



**“Eradication of Infectious Diseases: A proposal to reduce the contamination and susceptibility of infectious diseases to members of Rutgers University-New Brunswick, NJ”**  
**By Tehseen Khokhar**

**The Undergraduate Research Writing Conference**  
**• 2020 •**

**Rutgers, The State University of New Jersey**

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May 08, 2019

Melodee Lasky  
Assistant Vice Chancellor for Health and Wellness  
Rutgers Health Services Department  
11 Bishop Place  
New Brunswick, NJ 08901-1004

Re: Immunization Enforcement at Rutgers University-New Brunswick, NJ

Dear Dr. Lasky,

Greetings, it is Tehseen Khokhar. Formerly, I gave a presentation on Eradicating Infectious Diseases at Rutgers University-New Brunswick and would like to thank you for attending. The issue of discussion is the immunization enforcement and the importance of protecting the population of Rutgers. Nobody likes to send or receive emails on dangers to the health of society, or deal with the Centers for Disease Control and Prevention. With your position of power, we can develop an urgency of the issue and obtain proper funding from Rutgers and governmental agencies (CDC).

The spreading and susceptibility to infectious diseases can occur effortlessly. Infectious diseases do not discriminate, leaving everyone across the world at risk. With statistical evidence to support not only the issue but why the problem is expanding, are presented in the proposal. The current steps taken by Rutgers to protect the health of students are not effective enough. With similar issues found across the world, New York has tackled this issue by mandating nationwide laws to immunize younger children, reducing threats to their health.

The proposal attached, is based on tremendous research and application of multiple theories. My plan focuses on protection, promotion, and prevention of infectious diseases. Introducing reevaluations, educational programs, and development of an infectious disease department to attack determinants of the issue.

With your support and guidance for my proposal, we can help eradicate the constant issue of infectious diseases appearing on campus at Rutgers University. If you have any questions or require more information, you can contact me immediately at (201) 993-1175 or at [tkk27@scarletmail.rutgers.edu](mailto:tkk27@scarletmail.rutgers.edu).

Sincerely,

*Tehseen Khokhar*

Tehseen Khokhar



# Eradication of Infectious Diseases

A proposal to reduce the contamination and susceptibility of infectious diseases to members of Rutgers University-New Brunswick, NJ



**Submitted by:**  
Tehseen Khokhar

**Submitted to:**  
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**May 06, 2019**

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## **Abstract**

A proposal supported by tremendous research and statistical data dives into a determinantal issue of infectious diseases in the population of Rutgers University-New Brunswick. Currently Rutgers immunization policy has loopholes and is ignoring forms of contamination impacting the members of Rutgers. Leaving members within the community in high risk to contracting an infectious disease, especially with the involvement of the CDC in 2019 and an associated outbreak with Rutgers.

Discovered within the research conducted poor hygiene in college students, and lack of education on vaccination creates a larger risk of infectious diseases. The reduction in DTaP vaccination by 3.9% between 2011 to 2017 is alarming within New Jersey (Increase Children Age). With examples of Rutgers's website of immunization still have alerts still present from 2017 and not mandating vaccinations amongst the community prevalent infectious diseases are truly a problem on-campus. With the assistance of behavioral economics, kinesthetic learning, cognitive development, public health principals understanding the concept of this issue will help pair with the models of success (like the CDC) to advise fight against infectious diseases. The necessary information to understand the predicament are found within the proposal. Save yourself before it's too late.

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## Executive Summary

Infectious diseases are damaging the lives of people across the world. But with the availability of vaccinations in America, you would never think this is an issue in the United States. This issue is occurring in the United States due to lack of awareness on infectious diseases, misconceptions of vaccinations, and poor hygiene. This predicament must be solved before diseases such as the bubonic plague return. The misconception of vaccinations and awareness of infectious diseases must be addressed.

The impact of infectious diseases is treacherous. With side-effects like fevers, rashes, loss of limbs, and even death possible. The power of these invisible beasts is underrated and even possibly being developed for biowarfare. At Rutgers University-New Brunswick, the prevalence of infectious diseases is an issue. This is supported by the involvement of the CDC and an associated outbreak of Meningitis B on campus. Research shows that infectious diseases are higher in college students due to improper hygiene. An experiment noted that 57.7% of the volunteers had microbial colonies on their hands in Northwestern Ohio University (Prater et al. 69). If that rate is applied to the Rutgers population, the contamination of diseases is endless. Then the negligence and lack of education of vaccinations result in fewer people being protected for diseases. The opinions of the opposing view of vaccinations consist of opinions such as they are too young. With the rates of vaccinations going down in New Jersey as well like the DTaP going down 3.9% from 2011 to 2017, the threat of infectious diseases in New Jersey is very high (Increase Children Age). Then with college students in close proximity, constant contact, and traveling the chances to contract a disease are increases significantly (Prater et al. 1).

In order to assist the population of Rutgers Universities health, a plan involving the three core principles of public health must be implemented in the plan. The principals are protection, prevention, and promotion of health. Theories such as behavioral economics also have to be applied to nudge people towards making the correct decision for their personal well-being, while also being applied to policies (Matjasko et al. 1). This assists in educating and renovations and development of policies on infectious diseases. Using the theory of Cognitive Development, we understand that parents influence the development of their child heavily. They must be targeted in the plan especially mothers as they take care of their child the most, educating them on infectious diseases will lead to a better chance of improvement of vaccination rates (Schaub 49). The best way to educate the students and parents is by using kinesthetic learning which is the learning of concepts by using practical movements. Elissa A. Wagner's experiment determined, "Using more kinesthetic learning activities with students may help to improve information transfer, problem solving, critical thinking, understanding of key concepts, and overall satisfaction with teaching methods" (Wagner 351). This type of teaching style would result in actual interpretation of infectious diseases and further be able to communicate with others.

