Heidi E. Brown, Ph.D., M.P.H.

CONTACT INFORMATON

Division of Epidemiology and Biostatistics
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EDUCATION

2007	Ph.D., Division of Epidemiology of Microbial Diseases, Department of Epidemiology, Yale University
2006	M.Phil., Division of Epidemiology of Microbial Diseases, Department of Epidemiology, Yale University
1999	M.P.H., Division of Global Health, School of Public Health, George Washington University, Major: International Health Promotion
1995	B.S., Department of Psychology, Virginia Polytechnic Institute & State University, Major: Psychology, Minor: Biology

DISSERTATION & THESIS

2007	Into the Environment of Mosquito-Borne Disease: Spatial Analysis of Vector Distribution Using Traditional and Remotely Sensed Methods, Doctor of Philosophy Dissertation, Yale University, Durland Fish, Chair
1999	Rabies in Fairfax County, VA, USA, Masters of Public Health Thesis, George Washington University, Gilbert Kombe, Chair

RESEARCH EXPERIENCE

The University of Arizona, Tucson, AZ

2013 –	Assistant Professor Develop spatial and temporal statistical models of disease risk on a variety of systems (e.g., mosquitoes and West Nile virus disease, dengue, and canine heartworm; biting midges and bluetongue; fleas and plague; ticks and tularemia). Provide quantitative assessment and predictions of the association between climate change and health.

2010 – 2013 Postdoctoral Research Associate
As part of the Applied Climate for Environment and Society Laboratory, develop weather driven dynamic models of West Nile virus vector abundance. Investigate public health implications of climate change.

Texas Biomedical Research Institute, San Antonio, TX

2010 – 2011 Visiting Scientist
Conducted experiments to compare differential midgut binding affinities for multiple dengue serotype-2 strains in two mosquito populations and a study aimed at characterizing dengue disease severity in humanized mouse models under natural infection (mosquito bite versus needle inoculation). Maintain multiple mosquito strain colonies.

Centers for Disease Control and Prevention, Fort Collins, CO

2009 – 2010 Senior Service Fellow
2008 – 2009 ORISE Fellow
Determined spatial and temporal predictors of two vector-borne diseases, plague and tularemia, utilizing meteorological and land-cover information in a GIS. Organized and lead field sampling collections (16 collectors, 79 sites). Identified flea and tick specimens to species.

Oxford University, Oxford, UK

2007 – 2008 Postdoctoral Research Assistant
As a member of the Spatial Ecology and Epidemiology Research Group, identified the effect of wind in the spread of a blue tongue virus throughout northern Europe.

Yale University, New Haven, CT

2004 – 2007 Graduate Student
Graduate studies included field collections of adult and larval mosquitoes in order to develop ecological niche models using remotely sensed imagery. Identified adult and larval specimens to species.

As a member of the Vector Ecology Laboratory, designed and directed mosquito field collections in Dominica (8 collectors). This Caribbean island has sporadic dengue epidemics and at least one vector competent species, *Aedes aegypti*, is well established.

TEACHING EXPERIENCE

University of AZ, Mel and Enid Zuckerman College of Public Health, Tucson, AZ

2013, S	Intro Epidemiology	Instructor, 127 students
2013, S	Infectious Disease Epidemiology	Co-Instructor, 22 students
2012, F	Intro Health Science Statistics	Instructor, 122 students
2012, S	Intro Health Science Statistics	Instructor, 128 students

San Antonio College, San Antonio, TX

2011	Intro to Geographic Information Systems Adjunct Faculty, 10 students 4 credit Course (Lecture and Lab)

Oxford University, Oxford, UK

2007 – 2008	RS/GIS Applications to Habitat Modeling	Tutor, 8 students
2008	Biology of Vector-borne Disease	Teaching Assistant, ~25 students

Yale University, New Haven, CT

2007	Epidemiologic Methods in STD/HIV	Teaching Assistant, 18 students
2006	Observing Earth from Space	Assistant (3 wk), 45 students
2005	Epidemiologic Methods in STD/HIV	Teaching Assistant, 13 students
2005	Psychosocial Epidemiology	Teaching Assistant, 42 students
2004	Immunology for Epidemiologists	Teaching Assistant, 32 students
2004	Public Health Issues in HIV/AIDS	Teaching Assistant, 42 students

