

I am a researcher focused on quantifying risks over the life-course from occupational and environmental exposures. I seek to advance our collective understanding of their public health impacts using a policy-oriented, causal inference framework.

Education

2014	Ph.D., Epidemiology	University of North Carolina at Chapel Hill
2010	M.S.P.H., Epidemiology	University of North Carolina at Chapel Hill
2003	B.S.(Hons), Biology	Santa Clara University

Professional experience

2016-Present	Research Assistant Professor, Department of Epidemiology University of North Carolina at Chapel Hill
2014-2016	Postdoctoral Fellow Department of Epidemiology University of North Carolina at Chapel Hill

Honors

2019	Rising Star award, UNC Center for Environmental Health and Susceptibility
2018	Paper of the year - American Journal of Epidemiology
2014-2016	National Institute of Environmental Health Sciences Training Grant - Environmental Epidemiology
2014	EPICOH (Scientific Committee on Epidemiology in Occupational Health) conference Young Investigator Award
2013	Marilyn & Al Tyroler Scholarship in Epidemiology
2012	Sidney Kark Award for Distinguished Teaching Assistant - The University of North Carolina at Chapel Hill Gillings School of Global Public Health, Department of Epidemiology
2010-2014	National Institute of Environmental Health Sciences Training Grant - Occupational Epidemiology
2008-2010	National Institute of Environmental Health Sciences Training Grant - Environmental Epidemiology

Memberships

2017-Present	American Association for the Advancement of Science
2014-Present	American Statistical Association
2008-Present	Society of Epidemiologic Research
2008-Present	International Society of Environmental Epidemiology

Publications and presentations

Peer-reviewed and pre-print research papers

1. Richardson, D. B., **A. P. Keil**, J. Edwards, A. C. Kinlaw, and S. R. Cole (n.d.). Standardizing discrete time hazard ratios with a disease risk score. *American Journal of Epidemiology* ().

2. Bayissasse, B., K. M. Sullivan, S. L. Merbs, B. Munoz, A. **Keil**, A. Sisay, A. Singer, and E. W. Gower (2020). Maximising trichiasis surgery success (MTSS) trial: rationale and design of a randomised controlled trial to improve trachomatous trichiasis surgical outcomes. *BMJ open* **10**(3), e036327.
3. Carroll, R., A. J. White, **A. P. Keil**, J. D. Meeker, T. F. McElrath, S. Zhao, and K. K. Ferguson (2020). Latent classes for chemical mixtures analyses in epidemiology: An example using phthalate and phenol exposure biomarkers in pregnant women. *Journal of Exposure Science and Environmental Epidemiology* **30**, 149–159.
4. Gellert, K., **A. P. Keil**, D. Zeng, C. Lesko, R. Aubert, C. Avery, P. B. Lutsey, G. Windham, A. M. Siega-Riz, and G. Heiss (2020). Reducing the population burden of coronary heart disease by modifying adiposity: Estimates from the Atherosclerosis Risk In Communities (ARIC) Study. *J Am Heart Assoc* **9**(4), e012214.
5. **Keil, A. P.**, J. P. Buckley, K. M. O'Brien, K. K. Ferguson, S. Zhao, and A. J. White (2020). A quantile-based g-computation approach to addressing the effects of exposure mixtures. *Environmental health perspectives* **128**(4), 047004.
6. Lawrence, K. G., **A. P. Keil**, S. Garantziotis, D. M. Umbach, P. A. Stewart, M. R. Stenzel, J. A. McGrath, W. B. Jackson, R. K. Kwok, M. D. Curry, et al. (2020). Lung function in oil spill responders 4-6 years after the Deepwater Horizon disaster. *Journal of Toxicology and Environmental Health, Part A* **83**(6), 233–248.
7. Lesko, C. R., **A. P. Keil**, and J. K. Edwards (2020). The Epidemiologic Toolbox: Identifying, Honing, and Using the Right Tools for the Job. *American Journal of Epidemiology* [**Published ahead of Print**].
8. Niehoff, N. M., **A. P. Keil**, K. M. O'Brien, B. P. Jackson, M. R. Karagas, C. R. Weinberg, and A. J. White (2020). Metals and trace elements in relation to body mass index in a prospective study of US women. *Environmental Research* **184**, 109396.
9. Peery, A. F., **A. Keil**, K. Jicha, J. A. Galanko, and R. S. Sandler (2020). Association of Obesity With Colonic Diverticulosis in Women. *Clin Gastroenterol Hepatol* **18**(1), 107–114. e1.
10. Richardson, D., **A. Keil**, S. Cole, A. Kinlaw, et al. (2020). Assessing Exposure-Response Trends Using the Disease Risk Score. *Epidemiology* **2**, e15–e16.
11. DeBono, N., K. Kelly-Reif, D. Richardson, **A. P. Keil**, W. Robinson, M. Troester, and S. Marshall (2019). Mortality among autoworkers manufacturing electronics in Huntsville, Alabama. *American journal of industrial medicine* **62**(4), 282–295.
12. DeBono, N., D. Richardson, **A. Keil**, K. Kelly-Reif, W. Robinson, M. Troester, and S. Marshall (Apr. 2019). Employment characteristics and cause-specific mortality at automotive electronics manufacturing plants in Huntsville, Alabama. *Am J Ind Med* **62**(4), 296–308.
13. Doherty, B. T., K. Hoffman, **A. P. Keil**, S. M. Engel, H. M. Stapleton, B. D. Goldman, A. F. Olshan, and J. L. Daniels (Apr. 2019a). Prenatal exposure to organophosphate esters and behavioral development in young children in the Pregnancy, Infection, and Nutrition Study. *Neurotoxicology* **73**, 150–160.
14. Doherty, B. T., K. Hoffman, **A. P. Keil**, S. M. Engel, H. M. Stapleton, B. D. Goldman, A. F. Olshan, and J. L. Daniels (2019b). Prenatal exposure to organophosphate esters and cognitive development in young children in the Pregnancy, Infection, and Nutrition Study. *Environmental research* **169**, 33–40.
15. Kim, S. S., J. D. Meeker, **A. P. Keil**, M. T. Aung, P. A. Bommarito, D. E. Cantonwine, T. F. McElrath, and K. K. Ferguson (2019). Exposure to 17 trace metals in pregnancy and associations with urinary oxidative stress biomarkers. *Environmental research* **179**, 108854.
16. Lesko, C. R., **A. P. Keil**, A. T. Fojo, G. Chander, B. Lau, and R. D. Moore (2019). Recent Substance Use and Probability of Unsuppressed HIV Viral Load Among Persons on Antiretroviral Therapy in Continuity Care. *American journal of epidemiology* **188**(10), 1830–1837.
17. Niehoff, N. M., M. D. Gammon, **A. P. Keil**, H. B. Nichols, L. S. Engel, D. P. Sandler, and A. J. White (2019). Airborne mammary carcinogens and breast cancer risk in the Sister Study. *Environment international* **130**, 104897.
18. Niehoff, N. M., M. D. Gammon, **A. P. Keil**, H. B. Nichols, L. S. Engel, J. A. Taylor, A. J. White, and D. P. Sandler (2019). Hazardous air pollutants and telomere length in the Sister Study. *Environmental Epidemiology* **3**(4), e053.