The models of success used to model the framework of the plan include the public health law titled POLIOMYELITIS AND OTHER DISEASES, was amended and put into effect on July 12, 2018. This section of the law implements the mandatory requirements of immunization of prevalent diseases for children (age of 2 months to 18 years old) attending any form of schools in



New York (NY. Senate Public Health Law). Then another model of success that provides support to the fight against infectious disease is the CDC. The CDC uses the Social-Ecological Model Theory to identify risks to population health from various factors.

The plan consists of four parts. The first part is involved with the reform of Rutgers immunization policy. With the application of behavioral economics, we can adjust policies applying the framing effect and time-inconsistent preferences. Assistance from the CDC will be requested for the modification of policies. Vaccinations will be made more available on campus and the website will be updated. The budget for step 1 will be \$680,155 and will be implemented at the end of 2020 spring semester. The following step is the development of the educational program aimed at incoming students and parents. This will take behavioral economics and kinesthetic learning and apply them to the curriculum given by the CDC. This was incorporated with the cognitive theory as the days selected like Mother's Day help improve the chances of their child getting vaccinated. They will also be given during orientation for new students. This plan will be implemented on Mother's Day in 2020. The budget for this step is \$72,300. The following step is just the evaluations of step one and two in 2023 and will cost approximately \$150,000. The fourth step is a proposal for the creation of the infectious disease department at Rutgers. The Social-Ecological Model Theory is applied to this plan in developing a medical research facility on campus to provide tremendous functions in detail in the proposal. It will cost \$1,613.0 (cost in million dollars) to build and its yearly cost is 107,335.865 (cost in thousands).

The awareness and proper education of infectious diseases are necessary for the protection of society. The plan plans on attacking not just problems associated with Rutgers but across New Jersey. With your support, the proper funding for this proposal can be achieved from the government, Rutgers, or CDC. The plan will not only protect but also prevent and promote the threat of infectious diseases on the population's health. The goal of this plan is really to protect everyone because society has an impact on each other's health, so protecting others from infectious diseases, protects oneself. People in third worlds have no vaccinations and are dying, while people have the resource in the United States and rejecting it. As an undergraduate student at Rutgers, I hope we are more than just a number and our health matters.

# Introduction

## Infectious Diseases Detrimental to Population Health at Rutgers

Infectious diseases have caused detrimental damage to the health of the Rutgers population. This issue has the potential to even create more serious problems in the future due to bioterrorism, genetic modification, and anti-resistant. The question that arises is, why are incidences and prevalence of cases of infectious diseases increasing when vaccinations are present? The impact of suspecting an infectious disease is it damages the health of the population. Leaving individuals with symptoms like fevers, rashes, coughs and fatigue. Infectious diseases are a major problem across the world and especially in New Jersey with a measles outbreak (measles was thought to be eradicated) currently occurring in 2019. This problem has already involved the CDC at Rutgers and affects multiple aspects of life at Rutgers University.

Infectious diseases are dangerous and without proper planning and rapid identification, the contamination of the diseases is uncontrollable. Rutgers University has set in place certain measures such as vaccination requirements before entering the university. The measures set in place are simply not effective or efficient enough due to struggle in the enforcement of policies. This is supported by the emails received by Melodee Lasky informing Rutgers at various points across the semester about health predicaments.

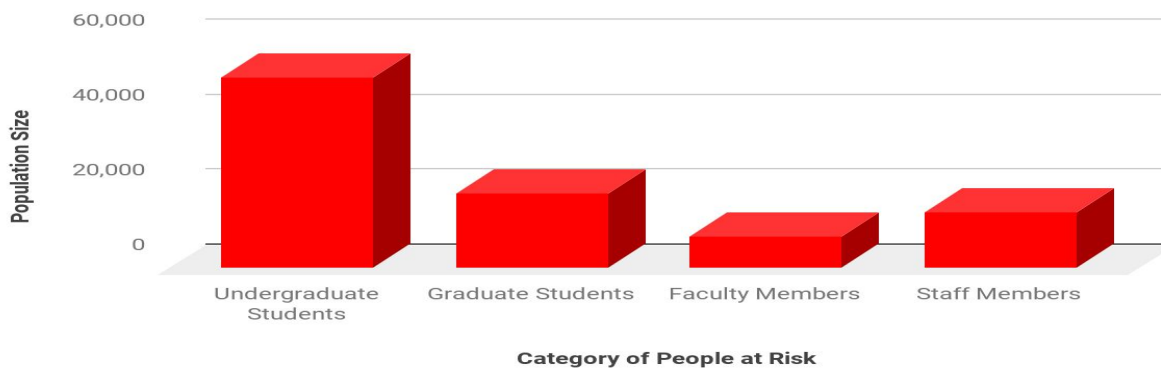
Rutgers University is also a public university. This means that the general public has access to public areas such as libraries and transportation systems found on campus. Thus, making the source of an infectious disease that originates on campus harder to track but easier to enter the community. But these infectious diseases also damage student life pertaining to education. In “Colds and Influenza-Like Illnesses in University Students: Impact on Health, Academic and Work Performance, and Health Care Use,” Kristin L. Nichol, et al. discuss the impact infectious upper respiratory diseases have on students and academics in the University of Minnesota. Nichol, et al. identify in their cohort study, that upper respiratory infections caused 6023 bed-days, 4263 missed school days (Nichol et al. 1263). The population of the University of Minnesota’s students is 47,568, so compared to Rutgers, the days missed, and bed-days are more if the same rate is applied to population number.

