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Education

Ph.D. Biostatistics, Johns Hopkins Bloomberg School of Public Health, 2012

Thesis title: *Statistical analysis of multisite time series data for estimating health effects of environmental exposures*

Advisor: Roger D. Peng, Associate Professor, Department of Biostatistics

B.A. Mathematics, *summa cum laude*, Washington University in St. Louis, 2006

Professional Experience

Assistant investigator, Biostatistics Unit, Group Health Research Institute, 2015–present

Research associate, Department of Biostatistics, Harvard T.H. Chan School of Public Health, 2013–2015

Postdoctoral fellow, Department of Biostatistics, Harvard T.H. Chan School of Public Health, 2012–2013

Research assistant, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, 2008–2011

Student software developer, R Project for Statistical Computing, Google Summer of Code, 2011

Data analyst, Career Services and Disability Support Office, Johns Hopkins Bloomberg School of Public Health, 2008–2010

Research assistant, Johns Hopkins Asthma and Allergy Center, 2009

Research assistant, Department of Critical Care Medicine, University of Pittsburgh, summer 2006

Honors and Awards

Junior Researcher Travel Award, Women in Statistics Conference, 2014

John M. Chambers Statistical Software Award, ASA Section on Statistical Computing, 2012

Statistics in Epidemiology Young Investigator Award, ASA Section on Statistics in Epidemiology, 2011

Louis I. and Thomas D. Dublin Award for the Advancement of Epidemiology and Biostatistics, Johns Hopkins Bloomberg School of Public Health, 2011

First place, Delta Omega Biostatistics Poster Competition, Johns Hopkins Bloomberg School of Public Health, 2011

Sommer Scholar, Johns Hopkins Bloomberg School of Public Health, 2007–2011

NIH Environmental Biostatistics Training Grant, 2007–2011

Washington University Dean's Scholarship, 2002–2006

Sigma Xi, scientific research honorary, 2006

NSF Research Experience for Undergraduates, Summers 2004, 2005

Publications

Published or in press

School JLC, **Bobb JF**, Savitz DA, Ito K, Matte TD, Johnson S, Elston B, Ross Z, Dominici F, Clougherty JE. Area-level socioeconomic deprivation, nitrogen dioxide exposure, and term birth weight in New York City. *Environmental Health*. In press.

Savitz DA, Elston B, **Bobb JF**, Clougherty JE, Dominici F, Ito K, Johnson S, McAlexander T, Ross Z, School JLC, Matte TD, Wellenius GA. Ambient fine particulate matter, nitrogen dioxide, and hypertensive disorders of pregnancy in New York City. *Epidemiology*. In press.

Bobb JF, Valeri L, Claus Henn B, Christiani DC, Wright RO, Mazumdar M, Godleski JJ, Coull BA (2015). Bayesian kernel machine regression for estimating the health effects of multi-pollutant mixtures. *Biostatistics*. 16(3):493–508

*Featured in a [Researcher Spotlight](#) by the Harvard T.H. Chan School of Public Health Superfund Program

Bobb JF, Obermeyer Z, Wang Y, Dominici F (2014). Cause-specific risk of hospital admission related to extreme heat in older adults. *Journal of the American Medical Association*. 312(24):2659–2667

Coull BA, **Bobb JF**, Wellenius GA, Kioumourtzoglou M, Mittleman MA, Koutrakis P, Godleski JJ. New statistical methods for analyzing multiple pollutants, sources, and health outcomes. Part I: Statistical learning methods for the effects of multiple air pollution constituents. *Health Effects Institute*. Report 183

Bobb JF, Peng RD, Bell ML, Dominici F (2014). Heat-related mortality and adaptation to heat in the United States. *Environmental Health Perspectives*. 122:811–816. doi: 10.1289/ehp.1307392

*Featured as a [Science Selection](#) by Environmental Health Perspectives

Savitz DA, **Bobb JF**, Carr JL, Clougherty JE, Dominici F, Elston B, Ito K, Ross Z, Yee M, Matte TD (2014). Ambient fine particulate matter, nitrogen dioxide, and term birth weight in New York City. *American Journal of Epidemiology*. 179(4):457–66

Bobb JF, Schwartz BS, Davatzikos C, Caffo B (2014). Cross-sectional and longitudinal association of body mass index and brain volume. *Human Brain Mapping*. 35(1):75–88

Roberts AL, Lyall K, Hart JE, Laden F, Just AC, **Bobb JF**, Koenen KC, Ascherio A, Weisskopf MG (2013). Perinatal air pollutant exposures and autism spectrum disorder in the children of Nurses' Health Study II participants. *Environmental Health Perspectives*. 121(8):978–84

Bobb JF, Dominici F, Peng RD (2013). Reduced hierarchical models with application to estimating health effects of simultaneous exposure to multiple pollutants. *Journal of the Royal Statistical Society, Series C*. 62(3):451–472

James BD, Glass TA, Caffo B, **Bobb JF**, Davatzikos C, Yousem D, Schwartz BS (2012). Association of social engagement with brain volumes assessed by structural MRI. *Journal of Aging Research*. vol. 2012, Article ID 512714, 9 pages. doi:10.1155/2012/512714.

