

CURRICULUM VITAE

Kathryn R. Dalton, Ph.D., V.M.D., M.P.H.

RESEARCH INTEREST

Broadly, I research how environmental exposures impact the human microbiome and their downstream influences on health outcomes, using a systems-thinking “One Health” approach. I am particularly interested in occupational exposures and exposures to animals, both in agriculture settings and in the home, with an emphasis on pediatric populations. I seek to gain experiential training in how microbial community alterations can affect cancer diagnosis, progression, therapy, and recurrence, and bridge this knowledge to my existing skills as an exposure scientist and environmental epidemiologist.

PERSONAL DATA

Johns Hopkins University
Bloomberg School of Public Health,
Department of Environmental Health & Engineering

615 N. Wolfe Street, Baltimore, Maryland 21205
W7034G office / W7704 & W7707 laboratory
kdalton4@jhu.edu

EDUCATION AND TRAINING

Postdoctoral Fellow	Current
Johns Hopkins School of Public Health Microbiome Bioinformatics and Exposures	
Ph.D.	2020
Johns Hopkins School of Public Health Environmental Epidemiology and Exposure Science Dissertation: “Infection Control Insights for Hospital Animal-Assisted Intervention Program Implementation: From Stakeholder Perspectives to Microbial Dynamics”	
Clinical Research Fellow	2017
Johns Hopkins School of Public Health Environmental Microbiology	
M.P.H.	2016
Johns Hopkins School of Public Health Infectious Disease Capstone: “Biosecurity Challenges in the Poultry Industry against Highly Pathogenic Avian Influenza”	
V.M.D.	2013
University of Pennsylvania, School of Veterinary Medicine Veterinary Public Health	

Independent Student Research Project: “The Mere Saathi Project: Community-based Dairy Education to Empower Women and Improve Health in Rural India”

B.S.	2008
SUNY Stony Brook University	
Biology and Anthropology	
Senior Thesis “Ebola in Lowland Gorillas: Conservation and Public Health Connections”	

MEDICAL OR OTHER LICENSURE

Licensed veterinarian in Maryland, New Jersey, and Pennsylvania	2013
USDA veterinary accreditation:	
Maryland	2015
New Jersey	2013
Veterinary Medical Certification	2013

PROFESSIONAL EXPERIENCE

Relief Veterinarian	2015-2019
Banfield Pet Hospitals in North Maryland region	
Provided veterinary preventative services, and other veterinary clinical duties	
Associate Veterinarian	2013-2015
Banfield Pet Hospital, Mount Laurel, New Jersey	
Provided veterinary preventative, general medicine, surgical and emergency services in an AAHA-certified three-doctor practice, was primary medical doctor and trained on-boarding doctors	

PROFESSIONAL ACTIVITIES

SOCIETY MEMBERSHIP & LEADERSHIP

Infectious Disease Society of America (IDSA)	2018-present
Society for Healthcare Epidemiology in America (SHEA)	2018-present
International Society for Environmental Epidemiology (ISEE)	2017-present
American Association of Public Health and Food Safety Veterinarians	2016-present
American Veterinary Medical Association (AVMA)	2009-present
Maryland Veterinary Medical Association (MVMA)	2015-2019
American Public Health Association (APHA)	2015-2017

CONSORTIUM ACTIVITIES

Mid-Atlantic Vector-borne Disease Inter-Agency Workgroup	2015-present
CDC / Maryland Department of Health Lyme Corp Outreach Group	2015-2017

EDITORIAL ACTIVITIES

PEER-REVIEW ACTIVITIES

Reviewed for the following journals:

American Journal of Infection Control
 Environmental International
 Zoonoses and Public Health
 Infection, Genetics, and Evolution
 Open Veterinary Journal

HONORS & AWARDS

Delta Omega Public Health Honors Society, Alpha Chapter, Inductee	2021
IDweek2018 Kass Award	2018
IDweek2018 Oral Abstract Media Release and Press Conference Recognition	2018
Delta Omega Honors Society Poster Competition Runner Up Laboratory Science	2017
Department of Environmental Health Research Retreat Poster Award Runner Up	2017
Department of Environmental Health Sciences MPH Capstone Award	2016
FDA Center for Excellence in Regulatory Science and Innovation (CERSI) Award	2015
University of Pennsylvania School of Vet Medicine, Student Inspiration Award	2012

PUBLICATIONS

The following link provides access to all published work:

All works:

<https://scholar.google.com/citations?user=UshXcZUAAAAJ&hl=en>

Currently indexed by PubMed:

<https://www.ncbi.nlm.nih.gov/myncbi/kathryn.dalton.1/bibliography/public/>

JOURNAL ARTICLES (PEER-REVIEWED)

Dalton KR, Ruble K, Redding LE, Morris DO, Mueller NT, Thorpe RJ, Agnew J, Carroll KC, Planet P, Rubenstein RC, Chen AR, Grice EA, and Davis MF. Microbial sharing between pediatric patients and therapy dogs during hospital animal-assisted intervention programs. *Microorganisms*. 2021. 9(5), 1054. DOI: 10.3390/microorganisms9051054.