SERVICE

Mentoring

2012	Honor's Thesis Advisor, "Comparing the Effect of Natural Versus Processed Sugar on College Student's Cognitive Ability," Cassandra Votruba (B.S. Student), University of Arizona
2010	Judge, San Antonio Science Fair
2008	Committee Meeting Participant, Laura Harrup (D. Phil. Candidate), Oxford University
2007 – 2008	Mentoring and advising for undergraduate senior theses, Oxford University

Professional Memberships

American Society of Tropical Medicine and Hygiene
Society for Vector Ecology

Manuscript Reviewer

Journal of the American Mosquito Control Association
PLoS Neglected Tropical Diseases
American Journal of Tropical Medicine and Hygiene
EcoHealth
Emerging Infectious Diseases
Remote Sensing of Environment

Grant Reviewer

2012	Deutsche Forschungsgemeinschaft (German Research Group), Establish a Research Group
2011	National Science Foundation, Catalyzing New International Collaborations

AWARDS

2008 – 2009 Oak Ridge Institute for Science and Education (ORISE) Post-Doctoral Fellowship at the CDC – Fort Collins, CO (Salary and expenses)
2006 "Predicting mosquito species distribution using satellite imagery." Society for Vector Ecology 37th Annual Conference Student Presentation Award, Anchorage, AK ($200 honorarium and conference registration remission)
2004 – 2007 McDougal Fellow for Academic and Student Life- Community Service, Career Services and Coordinating Fellow, Yale University ($4,000 annual)
2003 – 2007 CDC Training Program in Vector-Borne Diseases Fellow, New Haven, CT
2002 US Delegate to the NATO Bio Medical Advisory Committee Working Group, Institute for Defense Analyses
1998 M.P.H. Merit Scholarship, George Washington University (Tuition remission for one course)

ADVANCED SOFTWARE SKILLS

Data analysis: Proficient in STATA and MS Excel, Familiar with SPSS and SAS
Geographical analysis: Proficient in ENVI, ArcGIS

INVITED TALKS

1. "Where's Cocci?: Valley Fever and the Weather." Presented at the Valley Fever Center for Excellence free public forum "Learn About Valley Fever: Ask the Doctors" at the UA Bio5 Institute, 17 November 2013
2. "Climate Change Related Health Vulnerabilities in AZ and the Southwest." At the *Climate Smart Southwest: Ready or Hot* Conference hosted by Physicians for Social Responsibility, AZ at the Tucson Convention Center (300 registrants), September 20. 2013.
3. "Climate and the re-emergence of Eastern Equine Encephalitis in the northeastern US." Invited speaker for Session 56 "Climate Change and Human Health" at the 5th International Conference on Medical Geology, Hilton Crystal City Hotel, Arlington, VA, 25-29 August 2013.
4. "Eastern Equine Encephalitis – Is climate change to blame" at the Pima County SWAT – Strategic Warriors Against Transmission in the Abrams Building of the Pima County Health Department, July 18, 2013. Invited by Babs Johnson
5. "Chapter 15: Health Effects of Climate Change in the Southwest" Webinar as part of a series discussing key chapters from the *Assessment of Climate Change in the Southwest United States: A Technical Report Prepared for the U.S. National Climate Assessment*. December 5, 2012Recording available on the CLIMAS website: www.climas.arizona.edu.
6. "Climate change and health." "The Power to Prepare Tucson: A summit to ready our communities for a changing climate," Earth Day event sponsored by the City of Tucson, World Wildlife Fund, and Action Climate Tucson, AZ. March 31, 2012
7. "Climatic predictors of the intra- and inter-annual distributions of plague cases in New Mexico based on 29 years of animal-based surveillance data." CDC- Fellow's Science Day, Fort Collins, CO. May 15, 2009
8. "Making the most of graduate school." Panelist, New Haven, CT. March 6, 2007.

9. "Finding Mosquitoes in CT Wetlands Using Hyperspectral Imagery." Sandia National Laboratories, Albuquerque, NM. February 1, 2006.

