Joshua L. Warren

Contact Information

Department of Biostatistics
Yale School of Public Health
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Research Interests

Bayesian analyses; Bayesian nonparametrics; environmental health; glaucoma; infectious diseases; reproductive epidemiology; spatial and spatiotemporal statistics.

Education

North Carolina State University, Raleigh, North Carolina USA

Ph.D. Statistics; July 2011

- Dissertation Topic: Spatial-Temporal Modeling of the Association between Air Pollution Exposure and Birth Outcomes
- Advisor: Professor Montserrat Fuentes

Professional Experience

Department of Biostatistics, Yale School of Public Health
Yale University
New Haven, Connecticut

- *Associate Professor of Biostatistics* **July 2019 - Present**
- *Assistant Professor of Biostatistics* **July 2014 - June 2019**
  - *Public Health Modeling Concentration Faculty Member*
  - *Yale Climate Change and Health Initiative Affiliated Faculty Member*

Department of Biostatistics, Gillings School of Global Public Health
The University of North Carolina at Chapel Hill
Chapel Hill, North Carolina

- *Postdoctoral Research Associate* **August 2011 - July 2014**

Publications

***Indicates mentored student first author/senior author**

Refereed Journal Articles:

Mohammad AY, **Warren JL**, and Pitzer VE (2019). Diarrhea patterns and climate: a spatiotemporal analysis of diarrheal disease in Afghanistan. *American Journal of Tropical Medicine & Hygiene*, In Press.

*Mehra R, Kershaw T, Ickovics J, Keene D, and **Warren JL** (2019). Race/ethnicity, nativity, and adverse birth outcomes: differences by racial residential segregation. *SSM - Population Health*, In Press.

Warren JL, Kong W, Luben TJ, and Chang HH (2019). Critical window variable selection: estimating the impact of air pollution on very preterm birth. *Biostatistics*, In Press.

Liu Y, **Warren JL**, and Zhao H (2019). A hierarchical Bayesian model for single-cell clustering using RNA-sequencing data. *Annals of Applied Statistics*, In Press.

Strickland MJ, Lin Y, Darrow LA, **Warren JL**, Mulholland JA, and Chang HH (2019). Associations between ambient air pollutant concentrations and birth weight: a quantile regression analysis. *Epidemiology*, In Press.

*Berchuck SI, Mwanza JC, and **Warren JL** (2019). Diagnosing glaucoma progression with visual field data using a spatiotemporal boundary detection method. *Journal of the American Statistical Association*, In Press.

Zeng L, **Warren JL**, and Zhao H (2019). Phylogeny-based tumor subclone identification using a Bayesian feature allocation model. *Annals of Applied Statistics*, 13(2):1212-1241.

Weinberger DM, **Warren JL**, Dalby T, Shapiro ED, Valentiner-Branth P, Slotved HC, and Harboe ZB (2019). Differences in the impact of pneumococcal serotype replacement in individuals with and without underlying medical conditions. *Clinical Infectious Diseases*, 69(1):100-106.

Rappazzo KM, **Warren JL**, Davaolos AD, Meyer RE, Sanders AP, Brownstein NC, and Luben TJ (2019). Maternal residential exposure to specific agricultural pesticide active ingredients and birth defects in a 2003-2005 North Carolina birth cohort. *Birth Defects Research*, 111(6):312-323.

*Berchuck SI, Mwanza JC, Tanna AP, Budenz DL, and **Warren JL** (2019). Improved detection of visual field progression using a spatiotemporal boundary detection method. *Scientific Reports*, 9(1):4642.

*Berchuck SI, Mwanza JC, and **Warren JL** (2019). A spatially varying change points model for monitoring glaucoma progression using visual field data. *Spatial Statistics*, 30(2019):1-26. (Winner of *RAB Poster Competition Award*, ENAR 2018)

Chadha N, **Warren JL**, Liu J, Tsai JC, and Teng CC (2019). Seven- and eight-year trends in resident and fellow glaucoma surgical experience. *Clinical Ophthalmology*, 2019(13):303-309.

Regan AK, Ball SJ, **Warren JL**, Malacova E, Padula A, Marston C, Nassar N, Stanley F, Leonard H, de Klerk N, and Pereira G (2019). A population-based matched sibling analysis estimating the association between first interpregnancy interval and birth outcomes. *American Journal of Epidemiology*, 188(1):9-16.

Shioda K, Schuck-Paim C, Taylor RJ, Lustig R, Simonsen L, **Warren JL**, and Weinberger DM (2019). Challenges in estimating the impact of vaccination with sparse data. *Epidemiology*, 30(1):61-68.

Nealy BE, **Warren JL**, Strickland MJ, Darrow LA, and Chang HH (2018). Impacts of gestational age uncertainty in estimating associations between preterm birth and ambient air pollution. *Environmental Epidemiology*, 2(4):e031.

Cudahy PGT, **Warren JL**, Cohen T, and Wilson D (2018). Trends in CRP, D-dimer and fibrinogen during therapy for HIV associated multidrug resistant tuberculosis. *American Journal of Tropical Medicine & Hygiene*, 99(5):1336-1341.

*Gonsalves GS, Copple JT, Johnson JT, Paltiel AD, and **Warren JL** (2018). Bayesian adaptive algorithms for locating HIV mobile testing services. *BMC Medicine*, 16(155):1-13.

