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Ebola Scare and Measles Resurgence: Mandatory Isolation/ quarantine and Vaccination

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INTRODUCTION

The Ebola epidemic of 2014, which caused thousands of deaths in Liberia, Sierra Leone and Guinea, made its way to Dallas, Texas where Eric Duncan, returning from travel in Liberia, was admitted to Texas Presbyterian Hospital Sept 28 of same year for fever and abdominal pain. On the 3rd hospital day Oct 1, doctors confirmed diagnosis of Ebola infection. Duncan's medical condition deteriorated rapidly and he died Oct 8, the 10th day of his hospitalization.

Fear that Ebola would spread rapidly and become a national epidemic gripped the nation. Early media reporting was sensational and momentous, evoking a strong emotional response from the public who were terrified at the prospect of contracting a deadly disease. In the span of 11 days (Oct 7-16, 2014) the media was ripe with dramatic and misleading headlines and sound bites, such as

“Ebola in the air? A nightmare that could happen” (1)

“Ebola: The ISIS of biological weapons” (2)

“Nurses in safety gear got Ebola, why wouldn't you?” (3)

“How the Feds block Ebola cures” (4)

Oct 17, 2014 *NBC News* featured a story which began with similarly incredible claims

“A bridal shop in Ohio closes its doors because a nurse who later came down with Ebola shopped there. A lab technician who handled samples from the patient who died in Dallas has confined himself to his room on a Caribbean Cruise ship. Schools in Cleveland and in Texas with only tenuous links to people infected with Ebola are closed and cleaned with bleach.”(5)

The story concludes that “America needs a viral reality check”. None of the above measures were medically necessary. What is responsible for the Ebola hysteria? Experts blamed the news media. (6)

This paper argues that the history of two governmental directives (non-voluntary isolation/quarantine and mandatory measles vaccination) follow common routes in American jurisprudence and share many congruencies in ethical analysis. Two Oct 2014 *real life* case studies and the Dec 2014 Disneyland measles outbreak serve as prototypes for ethical and legal analysis of non-voluntary isolation/quarantine and mandatory measles vaccination respectively. Both mandates pit the rights of the individual v. the rights of the public. The paper argues that the dilemma of conflicting rights is caused by a collision of two principles of right action (duty-based v. consequence-maximizing) and that the clash can be mediated by applying the *felicity calculus* (net utility) from the theory of utilitarianism. The paper also argues that emotivism, and more specifically the theory of persuasive definition, explains the formation and expression of public sentiment on the two governmental directives.

THEORY OF EMOTIVISM

Metaethics is concerned with the nature of ethical theories and moral judgments, and emotivism is one of the metaethical theories. Emotivism takes the view that moral judgments do not function as statements of fact but rather as expressions of the speaker's or writer's feelings. For example, when we say "You acted wrongly in stealing that money," we are not expressing any fact beyond that stated by "You stole that money." It is, however, as if we had stated this fact with a special tone of abhorrence, for in saying that something is wrong, we are expressing our feelings of disapproval toward it. A.J. Ayer first described emotivism in *Language, Truth and Logic* (1936), and Charles Stevenson further developed the theory in *Ethics and Language* (1945). Stevenson described *emotive meaning*, which he then used to provide a foundation for his theory of *persuasive definition*.

"Persuasion depends on the sheer, direct emotional impact of words—on emotive meaning, rhetorical cadence, apt metaphor, stentorian, stimulating, or pleading tones of voice, dramatic gestures, and care in establishing *rappport* with the hearer or audience, and so on. ... A redirection of the hearer's attitudes is sought not by the mediating step of altering his beliefs, but by *exhortation*, whether obvious or subtle, crude or refined."(7)

Emotivism makes its claims from emotional attitudes, not ethical sentences. The key point is to express one's views with emotions in order to influence the thought patterns of others.

The theory of emotivism can be applied to the impact media news messaging exerted on public perception of an impending Ebola epidemic Oct 2014 in the United States. By implying that Ebola virus is airborne, deadly like a biological weapon and so strong it penetrates safety gear, invokes unwarranted uncertainty and anxiety. Suggesting that all passengers on flights from West Africa to the United States should be isolated without reasonable cause compounds the fear. The hype of media news reports on an impending Ebola epidemic in the United States was a direct appeal to the emotions at the expense of reasoned thought.

When the media reports that burglaries and home invasions are on the rise, people may be inclined to invest in home security systems or take self-defense classes. When there are reports about people getting sick from the flu vaccination, people become more apprehensive about taking a flu shot. When it is reported that America's first Ebola case arrived on a flight from West Africa and that he was admitted to a hospital which lacked appropriate guidelines for treatment, people may cancel planned air travel to Africa and they may boycott the index hospital. Framing public perception through persuasive fear techniques can coerce people to think or act in a certain way. "When an attorney tells a jury that the defendant is a violent criminal who threatens every member of the community, the attorney is using a fear appeal. A manager who argues that the company will go bankrupt if employees are not more efficient is using fear appeal as well."(8)

In contrast to the emotional tone of media news reporting, the Centers for Disease Control (CDC) with years of experience and expertise tracing and managing epidemics consistently assured the public that the Ebola virus would not spread far into the United States:

“When an infection occurs in humans, the virus can be spread only through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth), with; blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with Ebola, or objects (like needles and syringes) that have been contaminated with the virus.”(9)

The CDC made it clear that Ebola virus is not airborne; whereas highly contagious viral infections, like Measles, are airborne and disseminate rapidly throughout a community from infected individuals to non-immunized contacts through coughing and sneezing. By contrast, dissemination of Ebola virus in the community would be highly unlikely in the United States where every hospital follows “Universal Precautions” (10) to prevent spread of infection and the more sophisticated gowns and headgear to protect health workers against the Ebola virus are readily available. Unlike Sierra Leone, Liberia and Ghana, public health infrastructure in the United States is a strong deterrent against dissemination of viruses, like Ebola, which spread through body fluids contact.