PUBLICATIONS

Peer Reviewed Publications

1. **Brown, H.E.**, Harrington, L.C., Kaufman, P.E., McKay, T., Bowman, D.D., Nelson, C.T., Wang, D. and Lund, R. "Key Factors Influencing Canine Heartworm, *Dirofilaria immitis,* in the United States." *Parasites Vectors.* 2012 5:245.
2. Sedda, L., **Brown, H.E.,** Purse, B.V., Burgin, L., Gloster, J., Rogers, D.J. "A new algorithm quantifies the roles of wind and midge flight activity in the bluetongue epizootic in North-West Europe." *Proceedings of the Royal Society Biology.* 8 February 2012. doi:10.1098/rspb.2011.2555*.*
3. Borchert, J.N., Eisen, R.J., Holmes, J.L., Atiku, L.A., Mpanga, J.T., **Brown, H.E.,** Graham, C.B., Babi, N., Montenieri, J.A., Enscore, R.E., and Gage, K.L. "Evaluation and Modification of Off-Host Flea Collection Techniques Used in Northwest Uganda: Laboratory and Field Studies." *Journal of Medical Entomology.* 2012. 49(1):210-214.
4. **Brown, H.E.,** Levy, C.E., Enscore, R.E., Schriefer, M.E., DeLiberto, T.J., Gage, K.L., Eisen, R.J. "Annual seroprevalence of *Yersinia pestis* in coyotes as predictors of interannual variation in reports of human plague cases in Arizona, USA." *Vector-Borne and Zoonotic Diseases.* 2011 Jul 14. 11(11): 1439-1446.
5. **Brown, H.E.,** Doyle, M.S., Cox, J., Eisen, R.J., Nasci, R.S. "The effect of spatial and temporal subsetting on *Culex tarsalis* abundance models - a design for the sensible reduction of vector surveillance." *Journal of the American Mosquito Control Association.* 2011. 27(2), 120-128*.*
6. Cox, J., **Brown, H.E.,** Rico-Hesse, R. "Variation in vector competence for dengue viruses does not depend on mosquito midgut binding affinity." *PLoS Neglected Diseases.* 2011, 5(5): e1172
7. **Brown, H.E.,** Yates, K., Dietrich, G., MacMillan, K., Graham, C.B., Reese, S.M., Helterbrand, W.S., Nicholson, W.L., Blount, K., Mead, P., Patrick, S.L., Eisen, R.J. "An acarological survey and *Amblyomma americanum* distribution map with implications for tularemia risk in Missouri." *American Journal of Tropical Medicine and Hygiene.* 2011, 84(3), p. 411-419.
8. **Brown, H.E.,** Ettestad, P., Reynolds, P., Brown, T., Hatton, E., Holmes, J., Glass, G., Gage, K., and Eisen, R. "Climatic predictors of the intra- and inter-annual distributions of plague cases in New Mexico based on 29 years of animal-based surveillance data." *American Journal of Tropical Medicine and Hygiene.* 2010, 82(1), p. 95-102.
9. Hartemink, N., Purse, B.V., Meiswinkel, R., **Brown, H.E.,** de Koeijer, A., Elbers, A.R., Jan Boender, G., Rogers, D.J., Heesterbeek, H. "Mapping the basic reproduction number (R_0) for vector-borne diseases: A case study on bluetongue virus." *Epidemics.* 2009, 3(1), p. 153-161.
10. Purse, B.V., **Brown, H.E.,** Harrup, L., PPC Mertens and Rogers D.J., "Invasion of bluetongue and other orbivirus infections into Europe: the role of biological and climatic processes." *Revue scientifique et technique.* 2008, 27(2), p. 427-442.

11. **Brown, H.E.,** Childs, J.E., Diuk-Wasser, M.A., and Fish, D. "Ecological factors associated with West Nile virus transmission, northeastern United States." *Emerging Infectious Diseases.* 2008, 14(10), p. 1539-1545.
12. **Brown, H.E.,** Paladini, M., Kline, D., Barnard, D., and Fish, D. "Effectiveness of mosquito traps in measuring species abundance and composition." *Journal Medical Entomology.* 2008, 45(3), p. 517-521.
13. **Brown, H.E.,** Diuk-Wasser, M.A., Andreadis, T.G., and Fish, D. "Remotely-Sensed Vegetation Indices Identify Mosquito Clusters of West Nile Virus Vectors in an Urban Landscape in the Northeastern United States." *Vector-borne and Zoonotic Diseases.* 2008, 8(2), p. 197-206.
14. **Brown, H.E.,** Diuk-Wasser, M.A., Guan, Y., Caskey, S., and Fish, D. "Comparison of three satellite sensors at three spatial scales to predict larval mosquito presence in CT Wetlands." *Remote Sensing of the Environment.* 2008, 112(5), p. 2301-2308.
15. Diuk-Wasser, M.A., **Brown, H.E.,** Andreadis, T.G., and Fish, D. "Modeling the spatial distribution of mosquito vectors for West Nile virus in Connecticut, USA." *Vector-Borne and Zoonotic Diseases.* 2006, 6(3), p. 283-95.
16. Eden, G.F., Joseph, J.E., **Brown, H.E.,** Brown, C.P., and Zeffiro, T.A. "Utilizing hemodynamic delay and dispersion to detect fMRI signal change without auditory interference: the BIG technique." *Magnetic Resonance in Medicine.* 1999, 41(1), p. 13-20.
17. Helmbrecht, G.D., Farhat, M.Y., Lochbaum, L., **Brown, H.E.,** Yadgarova, K.T., Eglinton G.S., and Ramwell, P.W. "L-Arginine reverses the adverse pregnancy changes induced by Nitric Oxide Syntase inhibition in the rat." *American Journal of Obstetrics and Gynecology.* 1996, 175 (4pt1), p. 800-805.