Bobb JF, Dominici F, Peng RD (2011). A Bayesian model averaging approach for estimating the relative risk of mortality associated with heat waves in 105 U.S. cities. *Biometrics*. 67(4):1605–1616
*Received Statistics in Epidemiology Young Investigator Award

Bobb JF, Scharfstein DO, Daniels MJ, Collins FS, Kelada SN (2011). Multiple imputation of missing phenotype data for QTL mapping. *Statistical Applications in Genetics and Molecular Biology*. Vol. 10: Iss. 1, Article 29.

Peng RD, **Bobb JF**, Tebaldi C, McDaniel L, Bell ML, Dominici F (2011). Toward a quantitative estimate of future heat wave mortality under global climate change. *Environmental Health Perspectives*. 119(5):701–706.

Goldsmith J, **Bobb J**, Crainiceanu C, Caffo B, Reich D (2011). Penalized functional regression. *Journal of Computational and Graphical Statistics*. 20(4):830–851.

Eisenstat D, **Feder (Bobb) J**, Francos G, Gordon G, Redlich A (2008). Expected rank and randomness in rooted graphs. *Discrete Applied Mathematics*. 156(5):746–756.

Under review

Johnson S, **Bobb JF**, Ito K, Elston B, Matte T, Shmool JLC, Dominici F, Ross Z, McAlexander T, Clougherty JE, Savitz D. The association between ambient fine particulate matter, nitrogen dioxide, and preterm birth.

Wang Y, **Bobb JF**, Papi B, Wang R, Kosheleva A, Di Q, Schwartz JD, Dominici F. Heat stroke admissions during heat waves in 1,916 US counties for the period from 1999 to 2010 and their effect modifiers.

In progress

Valeri L, **Bobb JF**, Claus Henn B, Bellinger DC, Wright RO, Christiani DC, Coull BA, Mazumdar M. Metal mixtures exposure and child neurodevelopment: evidence from rural and urban Bangladesh.

Claus Henn B, **Bobb JF**, Valeri L, Mazumdar M, Christiani DC, Bellinger DC, Coull BA, Wright RO. Associations between combined exposure to multiple metals and neurodevelopment in a US cohort.

Ito K, **Bobb JF**, Johnson S, Clougherty JE, Schmool JLC, Dominici F, Elston B, Ross Z, McAlexander T, Savitz D, Matte T. Fine Particulate Matter Chemical Components, Emission Source Indicators, and Term Birth Weight in New York City.

Teaching Experience

Mentoring

Shelley Liu (co-mentor with Brent Coull), 2013–present, Ph.D. candidate, Harvard T.H. Chan School of Public Health. Advising on the development of statistical methods for time-varying, multi-pollutant mixtures. Served on oral exam committee.

Bianca Papi (co-mentor with Francesca Dominici), 2013–2015, M.A., Sapienza University of Rome. Advised on masters thesis. Paper in progress: *Temporal and spatial variability of heat wave-related heat stroke admissions in the United States*.

Elizabeth Smoot (co-mentor with Francesca Dominici), 2014–2015, Ph.D. candidate, Harvard T.H. Chan School of Public Health. Paper in progress: *Hospital admission causes related to acute fine particulate air pollution exposure in older adults*.

Stephanie Hopp (co-mentor with Francesca Dominici), 2014–present, Candidate for Post-Baccalaureate Certificate in Pre-Medical Studies, Boston University. Advising on thesis project to investigate hospital discharge diagnoses associated with heat wave exposure.

Fei Jiang (co-mentor with Francesca Dominici), 2014–2015, Postdoctoral fellow, Harvard T.H. Chan School of Public Health. Advising on the development of a spatial-temporal model of heat wave-related hospitalizations.

Frederick Cudhea (co-mentor with Francesca Dominici), 2014–2015, Postdoctoral fellow, Harvard T.H. Chan School of Public Health. Advising on the development of an hierarchical imputation model of missing nutrition data arising from heterogeneous data sources.

