Exponent®
Engineering & Scientific Consulting

Ben Davis, Ph.D.

Managing Scientist | Chemical Regulation and Food Safety
Washington DC
+1-202-772-4942 tel | davisb@exponent.com

Professional Profile

Dr. Davis is an epidemiologist and data scientist with specialized experience in human health risk assessment, food safety, environmental health, and infectious diseases. He applies his rigorous training in epidemiology and biostatistics to a variety of public health topics, including probabilistic exposure assessment and dose-response methodology, respiratory and foodborne infectious diseases, and physiologically-based pharmacokinetic models.

Dr. Davis conducts exposure assessments using large databases including publicly available data sources such as NHANES and the U.S. FDA Total Diet Study and performs dose-response modeling using both the PROAST and BMDS software. His expertise extends to both chemical and biological health hazards, including heavy metals and SARS-CoV-2. Dr. Davis has conducted several large and multifaceted systematic reviews and risk assessments related to the safety and critical control points of regularly-consumed food products. He has extensive experience in complex biostatistical methodology, including mixed-effect modeling and spatial-temporal analysis, which he applies to estimating regular dietary patterns from large survey databases, evaluating microbial and chemical contaminants in food products, and deriving dose-response relationships for a variety of chemicals. Dr. Davis is also well-versed in complex human observational research including but not limited to the field of nutritional epidemiology. He has been involved in comprehensive reviews of infectious disease dynamics, such as the spread of COVID-19.

Dr. Davis has worked with food and ingredient manufacturers, trade associations, and insurance companies. He has also played an active role in several regulatory submissions to the U.S. FDA and U.S. EPA, including novel food products, food and color additive petitions, as well as GRAS notifications. He has provided scientific support to litigation related to COVID-19 business interruption as well as nutritional epidemiology and food safety. Dr. Davis has developed and executed several statistical analyses related to the residual concentrations and health effects of pesticides applied to crops, as well as to the composition of the human microbiome. Dr. Davis is also experienced in intake assessments including those applied to Proposition 65 claims.

Prior to joining Exponent, Dr. Davis was on the faculty at the Johns Hopkins Bloomberg School of Public Health, Department of Epidemiology, managing a large multi-year research project on the environmental variation and subsequent health risks of the bacterium Vibrio parahaemolyticus among oyster consumers in the United States. Dr. Davis was awarded his Ph.D. from the Johns Hopkins Department of Environmental Health and Engineering. During his Ph.D., Dr. Davis received a certificate in risk sciences and public policy and was awarded a fellowship from the Johns Hopkins Center for a Livable Future as well as a traineeship from the National Science Foundation's Integrative Graduate Education & Research Traineeship program in Water, Climate, and Health. His previous experience also includes conducting epidemiological research at the National Institute of Aging.

Dr. Davis regularly collaborates with scientists from a broad range of disciplines, from engineers to social

scientists, and has regularly interacted with federal and state risk policy managers and food industry stakeholders. He has co-authored several peer-reviewed scientific articles related to food safety and risk assessment and has presented his work at numerous scientific conferences. Dr. Davis has also been an instructor for multiple courses concerning geospatial analysis and public health.

Academic Credentials & Professional Honors

Ph.D., Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, 2017

B.A., Neuroscience and Behavior, Vassar College, 2010

Delta Omega Public Health Honor Society Member, 2018

Academic Appointments

Associate Faculty, Epidemiology, Johns Hopkins Bloomberg School of Public Health, 2020-2022

Prior Experience

Research Associate (Faculty), Department of Epidemiology, Johns Hopkins Blomberg School of Public Health, 2017-2019

Post-baccalaureate Intramural Research Training Award (IRTA) Fellow, National Institute of Aging, NIH. 2010-2012

Professional Affiliations

Society for Risk Analysis

International Epidemiological Association

International Society for Environmental Epidemiology

Publications

Davis BJK, Bi X, Higgins K, Scrafford C. Gestational health outcomes among pregnant women in the United States by level of dairy consumption and quality of diet, NHANES 2003-2016. Maternal and Child Health Journal. 2022. Oct;26(10):1945-52 (Accepted).

Higgins KA, Bi X, Davis BJK, Barraj LM, Scrafford CG, Murphy MM. Adequacy of total usual micronutrient intakes among pregnant women in the United States by level of dairy consumption, NHANES 2003–2016. Nutrition and Health, 2022; 02601060211072325.

Fries B, Davis BJK, Corrigan AE, DePaola A, Curriero FC. Nested Spatial and Temporal Modeling of Environmental Conditions Associated With Genetic Markers of Vibrio parahaemolyticus in Washington State Pacific Oysters. Frontiers in Microbiology, 2022; 13, 849336.