Silva GS, **Warren JL**, and Deziel NC (2018). Spatial modeling to identify sociodemographic predictors of hydraulic fracturing wastewater injection wells in Ohio census block groups. *Environmental Health Perspectives*, 126(6):1-8.

Elliott EG, Ma X, Leaderer BP, McKay LA, Pedersen CJ, Wang C, Gerber CJ, Wright TJ, Sumner AJ, Brennan M, Silva G, **Warren JL**, Plata DL, and Deziel NC (2018). A community-based evaluation of proximity to unconventional oil and gas wells, drinking water contaminants, and health symptoms in Ohio. *Environmental Research*, 167(2018):550-557.

Warren JL, Grandjean L, Moore DAJ, Lithgow A, Coronel J, Sheen P, Zelner JL, Andrews JR, and Cohen T (2018). Investigating spillover of multidrug-resistant tuberculosis from a prison: a spatial and molecular epidemiological analysis. *BMC Medicine*, 16(122):1-9.

Hussnain SA, Kovacs KD, **Warren JL**, and Teng CC (2018). Corneal hysteresis and anterior segment optical coherence tomography anatomical parameters in primary angle closure suspects. *Clinical and Experimental Ophthalmology*, 46(5):468-472.

Yang C, Lu L, **Warren JL**, Wu J, Jiang Q, Zuo T, Gan M, Liu M, Liu Q, DeRiemer K, Hong J, Shen X, Colijn C, Guo X, Gao Q, and Cohen T (2018). Internal migration and the transmission dynamics of tuberculosis in Shanghai, China: a prospective epidemiological, spatial, and genomic analysis. *The Lancet Infectious Diseases*, 18(7):788-795.

Warren JL and Gordon-Larsen P (2018). Factors associated with supermarket and convenience store closure: a discrete-time spatial survival modeling approach. *Journal of the Royal Statistical Society: Series A*, 181(3):783-802.

Warren JL, Son J, Pereira G, Leaderer BP, and Bell ML (2018). Investigating the impact of maternal residential mobility on identifying critical windows of susceptibility to ambient air pollution during pregnancy. *American Journal of Epidemiology*, 187(5):992–1000. (Editor's Choice)

Mwanza JC, **Warren JL**, and Budenz DL. Utility of combining spectral domain optical coherence tomography structural parameters for the diagnosis of early glaucoma: a mini-review (2018). *Eye and Vision*, 5(9).

Mwanza JC, Lee G, Budenz DL, **Warren JL**, Wall M, Artes PH, Callan T, and Flanagan JG (2018). Validation of the UNC OCT Index for the Diagnosis of Early Glaucoma. *Translational Vision Science & Technology*, 7(2):16.

Deziel NC, Humeaua Z, **Warren JL**, and Niccolai LC (2018). Shale gas activity and increased rates of sexually transmitted infections in Ohio, 2000–2016. *PLoS ONE*, 13(3):e0194203.

Cassell K, Gacek P, **Warren JL**, Raymond PA, Cartter M, and Weinberger DM (2018). Association between sporadic legionellosis and river systems in Connecticut. *The Journal of Infectious Diseases*, 217(2):179-187. (Editor's Choice)

Benz L, Wrensch MR, Schildkraut JM, Bondy ML, **Warren JL**, Wiemels JL, and Claus EB (2018). Quality of life after surgery for intracranial meningioma. *Cancer*, 124(1):161-166.

Kurum E, **Warren JL**, Schuck-Paim C, Lustig R, Lewnard J, Fernandes RM, Fuentes R, Bruhn CAW, Taylor RJ, Simonsen L, and Weinberger DM (2017). Bayesian model averaging with change points to assess the impact of vaccination and public health interventions. *Epidemiology*, 28(6):889-897. (Winner of 2018 *Kenneth Rothman Epidemiology Prize Paper Award*)

Warren JL, Shioda K, Kurum E, Schuck-Paim C, Lustig R, Taylor RJ, Simonsen L, and Weinberger DM (2017). Impact of pneumococcal conjugate vaccines against pneumonia hospitalizations in high- and low-income sub-populations in Brazil. *Clinical Infectious Diseases*, 65(11):1813-1818.

*Sun J, Herazo-Maya JD, Kaminski N, and Zhao H, **Warren JL** (2017). A Dirichlet process mixture

model for clustering longitudinal gene expression data. *Statistics in Medicine*, 36(22):3495-3506.

Sun J, **Warren JL**, and Zhao H (2017). A Bayesian semiparametric factor analysis model for subtype identification. *Statistical Applications in Genetics and Molecular Biology*, 16(2):145–158.

Antillon M, **Warren JL**, Crawford FW, Weinberger DM, Kurum E, Pak GD, Marks F, and Pitzer VE (2017). The burden of typhoid fever in low- and middle-income countries: a meta-regression approach. *PLOS Neglected Tropical Diseases*, 11(2):e0005376.

Bruhn CA, Hetterich S, Schuck-Paim C, Kurum E, Taylor RJ, Lustig R, Shapiro ED, **Warren JL**, Simonsen L, and Weinberger DM (2017). Estimating the population-level impact of vaccines using synthetic controls. *Proceedings of the National Academy of Sciences*, 114(7):1524-1529.