Isolation and quarantine help protect the public by preventing exposure to people who have or may have a contagious disease. The terms are commonly confused. *Isolation* separates sick people with a contagious disease from people who are not sick. *Quarantine* separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick. In news reports and in common parlance, the two terms are used interchangeably and incorrectly. This paper follows the formal definitions. For example, the subjects of our two case studies, Thomas Eric Duncan and Kaci Hickox were forced into *isolation* to prevent them from infecting others, whereas Duncan’s family was placed in *quarantine* to protect them, and thus others, from being infected with the Ebola virus.

THE CASE OF THOMAS ERIC DUNCAN

Mr. Thomas Eric Duncan was a Liberian man who had family in Dallas, Texas. Mr. Duncan took two connecting flights to get to Dallas from Liberia. He arrived in Dallas on September 20, 2014. On the health screening before departure he stated he did not care for anyone with the virus or touch the body of anyone who died from the virus. Five days after arriving in Dallas, Mr. Duncan was taken to the Emergency Room of Texas Presbyterian Hospital. A nurse recorded low grade fever but did not inquire as to his travel history as this was not triage protocol at the time. Duncan did not volunteer to any of the nurses that he had recently traveled from Liberia to the United States. After a series of tests, Duncan was sent home with prescription for an antibiotic.

Duncan's condition worsened, and on September 28 he returned to the same Texas Presbyterian Hospital emergency room by ambulance with symptoms of diarrhea, abdominal pain, and fever. The ER doctor noted that Duncan had recently come from Liberia and needed to be tested for Ebola. Duncan was admitted urgently and placed in isolation. Two days later, the hospital confirmed that Duncan had Ebola. While in the hospital, he was rehydrated with massive intravenous infusions and treated with an experimental drug which did not improve his condition. On October 8, 2014, Duncan died of the Ebola virus.

While Duncan was sick in the hospital, his family was quarantined in their apartment for 21 days. According to the CDC, symptoms may appear anywhere from 2 to 21 days after exposure to Ebola, but the average is 8 to 10 days. The family had been ordered not to leave the apartment until Dallas County Officials had thoroughly decontaminated the area. Within a few days all family members tested negative for Ebola, yet they were detained in quarantine for the full 21 days. Dallas County Officials would later apologize for the undue length of the quarantine, claiming they couldn't find anyone to take the contaminated items out of the house.

What is news media? How does the news impinge on our everyday lives? What impact does news messaging have on society? How should society effectively respond to what is reported and disseminated to the public? Timothy Borchers in his book *Persuasion in the Media Age* makes the following points in his provocative depiction of the news media. The purpose of a news broadcast is to be appealing and dramatic. Editors and journalists utilize subjective and vague understanding of the information that is printed or displayed in the news. Similar to a television program, theatrical production, or movie, the news is dramatized. News stories have a beginning, middle, and an end, rising and falling action, structure and conflict, and a narrative. News stories can be created to display the attributes of fiction and drama. Through the process of dramatization, Bouchers concludes, media news reporting can be detrimental to the overall mentality of the public". (11)

The viewer is drawn into the theatrics of news reporting. The ongoing drama feeds one's appetite for more and more reporting of a hot topic. Theater may become confused with reality in the perception of many viewers. In the end, one must question if dramatic presentation of a news story so distorts the message and misleads the viewer that any semblance of authenticity is lost.

Fear is a part of an emotional appeal that can be used in order to provoke strong feelings and emotions. "A fear appeal involves three dimensions. A fear appeal describes a threat, indicates that audience members are likely to experience the threat, and indicates that one way audience members can avoid the threat is by adopting the message of the persuader"(12). The threat in these cases would be the Ebola virus. Once it was confirmed that Ebola had made its way to the U.S., many people were fearful about how they should proceed. Society thought the threat of Ebola was larger than it actually was. Some news commentators and even public officials were calling for the quarantine of all passengers arriving from West Africa. Although the CDC stated that the virus would not spread quickly in the U.S., people still believed the message of fear.

After the death of Mr. Duncan, the American public seemed to fear an epidemic of Ebola even more. Despite continued reassurance from the CDC, people remained fearful of a national Ebola epidemic. As an authoritative source with a good record of reporting on public health issues with accuracy, a reasonable person would tend to place faith in statements coming from the CDC. However, fear of Ebola, fueled by vivid news reporting, clouded public perception. People believed what they wanted to believe and the Ebola scare continued.

The virus has not spread and there has been no outbreak of Ebola. Of the four cases of Ebola (suspected, probable, and confirmed), the only death was the subject of our case study,

Thomas Eric Duncan. Clearly, the impact of Ebola in the U.S. pales in comparison to West Africa. In Guinea, Liberia, and Sierra Leone the number of Ebola cases (suspected, probable, and confirmed) exceeds 20,000 and the number of deaths surpasses 9,000. West Africa was ravaged by the Ebola Virus whereas the United States was largely spared.