## Who are the Ones in Jeopardy?

The population of Rutgers University, located in the city of New Brunswick, is in critical danger of infectious diseases. The immediate threat targets the total population of Rutgers-New Brunswick which is about 90,246 people (Facts and Figures). The people at risk of infectious diseases are broken down into subgroups in figure 1. As seen through the figure, the students are at detrimental risk due to the larger percentage of the total population. Infectious diseases are able to spread rapidly and are calculable by application of rate ( $\text{Infection Rate} = \frac{\text{New cases}}{\text{Population at Risk}} \times 100$ ). For example, if we wanted to calculate the rate of infection within just Rutgers total population the rate would be 1% (with just one thousand new cases of an infectious

disease). This leaves not just the people at Rutgers at risk but potentially the world. Diseases can spread from Rutgers to homes of people located in different cities, even other states and countries due to internships and study-abroad programs.

### **Rutgers' University Population Separated into Categories** *Separated By Categories of People in Danger*



**Figure 1: Population at Risk to Infectious Diseases  
(Facts & Figures)**

### **Determinants to Proliferation of Infectious Diseases at Rutgers University**

The following reasons are provided and explained to show the importance of hindering and terminating infectious diseases. As these reasons are promoting the contamination of infectious diseases.

#### *Immunization Legislation*

The immunization legislation of Rutgers University is one of the factors leading to an increase of susceptibility to infectious diseases by students. While it is understood that the Rutgers Health Services Department is trying their best to endeavor the maximal safety of student health, however, is this enough? The effectiveness and efficiency came into question when multiple emails received by Melodee Lasky informing Rutgers at various points across the semester about health predicaments. Then the assistance from the Centers for Disease Control and Prevention is needed on campus, as explained on March 12, 2019 (mass email sent by Dr. Lasky). The involvement was due to the associated outbreak that could have possibly occurred due to the two reported cases of Meningitis B at Rutgers. A disease for which the vaccination is not enforced on campus making it extremely dangerous, especially with a 10%-15% fatality rate (Pinkbook).

The problem begins with immunization policies enforced by Rutgers are not considering all perceivable threats of infectious diseases. For example, Meningococcal Meningitis ACYW is a policy only enforced upon on-campus residing students. This ignores the threat of students that

live off-campus (close to Rutgers) and commuters obtaining and transmitting infectious diseases between each other. Then certain policies are only recommendations like the Influenza vaccination. While it is known to be a prevalent disease within the community it is still not enforced. Then the availability of vaccinations on campus is limited or nonexistent for certain infectious diseases throughout the year.

The enforcement of the policies is volatile. While some students state that kids were rejected their keys to dorms for not being vaccinated, others (such as me), can state keys to dorms were given even if vaccination was not completed. Then the website to obtain information on immunization requirements is not updated frequently. This is supported by a statement on the website, “December 4, 2017: Rutgers Student Health is currently out of stock of the vaccine for Yellow Fever. Click [here](#) for important information regarding vaccine availability” (Immunization Requirements & Allergy Shots). Just like how infectious diseases have rapid modification and spread ability, the policies should be constantly evaluated and updated.

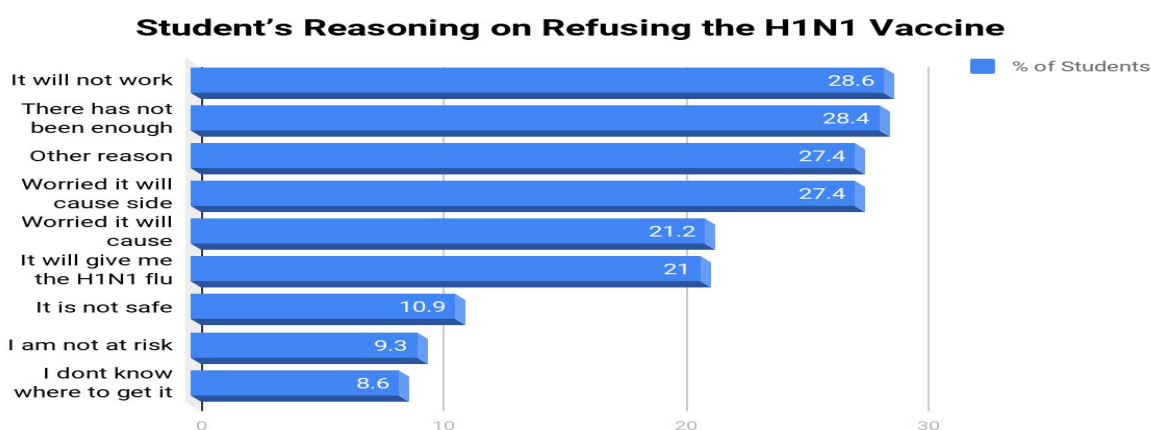
### *Negligence of Hygiene*

The negligence of maintaining proper hygiene is an important factor which contributes to contracting infectious diseases among college students (Prater et al. 69). The spreading of infectious diseases can also be caused by improper hygiene. 57.7% of the volunteers had microbial colonies on their hands in Northwestern Ohio University (Prater et al. 69). Due to hands not being kept up to par the infectious diseases are able to increase the number of new incidents on campus. The spread of disease from person to person is effortless. Possible forms of contamination include touching, talking, kissing, coughing, and exchange of bodily fluids in any way. The advocacy of proper hygiene must be informed to students. As noted in a quantitative systematic review, upper respiratory infectious diseases can be reduced due to washing hands by up to 24% (Rabie, Valerie 261). As the negligence of hygiene almost destroyed the world in 1665-1666 due to the Great Plague.