Warren JL, Pingali SC, and Weinberger DM (2017). Spatial variability in the persistence of pneumococcal conjugate vaccine-targeted pneumococcal serotypes among adults. *Epidemiology*, 28(1):119-126.

Noveroske DB, **Warren JL**, Pitzer VE, and Weinberger DM (2016). Local variations in the timing of RSV epidemics. *BMC Infectious Diseases*, 16(1):674.

Warren JL, Mwanza JC, Tanna AP, and Budenz DL (2016). A statistical model to analyze clinician expert consensus on glaucoma progression using spatially correlated visua field data. *Translational Vision Science & Technology*, 5(4):14.

Warren JL, Perez-Heydrich C, Burgert CR, and Emch ME (2016). Influence of Demographic and Health Survey point displacements on distance-based analyses. *Spatial Demography*, 4(2):155-173.

Perez-Heydrich C, **Warren JL**, Burgert CR, and Emch ME (2016). Influence of Demographic and Health Survey point displacements on raster-based analyses. *Spatial Demography*, 4(2):135-153.

Warren JL, Perez-Heydrich C, Burgert CR, and Emch ME (2016). Influence of Demographic and Health Survey point displacements on point-in-polygon analyses. *Spatial Demography*, 4(2):117-133.

Weinberger DM, Grant LR, Weatherholtz RC, **Warren JL**, O'Brien KL, and Hammitt LL (2016). Relating pneumococcal carriage among children with disease rates among adults before and after introduction of conjugate vaccines. *American Journal of Epidemiology*, 183(11):1055-1062.

Warren JL, Stingone JA, Herring AH, Luben TJ, Fuentes M, Aylsworth AS, Langlois PH, Botto L, Correa A, Olshan AF, and the National Birth Defects Prevention Study (2016). Bayesian multinomial probit modeling of daily windows of susceptibility for maternal $PM_{2.5}$ exposure and congenital heart defects. *Statistics in Medicine*, 35(16):2786-2801.

Rappazzo KM, **Warren JL**, Meyer RE, Herring AH, Sanders AP, Brownstein NC, and Luben TJ (2016). Maternal residential exposure to agricultural pesticides and birth defects in a 2003-2005 North Carolina birth cohort. *Birth Defects Research Part A: Clinical and Molecular Teratology*, 106(4):240-249.

Pingali SC, **Warren JL**, Mead AM, Sharova N, Petit S, and Weinberger DM (2016). Association between local pediatric vaccination rates and patterns of pneumococcal disease in adults. *The Journal of Infectious Diseases*, 213(4):509-515.

*Berchuck SI, **Warren JL**, Herring AH, Evenson KR, Moore KAB, Kesavan YK, and Diez-Roux AV (2016). Spatially modelling the association between access to recreational facilities and exercise: the 'Multi-ethnic study of atherosclerosis'. *Journal of the Royal Statistical Society: Series A*, 179(1):293-

310.

Mwanza JC, Kim H, Budenz DL, **Warren JL**, Lawrence SD, Jani PD, Thompson GS, and Lee RK (2015). Residual and dynamic range of retinal nerve fiber layer thickness in glaucoma: comparison of three OCT platforms. *Investigative Ophthalmology & Visual Science*, 56(11):6344-6351.

*Nethery RC, **Warren JL**, Herring AH, Moore KAB, and Diez-Roux AV (2015). A common spatial factor analysis model for measured neighborhood-level characteristics: the multi-ethnic study of atherosclerosis. *Health and Place*, 36:35-46.

Weinberger DM, **Warren JL**, Steiner CA, Charu V, Viboud C, and Pitzer VE (2015). Reduced-dose schedule of prophylaxis based on local data provides near-optimal protection against RSV. *Clinical Infectious Diseases*, 61(4):506-514.

Chang HH, **Warren JL**, Darrow LA, Reich BJ, and Waller LA (2015). Assessment of critical exposure and outcome windows in time-to-event analysis with application to air pollution and preterm birth study. *Biostatistics*, 16(3):509-521.

Lamichhane AP, **Warren JL**, Peterson M, Rummo P, and Gordon-Larsen P (2015). Spatial-temporal modeling of neighborhood sociodemographic characteristics and food stores. *American Journal of Epidemiology*, 181(2):137-150.

Mwanza JC, Budenz DL, **Warren JL**, Webel AD, Reynolds CE, Barbosa DT, and Lin S (2015). Retinal nerve fiber layer thickness floor and corresponding functional loss in glaucoma. *British Journal of Ophthalmology*, 99(6):732-737.

Mwanza JC, **Warren JL**, Hochberg JT, Budenz DL, Chang RT, and Ramulu PY (2015). Combining frequency doubling technology perimetry and scanning laser polarimetry for glaucoma detection. *Journal of Glaucoma*, 24(8):561-567.

Sanders AP, Desrosiers TA, **Warren JL**, Herring AH, Enright D, Olshan AE, Meyer RE, and Fry RC (2014). Association between arsenic, cadmium, manganese, and lead levels in private wells and birth defects prevalence in North Carolina: an ecologic study. *BMC Public Health*, 14(1):955.

