

Distemper in a Humane Society

Supercomputing Challenge

Final Report

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1020

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## Executive Summary

Distemper is a virus that affects dogs. Canines can catch this disease by going in direct contact with an infected canine by touching the blood, saliva and urine. The symptoms for Distemper are: digestive problems such as vomiting, diarrhea, lack of appetite, dehydration, and weight loss. The digestive problems occur shortly after the canine has been infected. Neurological signs found in canine Distemper such as tremors in the head, neck, and or more legs. The physical changes in canine Distemper include overgrowth in the foot pads of the canine and teeth abnormalities can be seen in dogs that are recovering from this deadly disease. The Las Cruces Animal Shelter has to euthanize dogs that show symptoms of Distemper.

We used Starlogonova to model an outbreak of Distemper at an animal shelter. We found the mortality rate for distemper for adult dogs is at 50%. The mortality rate for puppies is 80%. The program had the population of dogs and puppies held at the Mesilla Valley Humane Society at the animal shelter for July 1st.

We investigated how dogs and puppies living in fenced kennels would be exposed to 1 dog, 2 dogs or 3 dogs that came into the shelter. The program used square kennel movement for dogs and puppies. The program will show how many dogs and puppies will die due to transmission of distemper in a shelter or will potentially get infected. Our program investigated how many of the dogs and puppies will have to be euthanized due to catching Distemper.

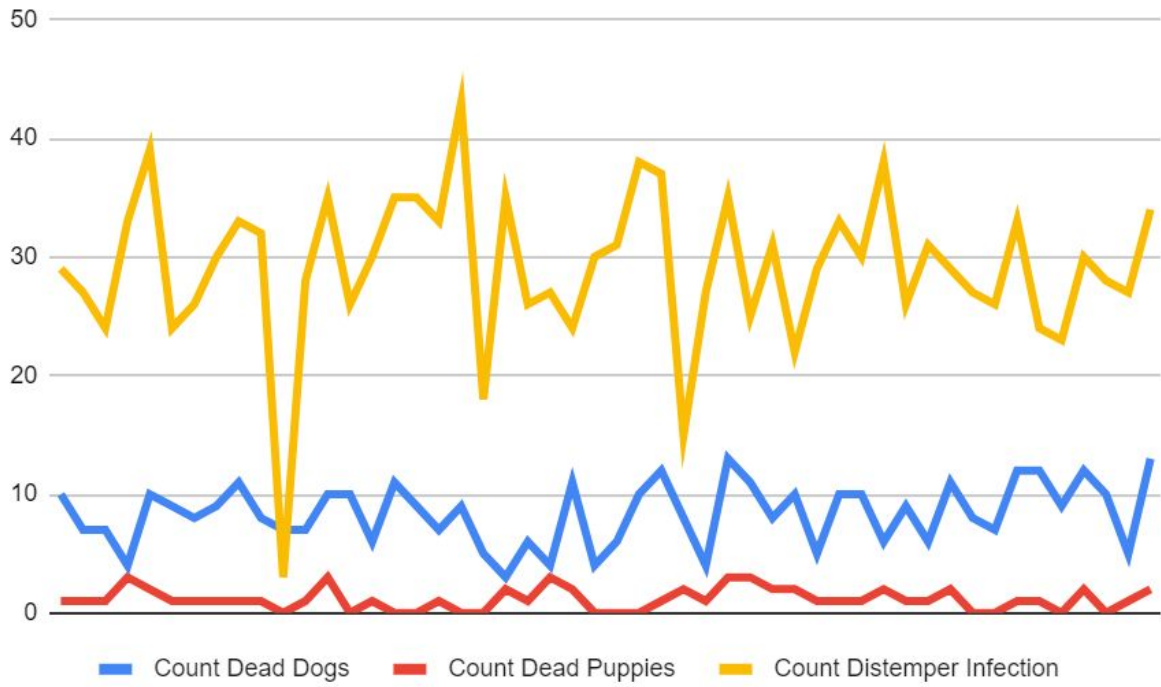
## Problem

The problem is that some dogs are infected with canine Distemper and get housed at the animal shelter causing a high mortality rate. The question will be how many dogs and puppies will have to be euthanized at a set population at an animal shelter. One of our variables is 50% of the dogs will be vaccinated before the seven infected dogs spread the disease. We will change the number of dogs that came in with shelter. This project will focus on how important it is to vaccinate dogs and puppies because if they wind up in a shelter a few dogs that are not vaccinated can cause an outbreak.