Innes GK, Markos A, **Dalton KR**, Gould CA, Nachman KE, Fanzo J, Barnhill A, Frattaroli S, and Davis MF. How animal agriculture stakeholders define, perceive, and are impacted by antimicrobial resistance: challenging the Wellcome Trust's Reframing Resistance principles. *Agriculture and Human Values*. 2021. DOI: 10.1007/s10460-021-10197-y.

Dalton KR, Campbell P, Altekruze W, Thorpe RJ, Agnew J, Ruble K, Carroll KC, and Davis MF. A conceptual framework to address administrative and infection control barriers for animal-assisted intervention programs in healthcare facilities: Perspectives from a qualitative study. *Infection Control & Hospital Epidemiology*. 2021. 1-2. DOI: 10.1017/ice.2021.24.

Dalton KR, Waite K, Ruble K, Carroll KC, DeLone A, Frankenfield P, Serpell J, Thorpe R, Morris DO, Agnew J, Rubenstein R, and Davis MF. Risks Associated with Animal-Assisted Intervention Programs: A Literature Review. *Complementary Therapies in Clinical Practice* 2020, May;39:101145. DOI: 10.1016/j.ctcp.2020.101145.

Dalton KR, Rock C, Carroll KC, and Davis MF. One Health in Hospitals: How understanding the dynamics of people, animals, and the hospital built environment can be used to better inform interventions for antimicrobial-resistant Gram-positive infections. *Antimicrobial Resistance & Infection Control* 2020, June;9(78). DOI: 10.1186/s13756-020-00737-2.

Leibler, JH, **Dalton, K**, Pekosz A, Gray GC, and Silbergeld EK. Epizootics in industrial livestock production: preventable gaps in biosecurity and biocontainment. *Zoonoses and Public Health*, 2017. 64(2), pp.137-145. DOI: 10.1111/zph.12292

PRE-PRINT PUBLICATIONS

Dalton KR, Guyer KM, Schiaffino F, Ferradas C, Falke JR, Beasley EA, Meza K, Laughlin P, Agnew J, Barnett DJ, Nuzzo JB, and Davis MF. Assessing COVID-19 Pandemic Risk Perception and Response Preparedness in Veterinary and Animal Care Workers. *medRxiv*. DOI: 10.1101/2021.05.04.21256626.

* Under peer review at Health Security Journal

Dalton KR, Altekruze W, Campbell P, Ruble K, Carroll KC, Thorpe RJ, Agnew J, and Davis MF. Perceptions and Practices of Key Worker Stakeholder Groups in Hospital Animal-Assisted Intervention Programs on Occupational Benefits and Perceived Risks. *medRxiv*. DOI: 10.1101/2020.12.18.20248506.

* Under peer review at People and Animals: The International Journal of Research and Practice

Dalton KR, Ruble K, Carroll KC, Redding LE, Chen AR, Grice EA, Morris DO, and Davis MF. Impact of a Chlorhexidine Decolonization on the Nasal and Dermal Microbiome of Therapy Dogs Participating in Hospital Animal-Assisted Intervention Programs: A Pilot Study. *medRxiv*. DOI: 10.1101/2021.02.11.21250783.

Dalton KR, Spicer K, Ludwig S, Clemons-Erby D, Green, T, Rule A.M, Koehler K, McCormack MC, Davis MF. Evaluation of Field Sampling Techniques for Environmental Microbial Exposure: Assessing Efficacy and Feasibility. *bioRxiv* 2020.06.14.150722; DOI: 10.1101/2020.06.14.150722

Baron PA, Love DC, Ludwig S, **Dalton K**, Larsen J, Innes GK, and Heaney CD, Davis MF. Microbial food safety in the Maryland direct-to-consumer poultry supply chain. *bioRxiv* 643106. DOI: 10.1101/643106.