Throughout the Ebola crisis, the CDC was in constant battle with news media for the dissemination of accurate information on Ebola. CDC predictions about the spread of Ebola were correct. The virus has not spread and there has been no Ebola outbreak in the United States. The CDC remained steadfast to its prediction that spread of the virus would be minimal in an industrialized nation like the U.S. which does not suffer the underlying poverty, poor infrastructure and sanitation problems of West Africa nations.

THE CASE OF NURSE KACI HICKOX

Kaci Hickox, Doctors *without Borders* Nurse, who treated patients with Ebola in West Africa during the height of an epidemic, returned home to the United States from Sierra Leone, arriving at Newark International Airport Fri Oct 24, 2014. She was detained at the airport for 7 hours and then isolated in a tent inside University Hospital Newark. That same day NJ Gov. Chris Christie's promulgated a new isolation/quarantine policy requiring all people entering the United States through Newark Liberty Airport to be isolated for 21 days if they had direct contact with Ebola patients in Guinea, Liberia or Sierra Leone, even if they show no symptoms of infection. Hickox did not exhibit any symptoms of Ebola and she had tested negative on two previous occasions for the virus. During her weekend in the hospital, she remained well and had 3rd test for Ebola, likewise negative. She was discharged Mon Oct 27.

Hickox returned to her home state of Maine where she was monitored at her boyfriend's house. She again found herself at odds with state officials. Maine Gov. Paul LePage ordered that Hickox remain in isolation at home for the 21 day incubation period for Ebola infection. On Thurs Oct 30 Hickox defied the governor's isolation order and went on a bike ride with her boyfriend. That prompted the governor to try to enforce her isolation at home through the courts. On Fri Oct 31 Maine District Court Judge Charles LaVerdiere rescinded the isolation order on the grounds that Hickox did not show any symptoms of Ebola and therefore is not infectious. Gov. LePage reluctantly complied.

The case of Nurse Kaci Hickox raised extensive national and international media coverage (print, television, and internet). Hickox was outspoken in her criticism of Maine's 21 day isolation order. She claimed it unjustly violated her individual rights. Also, she did not want her other colleagues coming back home to this destructive sense of fear and isolation. Hickox told CNN that "The biggest reason that I fought is because I felt so much fear and confusion, and I imagined what my fellow aid workers were going to feel if they came back to this same situation—and the more I thought about the fact that these policies are being made by politicians, really not the experts in the field—the more I felt like I had no choice but to fight back" (13).

Both Gov. Christi and Gov. LePage claimed their motivation for issuing the isolation orders was caution to protect the public good, yet likely their caution was exaggerated as

politicians who sensed the heightened fear in their constituents of the Ebola virus. Our emotions can force us into a state of panic or a state of calmness. Either way, our society is impacted by what is broadcast on a large scale. Our emotions can force us to act in certain way, and to produce a particular result. The feelings and attitudes that we have about particular events or situations will shape how we react to the situation in the future.

In his ruling to rescind Maine's isolation order, Judge LaVerdiere eloquently discussed the key role of the emotions in the case of Kaci Hickox. He acknowledged the broader theme of fear that dogged Hickox's return to the United States, from her isolation in a tent inside a New Jersey hospital to her well-documented homecoming in Maine:

“(Hickox) should understand that the court is fully aware of the misconceptions, misinformation, bad science and bad information being spread from shore to shore in our country with respect to Ebola,” the judge wrote. “The court is fully aware that people are acting out of fear and that this fear is not entirely rational. However, whether that fear is rational or not, it is present and it is real” (14).

A reasonable and prudent person should be able to make precise and clear decisions. Her autonomy should be protected and valued. James Childress explains that autonomy has two essential features: acting freely and deliberating rationally (15). A reasonable person quite capable of making precise and clear decisions, Kaci Hickox knew that it is indeed unjust to isolate a person who tested negative for the virus. Such a blatant attempt at coercion violated her autonomy.

The case of Kaci Hickox focused attention on the plight of health personnel returning home from West Africa and framed the ethical and legal discussion on two competing interests: liberty of the individual v. state duty to protect the public good.

ETHICAL ANALYSIS

Jacobson v. Massachusetts (U.S. Supreme Court, 1905) upheld the Massachusetts law mandating vaccination against smallpox to control the spread of this serious contagious disease. Rev Henning Jacobson refused to take the smallpox vaccination because he did not trust the safety of the vaccine. He sued the state, because he felt that it violated his rights and freedoms. In 1905 the U.S. Supreme Court in *Jacobson v. Massachusetts* ruled that individual freedom can be restrained for the common good of the public, and that an individual is not fully free from restraint at all times and circumstances.

Issues which stem from the conflict between rights of the individual and protection of the public cry out for resolution. Laws and regulations continue to advance on criteria for issuing an isolation order to prevent entrance into the United States of people suspected to have serious communicable diseases and criteria for ordering a quarantine of suspected contacts, while at the same time accommodating individual rights and freedoms of relevant parties.

Public Health regulations and Congressional legislation will continue to shape how we deal with communicable diseases and the extent to which law may restrict movement and

activities of individuals infected or suspected to be infected with contagious diseases. Each case is adjudicated individually on its merits, but the tendency of American government (congress, executive branch and the courts) is to rule in favor of protecting the public, even when to do so infringes on the rights of the individual.