Warren JL, Luben TJ, Sanders AP, Brownstein NC, Herring AH, and Meyer RE (2014). An evaluation of metrics for assessing maternal exposure to agricultural pesticides. *Journal of Exposure Science and Environmental Epidemiology*, 24(5):497-503.

Mwanza JC, **Warren JL**, Budenz DL, and the Ganglion Cell Analysis Study Group (2013). Combining spectral domain optical coherence tomography structural parameters for the diagnosis of glaucoma with early visual field loss. *Investigative Ophthalmology & Visual Science*, 54(13):8393-8400.

Lamichhane AP, **Warren JL**, Puett R, Porter DE, Bottai M, Mayer-Davis EJ, and Liese AD (2013). Spatial patterning of supermarkets and fast food outlets with respect to neighborhood characteristics. *Health and Place*, 23:157-164.

Warren JL, Perez-Heydrich C, and Yunus M (2013). Bayesian spatial design of optimal deep tubewell locations in Matlab, Bangladesh. *Environmetrics*, 24(6):377-386.

Meng Q, Richmond-Bryant J, Lu S, Buckley B, Welsh WJ, Whitsel EA, Hanna A, Yeatts KB, **Warren JL**, Herring AH, and Xiu A (2013). Cardiovascular outcomes and the physical and chemical properties of metal ions found in particulate matter air pollution: a QICAR study. *Environmental Health Perspectives*, 121(5):558-564.

Warren JL, Fuentes M, Herring AH, and Langlois PH (2013). Air pollution metric analysis while determining susceptible periods of pregnancy for low birth weight. *ISRN Obstetrics and Gynecology*, 2013:387452.

Warren JL, Fuentes M, Herring AH, and Langlois PH (2012). Bayesian spatial-temporal model for cardiac congenital anomalies and ambient air pollution risk assessment. *Environmetrics*, 23(8):673-684.

Warren JL, Fuentes M, Herring AH, and Langlois PH (2012). Spatial-temporal modeling of the association between air pollution exposure and preterm birth: identifying critical windows of exposure. *Biometrics*, 68(4):1157-1167. (Winner of 2012 *Best Paper in Biometrics Award*)

Book Chapters:

Warren JL and Bell ML. Alternative models for estimating air pollution exposures - land use regression and stochastic human exposure and dose simulation for particulate matter (SHEDS-PM), in *Handbook of Environmental and Ecological Statistics* (editors: Gelfand A, Smith R, Hoeting J, and Fuentes M), CRC Press, 2019.

Warren JL, Fuentes M, Herring AH, and Langlois PH. Spatiotemporal modeling of preterm birth, in *Handbook of Spatial Epidemiology* (editors: Lawson AB, Banerjee S, Haining RP, and Ugarte L), CRC Press, 2016.

Patent:

Mwanza JC, Budenz DL, and **Warren JL** (2017). Methods, systems, and computer readable media for predicting early onset glaucoma. US Patent Number: 9,554,755; January 31st, 2017.

Journal Correspondence:

Regan AK, Ball SJ, **Warren JL**, Malacova E, Padula A, Marston C, Nassar N, Stanley F, Leonard H, de Klerk N, and Pereira G (2019). The uncertain role of interpregnancy interval and why we need new approaches to an old problem. *American Journal of Epidemiology*, 188(1):22-23.

Cassell K, Gacek P, **Warren JL**, Raymond PA, Cartter M, and Weinberger DM (2018). Reply to Rucinski et. al. Letter. *The Journal of Infectious Diseases*, 218(4):670-671.

Internal Publications:

Perez-Heydrich C, **Warren JL**, Burgert CR, and Emch ME (2013). Guidelines on the use of DHS GPS data. *Spatial Analysis Reports No. 8.* Calverton, Maryland, USA: ICF International.

Blog Posts:

*Berchuck SI and **Warren JL** (2018). Statistics in glaucoma: Part I. *R Views*. Retrieved from `https://rviews.rstudio.com/2018/12/03/statistics-in-glaucoma-part-i/`.

*Berchuck SI and **Warren JL** (2018). Statistics in glaucoma: Part II. *R Views*. Retrieved from `https://rviews.rstudio.com/2018/12/07/statistics-in-glaucoma-part-ii/`.

*Berchuck SI and **Warren JL** (2018). Statistics in glaucoma: Part III. *R Views*. Retrieved from `https://rviews.rstudio.com/2018/12/18/statistics-in-glaucoma-part-iii/`.

Students

Current:

Kenneth Gunasekera, Ph.D. student, Yale University, Department Epidemiology of Microbial Diseases (Qualifying examination committee member, 2019).

Shan Jiang, M.P.H. student, Emory University, Department of Biostatistics (Summer field supervisor, 2019). Machine learning algorithms for heat events and emergency room visits in Atlanta, Georgia.

Amrutasri Nori-Sarma, Ph.D. student, Yale University, The School of Forestry & Environmental Studies (Dissertation reader, 2019). Temperature, air pollution, and human health burden in urban India.

Phoebe Tran, Ph.D. student, Yale University, Department of Chronic Disease Epidemiology (Dissertation committee member).

Cassie Clark, Ph.D. student, Yale University, Department of Environmental Health Sciences (Dissertation committee member).

Maile Phillips, Ph.D. student, Yale University, Department Epidemiology of Microbial Diseases (Dissertation committee member).

