absence for everyone. Vaccines have drastically reduced the morbidity and mortality of infectious diseases. In the United States, beginning in the early 1900s, annual epidemics of polio occurred with frightening regularity. In 1952, 57,628 cases of polio were reported. That year 3,145 people died, and 21,269 were left with mild to disabling paralysis. In 1955 the first polio vaccine was introduced in the United States. The last case of endemic paralytic polio in the country occurred in 1979. Smallpox caused a minimum of 300 million deaths in the twentieth century. It was a major cause of blindness. It was completely eliminated in 1979, thanks to vaccination (College of Physicians Philadelphia 2011).

Utilitarianism and the promotion of public health provide an ethical justification for vaccine mandates, even though those mandates arguably infringe upon liberty and expression of autonomy. Vaccine mandates undoubtedly make us better off than we otherwise would be in their absence.

C. The Harm Principle: Protecting the Most Vulnerable

In John Stuart Mill's essay "On Liberty" (Mill 1869), Mill defends what has come to be called the Harm Principle. The Harm Principle says that the only justification for interfering with the liberty of an individual, against her will, is to prevent harm to others. The Harm Principle is used to justify various infectious disease control interventions - including vaccinations.

When herd immunity is reached – and maintained – vaccines protect not only those who are vaccinated, but also those who cannot be vaccinated. Thus, when parents choose not to vaccinate their children, it puts the most vulnerable in the community at increased

risk of contracting infectious diseases. Some of the most vulnerable population are newborns, people who are immuno-compromised from diseases such as cancer, and the elderly are highly susceptible to diseases. When more parents choose not to vaccinate their healthy children, those most vulnerable have a much greater chance of becoming ill, since it creates more incubators where infectious disease can live. When all or most people in the same geographic area are vaccinated, infectious diseases have no bodies in which to grow. So, it is supposed, it is impossible to have an outbreak of disease. As the number of unvaccinated people rises due to vaccine refusal, it creates more places for disease to live (inside more bodies).

We have special obligations to protect the most vulnerable, those who cannot protect themselves from infectious diseases but who seek protection nonetheless. Healthy people protect them by getting vaccines. Mandatory vaccination laws are justified, then, by the Harm Principle. They license interfering with personal liberty and autonomy because they prevent harm to the most vulnerable.

D. Preventing Harm to Individuals

In general, it is not justifiable to put individuals at increased risk of harm for the sake of public health (absent their consent). Individuals are justified in opting out of public health measures, such as vaccinations, if compliance is expected to cause harm or illness to themselves. Medical exemptions to vaccine mandates are justified by this principle. We do not require already vulnerable or sick persons to put themselves at risk of contracting an infectious disease from vaccinations.

This principle is only applicable to the vaccination debate when the risk of harm is a genuine risk. For example, the immune-compromised are at a genuine risk of becoming sick following vaccination, since their body cannot produce enough anti-bodies to respond to the vaccine and ward off other infection. However, some people use this principle as a justification for opting out of vaccines even when there is no real risk of harm to themselves or their children. Reports from parents and pediatricians indicate that vaccine safety concerns are translated into delay or refusal to immunize in some cases. Websites like the National Vaccine Information Center continue to say that vaccines put children at serious risk of harm even as the American Academy of Pediatricians, the American Medical Association, the American Public Health Association, among other scientific and medical organizations, have strengthened support of vaccination programs and stress their safety in healthy children. Vaccines do not put healthy children (or adults) at increased risk of illness or harm.

In sum, while it is unjustifiable to require that individuals expose themselves to risk for the sake of public health, this argument only works as a justification to refuse vaccinations when there is a real risk of harm. For most people, there is no such risk.

Have students work in small groups to answer the questions below. Students will be provided information on each of the four positions described above and asked to compare and contrast. Groups may—alternatively—be provided with the information on one of these positions and asked to research and defend that one position in greater detail.

Each group will try to answer the following questions about the principle they have been assigned:

- What is the main criterion or guiding principle used to determine whether or not mandatory vaccination programs are justified?
- Does your position support mandatory vaccination, or not?
- Do you agree with the position supported

by your principle? Why or why not?

6. BE A LAWMAKER

Within groups, ask students to craft policies regarding vaccinations. If they were in charge, would vaccines be mandatory? Would they allow medical, religious, and/or philosophical exemptions to vaccine mandates? How would parents obtain exemptions to vaccine mandates?

Have groups write a policy together, with equal input from all group members. Remind them that crafting policy usually requires compromise! Groups will present their proposed policy to the class, presenting an ethical argument as rationale for their policy.

"Lawmakers" should also consider the argument in the op-ed "Revoke the license of any doctor who opposes vaccinations." Should there be laws that penalize doctors who influence their patients to oppose vaccines? How might they be enforced? Or does this violate the doctor's right to free speech?

7. REFERENCES AND ADDITIONAL RESOURCES

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