Jacobson v. Massachusetts set a precedent for all subsequent law on mandatory vaccination and isolation/quarantine as the government's imperative to protect the public's health over the rights of an individual person when there is a serious threat of infection with a virulent communicable disease. Later the paper will show how *Jacobson* is a good example of how the government through its court decisions, legislation and public policy often resorts to the consequentialist (outcome oriented) theory of utilitarianism and applies the theory by employing the process of *net utility*.

The juxtaposition of two governmental directives (mandatory vaccination and mandatory isolation/quarantine) is the subject of this ethical analysis. Both directives treat the relationship between the rights of the individual and the health of the general public. Both directives argue that the harms to the health of the general public, at present and in the future, are of such magnitude that the mandate takes precedence over the rights of the individual. The directive for mandatory vaccination, of course, would include millions of people, especially children; whereas the directive for isolation/quarantine would involve only the few who pose a significant risk of harm to the general public were they to gain entrance into the country with a serious communicable disease.

MANDATORY MEASLES VACCINATION

Since the resurgence of measles is of such recent interest among the American people, mandatory measles vaccination will be the point of comparison. After discussion of measles as a disease, the history of mandatory measles vaccination and the exemptions that have been granted over the years, the paper will present an ethical analysis on mandatory measles vaccination and show how this analysis is instructive for better understanding of mandatory (non-voluntary) isolation/quarantine.

In the United States, there are policies which mandate certain immunizations, including vaccinations to enter school. In 1809 Massachusetts was the first state to impose compulsory vaccination and by the 1850s it required vaccination before school entry (16). It was not until 1967 that the Edmonston-Enders measles vaccine became available for widespread use. Subsequent to this effective vaccine, nearly all children contracted measles by the time they were 15 years of age. It is estimated 3 to 4 million people in the United States were infected each year. Also each year an estimated 400 to 500 people died, 48,000 were hospitalized, and 4,000 suffered encephalitis (swelling of the brain) from measles. In 1978, CDC set a goal to eliminate measles from the United States by 1982 (17). Although this goal was not met, widespread use of measles vaccine drastically reduced disease rates. By 1981, the number of reported measles cases was 80% less compared to the previous year.

Federal and state efforts to eradicate measles motivated modern mandate policies. By the 1990s, all 50 states required children to receive measles vaccination before entry into school, and

most states also required coverage for older schoolchildren and those in daycare centers and Head Start programs. Measles was declared eliminated (absence of continuous disease transmission for greater than 12 months) from the United States in 2000. This great achievement was possible thanks to a highly effective vaccination program and better measles control measures.

As the incidence of measles declined, there was gradual loosening of the measles vaccination mandate. Herd immunity is present in a community when such a high percentage of its members have been immunized from a particular disease that it cannot gain a foothold in the community (18). Based on the phenomenon of herd immunity that 100% immunization rates are not needed to achieve herd immunity (19), states began to liberalize their mandate policy and grant an exemption to certain individuals who had serious objections to vaccination. Currently, all 50 states allow exemptions for medical reasons. These reasons generally include children with compromised immune status, a child who has serious allergic reaction to a vaccine component, and a child who has had prior serious adverse event related to vaccination. Mississippi and West Virginia are the only states to offer *only* medical exemptions to vaccination. Religious exemptions are allowed in 48 states. And 20 states permit exemptions to children whose parents object on the basis of philosophical or personal belief objections to vaccination (20).

Overall, vaccination rates in the United States remain high. But many experts are wondering what the effect will be on public health of increasing numbers of children being exempted from vaccination. The concept of herd immunity gave the American government and its people a false sense of security that there was no need for concern as more and more people sought and received exemptions from measles vaccination. One U.S. study showed that children with nonmedical vaccination exemptions were 35 times more likely to contract measles than vaccinated children. And several measles epidemics have been traced to religious communities that do not commonly practice vaccination (21).

In 2004 there were only 34 reported measles cases – a record low – but the number has been rising rapidly ever since. The number of reported cases for 2014 totaled 648, and the incidence of measles is trending higher for 2015. Especially troubling was the outbreak of measles affecting 147 people from a half-dozen states, Mexico and Canada, all traced to a visit at Disneyland theme parks shortly before Christmas Dec 2014. Many were not immunized against measles, some cited personal reasons for refusing shots, and others were too young to get the measles-mumps-rubella vaccine (22). An objective assessment of the outbreak would suggest that there are limits to herd immunity protection and that perhaps the critical number of unvaccinated individuals has exceeded the protective capacity of herd immunity.

Ethical issues pertaining to immunization activities are important in the implementation of and the public's response to mandatory vaccination programs. Often, certain ethical principles are in conflict with others, or at the very least, are required to be given more weight than others, when mandatory vaccination campaigns are implemented (23).

PRIMUM NON NOCERE: “FIRST, DO NO HARM”

Diekema and Marcuse proposed a direct approach for evaluating and resolving ethical issues arising from mandatory vaccination programs (24). Their approach is based upon the often cited medical maxim translated as: “first, do no harm.” When applied to vaccination activities, this maxim has the following implications: (1) the vaccination should be of benefit to the subject being vaccinated; (2) care should be taken to prevent any harm that might accrue from the vaccination; (3) compared to other procedures for addressing the same issue, the vaccination should be the best opportunity for successfully preventing disease as compared to the risk for harm; and (4) if harm does result from the vaccination, the benefit of vaccination to the subject should at least compensate for the harm incurred.

Is measles vaccine “of benefit to the subject being vaccinated”? Symptoms of measles are fever, dry cough, runny nose, sore throat, inflamed eyes and a characteristic skin rash. A child with measles spreads the virus to others for about eight days, starting four days before the rash appears and ending when the rash has been present for four days. In addition to the physical burden of illness, the child misses several days of school and parents may need to stay home from work.