Guest lectures

“Quantifying future mortality attributable to extreme heat under global climate change: A case study of Bayesian methodology in environmental health,” Bayesian Methodology in Biostatistics, Harvard T.H. Chan School of Public Health, 2012, 2013

“Bayesian methods for estimating health risks of environmental exposures,” Advanced Methods in Biostatistics IV, Johns Hopkins Bloomberg School of Public Health, 2011

Advanced Methods in Biostatistics II, Johns Hopkins Bloomberg School of Public Health, 2010

Design of Clinical Experiments, Johns Hopkins Bloomberg School of Public Health, 2010

Methods in Biostatistics IV, Johns Hopkins Bloomberg School of Public Health, 2009

Teaching assistant, Johns Hopkins Bloomberg School of Public Health

Advanced Methods in Biostatistics II–IV (Doctoral level), 2010–2011

Design of Clinical Experiments, 2010

Data Analysis Workshop I–II, Summers 2009, 2010

Multilevel Statistical Models in Public Health, 2009

Analysis of Longitudinal Data, 2009

Essentials of Probability and Statistical Inference I–II (Masters level), 2009

Methods in Biostatistics I–IV (Masters level), 2008–2009

Research Grant Participation

Principal investigator (GHRI sub.), NIH/NIEHS R01 ES024332 (PI: Zanobetti) 01/05/15–02/28/19
Cardiovascular health and air pollution: a national study

This project will quantify the acute and chronic cardiovascular effects of PM_{2.5} using improved exposure at a smaller scale than has been previously studied, including rural populations, and at low concentrations. The results will provide a strong evidence base for developing the most cost effective and beneficial air quality interventions.

Principal investigator, HSPH-NIEHS Center P30ES000002 04/01/15–03/31/16

A statistical approach for estimating the health effects of air pollution mixtures on multiple outcomes simultaneously

We will develop a new scientific and statistical paradigm for analyzing concurrently a massive number of health outcomes. This project will enable us to study, for the first time, the short-term effects of exposure to air pollution mixtures on more than 15,000 ICD-9 codes simultaneously, rather than on pre-specified individual conditions. Knowledge of the range of health responses that are affected by air pollution mixtures will inform public health approaches to prevention.

Co-investigator, NIH/NIEHS R21 ES024012 (PI: Zanobetti) 08/19/14–07/31/16

Chronic effects of weather fluctuations: population susceptibility and adaptation

This project will estimate the chronic mortality and morbidity effects of long-term exposure to fluctuations in temperature and humidity in a large nationally representative cohort of elderly. To provide insight into vulnerability and susceptibility, we will identify which individual- and community-level factors explain temporal and spatial heterogeneity in these health risks.

Completed

Co-investigator, NIH/NIEHS R21 ES022585 (PI: Dominici) 09/01/13–11/30/15

Vulnerability and adaptation to heat and air pollution in a changing climate

To mitigate the public health consequences of climate change we need to recognize the synergy due to concurrent changes in several environmental stressors and that populations will adapt. This is the first national study that will characterize the public health consequences of changes in both heat and air pollution under changing climate. By strengthening our understanding of which communities and populations will be most vulnerable and of how they will adapt, we will greatly impact the development of environmental interventions.

Postdoctoral fellow, NIH/NIEHS R01 ES019955 (PI: Savitz) 07/01/11–03/31/15

Air Pollution and Pregnancy Outcome in New York City

We propose to examine the relationship between air pollution and pregnancy outcome in New York City to help determine whether there is a causal link, focusing on the effect of particulate air pollution in late pregnancy on preterm birth and reduced fetal growth.

Software

Bobb JF, Zhao H, Varadhan R. turboEM: A Suite of Convergence Acceleration Schemes

for EM and MM algorithms. R package.

*Winner of the 2012 John M. Chambers Statistical Software Award

Presentations

“Identification of acute health conditions during extreme heat events.” Poster, Women in Statistics Conference, Cary, NC, 2014

“Identifying the constellation of emergency health conditions most sensitive to extreme heat.” Poster, ENAR Spring Meeting, Baltimore, MD, 2014

“Ambient fine particulate matter, nitrogen dioxide, and term birth weight in New York City.” Clean Air Research Center, Harvard T.H. Chan School of Public Health, 2013

“Statistical methods for estimating health effects of simultaneous exposure to multiple pollutants.” Work-in-Progress Webinar, Clean Air Research Center, Environmental Protection Agency, 2013

“Bayesian kernel machine regression for estimating the health effects of multi-pollutant mixtures.” International Society for Environmental Epidemiology, Basel, Switzerland, 2013

