Master of Public Health

Applied Practice Experience

DATA COLLECTION AND ANALYSIS WITH ANNE ARUNDEL COUNTY ANIMAL CARE & CONTROL

by

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MPH Candidate

submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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Chapter 1- Portfolio Products

Anne Arundel County's Animal Care & Control (AACACC) department is an agency of the Anne Arundel County Police Department. AACACC has a shelter that cares for lost, stray, or impounded animals until they are adopted or retrieved. AACACC has a program to help victims of domestic abuse by providing housing for their pets while the victims seek their own safety. This agency provides low-cost spay/neuters, rabies vaccinations, microchipping, and FiL/FeLV testing for pets to ensure all owners, regardless of economic status, can provide these critical procedures for their animals. AACACC distributes and tracks licenses for pets and businesses. The department acts a source of information to the public regarding various animal and pet related topics, such as animal laws, community cats, introducing a newly adopted animal to a home, rabies, and filing complaints. The Bite Investigation Department within AACACC is focused on working with the victims and owners of bite incidents in order to ensure proper rabies prevention was performed and to issue any warning letters, potentially dangerous orders, dangerous orders, or vicious orders that are necessary.

 My main projects were creating spreadsheets and manipulating data for the monthly bite statistics (2002-2018), the warning letters, potentially dangerous orders, and dangerous orders (2014-2018), and rabies examination results (2014-2018). From the monthly bite statistics, I was able to create trends for rabies test results and exposures over time (months and years). I graphed exposures and rabies-positive tests over months to see seasonal trends, and yearly to see yearly trends. I graphed different species to see seasonal and yearly trends of rabies-positives among different species. These graphs were especially important to compare the years in which the ORV programs were in place (1997-2011, 2014-2018) and the years (2012-2013) in which funding was cut and there were no ORV distributed. I created a standardized form to be used by ACCOs in the Bite Surveillance Department for the monthly bite statistics because there were discrepancies in how species were described (e.g. rodents could be described as rodents, or separately as mice, rats, moles, etc.). This form also contains protected formulas to ensure that all total calculations would be correct. I completed a 2019 sheet that is ready to be filled in with 2019 data and is linked so it will automatically populate all graphs and tables with the 2019 data.

There was a registry and map of all animals with potentially dangerous orders and dangerous orders on the AACACC website, however, there was not a database that included warning letters. I created a spreadsheet with all of the data from the registry and included any warning letters issued from 2014 to 2018. These data were then mapped and graphed. I graphed the warning letters, potentially dangerous orders, and dangerous orders by city, both population adjusted and not population adjusted. I created two graphs of the most "dangerous" dog breeds. In the past, AACACC has listed the breeds using just the number of each breed that received a warning letter, potentially dangerous order, or dangerous order. However, it is critical when making these lists, because many apartment complexes and homeowners associations will cite these lists when restricting dog breeds for residents, to consider the total population of each breed in the calculation. Therefore, I created one graph with just the count for each breed, and one graph that was adjusted by the total number of each breed using the animal license database from the county.

I created a spreadsheet to organize the rabies examination results from 2014 to 2018. Previously, the data were only available in monthly summary statistics or in paper form. From the data, I was able to create several different maps and graphs. I mapped rabies test results for each year, all rabies test results for the five years, total positive tests results for the five years (maps of positive test results from each year are already created every year), rabies tests of bats (2014-2018), rabies tests of raccoons (2014-2018), rabies tests of stray cats (2014-2018), and rabies tests of species immunized by the ORV (2014-2018). I graphed the test results over time, by species, by type of exposure, and by type of exposed.

I created nine brochures for the department. I updated six brochures that were previously being distributed that were outdated and not particularly visually pleasing. AACACC's name recently changed from Anne Arundel County Animal Control to Anne Arundel County Animal Care & Control, so most of these brochures needed the updated name. I created three brochures that did not have previous brochures. While creating the brochures, I designed them all to have a standardized format so that it is clear that they were all produced by the same department.

