Canine Heartworm in the Santa Clara County

Nidhi Bandrapalli
Santa Clara University
Intern at Santa Clara County Vector Control District
Mentors: Noor Tietze and Babak Ebrahimi

Background and Research Objectives

Canine Heartworm Disease (CHW) impacts around 250,000 dogs out of 50,000,000 dogs every year. This disease is caused by nematode parasite, Dirofilaria immitis, and is the most common disease affecting household dogs today. Dirofilaria immitis is transmitted to new hosts through the bite of the Western Treehole Mosquito (*Aedes sierrensis*). Throughout this project, we observed the prevalence of CHW in the Santa Clara County by surveying veterinarians in the county and gathering specific detail on each of their diagnosed heartworm cases.

Coyotes are the primary sylvatic maintenance host and it has been found that areas with high coyote presence tend to have higher levels of CHW. We examined previous data on coyote spottings in the county to determine if there was a correlation between levels of CHW and coyote presence. From the baseline data, we predicted there would be higher levels of CHW in the foothills of our county and in areas that were highly coyote concentrated.

Materials and Methods

- Created a general online 25 question survey via surveymonkey directed towards veterinarians regarding their hospital's experience in treating CHW
- Contacted each of 89 pet hospitals and informed them about survey
- Created a follow-up questionnaire per city for clinics with the highest number of CHW cases (<5 cases)
- Hospitals were chosen based on two factors: number of total canine heartworms cases present and if they had the highest amount of cases in their respective cities.
- Hand-delivered surveys to 15 hospitals in cities of: Milpitas, San Jose, Cupertino, Sunnyvale, Campbell, Morgan Hill, Mountain View
- Analyzed data received on both individual cases and entire data collected on general survey

Results

Of the 89 clinics, we had about 42% respondents. About 81% (30 individuals) claimed they had diagnosed a case of Canine Heartworm, 18% said they had not. Based on the data gathered from the survey, there appears to have been a slight increase in CHW throughout the county. 60% of respondents claimed that the majority of the cases they dealt with were Class 1 (mild symptoms), 36% claimed they mainly treated patients that were Class 2 (moderate symptoms), and 4% claimed they diagnosed a Class 3 case which entails loss of body condition for canine. The highest number of canine heartworm cases in the county were found in Los Gatos, near the Santa Cruz mountains, and in San Jose. The number on the upper left corner indicates the question's number on the survey conducted.

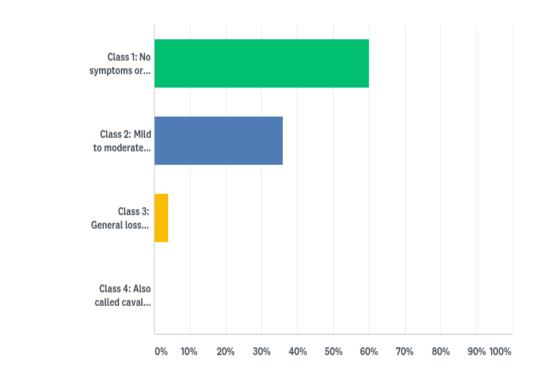Figure 3: The data depicted in the bar chart indicates that there has been a slight increase each year in terms of number of CHW cases. Regardless of only half of the respondents answering this question, we can understand that there is a difference to be noticed. The bottom table expands upon further detail and information from the bar chart.

Figure 4: While CHW levels in the Santa Clara County have increased, they have been manageable as Class 1 symptoms. The bar chart indicates what class of symptoms the respondents treated at their respective hospitals. Out of 25 hospitals, only one has dealt with a Class 3 case. While this disease is on the rise, levels are treatable and shouldn't be of much harm to dogs.

Figure 5: The concluding statements of the general survey focused on habits, treatments, and prevention that were being done to limit the spread of CHW. About 50% of those who answered this question claimed that around half of their canine patients have been prescribed preventative treatment.

Figure 6: The bar chart above depicts different clinics' views on where the greatest amount of CHW is present.