“Bayesian kernel machine regression for estimating the health effects of air pollution mixtures.” Joint Statistical Meetings, Montreal, Canada, 2013

“Bayesian kernel machine regression for estimating the health effects of environmental mixtures.” Superfund Research Program, Harvard T.H. Chan School of Public Health, 2013

“Bayesian kernel machine regression for estimating the health effects of environmental mixtures.” Environmental Statistics Seminar, Harvard T.H. Chan School of Public Health, 2013

“Accounting for uncertainty in estimating the health effects of climate change.” Special Seminar, Harvard T.H. Chan School of Public Health, 2013

“Bayesian kernel machine regression for estimating the health effects of air pollution mixtures.” Clean Air Research Center, Harvard T.H. Chan School of Public Health, 2013

“Challenges of estimating the health impacts of extreme heat under global climate change.” P01/ Environmental Statistics Retreat, Harvard T.H. Chan School of Public Health, 2013

“Integration and benchmarking of state-of-art convergence accelerators of the EM algorithm.” *Enhancing the EM Algorithm by Leveraging Modern Advances in Computing*. Joint Statistical Meetings, San Diego, CA, 2012

“Reduced Bayesian hierarchical models: Estimating health effects of simultaneous exposure to multiple pollutants.” *Statistical Challenges of Spatial Multi-Pollutant Data in Environmental Epidemiology*. ENAR Spring Meeting, Washington, DC, 2012

“Reduced Bayesian hierarchical models for high-dimensional, clustered data.” Poster, Statistical Methods for Very Large Datasets Conference, Baltimore, MD, 2011

“Statistical analysis of multisite time series data for estimating health effects of environmental exposures.” Environmental Statistics Seminar, Harvard T.H. Chan School of Public Health, 2011

“Accounting for model uncertainty in estimating the relative risk of mortality associated with heat waves.” *Symposium: Heat or heat waves? Does it matter which epidemiologists study?* International Society for Environmental Epidemiology, Barcelona, Spain, 2011

“A Bayesian model averaging approach for estimating the relative risk of mortality associated with heat waves in 105 U.S. cities.” Joint Statistical Meetings, Miami Beach, FL, 2011

*Statistics in Epidemiology Young Investigator Award recipient

“On eliminating nuisance parameters in Bayesian hierarchical models.” Environmental Biostatistics and Epidemiology Working Group, Johns Hopkins Bloomberg School of Public Health, 2011

“A Bayesian model averaging approach for estimating the relative risk of mortality associated with heat waves in 105 U.S. cities.” Delta Omega Poster Competition, Johns Hopkins Bloomberg School of Public Health, 2011

*First place, Delta Omega Biostatistics Poster Competition

“A Bayesian model averaging approach for estimating the relative risk of mortality associated with heat waves in 105 U.S. cities.” ENAR Spring Meeting, Miami, FL, 2011

“Displaying data.” Department of Biostatistics Student Journal Club, Johns Hopkins Bloomberg School of Public Health, 2010

“A Bayesian model averaging approach for estimating the relative risk of mortality associated with heat waves in 105 U.S. cities.” Environmental Biostatistics and Epidemiology Working Group, Johns Hopkins Bloomberg School of Public Health, 2010

“Advice for conducting statistical research.” Department of Biostatistics Student Journal Club, Johns Hopkins Bloomberg School of Public Health, 2009

“Quantifying the health effects of heat waves, present and future.” Environmental Biostatistics and Epidemiology Working Group, Johns Hopkins Bloomberg School of Public Health, 2009

“Assessing air pollution interventions.” Environmental Biostatistics and Epidemiology Working Group, Johns Hopkins Bloomberg School of Public Health, 2008

Professional Memberships

American Public Health Association

American Statistical Association

Eastern North American Region, International Biometric Society

Computing Skills

R, L^AT_EX, SAS, STATA, WinBUGS, Stan, C++, Visual Basic, Git, Sun Grid Engine, Simple Linux Utility for Resource Management, and Microsoft Office

Service

Peer reviewer

American Journal of Epidemiology
Annals of Applied Statistics
Biometrics
Biostatistics
BMC Public Health
British Medical Journal
Environmental Health
Environmental Health Perspectives
Epidemiology
International Journal of Biometeorology
Journal of Agricultural, Biological, and Environmental Statistics
Journal of the Royal Statistical Society (Series C)
Nature Climate Change
PLOS One
Science of the Total Environment
Statistics in Medicine.

Co-organizer, Complex Mixtures Analysis Working Group, Harvard T.H. Chan School of Public Health, 2012–2014

Session chair, Joint Statistical Meetings, 2012

Organizer, Student Journal Club, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, 2009–2010

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