Book Chapters and Reports
1. **Brown, H.E.**, Comrie, A., Drechsler, D., Barker, C.M., Basu, R., Brown, T., Gershunov, A., Kilpatrick, A.M., Reisen, W.K., and Ruddell, D. *Review Editor: English, P.* Health Effects of Climate Change in the Southwest. Chapter 15, in: *Assessment of Climate Change in the Southwest United States: a Technical Report Prepared for the U.S. National Climate Assessment.* A report by the Southwest Climate Alliance [Garfin, G., Jardine, A., Merideth, R., Black, M., and Overpeck, J. (eds.)]. 2013, Tucson, AZ: Southwest Climate Alliance.
2. Hudspeth, W., Reisen, W.K., Barker, C.M., Kramer, V., Caian, M., Craciunescu, V., **Brown, H.E.,** Comrie, A.C., Zelicoff, A., Ward, T.G., Ragain, R.M., Simpson, G., Stanhope, W., Kass-Hout, T.A., Scharl, A., Sonricker, A.L., Brownstein, J.S. to "Chapter 10: Information Support Systems" *in* Environmental Tracking for Public Health Surveillance. Morain, S.A. and Budge, A.M.(eds). 2012*,* Taylor & Francis Group, London*.*
3. Caskey, S., Smartt, H., **Brown, H.E.,** Aspelin, M., Fish, D., Diuk-Wasser, M., and Wilson, M. "Entomological Remote Sensing Model for Vector-borne Disease Detection (EDD)." Albuquerque, NM: Sandia National Laboratories. 2006, SAND2006-6937.
4. Bombardt, J. N. and **Brown, H.E.** "Potential Influenza Effects on Military Populations." Alexandria, VA: Institute for Defense Analyses. 2004, IDA Paper P-3786.
5. Co Author, "An Operational Concept for Biological Defense." 2002, Alexandria, VA: Institute for Defense Analyses.

6. Burr, J.K. and **Brown, H.E.** "Development of Operational Concepts for Medical Response to Biological Agent Attacks." 2001, Alexandria, VA: Institute for Defense Analyses. IDA Document D-2610.
7. **Brown, H.E.** and Burr, J.K. "Historical Review of Military Support to Civilian Infectious Disease Outbreaks." 2001, Alexandria, VA: Institute for Defense Analyses. IDA Paper P-3654.

GRANTS
Completed Grants

Source Title Role Summary	Period of Funding Funds
Northeast Mosquito Control Association's McColgan Grant-in-Aid	11/2005
Hyperspectral Image Analysis and Mosquito Sampling PI	$2,000
The purpose of this grant was to support research regarding identification of wetland types using hyperspectral image analysis and mosquito sampling.	
Yale University Council on Southeast Asia Studies Student Grants	July – August 2005
Modeling of Vector-Borne Disease Epidemics PI	$2,000
The purpose of this grant was to support summer work with the Institute for Research Development at Mahidol University, Bangkok Thailand regarding "Modeling of Vector-Borne Disease Epidemics.	
The Institute for Defense Analyses Central Reviewed Project	2002
Historical Review of Military Support to Civilian Infectious Disease Outbreaks PI	$22,000
The purpose of this grant was to investigate the role of infectious disease research in U.S. military and to review how such efforts supported civilian public health.	