TECHNICAL SKILLS

Proficiency in Programming Languages:

R
 Unix / bash
 Stata
 Python
 SAS
 MATLAB

PART II

TEACHING / ADVISING

CAPSTONE/MASTER'S THESIS ADVISEES

Kimberley Guyer, D.V.M., current M.P.H. student	2020-present
Johns Hopkins Bloomberg School of Public Health, Excellence in US Public Health Award Finalist	
Julianna Nechin, current Sc.M. student (MMI)	2019-present

SUMMER STUDENT ADVISEES

Sabrina Waugh (CO State SVM), veterinary student	2019
Zoë Johnson (MI State SVM), current M.H.S. student	2017

RESEARCH ASSISTANTS

Peter Campbell (current medical student at UMBC)	2020-present
William Altekruze (current social work graduate student UMBC)	2020-present

LECTURER

Onsite Evaluation of Workplace and Occupational Health Programs Johns Hopkins Bloomberg School of Public Health "Occupational Health in the Agriculture, Forestry, and Fishery Sectors"	2021
The Health Effects of Indoor and Outdoor Air Pollution Johns Hopkins Bloomberg School of Public Health "Air Pollution and One Health"	2021
One Health Tools to Promote & Evaluate Healthy and Sustainable Communities Johns Hopkins Bloomberg School of Public Health "Rabies: A Public Health Threat"	2019
*co-lectured with Dr. David Crum, MD state public health veterinarian "Case Studies of Outbreak Response with a One Health Context"	2018

TEACHING ASSISTANTSHIP

The One Health Approach to Epidemiology and Global Public Health: Problem Solving Seminar Course Faculty Instructor: Justin Lessler and Emily Gurley 3.0 credits, Fourth Term *Improved course design and directed interactive group sessions	2021
One Health Tools to Promote & Evaluate Healthy and Sustainable Communities Johns Hopkins Bloomberg School of Public Health Course Faculty Instructor: Meghan F. Davis 3.0 credits, Fourth Term 2018, 2019 & 2020 Excellence in Teaching, based on student feedback *Assisted in course design and directed interactive group sessions	2018-2020

<p>Essentials of One Health Johns Hopkins Bloomberg School of Public Health Course Faculty Instructor: Meghan F. Davis 0.5 credits, First, Third & Fourth Terms Part of the “Cells to Society” public health curriculum</p>	<p>2019-present</p>
<p>Foundations of Occupational Health Johns Hopkins Bloomberg School of Public Health Course Faculty Instructor: Maureen Cadorette 3 credits, First Term</p>	<p>2018</p>
<p>Case Studies in Food Animal Production and Public Health Johns Hopkins Bloomberg School of Public Health Course Faculty Instructor: Keeve Nachmann 3 credits, Fourth Term</p>	<p>2017</p>
<p>JHU TEACHING ACADEMY CERTIFICATE</p>	
<p>Didactic Seminars 10 hours</p>	<p>completed 2019</p>
<p>Interactive Workshop 3 days</p>	<p>completed 2019</p>
<p>Independent Course Development and Implementation</p>	<p>anticipated 2021</p>

RESEARCH GRANT PARTICIPATION

CURRENT GRANTS

No number	(Dalton)	2019-2020
Johns Hopkins ERC Identifying Occupational Health Benefits and Concerns of Key Stakeholders Regarding Hospital-Based Animal-Assisted Intervention Programs: A Pilot Study to Inform Program Implementation. \$10,000 <u>Role:</u> Principal Investigator <u>Main Grant Objective:</u> Conduct qualitative interviews on key stakeholders in hospital animal-assisted intervention programs in order to understand barriers and facilitators to program implementation as a stress-reduction mechanism in healthcare workers. <u>Principal Responsibilities:</u> As student PI, I designed the project, wrote for initial funding, submitted for IRB approval, hired and trained research assistants, conducted or supervised interviews, performed or supervised coded qualitative data analysis, and transcript finding into a manuscript for publication.		
R01HD097692	(Davis)	2018-2022
R01, Eunice Kennedy Shriver National Institute of Child Health & Development Clinical trial of a disinfectant intervention in therapy dogs to combat hospital-associated pathogens and promote sustainability of Animal-Assisted visitation programs \$1,857,348 <u>Role:</u> Postdoctoral Fellow Co-Investigator <u>Main Grant Objective:</u> Leadership of one independent aim, to assess holistic microbial community alterations during a hospital animal-assisted intervention program, and the effect of a chlorhexidine-based intervention on acquisition of hospital-associated pathogens and microbial communities by patients during AAI sessions via a multicenter randomized controlled trial <u>Principal Responsibilities:</u> Assist with overall study management for multicenter clinical trial, aid in study design, supervise and train sample collection and laboratory assessment, supervise or perform data management and data analysis on microbial community analysis, give presentations, prepare manuscripts.		