Figure 7: A majority of the respondents indicated that they recommend universal CHW treatment because this will decrease levels of CHW in the county. One clinic found it unnecessary to have treatment for all canines because it is an expensive treatment if insurance does not cover it.
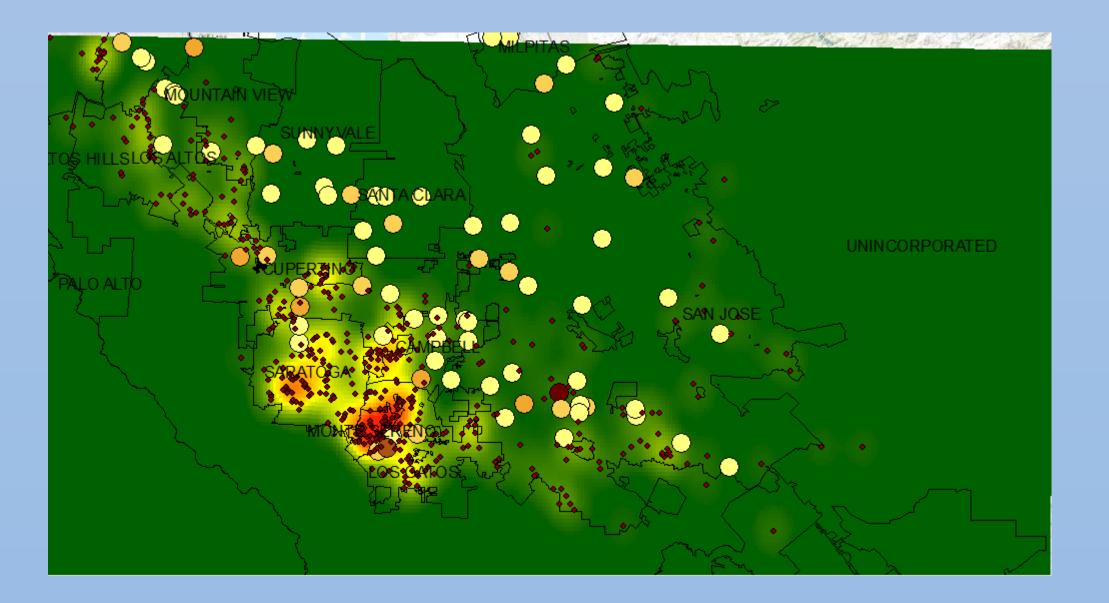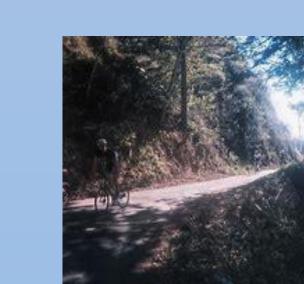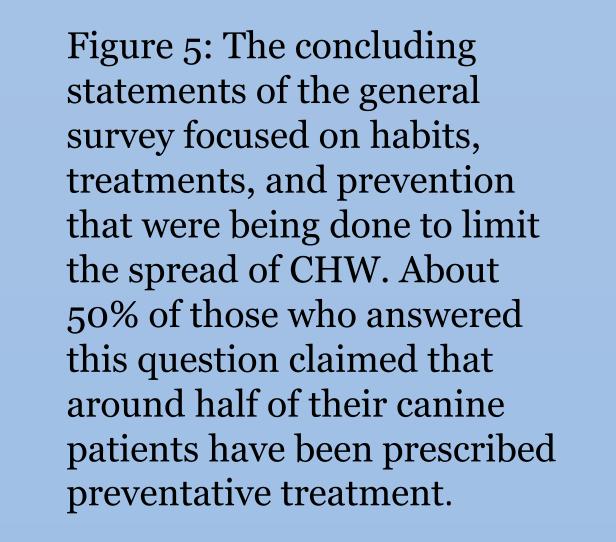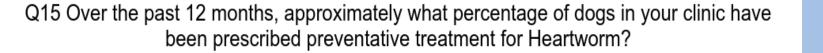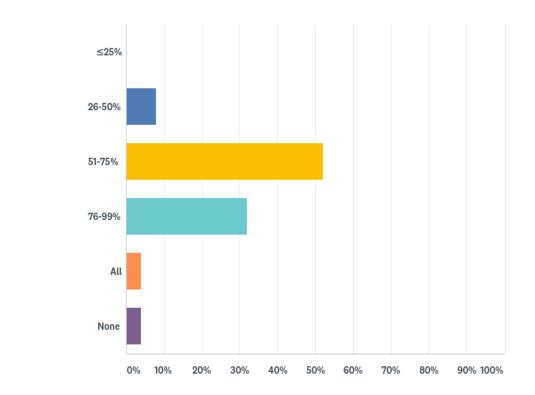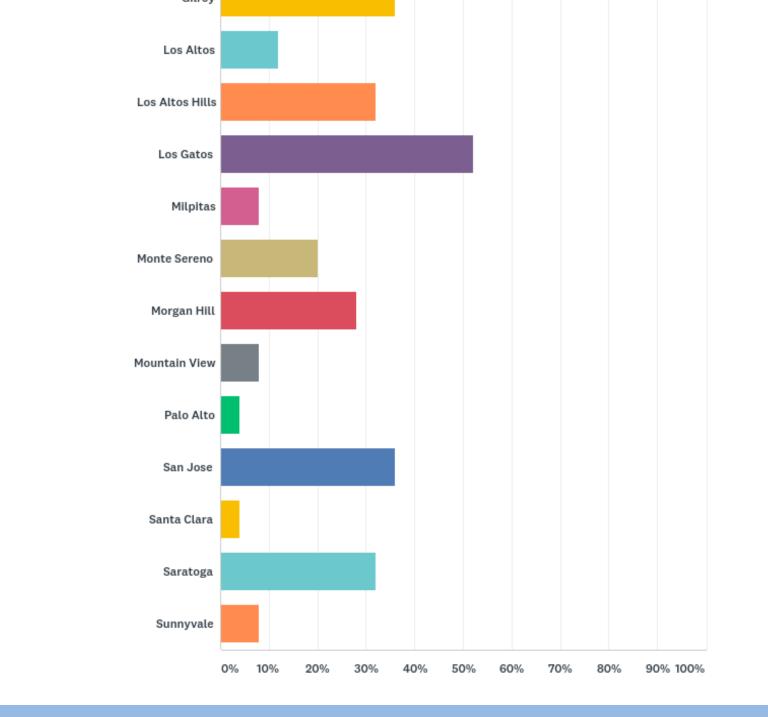
Figure 8: ArcGis was used to examine overlap of coyote prevalence with CHW prevalence. The heat map and brown dots represent coyotes found over the years, larger colored circles represent various pet clinics and their levels of diagnosed CHW. We observed higher rates of coyotes and higher prevalence of CHW cases in Saratoga and Monte Sereno in comparison to the rest of the county. Most clinics in the surrounding area tend to only have 1-2 cases of heartworm.

