New Mexico

Supercomputing Challenge

Final Report

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Shoo Flu, Don't Bother Me!

Team Number 88

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Executive Summary:

The purpose of this research project was to find out if the number of students absent before receiving the influenza vaccine would have an effect on the total number of students absent after receiving the influenza vaccine. The directional hypothesis was that the total number of students absent would be more after receiving the influenza vaccine.

This experiment was conducted by surveying middle school students that have been rolled during the 2012-2013 school year. Each student was asked the same question “Did you receive the flu vaccine this year?” by answering “yes” or “no”. Data was collected by counting the number of times each student was absent before receiving the flu vaccine during the months of August 2012 and October 2012 and counting the number of times each student was absent after receiving the flu vaccine during the months of November 2012 and January 2013. The before and after flu vaccine data collected showed the total number of students absent each month and then compared to find out which time period the students where the most absent in.

The results from this experiment show that the average number of students absent before receiving the flu vaccine was 0.67 during the months of August 2012 and October 2012. The average number of students absent after receiving the flu vaccine during the months of November 2012 and January 2013 was 2.73.

The results from this experiment did support the original hypothesis proving that the influenza vaccine is not as effective as it should be. The reason for this is because the influenza vaccine for this year did not include a certain strain of the influenza virus that occurred the pervious year. Therefore the antibodies were not able to provide the body protection against that specific strain of influenza virus infection.

Introduction:

Statement of the Problem:

The purpose of this project was to find out if the number of students absent before receiving the influenza vaccine would have an effect on the total number of students absent after receiving the influenza vaccine. The directional hypothesis stated that the total number of students absent would be more after receiving the influenza vaccine.

Background Information:

In the United States, flu season occurs in the fall and winter. Seasonal flu activity usually occurs in January or February, but it can be as early as October and as late as May. Each year approximately 5-20% the Untied States population is infected by the flu and more than 200,000 people are hospitalized for flu-related complications.

The Centers for Disease Control and Prevention (CDC) tracks and monitors flu activity in the United States year round and produces a weekly report of flu activity from October through mid-May. A recent CDC study shows that each year in the U.S. an average of 20,000 children under the age of 5 are hospitalized for flu-related complications. During the 2011-12 flu season, 26 deaths in children were reported.

The flu vaccine is designed to protect against three flu viruses that experts predict will be the most common during that season. Each year, one flu virus of each kind is used to produce the seasonal flu vaccine. The 2012-2013 flu vaccine is made from the following three viruses: (1) A/California/7/2009 (H1N1)-like virus, (2) A/Victoria/361/2011 (H3N2)-like virus, and (3) B/Wisconsin/1/2010-like virus.

Description:

This experiment was conducted by surveying middle school students that have been rolled during the 2012-2013 school year. Each student was asked the same question “Did you receive the flu vaccine this year?” by answering “yes” or “no”. Data was collected by counting the number of times each student was absent before receiving the flu vaccine during the months of August 2012 and October 2012 and counting the number of times each student was absent after receiving the flu vaccine during the months of November 2012 and January 2013. The before and after flu vaccine data collected showed the total number of students absent each month and then compared to find out which time period the students where the most absent in.

Computer Program Model:

The computer program was designed using the Star Logo, TNG program based on facts, information, and research learned from conducting the real life experiment about the influenza virus and the effectiveness of the vaccine. The program demonstrates how rapidly the influenza virus can spread from person to person through physical contact.

A person that is infected with the influenza virus can become contagious and can infect other people one day before symptoms develop and can continue five to seven days after symptoms appear. The flu virus can be easily spread by coughing, sneezing, talking, or touching surfaces that has been contaminated with the germs of an infected person and then touching your mouth, eyes, or nose.

. When designing this computer program we will create a random number of people that are not infected with the flu virus that will remain stay their natural color as selected representing a healthy person. We will also create one individual person that is infected with the

influenza virus that is colored green representing the person spreading the contagious virus infection. As the individuals walk randomly around the terrain they will eventually make contact with another person. When the people come in contact with each other they will either become infected with the flu virus and change to the color green or they will stay the same color remaining healthy and allowed to continue walking around in a random pattern. The people that become or that are already infected with the influenza virus will be assigned two different possible ways to ending their influenza virus infections. Ninety percent of the people infected will eventually get well and completely recover from the flu virus. Ten percent of the people infected will never be able to get well or recover from the influenza virus infection and eventually they will die.

Results:

There are two types of vaccine, the flu shot and the nasal spray. Both protect against the same virus strains. The flu shot is made with inactivated (killed) flu virus given by needle. The nasal spray is made with weakened live flu virus given with a mist sprayed in your nose. The vaccine works by cause antibodies to develop in the body and provide protection against influenza virus infection. It takes about two weeks after the vaccination for the virus to begin working.

The results from this experiment show that the average number of students absent before receiving the flu vaccine was 0.67 during the months of August 2012 and October 2012. The average number of students absent after receiving the flu vaccine during the months of November 2012 and January 2013 was 2.73.

Some possible experimental errors could have an effect on the results from this experiment was that not all the students were given the same type of influenza vaccination. The students that choose to receive their flu vaccination during school were given the nasal spray by the school nurse. Some students choose to receive the flu vaccine from their family doctor or medical service provider where they were given a flu shot. Because of the two possible types of flu vaccinations given to students might have affected the accuracy of the data collect from this experiment.

Conclusion:

The results from this experiment did support the original hypothesis stating that the total number of students absent would be more after receiving the influenza vaccine proving that the influenza vaccine is not as effective as it should be. When conducting research for this project we found several explanations for the results from this experiment and also for the computer program model. One of the possible reasons we discovered is because the influenza vaccine for this year did not include a certain strain of the influenza virus that occurred the pervious year. Therefore the antibodies were not able to provide the body protection against that specific strain of influenza virus infection.

Recommendations:

Recommendations for further experimentation would that the all the test subjects receive the same type of flu vaccine and are vaccinated around the same time period. This would make the data collected from the experiment more accurate and less difficult in determining if the influenza vaccine works against specific flu viruses that are spreading, causing illness, and if it was or was not as effective at preventing fewer illnesses during the flu season.

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