Table 1.1 Summary of Portfolio Products

	Portfolio Product	Description
1.	Yearly Bite Investigation Statistics Data 2002-2018	A spreadsheet designed to be populated with past and future bite investigation statistics. Spreadsheet data used for graphing. Includes a binder of all monthly and yearly statistics from 2002-2018.
2.	Animal Rabies Examination Spreadsheet and Map	A spreadsheet with past data from each rabies examination submission from 2013-2018. This data was then mapped to compare all exam submissions and positive rabies test result locations.
3.	Bite Classification Spreadsheet and Maps	A spreadsheet with all animals given a warning letter, potentially dangerous order or dangerous order, for use in graphing, mapping, and other statistics.
4.	Shelter Statistics Spreadsheet	A spreadsheet designed to be populated with past and future data describing the intakes/dispositions within the shelter.
5.	Rabies Information Brochure	An updated brochure designed to be distributed to the public to inform about the rabies virus, protection mechanisms, and AACACC's rabies vaccination clinics.
6.	Consequences of Animal Misbehaviors	A new brochure designed to be distributed to health centers where bitten patients typically go to seek medical care. This brochure explains the different classifications of animals and the consequences of these classifications.
7.	Dogs in Parks Brochure	An updated brochure designed to explain Anne Arundel County Department of Recreation and Parks and AACACC's laws regarding dogs in county parks.
8.	Severe Weather Brochure	A new brochure that describes AACACC's laws and recommendations regarding pets during severe weather emergencies.
9.	Community Cat Brochure	A new brochure that describes what Community Cats and Community Cat Caregivers are and the laws that apply to them.
10.	Bringing Home Your New Dog Brochure	An updated brochure given to adopters of dogs. Provides an overview of AACACC's recommendations for bringing home a new dog.

11.	Bringing a New Dog Home to Live With an Existing Dog Brochure	An updated brochure to give to adopters of dogs who already own a dog. Provides an overview of AACACC's recommendations for integrating the new dog with existing dog(s).
12.	Bringing Home Your New Cat	An updated brochure to give to adopters of cats. Provides an overview of AACACC's recommendations for bringing home a new cat.
13.	Bringing a New Cat Home to Live with an Existing Cat	An updated brochure to give to adopters of cats who already own a cat. Provides an overview of AACACC's recommendations for integrating the new cat with existing cat(s).

Table 1.2 Portfolio Products and Competency Addressed

Portfolio Product		Number and Competency Addressed	
1.	Yearly Bite Investigation Statistics Data 2002-2018	3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
		4.	Interpret results of data analysis for public health research, policy or practice
		19.	Communicate audience-appropriate public health content, both in writing and through oral presentation
2.	Animal Rabies Examination Spreadsheet and Map	1.	Apply epidemiological methods to the breadth of settings and situations in public health practice
		3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
		4.	Interpret results of data analysis for public health research, policy or practice
		19.	Communicate audience-appropriate public health content, both in writing and through oral presentation
		21.	Perform effectively on interprofessional teams
3.	Bite Classification Spreadsheet and Maps	1.	Apply epidemiological methods to the breadth of settings and situations in public health practice
		3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate

		4.	Interpret results of data analysis for public health research, policy or practice
		19.	Communicate audience-appropriate public health content, both in writing and through oral presentation
		21.	Perform effectively on interprofessional teams
4.	Shelter Statistics Spreadsheet	3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
5-18	Brochures	18	Select communication strategies for different audiences and sectors

Chapter 2- Competencies

Student Attainment of MPH Foundational Competencies

Competency #1: Apply epidemiologic methods to the breadth of settings and situations in public health practice

Epidemiologic methods were applied to public health settings in both the spreadsheets and graphs of Rabies Examination Results and the Warning Letters, Potentially Dangerous Orders, and Dangerous Orders. Descriptive epidemiology provides a method to organize and analyze data to understand the variations in disease/health events geographically over time, and how the disease/health event varies among person, places, and time. All epidemiologic techniques were limited to descriptive epidemiology because the data were from case reports of animal/human exposures. This information was still important because it could be used to describe the public health problem in graphical displays that were easy for the public understand and it could describe the extent of the public health issue.

Rabies is an infectious disease that is endemic in Maryland, and wildlife, particularly raccoons, serve as a reservoir. This is important epidemiologic information to know when approaching rabies surveillance and control. After analyzing the data using descriptive statistics, a strong seasonal pattern could be seen in both exposure and positive rabies tests. Total rabies positive tests, rabies positive tests per species, and exposure over time were also graphed. The data were mapped in order to see the geographic distribution of various attributes. Graphs were created to describe who the exposed individuals were (humans or animals) and what type of exposure each of the exposed type were likely to have.

The data collected for the Warning Letters, Potentially Dangerous Orders and Dangerous Orders were not disease data, but they were still a public health concern and could have epidemiologic methods applied. The data were also described in terms of the descriptive epidemiology of person (animal breed), place (city), and time (yearly, 2014-2018). The data were graphed by breed to view adjusted and unadjusted most "dangerous" dog breeds, though

the data were determined to have large caveats that made these lists unreliable. The data were both mapped and graphed to determine where these animals were located in the county. Finally, the data were collected over the five-year period of 2014-2018.

Competency #3: Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate

The Bite Investigation Statistics spreadsheets, Rabies Examination spreadsheets, and Warning Letters, Potentially Dangerous Orders, and Dangerous Orders spreadsheets all used similar computer-based software for analysis. All spreadsheets were completed in Google Sheets because AACACC had shifted to using Google Drive to share all documents created within the department. Google Sheets is similar to Microsoft Excel in respect to formulas and processes that can be completed. These skills are summarized in the **Table 5.1**. Google Fusion Tables were used to map the data originally, but the open source software QGIS was ultimately used for professional mapping.

Table 2.1 Summary of Google Sheets Skills

Skill	Description	Example
Conditional Formatting	Used to mark values, using a color, to easily see values outside of the intended range	Mark longitudes and latitudes in mapped spreadsheets that were outside the Anne Arundel County, Maryland values
Pivot Table Creation and Manipulation, Including Graph Creation	Used to easily view selected variables out of raw data and then graph these values	Creating a table containing the count of each warning letter, potentially dangerous order, and dangerous order for each city
Filters	Allows for only specific values from one column of data to be viewed, without creating an entirely new table	Used to view the ten breeds that had the highest count of warning letters, potentially dangerous orders, and dangerous orders to see which breeds would be considered most "dangerous"

Sorting	Sorts entire dataset by one or more columns while keeping each record intact	Sorting data by alphabetical city to view data easier
Capitalize all letters in a cell	Formula=UPPER(), then copy all cells, insert into a new column using paste special, values only	Initially did not input data in all caps which led to many non-standardized data entries and had to change to the uniform, all capitalizations
Protecting data sheets/cells	Protect data sheets/cells to accidental disruption; particularly important for cells with formulas	Use on templates to avoid accidental alterations to cells that contain formulas
Array formula	Formula=ArrayFormula(right( ), len()-n)) Removes characters from selected cells	Used to remove the first two digits from parcel boundaries (location identifiers) for mapping
Lookup formula	Formula=LOOKUP (A1, {""},{""}) Looks up value from cell and, if stated value, it returns the value that is assigned	Used to put population values into the spreadsheet for each city
Concatenate formula	Formula=CONCATENATE(A 1&" , ",B1&" , ") Combines columns, while keeping the data, and adds a delineator	Addresses were inputted in raw data as separate columns for street address, city, state, zip code and country, but needed to be in one column to calculate Longitude and Latitude. Formula combined all address columns into one column, separated by spaces and commas
IF formula	Formula=IF(A1="A",0, IF(A1="B",1)) Tests a value in a cell and outputs the value specified if the value is true or false	Google Fusion Tables required all variables to be numeric data. IF formula used to change categorical data to numeric

Competency #4: Interpret results of data analysis for public health research, policy or practice

All data were analysed and presented in the form of graphs and maps. These graphs and maps were designed to be easy to read by the general public and to be published on the AACACC website. It is possible that the data analysis could be used as a reference to research, however, it is unlikely due to the funding challenges for the department that much research could be conducted. The data from the rabies examinations could be potentially used for policy decisions if funding is cut for ORV programs in Anne Arundel County, because the analysis of the data showed a relatively significant correlation between cessation of the ORV program and increased raccoon rabies in Anne Arundel County.