Before the measles vaccine became available in 1967, nearly all children contracted measles by the time they were 15 years of age. It is estimated that each year 3 to 4 million people in the United States were infected with measles. Also each year an estimated 400 to 500 people died, 48,000 were hospitalized, and 4,000 suffered encephalitis (swelling of the brain). Then in 1967 a highly effective measles vaccine entered the market and vaccination campaigns were launched in every segment of the American population. The campaigns were so successful that by the year 2000, measles was declared eliminated (absence of continuous disease transmission for greater than 12 months) from the United States. Indeed, mandatory measles vaccination is of tremendous benefit to children, their parents and indeed the entire population who are vaccinated.

“Is care taken to prevent any harm that may accrue from the vaccination”? In recent times, an incident that changed some people’s perception of measles vaccination from beneficial to harmful occurred with the 1998 publication of a scientific article by Andrew Wakefield in the prestigious journal *Lancet* (25), which linked measles, mumps and rubella (MMR) vaccine to autism. In 2010 *Lancet* retracted the article because the findings were found to be the result of fraudulent research (26). The Wakefield article ignited fear in the hearts of parents that their children would get autism if they took the measles vaccine. The Wakefield article is felt to have been a key factor in the increased refusal rates for MMR vaccine.

Is the measles vaccine the “best opportunity for successfully preventing disease as compared to the risk for harm”? Measles vaccine is extremely effective in protecting the public against measles and the vaccine is very safe. Side effects of fever and rash are infrequent and if they occur, are usually very mild. More serious side effects are rare. These may include high fever that could cause a seizure (in about 1 person out of every 3,000 who get the shot) and

temporary pain and stiffness in joints, mostly in teens and adults (27). The phenomenon of herd immunity gave people false security that measles vaccination was no longer necessary. However, the recent precipitous rise in measles incidence demonstrates that herd immunity has its limits. Vaccination is the only way to prevent measles, and it is very safe.

If the measles vaccine were to cause harm, “is there compensation for the harm incurred?”. Of course, the manufacturer would be responsible for harms attributed to formulation of a contaminated vaccine batch. Compensation can be obtained through the process of tort law.

RESPECT FOR AUTONOMY

Over the past two decades, much activity has been directed toward the goal of defining the ethical principles relevant to public health. In 2002 James Childress postulated 6 principles which are relevant to the discussion. Three are 3 moral considerations that are critical to the goal of public health, and the other 3 principles are likely to limit public health activities: (1) respect for autonomy, (2) privacy, and (3) justice which includes distributing benefits and burdens fairly, distributive justice, and ensuring public participation, including the participation of affected parties, procedural justice (28).

A major reason that early immigrants sought refuge in the United States was their desire for religious and individual freedom. They thirsted for liberty, the legal analog of the philosophical principle of autonomy. The founding fathers declared independence from the rule of King George at the same time they established a democracy which spelled out in the *Bill of Rights*, a comprehensive list of individual rights, including freedom of religion and privacy. From the very beginning, respect for autonomy was etched in American stone.

Respect for autonomy is the principle underlying the interest of states to respect religious and philosophical objections to vaccinations. Ethical debates and objections over vaccination mandates come from individuals and communities who have religious or philosophical beliefs against vaccination. Parents argue that mandating vaccinations for their children infringes upon their personal autonomy, individual rights, freedom of religion, or personal philosophy.

Respect for autonomy is a deontological (duty-based) principle but it does not stand alone. For a society to prosper, autonomy is not absolutely free from infringement when it conflicts with public health. One’s autonomy ends where another’s begins, or in other words, society has a duty to respect one’s autonomy unless, in so doing, it imposes undue burden on someone else.

Tension results when individuals want to exercise their right to protect themselves and/or their children by refusing vaccination if they do not accept existing medical or safety evidence, or if their ideological beliefs do not support vaccination. There is scientific and medical research which strongly supports the view that individuals who exercise religious or philosophical exemptions are at a greater risk of contracting infections, which put themselves and their communities at risk. Thus, medical and public health advocates often struggle to balance the ethics of protecting individual beliefs and the community’s health (29).

THE FELICITY CALCULUS: NET UTILITY

Utilitarianism is a *normative ethical theory* that places the locus of right and wrong solely on the outcomes (consequences) of choosing one action or policy over other actions or policies. Jeremy Bentham and John Stuart Mills are associated with the theory of utilitarianism. The greatest happiness principle – “the greatest good for the greatest number” – forms the cornerstone of all Bentham's thought. By "happiness", he understood a predominance of "pleasure" over "pain". Utilitarianism is impartial and agent-neutral; everyone's happiness counts the same. In the words of John Stuart Mills:

“The happiness which forms the utilitarian standard of what is right conduct is not the agent’s own happiness, but that of all concerned as between his own happiness and that of others. Utilitarianism requires him to be as strictly impartial as a disinterested and benevolent spectator” (30).

How does one measure outcomes (consequences) to determine “the greatest good for the greatest number”? Bentham suggested a procedure for estimating the moral status of any action, which he called the *felicific calculus*, which in subsequent years was called “net utility” (31). In clinical medicine “net utility” was instrumental in the development of QALY (quality adjusted life year); a measure of disease burden, including both the quality and quantity of life lived, which provides an objective approach to cost-benefit analysis.