Hao Mei, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member).

Jiawei Wang, Ph.D. student, Yale University, Yale Computational Biology and Bioinformatics (Dissertation committee member).

Alyssa Parpia, Ph.D. student, Yale University, Department of Epidemiology of Microbial Diseases (Dissertation committee member).

Mo Li, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member).

Renee Mehra, Ph.D. student, Yale University, Department of Chronic Disease Epidemiology (Dissertation committee member).

Xiaochen Wang, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member).

Completed:
Jessica Rothman, Ph.D. student, Yale University, Department of Biostatistics (Applied area exam primary advisor, 2019). Statistical methods for examining the impact of air pollution on reproductive health.

Katherine Wolf, M.P.H. student, Yale University, Department of Environmental Health Sciences (Second thesis reader, 2019). Evaluation of sociodemographic factors and presence of oil and gas waste disposal wells in Kansas.

Hing Ting (Connie) Li, M.P.H. student, Yale University, Department of Epidemiology of Microbial Diseases (First thesis reader, 2019). Association between engagement in a community-based home visitation program and birth spacing between first and second children.

Maile Phillips, Ph.D. student, Yale University, Department Epidemiology of Microbial Diseases

(Qualifying examination committee member, 2019). Cost-effectiveness analysis of typhoid prevention in epidemic and endemic settings.

Xinyue Li, Ph.D. student, Yale University, Department of Biostatistics (Dissertation reader, 2019). Statistical methods for wearable device data: applications in clinical studies.

Hao Mei, Ph.D. student, Yale University, Department of Biostatistics (Applied area exam member, 2018). Building dynamic disease networks using administrative claims data.

Li Zeng, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member, 2018). Statistical and machine learning methods in cancer genomic data analysis.

Lan Jin, Ph.D. student, Yale University, The School of Forestry & Environmental Studies (Dissertation reader, 2018). Air pollution and adverse birth outcomes in Lanzhou, China.

Alyssa Parpia, Ph.D. student, Yale University, Department of Epidemiology of Microbial Diseases (Qualifying examination committee member, 2018). The impact of climate, environment, and vaccination on dengue incidence in Costa Rica.

Kayoko Shioda, Ph.D. student, Yale University, Department of Epidemiology of Microbial Diseases (Qualifying examination committee member, 2018). Obtain robust estimate of the population-level impact of pneumococcal conjugate vaccines.

Alyssa Sbarra, M.P.H. student, Yale University, Department of Epidemiology of Microbial Diseases (Second thesis reader, 2018). Increasing PCV impact estimate credibility via pooled analysis.

Jacob McPadden, M.D., Clinical Neonatology Fellow, Yale School of Medicine (Research mentor, 2018).

Yiyi Liu, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member, 2018). Statistical methods for cell heterogeneity and cell drug-response study.

Samuel Berchuck, Ph.D. student, The University of North Carolina at Chapel Hill, Department of Biostatistics (Primary dissertation advisor, 2018). Statistical methods for modeling the spatial structure on the visual field in glaucoma research.

Nisheet Nautiyal, Ph.D. student, Yale University, Department of Biostatistics

- Dissertation committee member, 2018. Spatio-temporal methods for reconstructing cancer incidence trends.
- Applied area exam primary advisor, 2015. Statistical methods for multipollutant research.

Kelsie Cassell, M.P.H. student, Yale University, Department of Epidemiology of Microbial Diseases (Second thesis reader, 2017). Association between sporadic Legionellosis and river systems in Connecticut.

Zhishan Gu, M.P.H. student, Yale University, Department of Biostatistics (Second thesis reader, 2017). Spatial trends in lung cancer mortality in the United States, 1969-2004.

Yinjun Zhao, M.P.H. student, Yale University, Department of Biostatistics (Second thesis reader, 2017). Bayesian integrative analysis of heterogeneous data in breast cancer prognosis.

Jiehuan Sun, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member, 2017). Statistical methods for translational medicine in longitudinal genomics studies.

Wenjing Kong, M.S. student, Yale University, Department of Biostatistics (Primary master's thesis advisor, 2017). Critical window variable selection for air pollution and adverse birth outcomes.

Veronika Shabanova, Ph.D. student, Yale University, Department of Biostatistics (Dissertation committee member, 2017). Multivariate approach to modeling of time to event data with non-susceptible fractions and informative censoring.

Joseph Lewnard, Ph.D. student, Yale University, Department of Epidemiology of Microbial Diseases (Dissertation reader, 2016). Inference of the natural histories of partially immunizing pathogens aided by studies of socioeconomically distinct populations.

Nan Zhao, Ph.D. student, Yale University, Department of Environmental Health Sciences (Dissertation reader, 2016). Understanding the role of prenatal exposure to ambient air pollutants in preterm birth and ultrasound measured fetal growth in China.

Yunwei Wang, M.S. student, Yale University, Department of Biostatistics (Primary master's thesis advisor, 2016). Spatial-temporal models for human Lyme disease in Connecticut.

Douglas Noveroske, M.P.H.. student, Yale University, Department of Epidemiology of Microbial Diseases (Second thesis reader, 2016). Respiratory syncytial virus in Connecticut: predictors of seasonal epidemic timing.