Davis BJK, Corrigan AE, Sun Z, Atherly E, DePaola A, Curriero FC. A case-control analysis of traceback investigations for Vibrio parahaemolyticus infections (vibriosis) and pre-harvest environmental conditions in Washington State, 2013–2018. Science of The Total Environment. 2020; 752:141650. https://doi.org/10.1016/j.scitotenv.2020.141650

Reiss, R., Davis, B. The use of new approach methodologies (NAMs) to derive extrapolation factors and evaluate developmental neurotoxicity for human health risk assessment. Comments on EPA's Fit-for-

Purpose Alternative to In Vivo DNT: Comment for FIFRA Scientific Advisory Panel Meeting. 2020.Comment ID: EPA-HQ-OPP-2020-0263-0050.

Spaur M, Davis BJK, Kivitz S, DePaola A, Bowers JC, Curriero FC, Nachman KE. A systematic review of post-harvest interventions for Vibrio parahaemolyticus in raw oysters. Science of The Total Environment. 2020; 745:140795. https://doi.org/10.1016/j.scitotenv.2020.140795

DeLuca NM, Zaitchik BF, Guikema SD, Jacobs JM, Davis BJK, Curriero FC. Evaluation of remotely sensed prediction and forecast models for Vibrio parahaemolyticus in the Chesapeake Bay. Remote Sensing of Environment. 2020; 250:112016. https://doi.org/10.1016/j.rse.2020.112016

Davis BJK, Jacobs JM, Zaitchik B, DePaola A, Curriero FC. Operational in-situ Prediction and Forecast Models for Vibrio parahaemolyticus in the Chesapeake Bay Are Attainable and Can Benefit from Including Lagged Water Quality Measurements. Applied and Environmental Microbiology. 2019; 85(17):e01007-19. doi: 10.1128/AEM.01007-19.

Davis BJK, Curriero FC. Development and Evaluation of Geostatistical Methods for Non-Euclidean-Based Spatial Covariance Matrices. Mathematical Geosciences. 2019; 51(6):767-791. https://doi.org/10.1007/s11004-019-09791-y.

Flynn A, Davis BJK, Atherly E, Olson G, Bowers JC, Depola A, Curriero FC. Associations of Environmental Conditions and Vibrio parahaemolyticus Genetic Markers in Washington State Pacific Oysters. Frontiers in Microbiology. 2019; 10:2797. doi: 10.3389/fmicb.2019.02797.

Kvit A, Davis BJK, Jacobs J, Curriero FC. Adjusted, non-Euclidean cluster detection of Vibrio parahaemolyticus in the Chesapeake Bay, USA. Geospatial Health. 2019; 14(2). https://doi.org/10.4081/gh.2019.783.

Love DC, Kuehl LM, Lane RM, Fry JP, Harding J, Davis BJK, Clancy K, Hudson B. Performance of cold chains and modeled growth of Vibrio parahaemolyticus for farmed oysters distributed in the United States and internationally. International Journal of Food Microbiology. 2019; 313(16):108378.

Love DC, Lane RM, Davis BJK, Clancy K, Fry JP, Harding J, Hudson B. Performance of Cold Chains for Chesapeake Bay Farmed Oysters and Modeled Growth of Vibrio parahaemolyticus. Journal of Food Protection. 2018; 82(1):168-178.

Davis BJK, Li CX, Nachman KE. A literature review of the risks and benefits of consuming raw and pasteurized cow's milk: A response to the request from The Maryland House of Delegates' Health and Government Operations Committee. Johns Hopkins Bloomberg School of Public Health's Center for a Livable Future Report.

Davis BJK, Jacobs JM, Davis MF, Schwab KS, DePaola A, Curriero FC. Environmental determinants of Vibrio parahaemolyticus in the Chesapeake Bay. Applied and Environmental Microbiology. 2017; 83(21):e01147-17.

Albanese E, Davis B, Jonsson PV, Chang M, Aspelund T, Garcia M, ... & Launer LJ. Overweight and Obesity in Midlife and Brain Structure and Dementia 26 Years Later: The AGES-Reykjavik Study. American Journal of Epidemiology, 2015; kwu331.

Davis BJK, Vidal JS, Garcia M, Aspelund T, van Buchem MA, JonsdottirMK, ... & Launer LJ. The Alcohol Paradox: Light-to-Moderate Alcohol Consumption, Cognitive Function, and Brain Volume. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences; 2014; glu092.

Presentations

Davis B, Corrigan A, Sun Z, Atherly E, DePaola A, Curriero FA case-control analysis of traceback

investigations for Vibrio parahaemolyticus infections (vibriosis) and pre-harvest environmental conditions in Washington State, 2013–2018. Poster presentation, 32nd Annual Conference of the International Society of Environmental Epidemiology, Virtual, 2020

Davis B, Kvit A, DeLuca N, Curriero F. Characterizing the Spatial-Temporal dynamics and human health risks of Vibrio parahaemolyticus bacteria in estuarine environments. Invited Seminar, Geographic Analysis Working Group, Division of Cancer Epidemiology & Genetics, National Cancer Institute, U.S. National Institutes of Health, Rockville, MD, 2019.