### *Education of Vaccinations*

There are many misconceptions around the understanding of vaccinations amid the world let alone Rutgers University. Common belief amongst people is that vaccinations don't work or are in danger of harming their health further. But these assumptions are made based on the view of others' opinions, rather than on personal assessment. The amount of interactions one has at Rutgers with new students every day allows for higher risk of contracting an infectious disease. The view of New Jersey civilians is opposed to vaccinations. This can be seen through the DTaP vaccinations rate decreasing. Children (aged 19-35 months) receiving 4 doses of DTaP vaccines rate went down since 2011. The rate in 2011 was 86.7% and went down to 82.8% in 2017 (Increase Children Age). The view of parents on children's health is detrimental for healthy development and may have even led to the view of college students on decisions regarding health.

The misconception discovered about college students and their opinions on vaccinations is alarming. The National Foundation for Infectious Diseases discovered through the use of a poll that U.S college students in 2017 gave the following reasons for not getting the vaccine for Influenza: 36% stated they were healthy, 31% addressed their fear of needles, 30% suspect that the vaccine does not work and 28% were worried about the risk of the vaccine (NFID). The students in colleges across America are rejecting vaccinations for Influenza without context. Furthermore, the discovery on H1N1 vaccination opinions was made by Meagan A. Ramsey and Cecile A. Marczynski in Northern Kentucky University give some more reasons. Of the surveyed college students, 53.1% were not planning on getting the vaccine and 31.1% reported undecided (Ramsey and Marczynski 7600). The reasons for refusing vaccinations or undecided are explained in figure 2.



**Figure 2: Student's Reasoning on Refusing the H1N1 Vaccine  
(Ramsey and Marczynski 7600)**

One outrageous reason was a simple fact that students thought they were healthy and couldn't get the disease because they are young. If the rate of 9.3% is applied to Rutgers student's population, there are approximately 6,592 students that are choosing to ignore vaccinations because they are not at risk. This misconception is incorrect as even in 1918 the Spanish flu was targeting young adults (Aimone 71-79). Infectious diseases do not discriminate and educating the students must occur so that they can make decisions based on their own opinions.

### What is Next?

There are continuous efforts across the world trying to deal with the prevention and protection of infectious diseases. The issues discussed above are some of the main reasons for the dilemma of infectious diseases at Rutgers-New Brunswick. The public university allows the generally public to use libraries and buses provided to everyone. The avoidance of external sources of contamination of infectious diseases is dangerous and jeopardizes the safety of people associated with Rutgers. People are susceptible to diseases that they are not vaccinated for, just like anyone

else. The immunization enforcement at Rutgers University is helping students be protected, but it is simply scarce. The following literature review will dive into the concepts of these issues while advising a basis for a plan that protects, promotes, and prevents the population at risk.

## Literature Review

### Theories of Interest

The protection of Rutgers population from the threatening infectious diseases requires a critical understanding of conceptual theories. The theories vary from various fields such as economics, education, public health, and psychology. These theories will help in understanding the reasoning behind the plan to protect Rutgers University-New Brunswick.

#### *Public Health Principles*

Infectious diseases are a threat to the general public's health. The principles of public health are vital in designing a framework to strike against infectious diseases. The principles of public health can be broken up into three core functions. Prevention is the first principal and this tactic works on stopping the illness from arising in the population (Public Health Principles 213). An example of prevention includes vaccinations against infectious diseases. The following principle is protection. Protection is the preservation of public health by shielding the population from danger. An example of this would be policies developed to protect health like the Affordable Care Act. The final principle is the promotion of quality health. The promotion of health principle means to educate the general public on beneficial information for their health. An example of this could be anti-smoking advertisements found across various platforms. These principles will help in developing a plan that implements these concepts to counter infectious diseases at Rutgers.

#### *Behavior Economics*

“Behavioral economics provides an empirically informed perspective on how individuals make decisions, including the important realization that even subtle features of the environment can have meaningful impacts on behavior” (Matjasko et al. 1). Behavioral economics basically explains the reasoning behind people’s certain decisions making based on environmental factors that nudge peoples towards a certain outcome. The remarkable reasons for decision making noticed are status quo bias, bounded rationality, framing effects, availability heuristic, and time-inconsistent preferences (Matjasko et al. 11).

Status quo bias is the prevention of differentiation due to default options or lack of interest to change earlier decision (Matjasko et al. 11). An example of this is, people may reject vaccinations because they never got them before. Bounded rationality is decision making based on lack of information (Matjasko et al. 11). A representation of bounded rationality is parents rejecting vaccinations for children as they believe it causes autism. Framing effects are the

decisions influenced by outcomes presented in either losses or gains (Matjasko et al. 11). An example of this could be presenting why you need a vaccination based on the death rate instead of the survival rate of diseases. The availability heuristic is decision making that are based around concerning events that are more relevant to the mind (Matjasko et al. 11). A model of this is a person getting a vaccination for the flu because their friend got the flu. Time-inconsistent preferences are decision making based on immediate pleasure instead of greater benefit over the longer-run (Matjasko et al. 11). An example of this is a person will take one dollar today instead of five dollars in five days.

The recognition of decision making is very crucial in understanding the reasons for why the policies provided by Rutgers on immunization are being ignored. With the understanding of decision making, we can convey policies that exist and new ones, in a way in which people will want to follow them. Then this can also be used to educate people in a way which nudges people to make decisions which benefit their health at Rutgers.