PREVIOUS GRANTS

T42OH008428	(Agnew)	2018-2020
NIOSH Johns Hopkins Education and Research Center Training Award (T42) <u>Role:</u> PhD Candidate <u>Main Grant Objectives:</u> To conduct research in occupational health and safety. <u>Principal Responsibilities:</u> Training grant for academic and research support.		
No number	(Dalton)	2018-2019
American Kennel Club Canine Health Foundation <i>Clinician-Scientist Fellowship</i> \$12,000 <u>Role:</u> Principal Investigator <u>Main Grant Objective:</u> Provide support for protected time to conduct research to advance the human-animal bond, and human and canine health. <u>Principal Responsibilities:</u> Attend advance trainings in metagenomics, conduct One Health research, present findings at professional conferences and in peer-reviewed journals.		

- No number (Dalton) 2017-2018
 JHSPH Center for a Livable Future Lerner Fellowship
 \$28,750
Role: PhD Student
Main Grant Objectives: To conduct research in environmental safety and sustainability in our current food systems.
Principal Responsibilities: Training grant for academic and research support.
- No number (Davis/Fanzo) 2017-2018
 Johns Hopkins Practical Ethics Award
The law of unintended consequences: Will the implementation of California SB27 impact animal health and well-being?
 \$67,500
Role: Student Investigator
Main Grant Objectives: To characterize the immediate impact of SB27 on animal health and welfare and examine ethical trade-offs associated with the California law.
Principal Responsibilities: conducted farmer interviews, assist with preparation of manuscripts.
- D15CA-802 (Chen) 2014-2015
 Morris Animal Foundation
Animal Assistance Therapy: Ensuring animal health and program sustainability in the context of hospital-associated infections
 \$10,000
Role: Study Coordinator
Main Grant Objectives: To demonstrate whether a dog intervention to decontaminate fur during AAT visits can reduce transmission of HAIs between patients and animals.
Principal Responsibilities: Study design, sample collection, laboratory and data analysis, manuscripts.
- No number (Dalton) 2015-2016
 FDA CERSI Grant
The Science and the Prevention of Highly Pathogenic Avian Influenza
 \$10,000
Role: Student Principal Investigator
Main Grant Objectives: To conduct literature review to assess current gaps in the biosecurity regulations in the industrial poultry production systems that could potentially lead to an outbreak of Highly Pathogenic Avian Influenza and make recommendations for improvement to the current system.
Principal Responsibilities: Develop systemic review model to preform literature evaluation, meet with industry representatives and stakeholders to collect qualitative data, create a comprehensive overview of the current production system and make recommendations based on current model.
- CHF 02241 (Davis) 2016-2018
 AKC Canine Health Foundation
The City Dog Study: Microbial determinants of dermatologic and respiratory disease among inner-city dogs living in homes of children with asthma
 \$158,367
Role: Postdoctoral Fellow (2016-17); PhD Student (2017-present)
Main Grant Objectives: (1) To evaluate whether a dog's personal bacterial exposures contribute to disease among an underserved community dog population, and (2) To examine whether dog bacteria determine colonizing bacteria in children with asthma,

which may improve asthma status.

Principal Responsibilities: Design and manage study, supervise and perform laboratory assessment, perform bioinformatics, analyze data, prepare manuscripts.

ACADEMIC SERVICE

UNIVERSITY (JOHNS HOPKINS)

One Health Student Group	
Co-Founder	2015
President	2015-2018
Senior Advisor	2018-present

DEPARTMENT (ENVIRONMENTAL HEALTH AND ENGINEERING)

Environmental Health and Engineering Practice committee	
Student Representative	2018-present
Environmental Health and Engineering Student Group	
Treasurer	2017-2020

SCIENTIFIC MEETINGS: PRESENTING AUTHOR, ORAL SESSIONS

Dalton KR, Waite KB, Agnew JA, Barnett DJ, David MF. The COVET Study: Preliminary Findings from the Ongoing Veterinary and Animal Care Workers' Perceived Risk and Willingness to Respond to the COVID-19 Pandemic. World One Health Congress. Oct 30 – Nov 3, 2020. (Presenting author, Oral presentation).