Conclusion

As our results indicated, there were higher cases of heartworm in areas that were located near the foothills and rural land. It is important to note that dog owners do travel with their dogs and don't always visit the same hospitals. The clinics located near the red shaded areas on the map tended to have higher amounts of canine heartworm indicating a potential correlation between coyote prevalence and canine heartworm prevalence.

As per sample size of those surveyed and the data gathered, we conclude that heartworm prevalence is slowly increasing each year in the Santa Clara County.

Next Steps

While the general data collection has been completed. We are still waiting to receive further data on individual CHW cases. The goal is to analyze the individual cases to see if there are patterns in the type of dogs that get canine heartworm, the age in which the dogs are most susceptible, and if there are ways we can limit the transmission of this disease.

References

Sacks, Benjamin N., et al. "Modeling the Distribution and Abundance of the Non-Native Parasite, Canine Heartworm, in California Coyotes." *Oikos*, vol. 105, no. 2, 2004, pp. 415–425., doi:10.1111/j.0030-1299.2004.12749.x.

Bowman, Dwight. "Commentary: An Argument for Year-Round Heartworm Prevention in Dogs." *dvm360*, UBM, 21 Oct. 2014, veterinarymedicine.dvm360.com/commentary-argument-year-round-heartworm-prevention-dogs.