Dennis Wang, M.P.H. student, Yale University, Epidemiology of Microbial Diseases (Second thesis reader, 2016). The effect of spatiotemporally-dependent air pollution exposure on birthweight in the Lanzhou Birth Cohort.

Samantha Emanuele, M.P.H. student, Yale University, Department of Biostatistics (Second thesis reader, 2015). Bayesian spatial modeling of respiratory syncytial virus transmission in the United States.

Rachel Nethery, Ph.D. student, The University of North Carolina at Chapel Hill, Department of Biostatistics (Summer research in spatial statistics, 2013-2015). A common spatial factor analysis model for measured neighborhood-level characteristics: the multi-ethnic study of atherosclerosis.

Invited Talks

A spatially varying change points model for monitoring glaucoma progression using visual field data. Recent Advances in Spatial and Spatial-temporal Methods. Joint Statistical Meetings (JSM), August 2019. Denver, CO.

Spatiotemporal statistical methods for monitoring glaucoma progression using visual field data. Statistics in Biosciences (SIBS) Invited Session: Statistical Advancement in Bioscience Research. International Chinese Statistical Association (ICSA) 2019 Applied Statistics Symposium, June 2019. Raleigh, NC.

Spatiotemporal statistical methods for monitoring glaucoma progression using visual field data. Statistics Colloquia Seminar Series, Department of Statistics, University of Connecticut, November 2018. Storrs, CT.

A Bayesian critical window variable selection method for estimating the impact of air pollution exposure during pregnancy. Statistical Inference in Air Pollution and Health Epidemiology. International Chinese Statistical Association (ICSA) 2018 Applied Statistics Symposium, June 2018. New Brunswick, NJ.

Diagnosing glaucoma progression with visual field data using a spatiotemporal boundary detection method. Statistical Methods for Emerging Spatial and Spatiotemporal Data. Eastern North Amer-

ican Region (ENAR) of the International Biometric Society, March 2018. Atlanta, GA.

Spatiotemporal boundary detection for localized smoothing in areal data. QPRC 2017: The 34th Quality and Productivity Research Conference, June 2017. Storrs, CT.

A spatial method to estimate local vaccine uptake using administrative records. New England Statistical Symposium, April 2017. Storrs, CT.

Identifying critical pregnancy indows of susceptibility to ambient air pollution exposure. Biostatistics Colloquia Seminar Series, Department of Biostatistics and Computational Biology, University of Rochester Medical Center, March 2017. Rochester, NY.

Methods for the analysis of spatial data (guest lecture). EMD 538: Quantitative Methods in Infectious Disease Epidemiology, Department of Epidemiology of Microbial Diseases, Yale School of Public Health, November 2015. New Haven, CT.

Jointly analyzing spatially correlated visual field data to detect glaucoma progression. Joint 24th International Chinese Statistical Association (ICSA) Applied Statistics Symposium and 13th Graybill Conference, Colorado State University, June 2015. Fort Collins, CO.

Modeling of daily windows of susceptibility for maternal $PM_{2.5}$ exposure and congenital heart defects. Environmental Statistics Seminar, Department of Biostatistics, Harvard University, May 2015. Boston, MA.

Bayesian spatial modeling of the local persistence of PCV-targeted pneumococcal serotypes among adults in Connecticut, 1998-2009. Public Health Modeling Seminar, Department of Epidemiology of Microbial Diseases, Yale University, May 2015. New Haven, CT.

Bayesian spatial modeling of the local persistence of PCV-targeted pneumococcal serotypes among adults in Connecticut, 1998-2009. New England Statistical Symposium, April 2015. Storrs, CT.

A spatially varying coefficient model with partially unknown proximity matrix for the detection of glaucoma progression using visual field data. MacMillan-CSAP Quantitative Research Methods Workshop Series, Institution for Social and Policy Studies, Yale University, April 2015. New Haven, CT.

A spatially varying coefficient model with partially unknown proximity matrix for the detection of glaucoma progression using visual field data. Spatial Structures in the Social Sciences (S4) Colloquia, Brown University, February 2015. Providence, RI.

DHS point displacement impact on covariate assignment. Demographic and Health Surverys (DHS) Program Technical Consultation on Geographic Masking and Displacement of GPS Data for Household Surveys, July 2014. Rockville, MD.

Spatial-temporal modeling of the critical windows of air pollution exposure for preterm birth. XXVII International Biometric Conference (IBC), July 2014. Florence, Italy.

Should I consider a postdoctoral position in statistics/biostatistics? Postdoc Information Session. Eastern North American Region (ENAR) of the International Biometric Society, March 2014. Baltimore, MD.

Bayesian spatial and spatial-temporal modeling with applications in environmental epidemiology and ophthalmology. Biostatistics Seminar Series, Department of Biostatistics, Yale School of Public Health, December 2013. New Haven, CT.

Bayesian spatial data analysis (guest lecture). BIOS 779: Bayesian Statistics, Department of Biostatistics, Gillings School of Global Public Health, November 2013. Chapel Hill, NC.

Statistical classification for early glaucoma detection. Carl Zeiss OCT Research Group Meeting, March 2013. Chapel Hill, NC.

Introduction to spatial statistical analyses (guest lecture). BIOS 767: Longitudinal Data Analysis, Department of Biostatistics, Gillings School of Global Public Health, April 2012. Chapel Hill, NC.