### *Parental Influence on Cognitive Development Theory*

Cognitive Development Theory states that the development of a thought process occurs from a young child into becoming an adult. This influence comes from ideas and social experiences (Girgis, Fady et al. 2). While the common belief of constructive-developmentalists is that people make changes and develop over time to their life (Girgis, Fady et al. 3). The influence parental figures have on the development of their child is crucial and occurs throughout the life of their children. This is supported by the different parenting styles resulting in different developments of children in "Perceptions of Family Relations when Mothers and Fathers are Depicted with Different Parenting Styles," by Ann V. M. Lisi and Richard D. The Lisi inform, "INDIVIDUALS' PERCEPTIONS, ATTITUDES, AND BELIEFS are important factors in understanding parenting styles and their potential impact on children's development" (Lisi, Lisi 1). Parents contribute to a tremendous amount of various aspects which are part of the development of their children. They make decisions and teach their children about things throughout life. The importance of parents' education for the safety of their children's health is imperative.

The health of students is vulnerable to infectious diseases. With parents refusing vaccinations (especially in New Jersey), they must be targeted for education on vaccinations not just the population of Rutgers. Especially the mothers of students should be targeted for vaccination as they are more involved with the care of their child. The mothers adopt their own educational experiences and apply them to the family environment (Schaub 49). The education of students and parents is important for the understanding of the danger that lurks within Rutgers (on-campus) of infectious diseases.

### *Kinesthetic Learning*

Kinesthetic learning is a type of teaching style that involves students performing activities. The use of kinesthetic learning has shown improvement in student confidence, carrying out instructions, recording information, and interpretation of data (Wagner 348). A form of kinesthetic learning is labs. The movement associated with kinesthetic learning is the justification for the enhancement in motivation and interest with the content of discussion (Wagner 348). An experiment was held by Elissa A. Wagner and documented in, "Using a Kinesthetic Learning Strategy to Engage Nursing Student Thinking, Enhance Retention, and Improve Critical Thinking." The experiment compared learning styles to determine which were more useful for nursing students. Wagner's experiment determined, "Using more kinesthetic learning activities with students may help to improve information transfer, problem solving, critical thinking, understanding of key concepts, and overall satisfaction with teaching methods" (Wagner 351). The use of kinesthetic learning resulted in an increase of retaining key information and information transfer. Kinesthetic learning is extremely helpful in defeating the predicament of infectious diseases. Kinesthetic learning provides an effective way to educate people on the danger to their health from infectious diseases at Rutgers. Rutgers population and parents of students' can not only retain but also communicate to others the key information learned correctly.

### **Prospering Modern Reforms Attacking Infectious Diseases**

There are continuous efforts across the world trying to deal with the prevention of infectious diseases. The following models successfully attempt on promoting, preventing and protecting people from infectious diseases. These models of success will help base a plan for prevention of infectious diseases at Rutgers University.

#### *Immunization Reinforcement in Public Schools by New York Government*

On June 22, 2018, the public health law titled POLIOMYELITIS AND OTHER DISEASES, was amended and put into effect on July 12, 2018 (NY. Senate Public Health Law). POLIOMYELITIS AND OTHER DISEASES is a law currently still in effect in New York. It is found under chapter 45 (The Consolidated Laws), article 21 (Control of acute communicable diseases), title 6 of the New York state laws (NY. Senate Public Health Law). This section of the law implements the mandatory requirements of immunization for children (age of 2 months to 18 years old) attending any form of schools in New York (NY. Senate Public Health Law). The creation of the law was necessary due to the damage the youth was taking to infectious diseases in schools found in New York. The law mandated the vaccination of diseases that are prevalent in the community. The law explicitly specifies, "Definitions; immunization against poliomyelitis, mumps, measles, diphtheria, rubella, varicella, Haemophilus influenzae type b (Hib), pertussis, tetanus, pneumococcal disease, meningococcal disease, and hepatitis B" (NY. Senate Public Health Law). It targets diseases that are commonly found in the children, and unless obligations (such as religion) state otherwise, vaccinations are mandated for these diseases. This can be incorporated at Rutgers by addressing the incidents of infectious diseases and mandating

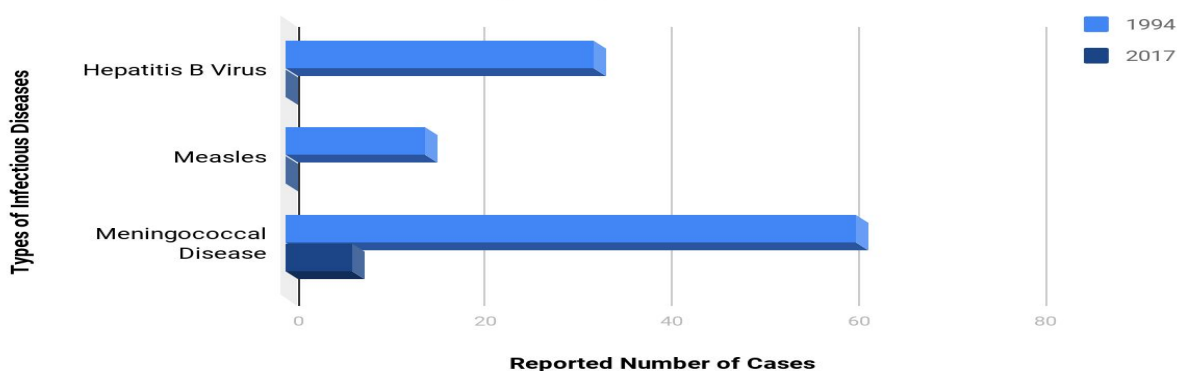


vaccinations for the next semester. A good example of lack of vaccination is The Influenza epidemic in 1918. This epidemic took the lives of 30,000 people just in New York (Aimone 72). These deaths occurred as the vaccinations were nonexistent. This led to the production of vaccinations and the importance of protection from infectious diseases.

