

After developing many models to fit the data, we now have an accurate showing of the differences of viral propagation over time. We managed to identify seven periods of time for disease spread based on the original data. We have days 1 to 100, days 101 to 250, days 251 to 350, days 351 to 500, days 501 to 650, days 651 to 700, and finally days 700 to day 798. In this data we see a slight rise of infection and deaths initially in our first period, a faster increase in period two, and an even faster growth of death and infection in period three.

We then see a significant reduction in new infections and deaths in period four, but then in period five and six we once again see a massive increase in deaths and infections until it finally calms down again in period seven. As we can see, there are two waves that can be identified in this data.

Wave one takes place between period 1 and period 3, and wave two takes place during the last four periods. Once we gathered our data, we took it and applied a policy to reduce infections and deaths by 25%. We decided to say we ran a vaccination policy. This is applied in the model by making a separate, parallel dataset and applying a 0.75 multiplier to it. The result is a reduction of both deaths and infections by 25% across the board.

We believe that this policy is feasible. After all, we saw such a policy effectively enforced in America during the rise of Covid-19 with little to no issue. Sure, there will be issues with adoption of the vaccine from reluctant people, but we can expect most people to take the opportunity to be vaccinated.

When creating our figures, we ran into a major problem: the graph for our modeled cases was great, but the graph for our modeled deaths was terrible. The data spiked and sunk erratically, and we couldn't figure out why this kept occurring.

It was then that we revisited the cost function and tried something new: instead of weighting the cases and deaths evenly, we put an exponentially higher weight on the deaths cost, so our function cared way more about getting the deaths right than our cases. Our results were phenomenal, and we got two incredible curves as shown in Figures 5 and 6 Below.