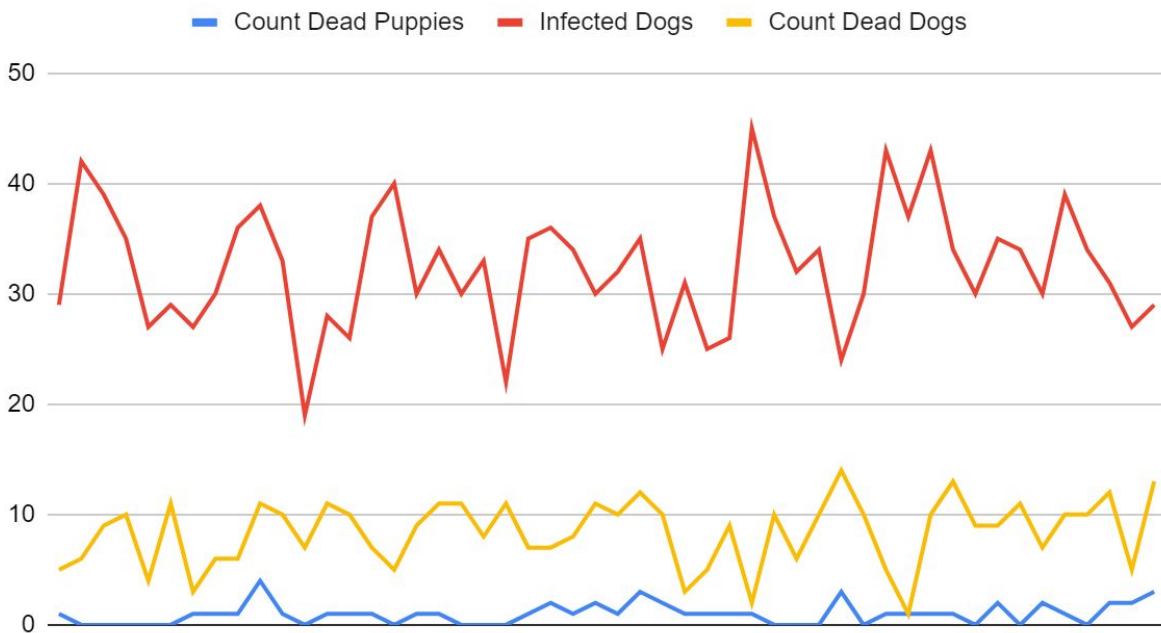
## Description of Method

Starlogonova was used to create a simulation of the animal shelter. The numbers of dogs that came into the shelter infected were the variables, with one dog sick, two dogs sick, and three dogs sick. Each simulation was run fifty times for each number of dogs infected. Every simulation ran at thirty ticks.

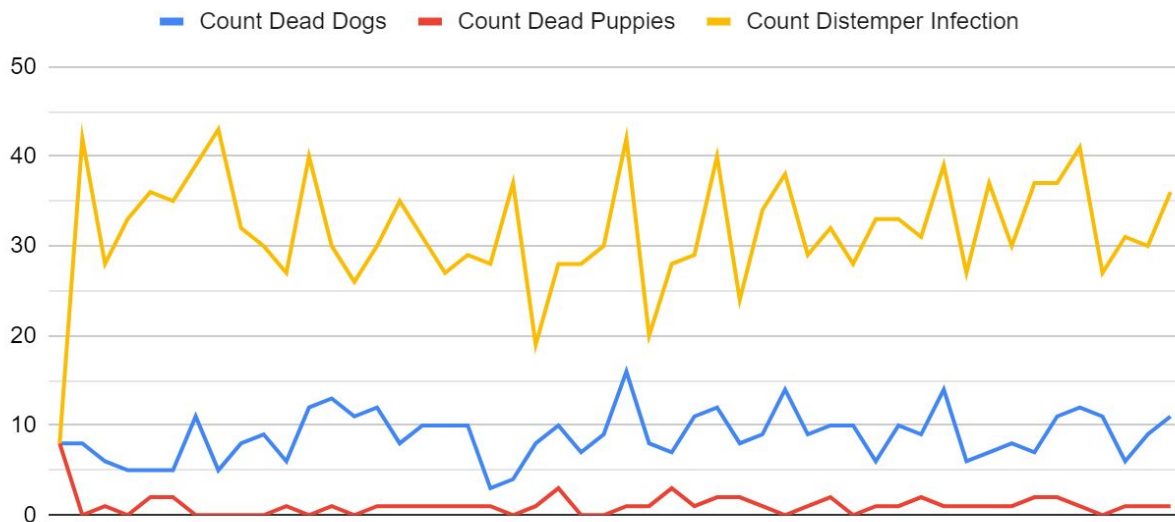
### 1 Dog with Distemper



### Two Infected



## Three Infected



### Validated and Verified

We found the mortality rate for distemper for adult dogs is at 50%. The mortality rate for puppies is 80%. The simulation has a mortality rate of fifty percent for adult dogs and eighty percent for puppies based on the information. The program had the population of dogs and puppies held at the Mesilla Valley Humane Society at the animal shelter for February 2020. At that time, there were 296 dogs and 44 puppies at the shelter.

### Results

With one dog infected with Distemper that came into the shelter, between thirty and forty dogs and puppies were infected with Distemper. Less than ten dogs died from Distemper and less than five puppies died from Distemper according to the data. With two dogs infected with Distemper that came into the shelter, between thirty five and forty two dogs and puppies were infected with Distemper. Less than thirteen dogs died from Distemper and less than five puppies died from Distemper according to the data. With three dogs infected with Distemper that came into the shelter, between thirty five and forty five dogs and puppies were infected with Distemper. Less than fifteen dogs died from Distemper and less than six puppies died from Distemper according to the data.

## Conclusion

For this reason, it is important that every pet owner and shelter should be cautious of Distemper and should think about vaccinating your canine. The data suggests that dogs and puppies can spread this disease and may result in death. If dogs and puppies get vaccinated it can slow down the spread and keep your canine safe from any canine that may enter the shelter and endanger that other dogs and puppies.

## BIBLIOGRAPHY

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## Achievements

Our project's most significant achievement is that it was very accurate to a closed dog shelter environment. It was very complex, but it worked perfectly. For example the dogs walked in square like ways to represent them being in a kennel. Another example is the dogs and the puppies had different mortality rates. Lastly, we were able to use a slider to test out different amounts of dogs that start the infection. Our color coding system was very easy to understand. We learned to use Excel and make a graph to illustrate data.

## Acknowledgements

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