Dalton KR, Carroll KC, Grice EA, Davis MF. Exploring Microbial Community Alterations during Hospital Animal-Assisted Intervention Programs. ID Week. Oct 21-25, 2020. (Presenting author, Poster presentation).

Dalton K, Ruble K, Carroll K, Grice E, and Davis MF. Emerging exposures and health effects in the hospital environment. International Society of Environmental Epidemiology (On Places II, So3), August 25-28, 2019, abstract published in Environmental Epidemiology (Presenting author, Oral presentation).

Dalton K, Ruble K, Delone L, Frankenfield P, Walker D, Ludwig S[†], Ross TL, Jaskulski J, Carroll KC, Rankin S, Morris DO, Chen A, and Davis MF. Reduction in the spread of hospital-associated infections among pediatric oncology patients in a group animal-assisted visitation program from a canine intervention. ID Week (Abstract #72940). October 4, 2018, abstract published in Open Forum Infectious Diseases. (Presenting author, Oral presentation and press conference)

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. (Poster session)

Innes G, **Dalton K**, Gould CA, Markos A, Nachman K, Frattaroli S, Fanzo J, Barnhill A, and Davis MF. Antibiotic resistance and societal consequences: perspectives from animal agriculture producers and other stakeholders. 8th Symposium on Antimicrobial Resistance in Animals and the Environment. July 1-3, 2019 (Poster presentation)

Davis MF, Ludwig S, **Dalton K**, Exum N, Schwab K, Kosek M, Koehler K, Rule A, Lautenbach E, McCormack M, and Matsui E. Assessment of indoor microbial exposures. International Society of Exposure Science & International Society for Environmental Epidemiology joint conference (Abstract#300180). August 28, 2018. (Poster session)

Davis MF, Ludwig S, Josephs-Spaulling J, **Dalton K**, Newman M, Balcer-Whaley S, Peng R, Keet C, McCormack MC, Matsui EC. Environmental exposure to *Staphylococcus aureus* and SEB are associated with asthma symptoms and worse lung function among low-income, urban children with asthma. The American Academy of Allergy, Asthma, and Immunology Annual Meeting, (Abstract# 33436). March 4, 2018, abstract published in the Journal of Allergy and Clinical Immunology.

INVITED SEMINARS

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| Johns Hopkins Microbiome Forum | 2020 |
| “Exploring Microbial Community Alterations during Hospital Animal-Assisted Intervention Programs” | |
| Johns Hopkins Medicine Fisher Center for Environmental Infectious Disease | 2019 |
| “Reduction in the Spread of Hospital-Associated Pathogens among Pediatric Oncology Patients in an Animal-Assisted Intervention Program from a Canine Decolonization Procedure” | |
| MidAtlantic Zoonotic and Vector-borne Disease Working Group | |
| “Hospital Infection Control and Animal-Assisted Intervention Programs: a unique Zoonotic Challenge” | 2018 |
| “LymeCorp in Maryland – Implementation and Future Directions” | 2017 |

PART III

PRACTICE PORTFOLIO

MEDIA OUTREACH

Research and quotes featured in:

Healthcare Hygiene Magazine June 2020
“Taking a One Health Approach to Infection Prevention and Control”

Associated Press Oct 2019
“Therapy dogs can spread superbugs to kids, hospital finds”
article picked up by New York Times, USA Today, DailyMail UK, and other major news outlets, both in print and broadcast

Other versions of this research featured in the press:

Modern Healthcare “New study scrutinizes hospital therapy dog programs”

TechTime “Therapy Dogs can transmit superbugs to young patients, but it can be prevented, study finds”

Tech2 “Cleaning procedure prevents therapy dogs from spreading MRSA”

American Veterinarian “Reducing MRSA transmission between therapy dogs and cancer patients”

Infection Control Today “Cleaning procedure prevents therapy dogs from spreading MRSA to children with cancer”

Healio “Antiseptic prevents therapy dogs from spreading MRSA to pediatric cancer patients”

MedPage Today “Medical dog wash cuts risk of MRSA spread from therapy dogs”

COMMUNITY OUTREACH

National Pet Therapy Day – Hopkins, Event Organizer Apr 2019

Infection Control in Hospital Animal-Assisted Intervention Programs Nov 2018
Townhall Meeting for Johns Hopkins Hospital Employees

CDC / Maryland Department of Health Lyme Corp Outreach Group 2015-2017