Herd immunity New Mexico Supercomputing Challenge Final report Team #1 New Futures School

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Problem:

We started off investigating the flu vaccine and universal flu vaccine that would cover more strains and be more effective. Then our question moved into making a simulator of herd immunity[1] based on the data we collected from our survey. How effective would herd immunity be in our school population.

Research:

We looked at cases were outbreaks would happen and if there was information on vaccination rates in the area where the outbreak happened. Recent outbreaks are measles and mumps. Europe has had more recent cases of measles. We looked at symptoms and deaths related to those diseases. To have herd immunity 90% to 95% of the population must be vaccinated. The more people vaccinate in a population the harder it is for a disease to spread[1]. Epidemiologist look at the R0 numbers of how one infected person can infect a unvaccinated and under vaccinated population[1]. We also looked at how many unvaccinated people can one infected person infect. As we know that vaccines are not 100% and at some are 85%-95% effective which is why herd immunity is so important to protect the too young to get vaccinated and the ones can't vaccinate at all. Herd immunity is very important especially when

it comes to very contagious diseases like measles and mumps. According to WHO "Measles is one of the leading causes of death among young children ..."[2]

Progress:

We used a model from Netlogo called Virus that showed how a virus spreads and over time the disease dies out. We added walls and changed the color to the turtles. We used a model example from Netlogo[3] to copy the wall and to make the turtles bounce off the walls. We wanted the turtles to bounce off the walls to represent our school.We wanted the turtles to bounce off the wall but we have not accomplished it yet. Back in December we conducted a survey on how many people got the flu vaccine and how many people got the flu. We are making our simulator based on that data [4]. We looked at other submitted reports and we do wish we could have been that far ahead. We hope to have the simulator done by the end of next week.

Citation:

- [1] http://www.pbs.org/wgbh/nova/body/herd-immunity.html
- [2] http://www.who.int/mediacentre/factsheets/fs286/en/
- [3] Model itself

Wilensky, U. (1998). NetLogo VIrus model. <u>http:ccl.northwestern.edu/netlogo/models/Virus</u> . Center for Connected Learning and Computer- Based Modeling, Northwestern University, Evanston, IL

NetLogo software:

Wilensky, U. (1999). NetLogo. <u>http://ccl.northwestern.edu/netlogo/</u>. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL

