RESEARCH PROGRESS REPORT SUMMARY

Grant 02241: The City Dog Study: Dermatologic and Respiratory Disease among Inner-City Dogs Living in the Homes of Children with Asthma

Principal Investigator: Meghan Davis, DVM, MPH, PhD

Research Institution: Johns Hopkins University

Grant Amount: $158,367

Start Date: 2/1/2016 **End Date:** 1/31/2020

Progress Report: FINAL

Report Due: 1/31/2020 **Report Received:** 2/27/2020

(The content of this report is not confidential and may be used in communications with your organization.)

Original Project Description:

Children who live in inner-city households of low economic means suffer disproportionately from skin and lung diseases, including asthma. This study will evaluate the burden of skin and respiratory disease among the dogs who live with them. These dogs often can be hard to study because their owners may not have the means or access to take them to the veterinarian. As an adjunct to a funded public health research effort targeting 200 children with asthma, Dr. Davis and her team will enroll 100 dogs and follow their health at three home visits over six months, and perform two additional evaluations. First, they will study the microbial (bacterial) communities on the dogs to determine how these change over time, and if the changes are associated with skin or respiratory diseases in the dogs. Then, the investigators will look at how the children and dogs share bacteria (i.e. microbiome). Early life exposures to dogs may protect children against the development of asthma; next steps are to investigate if dogs also have a beneficial impact when the children are older and have existing disease. This study will provide knowledge needed to help understand disease in underserved dogs in urban neighborhoods, providing data to support keeping dogs and keeping them healthy to benefit both dogs and their owners.

Publications:

Exum, N. G., Olórtegui, M. P., Yori, P. P., Davis, M. F., Heaney, C. D., Kosek, M., & Schwab, K. J. (2016). Floors and Toilets: Association of Floors and Sanitation Practices with Fecal Contamination in Peruvian Amazon Peri-Urban Households. *Environmental Science & Technology*, *50*(14), 7373–7381. https://doi.org/10.1021/acs.est.6b01283

Tsou, P.-Y., McCormack, M. C., Matsui, E. C., Peng, R. D., Diette, G. B., Hansel, N. N., & Davis, M. F. (2019). The Effect of Dog Allergen Exposure on Asthma Morbidity among Inner-city Children with Asthma. *Pediatric Allergy and Immunology*. https://doi.org/10.1111/pai.13144

Presentations:

Davis MF, Dalton K, Johnson Z, Ludwig S, Sabella K, Newman M, Balcer-Whaley S, Keet C, McCormack MC, Carroll KC, and Matsui EC. Household pets and recovery of Moraxella catarrhalis and other respiratory pathogens from children with asthma. ID Week (Abstract #71914). October 6, 2018.

Abstract published in Open Forum Infectious Diseases, Volume 5, Issue suppl_1, 26 November 2018, Pages S692–S693, https://doi.org/10.1093/ofid/ofy210.1984

Katie Sabella, Kathryn Dalton, and Meghan Davis. The City Dog Study: Examining Dermatologic and Respiratory Disease in a Cohort of Pets in Urban Baltimore. Johns Hopkins Department of Environmental Health & Engineering retreat, January 2017.

Erin Beasley, Shanna Ludwig, Andrea Christ, Kathryn Dalton, Elizabeth Matsui, Meghan F. Davis. Pet carriage of *Staphylococcus aureus* and *S. pseudintermedius* in the households of children with asthma. Merial Veterinary Student Scholars Program, August 2016.

Davis MF. Risk factors for dermatologic disease in dogs. Atlantic Coast Veterinary Conference. October 16, 2019.

Report to Grant Sponsor from Investigator:

The City Dog Study enrolled dogs that live with inner-city children diagnosed with asthma in order to understand the health of urban dogs that may or may not have routine access to veterinary care. We are interested in specific health outcomes related to skin and respiratory disease that will help veterinarians understand community incidence and triggers of these common ailments. In addition, we are studying how the dogs and children share bacteria and what role these bacteria play in promoting health. Because we evaluate the dogs over the course of six months, we are able to identify new cases and track changes over time. This work also will have implications for underserved dog populations and may help veterinarians better target care to disadvantaged urban communities.

The City Dog Study enrolled over 50 dogs. We have found that we have tremendous diversity of dog breeds represented; nearly half of the dogs we have enrolled are small-breeds (e.g. Chihuahua, Russell Terrier, Shih Tzu, West Highland White Terrier, Yorkshire Terrier). Our large breeds enrolled to date include Akita, American Staffordshire Terrier, Doberman Pinscher, Pointer, German Shepherd Dog, Labrador Retriever and mixed breeds, e.g. Great Dane-Labrador mix. Understanding dog ownership in

communities like the one we study may be helpful for breed rescue groups to better target their important services.

We also are providing training opportunities to students. We have engaged multiple veterinary clinical postdoctoral fellows and other graduate students in this work. One of these fellows, Dr. Kathryn Dalton, is now a PhD Candidate in Environmental Health and Engineering at Johns Hopkins Bloomberg School of Public Health and has been awarded an AKC Canine Health Foundation Clinician-Scientist Fellowship. She continues to be engaged with the City Dog Study.