Competency #18: Select communication strategies for different audiences and sectors

Brochures for a county department, like AACACC, need to be able to communicate information easily to many different types of people. The information needs to be clear and concise, without using jargon. Each brochure was designed with the specific intended audience in mind for the subject, but also with the idea that they will also be displayed on the website for any member of the public to see.

Competency #19: Communicate audience-appropriate public health content, both in writing and through oral presentation

This competency was spread over a presentation of the data analysis (graphs and maps) from the Rabies Examination Results spreadsheet, Bite Investigation spreadsheet, and the Warning Letters, Potentially Dangerous Orders, and Dangerous Orders spreadsheet, and writing public health information in the brochures. I gave a presentation to the employees of AACACC during a luncheon. I presented all of the graphs, maps, and brochures I had created to the employees. This presentation was designed so that the employees could see a collection of all of the rabies information and warning letters and orders cited information that had been gathered from their

surveillance work in the last five years. As stated with Competency #18, the brochures were designed to communicate to a large variety of audiences.

Competency #21: Perform effectively on interpersonal teams

I worked with Thomas Burja, the Zoonotic Disease Specialist at the Anne Arundel County Department of Health to create all of the maps. Mr. Burja regularly creates the positive rabies maps for each year and has a good working relationship with AACACC. He was a GIS major in college and helped me to find and develop maps with QGIS. Mr. Burja gave me valuable information for creating professional maps, as I had never done it, and I was able to show him some interesting features of the QGIS software and Google Fusion Maps, as he normally works with ArcGIS.

Table 2.2 Summary of MPH Foundational Competencies

Number and Competency		Description
1.	Apply epidemiological methods to the breadth of settings and situations in public health practice	Descriptive epidemiology was used to describe health events in the Rabies Examination Results and the Warning Letters, Potentially Dangerous Orders, and Dangerous Orders spreadsheets.
3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Google Sheets software, Google Fusion Tables, and QGIS mapping software were used to analyze the data from the Bite Investigation Statistics spreadsheets, Rabies Examination spreadsheets, and Warning Letters, Potentially Dangerous Orders, and Dangerous Orders spreadsheets.
4.	Interpret results of data analysis for public health research, policy or practice	All data were analyzed and presented in the form of graphs and maps that were designed to be published on the AACACC website.
18.	Select communication strategies for different audiences and sectors	Brochures were designed for any member of the public to read and understand.
19.	Communicate audience-appropriate public health content, both in writing and through oral presentation	All data analyzed and brochures created were presented to the employees of AACACC.

21.	Perform effectively on interprofessional teams	Maps were created by working with the Zoonotic Disease Specialist at the Anne Arundel County Department of Health.

Table 2.3 MPH Foundational Competencies and Course Taught In

22 Public Health Foundational Competencies Course Mapping	MPH 701	MPH 720	MPH 754	MPH 802	MPH 818
Evidence-based Approaches to Public Health					
1. Apply epidemiological methods to the breadth of settings and situations in public health practice	x		x		
2. Select quantitative and qualitative data collection methods appropriate for a given public health context	x	x	x		
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	x	x	x		
4. Interpret results of data analysis for public health research, policy or practice	x		x		
Public Health and Health Care Systems					
5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings		x			
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels					x
Planning and Management to Promote Health					
7. Assess population needs, assets and capacities that affect communities' health		x		x	
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs					x
9. Design a population-based policy, program, project or intervention			x		
10. Explain basic principles and tools of budget and resource management		x	x		
11. Select methods to evaluate public health programs	x	x	x		
Policy in Public Health					
12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence		x	x	x	
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes		x		x	
14. Advocate for political, social or economic policies and programs that will improve health in diverse populations		x			x
15. Evaluate policies for their impact on public health and health equity		x		x	

Leadership					
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making		x			x
17. Apply negotiation and mediation skills to address organizational or community challenges		x			
Communication					
18. Select communication strategies for different audiences and sectors	DMP 815, FNDH 880 or KIN 796				
19. Communicate audience-appropriate public health content, both in writing and through oral presentation	DMP 815, FNDH 880 or KIN 796				
20. Describe the importance of cultural competence in communicating public health content		x			x
Interprofessional Practice					
21. Perform effectively on interprofessional teams		x			x
Systems Thinking					
22. Apply systems thinking tools to a public health issue			x	x	