Davis B, Sun J, Flynn A, Bowers J, Atherly E, Curriero F. Environmental and Genetic Determinants of Vibrio parahaemolyticus abundance and vibriosis in Washington State. Invited speaker, Aquaculture 2019, New Orleans, LA, 2019.

Spaur M, Davis B, Depaola A, Bowers J, Curriero F, Nachman K. Identification of post-harvest inputs for Vibrio parahaemolyticus Quantitative Microbial Risk Assessment in Chesapeake Bay and Washington State. Poster presentation, Aquaculture 2019, New Orleans, LA, 2019.

Davis B, Jacobs J, DePaola A, Curriero FC. Spatial and temporal characteristics of Vibrio parahaemolyticus in the Chesapeake Bay. Poster presentation, International Society of Exposure Sciences and International Society of Environmental Epidemiology Joint Conference, Ottawa, Canada, 2018.

Davis B, Jacobs J, DePaola A, Curriero FC. Developing space-time prediction models of Vibrio parahaemolyticus in the Chesapeake Bay. Oral presentation, Chesapeake Community Research & Modeling Symposium, Annapolis, MD, 2018.

Davis B, Jacobs J, DePaola A, Curriero FC. Environmental determinants of Vibrio parahaemolyticus in the Chesapeake Bay: Current and Future Work. Oral presentation, National Shellfisheries Association, Seattle, WA, 2018.

Davis B, Jacobs J, Davis M, Curriero FC. Environmental determinants of Vibrio parahaemolyticus in the Chesapeake Bay. Poster presentation, 17th National Conference and Global Forum on Science, Policy, and the Environment: Integrating Environment and Health, Arlington, VA, 2017.

Davis B, Jacobs J, Zaitchik B, Curriero FC. Non-Euclidean distance-based Kriging, water quality monitoring, and remote sensing data to predict Vibrio parahaemolyticus in the Chesapeake Bay. Poster presentation, International Society of Exposure Sciences, Utrecht, The Netherlands, 2017.

Davis B. Food safety, statistical prediction & risk assessment. Oral presentation, Risk Analysis Branch, Division of Risk Decision Analysis, Office of Analytics and Outreach, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, MD, 2016.

Davis BJK. Use of Spatial Statistics to Predict Vibrio parahaemolyticus in the Chesapeake Bay. Oral Presentation, 67th Annual Interstate Seafood Seminar, Ocean City, MD, 2015.

Davis B, Vidal JS, Zhang J, Launer L. The alcohol paradox: The effects of alcohol consumption on brain volume and cognitive function in an aging Icelandic population. Poster Presentation, National Institutes of Health Research Festival, Bethesda MD, 2011.

Project Experience

Led an epidemiological study to evaluate associations between dairy intake or diet quality and gestational diabetes or gestational weight gain among pregnant women participating in the U.S. NHANES survey. Performed statistical analyses with complex survey weights and accounting for non-linear trends in

associations. Prepared a manuscript for publication in a peer-reviewed scientific journal.

Developed and summarized mixed-effect dose-response models for a variety of organophosphates using in vitro experiments on human and rodent blood samples. Developed novel approaches to account for stratified covariance within species. Prepared a complex technical report for submission to the U.S. EPA.

Assessed non-monotonic relationships of Bisphenol A from experiments conducted on behalf of the U.S. National Toxicology Program. Used a systematic rating method based upon criteria from RIVM (The Netherlands) and conducted analyses using the PROAST modeling program.

Compiled, integrated, and analyzed large metagenomic datasets of skin samples from human hands. Identified the prevalence and contribution of transmissible infectious diseases of the hand microbiome.

Additional Education & Training

Risk Sciences and Public Policy Certificate, 2013

Johns Hopkins Center for a Livable Future (CLF) - Lerner Fellowship, 2012-2017

Integrative Graduate Education & Research Traineeship in Water, Climate and Health. 2015-2017

Gordis Teaching Fellow, Johns Hopkins University, 2015.

Johns Hopkins Environment, Energy, Sustainability and Health Institute (E2SHI) Fellowship, 2014-2015

Research Grants

Co-Investigator. Characterizing The Spatial-Temporal Dynamics and Human Health Risks of Vibrio parahaemolyticus Bacteria in Estuarine Environments. National Institute of Allergy and Infectious Diseases, 2016-2021.

Principal Investigator. Mapping Aquaculture in Maryland and the Chesapeake Bay. Johns Hopkins Center for a Livable Future. 2013-2014.

Peer Reviews

Microbial Ecology

Microbial Risk Analysis

Mathematical Geosciences

Marine Environment Research

International Society for Photogrammetry and Remote Sensing (ISPRS) International Journal of Geo-Information.