Understanding historical emission trends. 16th Annual Environmental Protection Agency International Emission Inventory Conference, June 2007. Raleigh, NC.

Contributed Talks and Presentations

A spatially varying change points model for monitoring glaucoma progression using visual field data. Spatial Statistics 2019: Towards Data Science, July 2019. Sitges, Spain.

A Bayesian critical window variable selection method for estimating the impact of air pollution exposure during pregnancy. Eastern North American Region (ENAR) of the International Biometric Society, March 2019. Philadelphia, PA.

Spatial variability in the persistence of PCV-targeted pneumococcal serotypes among adults. Joint Statistical Meetings (JSM), August 2016. Chicago, IL.

Spatial variability in the persistence of PCV-targeted pneumococcal serotypes among adults. International Symposium on Pneumococcal and Pneumococcal Diseases (ISPPD), June 2016. Glasgow, Scotland.

A spatially varying coefficient model with partially unknown proximity matrix for the detection of glaucoma progression using visual field data. Eastern North American Region (ENAR) of the International Biometric Society, March 2015. Miami, FL.

Spatial-temporal modeling of the critical windows of air pollution exposure for preterm birth. Eastern North American Region (ENAR) of the International Biometric Society, March 2013. Orlando, FL.

Spatial-temporal modeling of the critical windows of air pollution exposure for preterm birth. Joint Statistical Meetings (JSM), July 2012. San Diego, CA.

Ambient air pollution exposure and preterm birth (poster presentation). The University of North Carolina at Chapel Hill Center for Environmental Health and Susceptibility Symposium on Interdisciplinary Environmental Health Research, November 2011. Chapel Hill, NC.

Understanding historical emission trends (poster presentation). 17th Annual North Carolina State Undergraduate Research Symposium, May and August 2007. Raleigh, NC.

Research Grants

Current:

R01AI137093 (Weinberger, Pitzer, Warren) 09/24/2018-09/23/2023 2.40 calendar
Agency: NIH/NIAID; MIDAS
Title: Predicting and monitoring variations in the impact of vaccines against RSV
Goal: To develop, validate, and apply statistical and mathematical models to predict the impact of different vaccines and delivery strategies for RSV vaccines and to establish a framework for monitoring their impact.
Role: Co-Principal Investigator

OPP1199204 (Warren) 11/01/2018-04/30/2020 2.16 calendar

Agency: Bill & Melinda Gates Foundation (Grand Challenges Explorations Round 21)
Title: Obtaining accurate estimates of subnational vaccine coverage
Goal: To improve local vaccine coverage estimation by introducing new spatial methodology to correct for data quality issues associated with routinely collected administrative data.
Role: Principal Investigator

1R01ES028346-01A1 (Chang, Darrow) 04/01/2018-03/31/2023 2.40 calendar
Agency: NIH/NIEHS
Title: Extreme heat events and pregnancy duration: a national study
Goal: Investigate the hypothesis that extreme heat events increase the risk of preterm birth and early term birth using national birth record data.
Role: Subcontract Principal Investigator

OPP1176267 (Weinberger) 07/19/2017-06/30/2020 1.80 calendar
Agency: Bill & Melinda Gates Foundation
Title: Evaluating PCV impact using data sources of variable quality from resource-poor settings
Goal: To develop a model for use of administrative data to assess PCV (Pneumococcal conjugate vaccine) impact in low and middle-income countries.
Role: Co-Investigator

EPA G2016-ORD-D1 (Deziel, Saiers) 09/01/2017-08/31/2020 0.60 calendar
Agency: U.S. Environmental Protection Agency
Title: Drinking water vulnerability and neonatal health outcomes in relation to oil and gas production in the Appalachian Basin
Goal: To investigate whether drinking-water contamination from oil and gas production activities occurring in proximity to maternal residence during critical windows of prenatal development is associated with increased risk of adverse birth outcomes.
Role: Co-Investigator

1R01MD012769-01A1 (Bell) 09/27/2017-06/30/2022 1.20 calendar
Agency: NIH/NIEHS
Title: Environmental health disparities in an older population
Goal: To identify the most significant common contributors to environmental health disparities for the elderly.
Role: Co-Investigator

1R01 AG056628-01A1 (Lichtman) 04/01/2018-03/31/2023 1.20 calendar
Agency: NIH/NIA
Title: Disparities in patterns of recurrent stroke in the elderly
Goal: Assess patterns of recurrent stroke from 2002-2012 in elderly Medicare beneficiaries across the United States.
Role: Co-Investigator

5R01AI123208-02 (Weinberger) 08/08/2016-07/31/2020 0.00 calendar
Agency: NIH
Title: Forecasting pneumococcal serotype frequencies to develop adult-specific vaccines
We will use a combination of high-throughput in vitro experiments and epidemiological data to determine which serotypes are most likely to increase in frequency as causes of disease in adults following introduction of conjugate vaccines in children. These models will inform the selection of serotypes for an adult-specific conjugate vaccine.
Role: Co-Investigator

Completed:
(Warren) 12/06/2016-12/05/2018 9.00 calendar

Agency: NIH/NCATS; Yale University Clinical and Translational Science Award Program YCCI Scholar Award
Title: Spatiotemporal statistical methods for analyzing glaucomatous visual field progression
Goal: To develop scientifically driven and highly innovative statistical methodology to improve the analysis of VF data for monitoring glaucoma patients.
Role: Principal Investigator