The creation of this law does show statistical data from Communicable Disease Annual Reports, to provide evidence of a model of success. For example, the hepatitis B virus must be vaccinated by children before they are administered into schools. In 1994, the total amount of children reported with hepatitis B virus was 33 from the age group of less than one to nineteen (Communicable Disease New York 1994). With the enforcement of the vaccination for hepatitis B, we see a decrease in cases in the same age group. As in 2017, the number of cases registered for hepatitis B (acute) was 0 (Communicable Disease New York 2017). The reduction of incidences of infectious diseases (comparing same years) can also be seen in measles and meningococcal disease. The reduction in infectious diseases is represented in figure 3.

### Reported Cases of Infectious Disease in New York

*Number of Infectious Diseases in the Age Group 0 to 19 Years Old*



**Figure 3: Impact of Public Health Law of New York:  
POLIOMYELITIS AND OTHER DISEASES  
(COMMUNICABLE DISEASE 1994) (COMMUNICABLE DISEASE 2017)**

The importance of vaccinations is understood by the New York state government and resulted in them creating the proper laws. The impact of enforcement of immunizations is highlighted by the statistical evidence and shows vaccinations can help prevent people from getting infected and even lead to the eradication of infectious diseases. At Rutgers, with a current issue of infectious diseases, the Health Department can implement the laws, policies, and enforcement of immunizations similarly to how New York state government did. By creating, implementing and enforcing immunizations (unless obligations apply), infectious diseases can be reduced or even eradicated correspondingly as noted in New York.

### *The Centers for Disease Control and Prevention*

The mission statement of the Centers for Disease Control and Prevention explains its function by informing the public, “CDC works 24/7 to protect America from health, safety and security threats, both foreign and in the U.S. Whether diseases start at home or abroad, are chronic or acute, curable or preventable, human error or deliberate attack, CDC fights disease and supports communities and citizens to do the same” (CDC Organization). The CDC is responsible for protecting American citizens from infectious diseases by constantly researching, producing and providing vaccinations, informing the general public of vital information and the list goes on. They are the security of the United States for their health as they save lives from health threats (CDC Organization). The CDC is a great tool that can be used by Rutgers University. They provide advanced scientific research and critical information on health threats. They can be used as a source to potentially help improve immunization policies and creating new ones. They also use a theory called *Social-Ecological Model Theory* which can further assist in helping Rutgers fight infectious diseases.

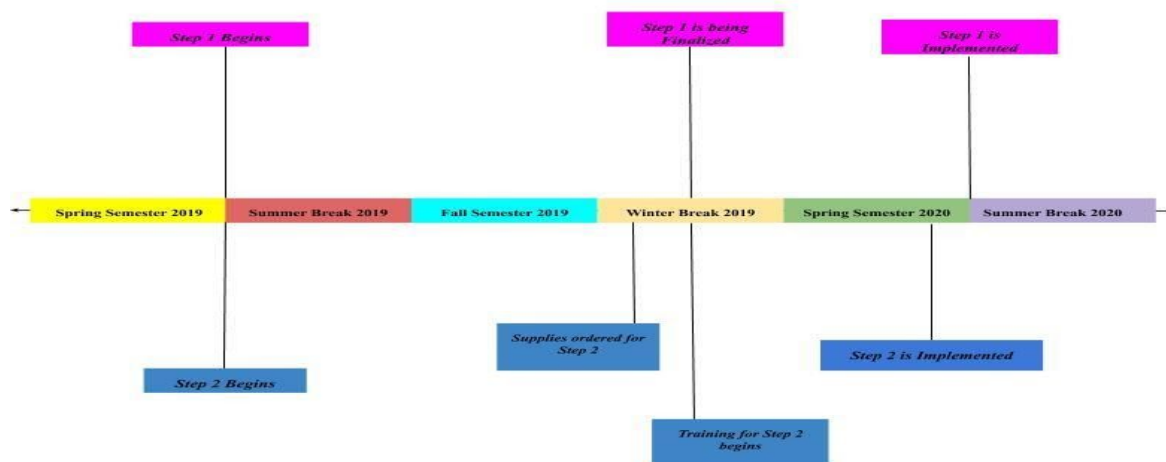
Social-Ecological Model Theory is the surveillance of five levels/rings of influence for health-related behaviors and conditions (Nyambe et al. 2). The five factors are interpersonal (individual characteristics), primary groups (social networks and support systems), institutional (organizational characteristics), community and public policy (Nyambe et al. 2). Within these factors, they observe an array of characteristics such as attitudes, knowledge, behaviors, rules and regulations, networks and policies found within local, state and nationally in the United States (Nyambe et al. 2). This theory can help support Rutgers in the development of a research facility on campus to help the CDC in solving problems related to diseases in general. Rutgers is considered a top tier research university across the world. The development of a research facility on infectious diseases could not only help examine the issues related to on-campus but also potentially worldwide.

## **Plan: Eradication of an Infectious Diseases**

Rutgers University has the potential to innovate the fight against infectious diseases. With the help of appropriate precautionary steps to defeat infectious diseases at Rutgers. The establishment of the plan will be incorporating the theories and models of success highlighted by the Literature Review.

### *The Timeline for the Next Model of Success - Rutgers University*

The plan will be using the three principles of public health to target the diverse determinants of infectious diseases. In order to safeguard the civilians of Rutgers, the plan will be providing a way to prevent, promote and protect from infectious diseases. Figure 4 provides a detailed timeline providing an overview of the plan for the first two steps which will assist in the eradication of infectious diseases at Rutgers.