In normative ethics there are two categories of principles for right action: duty-based principles and consequence-maximizing principles. Previously this paper discussed the duty-based principles of respect for autonomy and privacy. Now the discussion turns to consequence-maximizing principles. James Childress postulated 3 moral considerations that are critical to the goal of public health (32). These are the utilitarian principles of (1) producing benefits, (2) avoiding, preventing, and removing harms, and (3) producing the maximal balance of benefits over harms and other costs (aka *net utility*). For real world decision making, the concept of *net utility* is useful in adjudicating conflicts between individual rights and the public good.

This paper already established the clear benefits of mandatory measles vaccination. And it has presented a credible argument that care is taken to prevent any harm that might accrue from the vaccination and that mandatory measles vaccination is the best opportunity for successfully preventing disease as compared to the risk for harm. Now it is time to argue whether or not mandatory measles vaccination affords the maximal balance of benefits over harms and other costs. The methodology used is the application of the *felicity calculus* (net utility).

In the case of mandatory measles vaccination the *felicity calculus* evaluates the relative weight society should assign to the rights of the individual v. the health of the public at large. The *Bill of Rights* collides with government’s responsibility to protect the public health when confronted with the prospect of serious contagious diseases, like measles and Ebola. Advocates of individual rights would argue that the duty is fiduciary in that government is to act solely for the interest of the individual. Advocates for the public good argue that government has a greater

duty to protect the health of entire population of the United States, which in this case may conflict with the individual rights of some who have objections to mandatory vaccination.

The *Jacobson v Massachusetts* (US Supreme Court, 1905) ruling that there are “manifold restraints to which every person is necessarily subject for the common good” set the terms for the fundamental philosophical disagreement over whether and to what extent there is an inherent tension between individual rights and the common welfare. Justice John Marshall Harlan declared that the authority to compel vaccination fell within the “police powers” of state and local governments to guard the community’s health, welfare, safety, and morals. Turning to the central question of whether the statute violated Jacobson’s liberty, Harlan offered an unequivocal vision of the proper role the individual plays within society:

“The liberty secured by the Constitution does not import an absolute right, wholly freed from restraint. Society based on the rule that each one is a law unto himself would soon be confronted with disorder and anarchy” (33).

Although the law was clear, the trend in public health practice during the 20th century was in the opposite direction of the coercive path to which *Jacobson* had pointed (34). In place of coercion, the approach of public health turned toward the power of persuasion through health education. A sea change in public health philosophy from persuasion back to coercion occurred in the late 1960s when the CDC led a nationwide effort to eradicate measles by mandating vaccination of school children. When the measles vaccine became available for mass distribution in 1967, just half the states had a law that required one or more vaccinations for school entry. By 1981, all 50 states made vaccination against measles and most other vaccine-preventable illnesses mandatory for school entry (35). Support for these laws was buttressed by empirical evidence which showed a strong correlation between the presence of laws and lower rates of measles infections.

As the incidence of measles declined, there was gradual loosening of the measles vaccination mandate. Since the vaccine had worked so well, some argued, why should individuals continue to be subjected to the harms of vaccination unless there is actual threat of disease in the community? Based on the phenomenon of herd immunity that 100% immunization rates are not needed to achieve herd immunity (36), states began to liberalize their mandate policy and grant more exemptions for individuals who had serious objections to vaccination.

At this stage the weights on the *felicity calculus* underwent a shift. Whereas the weight given to protection of the health of the public at large, even to the point of coercion of an individual’s rights, was clearly dominant from the time of *Jacobson v. Massachusetts* (1905), the *felicity calculus* began to assign increasing weight to the individual’s right to choose. Although religious exemptions were granted by several states after *Jacobson*, it was not until the new, effective measles vaccine brought measles under control in the 1970s that the number of applications for religious exemption began to increase significantly.

Tilting the *felicity calculus* more in favor of individual rights in the form of exemptions is an expression of support for the duty-based principles. *Respect for autonomy* in American

culture began its ascendancy over the consequentialist, utilitarian principle of beneficence in the same 1970s decade when measles came under control. In several of his works, Edmund Pellegrino cites reasons for the ascendancy of respect for autonomy in modern cultures: participatory democracy, better public education, increased moral pluralism, general distrust of authority, and unprecedented expansion of medical technology (37). Respect for autonomy frequently enjoys *trumping status* in current ethical discussion and remains a key principle upon which many court decisions are based. Likewise, there was a similar time course for the ascendancy of the *right to privacy* in American jurisprudence. *Griswold v. Connecticut* (US Supreme Court, 1965) is the landmark case which ruled that the US Constitution protects the *right to privacy* by ruling that the right of marital privacy does not exclude the use of contraceptives. *Rowe v. Wade* (US Supreme Court, 1973) likewise based its ruling on the *right to privacy* in allowing abortion under certain circumstances. These are but two examples of court rulings which employed *right to privacy* as the ethical basis for a legal decision.

Exemptions for religious or philosophical reasons to mandatory vaccination are based on duty-based principles. Forty-eight states allow religious exemptions. Although there are no religious objections from any of the mainline religions, several smaller religious sects – especially Christian Scientist, Amish and Mennonite – oppose vaccination on religious grounds (38). Some states require that a family belong to a religious group with *bona fide* objections to vaccination. By contrast, California offers personal beliefs exemptions, which require only a parental affidavit (39). Other states simply require that a parent sign a form stating that he or she has religious objections to vaccination.