WI178463 (Weinberger) 06/03/2013-07/31/2015 1.80 calendar
Agency: Pfizer (Investigator Initiated Research)
Title: Factors associated with the local persistence of Prevnar-targeted serotypes among adults
Goal: To gain a comprehensive understanding of factors related to the persistence of vaccine serotypes among adults. This information can be used to identify situations where adult immunization with Prevnar would be particularly beneficial.
Role: Co-Investigator

54GM088558 (Lipsitch) 09/15/2009-08/31/2019 0.42 calendar
Agency: NIH/NIGMS; MIDAS center for communicable disease dynamics
Goal: To advance the quantitative study of communicable diseases through training/education, transdisciplinary research, and public health policy. The center will develop statistical and novel modeling methods, train mathematical modelers, perform outreach, and develop software for the analysis of communicable disease data.
Role: Co-Investigator

R01 AI112438-01 (Cohen, Salomon) 07/01/2014-06/30/2018 0.78 calendar
Agency: NIH/NIAID
Title: Evaluating health and economic effects of targeted strategies in TB/HIV epidemics
Goal: To use mathematical models of TB and HIV epidemics to examine this hypothesis and evaluate the comparative effectiveness and efficiency of alternative choices in the design and implementation of targeted strategies.
Role: Co-Investigator

OPP1114733 (Weinberger) 09/01/2014-07/31/2017 1.20 calendar
Agency: The Bill and Melinda Gates Foundation
Title: Impact of pneumococcal conjugate vaccines (PCVs) among poor populations living in middle-income countries
Goal: To evaluate variations in the impact of pneumococcal vaccines in sub-populations living in middle income in Latin America. As part of this work, we are developing novel statistical methods that can be applied to time series as well as novel web-based analysis and visualization tools that can be used by public health decision-makers and analyst.
Role: Co-Investigator

1R21NR016352-01 (Hawley) 09/01/2016-08/31/2018 0.00 calendar
Agency: NIH/NINR
Title: Establishing the preliminary feasibility and efficacy of a group prenatal care intervention to address maternal and child NCD risk in American Samoa
Role: Co-Investigator

Service to the Profession

Poster Judge, NextGen: Data Science Day, Yale University, 2018

Associate Editor, *Journal of the American Statistical Association - Theory and Methods*, 2018-Present

David P. Byar Young Investigator Award selection committee member (American Statistical Association (ASA) Biometrics Section), 2017

Grant reviewer for the Swiss National Science Foundation (SNSF), 2017

Mail reviewer for the NIH Diseases and Pathophysiology of the Visual System (DPVS) study section, 2016

Associate Editor, *Statistics in Biosciences*, 2015-Present

Grant reviewer for the Environment and Health Fund (EHF) in Israel, 2012

Reviewer for Advances in Research, AIMS Public Health, American Journal of Ophthalmology, Annals of Applied Statistics, Atmospheric Environment, Biostatistics, BMC Medicine, BMC Public Health, BMJ Open, British Journal of Ophthalmology, Challenges, Environmental Health, Environmental Health Perspectives, Environmental Protection Agency (internal review), Environmental Research, Environmental Science and Pollution Research, Environmetrics, Epidemiologic Methods, Epidemiology, International Journal of Environmental Research and Public Health, International Statistical Review, JABES, JAMA Network Open, JASA: Applications and Case Studies, JASA: Theory and Methods, National Birth Defects Prevention Study (NBDPS), New England Journal of Medicine, Ophthalmology, Ophthalmology Glaucoma, Preventing Chronic Disease, Scientific Reports, Spatial and Spatio-temporal Epidemiology, Spatial Demography, Statistical Methods in Medical Research, Statistics in Biosciences, Statistics in Medicine, Tobacco Science, and Toxics.

Service to the Yale School of Public Health

YSPH Department of Biostatistics Faculty Search Committee Member, 2018

YSPH Climate Change and Health Initiative Faculty Search Committee Member, 2017

The New England Statistics Symposium Co-Organizer (with Daniel Zelterman and Forrest Crawford), 2016

YSPH Staff Award for Outstanding Service Selection Committee Member, 2016

YSPH Biostatistics Department Seminar Organizer, 2014-2018

Honors and Awards

Kenneth Rothman Epidemiology Prize Paper, 2018 (co-author)

Best Paper in Biometrics (2012) by an IBS Member, 2014 (first author)

Outstanding Teaching Assistant Award, 2009

Recipient of the Vertical Integration of Research and Education (VIGRE) Statistical Traineeship Scholarship, 2006

Mu Sigma Rho (National Statistical Honor Society) Member, 2006

Recipient of the National Science Foundation Computer Science, Engineering, and Mathematics Scholarship (NSF-CSEMS), 2004-2008

Primary Instructor Teaching

BIS 567: Bayesian Statistics, Yale University, Department of Biostatistics, Fall 2015-Present.

BIS 525: Seminar/Journal Club in BIS, Yale University, Department of Biostatistics, Fall 2014-Spring 2018.

ST 311: Introduction to Statistics, North Carolina State University, Department of Statistics, Fall 2008.