19. O'Brien, K. M. and **A. P. Keil** (2019). Design and Interpretation Considerations in Registry-Based Studies. *JAMA psychiatry* [Online ahead of print].
20. Richardson, D. B., **A. P. Keil**, A. C. Kinlaw, and S. R. Cole (May 2019). Marginal Structural Models for Risk or Prevalence Ratios for a Point Exposure Using a Disease Risk Score. *eng. Am J Epidemiol* **188**(5), 960–966.
21. Rittenhouse, K. J., B. Vwalika, **A. P. Keil**, J. Winston, M. Stoner, J. T. Price, M. Kapasa, M. Mubambe, V. Banda, W. Muunga, et al. (2019). Improving preterm newborn identification in low-resource settings with machine learning. *PloS one* **14**(2), e0198919.
22. Shrestha, S., C. G. Parks, **A. P. Keil**, D. M. Umbach, C. C. Lerro, C. F. Lynch, H. Chen, A. Blair, S. Koutros, J. N. Hofmann, L. E. B. Freeman, and D. P. Sandler (2019). Overall and cause-specific mortality in a cohort of farmers and their spouses. *Occupational and Environmental Medicine* **76**(9), 632–643.
23. Strelitz, J., **A. P. Keil**, D. B. Richardson, G. Heiss, M. D. Gammon, R. K. Kwok, D. P. Sandler, and L. S. Engel (2019). Self-reported myocardial infarction and fatal coronary heart disease among oil spill workers and community members 5 years after Deepwater Horizon. *Environmental research* **168**, 70–79.
24. Strelitz, J., D. P. Sandler, **A. P. Keil**, D. B. Richardson, G. Heiss, M. D. Gammon, R. K. Kwok, P. A. Stewart, M. R. Stenzel, and L. S. Engel (2019). Exposure to Total Hydrocarbons During Clean-up of the Deepwater Horizon Oil Spill and Risk of Heart Attack Across Five Years of Follow-up. *American journal of epidemiology* **188**(5), 917–927.
25. Stürmer, T., T. Wang, Y. M. Golightly, A. **Keil**, J. L. Lund, and M. Jonsson Funk (2019). Methodological considerations when analysing and interpreting real-world data. *Rheumatology* **59**(1), 14–25.
26. Gam, K. B., R. K. Kwok, L. S. Engel, M. R. Stenzel, J. A. McGrath, W. B. Jackson, R. L. Jensen, **A. P. Keil**, M. Y. Lichtveld, A. K. Miller, and D. P. Sandler (2018). Lung function in oil spill response workers 1-3 years after the Deepwater Horizon disaster. *Epidemiology* **29**(3), 315–322.
27. **Keil, A. P.** (2018b). Super Learning in the SAS system. *arXiv preprint arXiv:1805.08058*.
28. **Keil, A. P.** and J. K. Edwards (Sept. 2018d). A review of time scale fundamentals in the g-formula and insidious selection bias. *Curr Epidemiol Rep* **5**(3), 205–213.
29. **Keil, A. P.**, S. J. Mooney, M. Jonsson Funk, S. R. Cole, J. K. Edwards, and D. J. Westreich (2018). Resolving an apparent paradox in doubly-robust estimators. *Am J Epidemiol* **187**(4), 891–892.
30. **Keil, A. P.**, D. B. Richardson, D. Westreich, and K. Steenland (Sept. 2018a). Estimating the Impact of Changes to Occupational Standards for Silica Exposure on Lung Cancer Mortality. *eng. Epidemiology* **29**(5), 658–665.
31. Lesko, C. R., **A. P. Keil**, R. D. Moore, G. Chander, A. T. Fojo, and B. Lau (Sept. 2018b). Measurement of Current Substance Use in a Cohort of HIV-Infected Persons in Continuity HIV Care, 2007-2015. *eng. Am J Epidemiol* **187**(9), 1970–1979.
32. Richardson, D. B. and **A. P. Keil** (2018). Challenges to studying population effects of medical treatments. *Eur J Epidemiol* **33**(4), 365–368.
33. Richardson, D. B., **A. P. Keil**, S. R. Cole, and J. M. Dement (2018). Asbestos standards: Impact of currently uncounted chrysotile asbestos fibers on lifetime lung cancer risk. *Am J Ind Med* **61**, 383–390.
34. Buckley, J. P., B. T. Doherty, **A. P. Keil**, and S. M. Engel (June 2017). Statistical Approaches for Estimating Sex-Specific Effects in Endocrine Disruptors Research. *Environ Health Perspect* **125**(6), 067013.
35. Edwards, J. K. and **A. P. Keil** (Mar. 2017). Measurement error and environmental epidemiology: a policy perspective. *Current Environmental Health Reports* **4**(1), 79–88.
36. Edwards, J. K., C. R. Lesko, and **A. P. Keil** (2017). Invited Commentary: Causal Inference Across Space and Time – Quixotic Quest, Worthy Goal, or Both? *Am J Epidemiol* **186**(2), 143–145.
37. **Keil, A. P.**, E. J. Daza, S. M. Engel, J. P. Buckley, and J. K. Edwards (2017). A Bayesian approach to the g-formula. *Stat Methods Med Res*, 0962280217694665.
38. **Keil, A. P.** and D. B. Richardson (2017a). Quantifying risks from radiation. *Risk Anal* **In press**.
39. **Keil, A. P.** and D. B. Richardson (Apr. 2017b). Reassessing the Link between Airborne Arsenic Exposure among Anaconda Copper Smelter Workers and Multiple Causes of Death Using the Parametric g-Formula. *Environ Health Perspect* **125**(4), 608–614.