Twenty states permit exemptions to children whose parents object on the basis of philosophical or personal belief objections to vaccination. In most cases, parents must file a one-time or annual form with a school district attesting to a personal objection to vaccination. In states with all three types of exemptions, personal belief exemptions tend to be most common. There has been a marked increase in exemptions (from 0.99 to 2.45% between 1991 and 2004) in the 20 states that allow philosophical and personal objections.

Conflict between the duty-based principles, expressed as exemptions to mandatory vaccination, v. consequentialist (outcome based) principles, which ground the vaccination mandates, continue unabated. The *felicity calculus* has not yet reached equilibrium and likely it never will. The relative weight given to each pole (right of the individual v. right to protect public health) has fluctuated over the years based on events, statistics and public perceptions. Although the occurrence of outbreaks within communities that deny vaccinations to their children is not frequent because of the benefits of herd immunity, when outbreaks do occur they are deadly and often affect the younger and more vulnerable school-age children within the community first. The measles outbreak of 1991 among the Faith Tabernacle, a controversial religious sect in suburban Pennsylvania that was given exemption from childhood vaccination, is one such example: six children within the community died from a measles outbreak, yet there were no adult deaths (40).

A cluster problem occurs when those who apply for the exemptions live in clusters in close proximity to one another. Clusters of exemptors, who are significantly more susceptible to

contracting vaccine preventable illnesses, pose an increased risk of spread of disease not only to their unimmunized peers, but also to the surrounding, largely vaccinated population (41).

A study of measles outbreaks in Colorado showed that day care and elementary age children who were exempted for religious or philosophical reasons were sixty-two times more likely to become infected with measles (42). The cluster effect therefore heightens the threats to public health and to the health of both vaccinated and unvaccinated individuals living in proximity to groups of exponents.

MANDATORY (NON-VOLUNTARY) ISOLATION/QUARANTINE

The ethical arguments for non-voluntary isolation/quarantine and mandatory measles vaccinations are quite similar. Both mandates pit individual rights vs. public good. Both mandates share the same landmark case, *Jacobson v. Massachusetts* (U.S. Supreme Court, 1905) which established the supremacy of the state's interest to protect the health of its population by mandating an effective vaccine for the prevention of a serious communicable disease, even to the point of force, against objections of individuals who object.

The authority of the state of Texas in October 2014 to order the *isolation* of Thomas Eric Duncan within Texas Presbyterian Hospital after diagnosis of Ebola infection and the *quarantine* of Duncan's family who were in close contact with him were likewise based on *Jacobson v. Massachusetts*. In the cases of Thomas Eric Duncan the Duncan family, the *felicity calculus* tilted in favor of utilitarianism. When faced with a disease with such a high mortality index, isolation and quarantine would produce the *greatest good for the greatest number* and thus takes precedence over the duty-based principles of *respect for autonomy* and *privacy* since the diagnosis is clear in the case of Eric Duncan and likelihood of contact is high in his family. The benefit to the population who may have been infected by a virulent and often deadly virus through direct contact with Duncan or through its subsequent dissemination, when inserted into the *felicity calculus* and weighed against the burden of confinement by isolation or quarantine of individuals (Duncan and his family) tilts markedly in favor of the public good over individual rights. Law and ethics are in agreement in the Case of Thomas Eric Duncan and his family.

The situation is very different in the case of Nurse Kaci Hickox. NJ Gov. Chris Christie and Maine Gov. Paul LePage thought they were legally justified in ordering the isolation of Nurse Kaci Hickox. They issued their orders within hours of Hickox's arrival at Newark airport from Ebola-ravaged Sierra Leone Fri Oct 24, 2014. In the heat of the moment, their impulse was to make a decision on the side of caution. A cooler head prevailed Fri Oct 31 when Maine District Court Judge Charles LaVerdiere ruled that Hickox did not show any symptoms of Ebola and therefore was not infectious; therefore, her isolation did not meet the standard of *Jacobson v. Massachusetts*. The Case of Nurse Kaci Hickox's tilted the *felicity calculus* in the opposite direction. Unlike Eric Duncan, Nurse Kaci Hickox did not demonstrate symptoms of Ebola upon arrival in the United States. Unlike Duncan, Hickox tested negative for the virus; thus there was no legal justification for the orders of isolation. The weight of the duty-based principles of *respect for autonomy* and *privacy* would produce the *greatest good for the greatest number* in the *felicity calculus* and thus outweigh the *consequentialist, utilitarian ethic* which would have required Nurse Hickox to be confined 21 days in isolation for the good of the public. Indeed, it

would have been an injustice to isolate a person who clearly is not infected with Ebola. Once again, ultimately law aligns with ethics in the Case of Nurse Kaci Hickox.

THEORY OF EMOTIVISM REVISITED

This paper discusses emotivism apart from the formal ethical analysis because support for it has eroded over time and indeed the details of emotivism tended to disappear from the metaethics scene in the latter half of the twentieth century (43).

The key point of emotivism is that we express our views with emotions in order to influence the thought patterns of others. Charles Stevenson further specified the theory by developing the concept of emotive meaning, which he then used to provide a foundation for his theory of a *persuasive definition*. For Stevenson, the *power of persuasion* “depends on the sheer, direct emotional impact of words, which redirect the hearer’s attitudes, not by the mediating step of altering his beliefs, but by *exhortation*, whether obvious or subtle, crude or refined” (44).

