

Vaccines and Viruses

New Mexico

Supercomputing Challenge

Final Report

April 4, 2018

YWIC163

Young Women in Computing

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Final Reports

Intro: How We Came Up With The Idea

After discussing together our future goals, it was stated that the three of us have an interest in being in the medical field. Sharing multiple of ideas and talking about just a few of the problems in the medical field affecting everyone's health, we came to the conclusion of targeting our project on vaccines and bacteria.

We want to bring awareness to those who choose to not get vaccinated or for those countries that do not provide certain vaccinations, that it is essential. Viruses can lead to outbreaks, outbreaks cause deaths. Vaccines do prevent bacteria, by preventing bacteria, viruses are prevented, and by preventing bacteria, we have prevented outbreaks and thousands of deaths. Even though some people have bad side effects, it is better than dying.

We want to make it recognizable how vaccines affect the lifestyle of people and their risks of death from multiple of viruses. The purpose of this project is to compare and contrast the importance of vaccines show how important it is to get vaccines and how vaccines affect the world.

We plan to put information about the microorganisms on a table. Then, we will use NetLogo to convert it into a graph to show the comparison of people who use vaccines and people who don't. In our program, the following will be presented: The risk of death without vaccines, the death count that follows, the lifespan average, and the effects on the health of people caused by the multiple different types of pathogens.

Step 1: Research

The main disease that we have studied is the flu virus for our netlogo. The flu is getting very common because many people have not taken their shots and forgot about the risks. In the recent years, there have been more cases of flu deaths than 20 years ago. There hasn't been a

disease breakout for many years. This causes people to forget about taking shots so there would be a decrease in people taking their shots.

The first thing we did was more research so we could be more familiar with vaccines and the flu. We could also learn more facts that can help us with coding. We have found that the flu rate has decreased over the years; especially after the flu vaccine was invented. After recent years, though, the flu rate has begun to increase again. The three main risks of not getting vaccinated is: 1. Contracting a disease. 2. Spreading it to others. 3. Getting symptome of the flu.

In the beginning, we had many other vaccines and viruses, but eventually narrowed down to the flu, which is one of the top ten causes of death right now. After some research, we have found many graphs and articles proving that flu vaccines do help prevent the flu. For, example, before the flu vaccine came out, flu death rates were extremely high. It even rose up to 15 million deaths. After the flu vaccine was invented in 1955, the death count rapidly went down to 500,000 deaths. In 2013, the death count was 56,000. But in the year of 2018, there were 40,000 deaths in the first three weeks and may continue to kill 4,000 a week. Many of these people did not get vaccinated. Research states that people can get immune to this disease after a while, but then would stop becoming immune from it after a few months.

Though vaccines may prevent you from diseases, it can also have some bad side effects. After getting a shot, there may be a possibility of fever, soreness, infection, and a lump where the shot was taken. Because of these side effects, many Americans have decided that it might be safer to not take flu shots. The flu can be a very deadly disease and may cause bigger problems than the side effects.

Step 2: Organization

The next step that we did was to organize what we wanted our code to look like. We first wanted to figure out what program we wanted to code in and we ended up doing NetLogo because some of our team members have had some experience. We wanted our graph to have some sliders, a graph, and a virtual drawing. The sliders will contain: population, infection chance, recovery chance, and duration. We wanted the graph to contain % sick, % healthy, %

immune, and total population over the time of years. Finally, the virtual drawing will virtually show you if the majority of people are healthy, sick, or immune based on color coding. We have also finalized that our key point is the flu vaccine, in which less people are being aware of.

Step 3: Coding and Processing

After finding all the research we need, we will start our code on NetLogo. The code consists of sliders that can change infection chance, recovery chance, and lasting time. We can also change the number of people in the code. We can change the turtles so it can be a circle or a person. Under the sliders, it shows some tabs and gives you a graph. The tabs give you % sick, % immune, and number of years. The graph shows the population based on healthy, sick, and immune people. You can also change the age, movement, and other items in the code.

Step 4: Conclusion

Based on the code, it is extremely beneficial to get vaccinated. If we get vaccinated, it decreases the infection chance and increases the chance to recover if you are infected. In the code, less people are getting infected and they are recovering faster. After coding, we also found more research that visually shows the decrease of flu deaths after the flu vaccine was invented. After many recent increases of flu deaths, it is crucial that everyone gets vaccinated. Besides getting vaccinated, people also need to have good hygiene. Washing your hands after you go to the bathroom and eating decreases the chance of the virus getting into your body. After these facts, we hope that we can encourage you to get vaccinated and have better hygiene. This way, we can have a cleaner and healthier world for everyone.