**Figure 4: Timeline for Step One and Two of Plan**

#### *Step One: The Reform of Rutgers Immunization Policy*

The reformation of the Rutgers immunization policy will begin at the end of the spring 2019 semester. The immunization policy is a leading factor in infectious disease contamination on campus. This step of the plan focuses on the prevention and protection of public health's principles. First, the CDC must be contacted and requested support for the development of the new immunization policies. The immunization policies should be an assimilation of all credible opinions due to the importance of Rutgers population's health. This will help create a proper immunization policy. Once the assistance of the CDC is acquired through available software of communication (phone calls, Skype or email), the next part of this step is to create and reevaluate immunization policies.

The evaluation of existing and creation of new policies should use behavioral economics to convince correct decision making of Rutgers population towards getting vaccinated. An example of this would be providing the death rate of Meningitis B next to the vaccination policy using the framing effects of behavioral economics. Following the reevaluation of current policies, new policies should be created. The new policies should be based on prevalent infectious diseases on-campus. Diseases like Meningitis B or Influenza should be required to be vaccinated before entering Rutgers. This is similar to how New York mandated vaccinations for diseases prevalent in public schools.

Following the creation of new policies, the obligations accepted to reject vaccinations will still be provided. But this will be provided using a concept of behavioral economics. The concept of time-inconsistent preferences will be applied. The form will only be given to students if they arrive on campus and only accepted if they deliver it back on campus. This can be picked up at the student financial accounting building as they are open over the break. Creating a longer

period of time will reduce opt-out forms for vaccinations, as it will be more convenient to get vaccinated. The enforcement of policies on-campus housing will now be updated as well. For students residing on-campus, a form will be signed move-in day (electronically) by the residential assistants and the student the key is given to. This form will be agreeing that the student is vaccinated up to date with the policies. The availability of vaccinations (of recommendation) on campus will be required to help reduce the impact of time-inconsistent preferences. Vaccinations can be given at health centers or pharmacies located on campuses by appointment. Then the website which provides current information on policies will now be updated more frequently. It will provide signs of symptoms, identification and recommended treatments for infectious diseases of relevance.

Step 1 should be finalized by winter break 2019 and implemented once 2020 spring semester is over.

### *Step 2: Introduction of Education Program*

The next step that should be put in place is a supplementary program in new student orientations, Accepted Student Day, Rutgers Day, and Mother's Day Brunch at Rutgers. This part of the plan focuses on the public health principle of promotion of beneficial behaviors toward health. These dates were selected as the number of new students and parents upon these days are higher than usual. This program will be focusing on educating the students and parents of future or current Rutgers population on the danger of infectious diseases. The parents are a major target in this educational program. Applying the theory of Cognitive Development, the influence parents have on the development of children is critical. This step will try to increase the vaccination rates of New Jersey vaccination, allow college students to create a proper view on vaccination and promote proper hygiene.

The educational program will be incorporating kinesthetic learning to help in the understanding and further communicating of information learned about infectious diseases, vaccinations, and hygiene. There will be one brief introduction given by a trained employee. This employee will be trained to use behavioral economics to convey a convincing message. Following this introduction, the Hand Washing and Being the "Host" at This Party Is No Fun Experiment will be conducted (Activities). This is a form of kinesthetic learning, as it involves practical movement. After the experiment, a flyer will be given which is called Flu Season-Educational Material for Children (Activities). The syllabus for these activities is provided by the CDC for free, but supplies are on the personal cost of Rutgers. This coloring book will provide the importance of why vaccinations are helpful in protecting the health of people. This will allow students to make choices on vaccinations based on knowledge rather than opinions.

Purchasing of the supplies for this program will occur at the beginning of winter break 2019. The training of employees for Accepted Student Day, Rutgers Day, and Mother's Day Brunch will be given starting in the middle of winter break. In the case of orientation leaders who will be required to learn this, will occur at normal orientation training times. The date of implementation

of step two will be on Mother's Day in 2020. This date would be perfect to start as mothers are involved with the care of their children's health the most.

*Step Three: Evaluation of Step 1 and 2*

The evaluation of step 1 can be determined by looking at statistics of the number of infectious diseases that occurred in Rutgers a year after implementation. Then the vaccination rate of New Jersey can be looked at to assess the impact of reforms on the immunization policies. Step 1 will basically be assessed for efficiency and effectiveness by looking at quantitative data on infectious diseases within New Brunswick.

The evaluation of step 2 can be measured by the students giving a survey before assessing their knowledge and a post-experiment survey based on personal opinion on things learned. Then over time, we can look at quantitative data on vaccination rates in New Jersey and surveys on college students' opinions on vaccinations.

The data used to evaluate both steps should be looked over yearly, but to determine significant results the wait to evaluate must be at least 3 years, so the evaluation should occur in 2023.

*Step Four: Begin Discussion of the Development of an Infectious Disease Department*

The final step of the solution is to create a new proposal for a new department at Rutgers called "Infectious Diseases." This would be using all the principles of public health to protect the population's health. This department would be built to support the fight against infectious diseases. It will be based on the model of success known as the CDC. The proposal of this step will be given after the third step is completed. So approximately two months after the evaluation is completed this idea should be considered in 2023.

The development of this project will require a lot of time and funding. Although a large sum of money will be required, it would create new jobs and have a potential source of income from insurance companies and foreign countries. This department would not only regulate the student immunization forms but also provide a place to obtain vaccinations on-campus throughout the year and even help develop proper immunization policies. The department would be able to research and collect new data on infectious diseases. The department would be based on the same theory as the CDC. The Social-Ecological Model Theory would be used to determine threats to the health of the Rutgers population. By accomplishing this step, the security on infectious diseases at Rutgers can be monitored and stopped in its track earlier but also provide support to the CDC and the rest of the world.