The first section of this paper made concrete application of the theory of emotivism. The guttural emotional import of sensational media news reporting of an impending Ebola epidemic and calls for far-reaching isolation and quarantine policy in response to it, is a true example of emotivism. Frightening sound bites, such as “Ebola in the air? A nightmare that could happen” and “Ebola: The ISIS of biological weapons”, exerted a strong persuasive effect on the psyche of the American people, making the fear of Ebola seem painfully imminent. Eric Duncan was justly isolated and his family justly quarantined; however, a popular cable news commentator exhorted his listeners to beware of the impending Ebola epidemic in the United States and he recommended an isolation/quarantine policy that would have confined many healthy people without cause (45).

The Theory of emotivism, especially emotive meaning and power of persuasion as described by Charles Stevenson, can also be applied to the Disneyland measles outbreak Dec 2014; just two months after Eric Duncan died from Ebola at Texas Presbyterian Hospital. Of the 147 people infected, most were not immunized against measles, some cited personal reasons for refusing shots, and others were too young to get the MMR vaccine. The outbreak triggered a strong and emotionally-charged backlash against anti-vaccination moms (46).

Mothers of affected children blamed the *anti-vaccine* moms, holding them accountable for the measles outbreak. Fear of measles contagion from non-vaccinated children extended beyond the Disneyland outbreak to all contexts which bring children together. In a Facebook post that went viral, one mom explained how her son Griffin, a newborn who is too young to receive vaccines, may have contracted measles from another patient in a doctor’s office. Rage against anti-vaccination moms reached a new peak, when she wrote

“I’m angry; angry as hell. If you have chosen to not vaccinate yourself or your child, I blame you. I blame you. You have stood on the shoulders of our collective protection for too long. From that high height, we have given you the PRIVILEGE of our protection, for free. And in return, you gave me this week; a week from hell wherein I don’t know if my BABY will develop something that has DEATH as a potential outcome. DEATH!

Look at Griffin. Tell me why he gets to bear the brunt of your stupidity and reckless abuse of our protection. Tell me” (47).

The backlash from mothers of affected children was so severe that many *anti-vaccine* parents were afraid to speak with the press. Critics questioned their intelligence, their parenting, even their sanity. Some have been called criminals for foregoing shots for their children that are overwhelmingly shown to be safe and effective (48).

Although the anti-vaccination movement has roots that extend to the time of *Jacobson v. Massachusetts* and has put forward many reasons for its objections, the Wakefield article uncovered the mighty impact of fear on human decision making. When Wakefield proposed linkage of measles vaccine and autism, parents of the *anti-vaccine* movement interpreted the article as confirmation of their belief that the measles vaccine is harmful to their children.

The prospect of having an autistic child is very frightening to parents. Autism has some unique characteristics that have created an almost perfect storm for shame and rejection. In its more serious forms autism often involves extremely disruptive antisocial behavior. Some with autism may flick their fingers repeatedly, hit, scream, or hurt themselves. Autistic children may fail to make eye contact or speak. They may violate other people's personal space, causing fear and discomfort. Yet they look just like everyone else, making their behavior doubly suspicious to the uninformed (49).

Although the Wakefield article was discredited as fraudulent research and indeed there is no scientific evidence of linkage, anti-vaccine moms are so paralyzed by fear of having an autistic child that their ears are closed to hearing the truth. Although it was shown in 2004 that Wakefield had serious conflicts of interest (50) and despite the ruling of the General Medical Council in London in 2010 that Wakefield acted unethically in researching a link between the MMR vaccine and autism, many parents who oppose mandatory vaccination continue to revere him as the “father of the anti-vaccination movement”(51). *Willful Ignorance*, the adage that “people believe what they want to believe”, seems to apply here.

The theory of emotivism as defined in Charles Stevenson’s concept of emotive meaning and power of persuasion rings true, not only in the backlash against anti-vaccine moms occasioned by the Disneyland measles outbreak, but it also rings true in the *autism scare* in the psyche of anti-vaccine moms.

Dr. Eric Kodish, director of the Cleveland Clinic's Center for Ethics, Humanities and Spiritual Care contends that some parents have forsaken parental responsibilities for the pursuit of parental rights:

"Do parents have any obligations to other children or just to their own biological children? I hope, certainly for our society, that we would be thinking collectively about what’s good for (all) children and not just our own individual children. (52).

The Supreme Court has not yet addressed whether the Constitution permits states to offer religious-based exemptions; however, many believe that the exemption statutes, specifically the

religious exemption, will be deemed unconstitutional because of the Establishment Clause and equal protection arguments (53).

What is the future for exemptions from mandatory vaccination? Certainly exemptions for medical contraindications will remain intact. Religious exemptions with specifically defined provisions most likely will continue. Philosophical/personal exemptions are more vulnerable. A proposal is working its way through the California legislature to end the opt-out provision which currently allows exemptions for philosophical/personal reasons. If passed, the California bill may reshape vaccination laws across the country and spell the end of the philosophical/personal exemption.

Once again, the paradigm would hold true. When a serious communicable disease threatens the nation and individual rights come in conflict with public health, ethics and law become congruent. “The greatest good for the greatest number” rests on the side of public health. The *felicity calculus* (net utility) assigns greater weight to consequence-maximizing than to duty-based ethical principles of right action. The legislative, executive and judicial branches of government, once again recognizing the trumping function of public health over individual rights, act accordingly by eliminating exemptions to mandatory measles vaccination and thus require that almost all children be vaccinated before entering school. *Jacobson v. Massachusetts* is alive and well.

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