## Budget

### Step One:

- *One-Time Starting Costs*
  - Web-Designer Flat Rate Cost for a Project ~ \$15,000 (Scacca)
  - Software Developer Cost for a Project ~ \$150,000 (Editors)

The web-designer and software developer are involved in the development of an electronic form and the improvement in the immunization website of Rutgers.

- *Recurring Costs*
  - Behavioral Economists Consultant Yearly Average Salary in the United States
    - ~ \$109,230 (Behavioral Economics)
  - Vaccination Spending (CDC Vaccine Price List)

<i>Vaccination</i>	<i>Per Unit Cost</i>	<i>Quantity</i>	<i>Total</i>
Flucelvax Quadrivalent	\$15.55	4,607	\$71,639
Trumenba	\$75.814	4,607	\$349,271

The availability of vaccinations on campus is very important for protection from infectious diseases. This eliminates time-inconsistent preferences. The quantity of vaccinations to purchase is applied with the concept of herd immunity on the population size. Herd immunity is the protection of unvaccinated people from a disease due to numerous amounts of vaccinated people around. The vaccinations of selection are to protect people from influenza and meningitis B as these diseases occur at Rutgers but are only recommended.

- *The Total Cost of Recurring Costs for Step 1 = \$530,140*
- *Governmental Agency*
  - The request for assistance of the CDC is covered by the federal government. Rutgers is a state school and the CDC is a federal agency which is paid for service by taxes.

### Step Two:

- *One-Time Starting Costs Total for Step Two = \$64,650*

<i>Item</i>	<i>Per Unit Cost</i>	<i>Quantity</i>	<i>Total</i>
Miscellaneous Supplies	\$100	10	\$1000
Training (Blakely-Gray)	\$38/ Hour	33.5 hours x 50 People	\$63,650

50 people are not required to be trained to accomplish the goal of step two. Additional employees are added so that back-up people are available in case of emergencies. Miscellaneous supplies include paper to print flyers, ink, and staples.

- *Recurring Costs Total for Step Two = Cost of Event + \$7,650*

<i>Item</i>	<i>Per Unit Cost</i>	<i>Quantity</i>	<i>Total</i>
Rutgers Event Cost	Same	Same	Same
Hand Washing Experiment (Glo Germ Classroom Kit)	\$450 (Supports 40 Groups)	17 Events	\$7,650

The hand washing experiment requires a glow kit that holds all the items essential for the experiment. Each kit costs \$250 and supports 20 groups, but it is assumed that there will be approximately 40 groups per event. The purchase of the experimental kit is crucial for kinesthetic learning to occur.

### Step Three:

<i>Item</i>	<i>Per Unit Cost</i>	<i>Quantity</i>	<i>Total</i>
Evaluation (Planning an Evaluation)	\$75,000	2	\$150,000

### Step Four:

<i>Item</i>	<i>Per Unit Cost</i>	<i>Quantity</i>	<i>Total</i>	<i>Type of Cost</i>
Medical Research Building (National Science Foundation, National Center for Science)	\$1,613.0 (cost in million dollars)	1	\$1,613.0 (cost in million dollars)	One-Time
Various Yearly Expenses (National Science Foundation (NSF), National Center for Science)	107,335.865 (cost in thousands)	1	107,335.865 (cost in thousands)	Recurring

All through the proposal may be rejected or not in need. Some basic research to determine the amount of cost for a medical research building is provided. The various yearly expenditures include salaries, benefits, equipment, and software purchases as well.

## **Discussion**

The awareness of the invisible villain known as infectious diseases among college students and other members within the community of Universities is imperative. The risk of retrieving an infectious disease on a public college campus is higher. Due to the lack of hygiene, continuous interactions with new people or from traveling from campus to campus. Any form of infectious disease is easily exchangeable among college students on campus. With the various opinions on vaccinations within college students being incorrect, it is crucial to target Universities and guide them to proper decision making.

Through the implementation of my four-step plan, not only will the population of Rutgers University-New Brunswick be contributed to but the issue of vaccination neglect across New Jersey can be addressed. The plan will not only protect but also prevent and promote the threat of infectious diseases on the population's health. With the reformation of immunization policies, development of an educational program, and even led to potential creation of a department on infectious diseases within the plan. This will create recognition amongst the community of dangers that are not visible to the naked eye.

While the request for a tremendous amount of money may be a discouragement to support my plan, the implementation of this plan will protect the population of Rutgers. The goal is to simply protect the lives of people around us in order to protect ourselves and loved ones because the actions of others do have an impact on our health. With your support the funding for this project is plausible. With the status and respect that you have, funding can be achieved from the government, Rutgers, or even the CDC.

I personally lived in Pakistan for a decent majority of my life. Being born in a country with mice running around in my birth room, people I personally know dying to the diseases that vaccinations in this country have available just hurts me in the heart. The ignorance of civilians in the United States upon vaccinations is insulting to the people that are losing their lives because they don't have these resources. With your help, I can not only create a plan to save the population of Rutgers but potentially the world. As an undergraduate student at Rutgers, I hope we are more than just a number and our health truly matters.



**Glows:** Great presentation of the problem. You provide strong evidence and a good structure for your information. You also provide several thoughtful and well-described paradigms. Your plan is thoughtful and detailed and your price is reflective of that. Fantastic growth in this project, Tehseen! You should be proud.

**Grows:** There is some awkward wording/ grammatical/ punctuation issues throughout. Split up your paragraphs into smaller and easier to digest pieces. The timeline is a little hard to makeup in your plan.

**Grade:** A

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