40. Kinlaw, A. C., J. P. Buckley, S. M. Engel, C. Poole, M. A. Brookhart, and **A. P. Keil** (2017). Left Truncation Bias to Explain the Protective Effect of Smoking on Preeclampsia: Potential, But How Plausible? *Epidemiology* **28**(3), 428–434.
41. Richardson, D. B., **A. P. Keil**, S. R. Cole, and R. F. MacLehose (Mar. 2017). Observed and Expected Mortality in Cohort Studies. *Am J Epidemiol* **185**(6), 479–486.
42. Richardson, D. B., **A. P. Keil**, E. J. Tchetgen Tchetgen, and G. S. Cooper (May 2017). The Authors Respond. *Epidemiology* **28**(3), e30–e31.
43. Buckley, J. P., **A. P. Keil**, L. J. McGrath, and J. K. Edwards (Mar. 2015). Evolving methods for inference in the presence of healthy worker survivor bias. *Epidemiology* **26**(2), 204–12.
44. **Keil, A. P.**, E. J. Daza, S. M. Engel, J. P. Buckley, and J. K. Edwards (2015). A Bayesian approach to the g-formula. *arXiv:1512.04809 [stat.ME]* (<http://arxiv.org/abs/1512.04809>).
45. **Keil, A. P.**, D. B. Richardson, and M. A. Troester (May 2015). Healthy worker survivor bias in the Colorado Plateau uranium miners cohort. *Am J Epidemiol* **181**(10), 762–70.
46. **Keil, A. P.**, J. L. Daniels, and I. Hertz-Picciotto (2014). Autism spectrum disorder, flea and tick medication, and adjustments for exposure misclassification: the CHARGE (CHildhood Autism Risks from Genetics and Environment) case-control study. *Environ Health* **13**(1), 3.
47. **Keil, A. P.**, J. K. Edwards, D. B. Richardson, A. I. Naimi, and S. R. Cole (2014). The Parametric g-Formula for Time-to-event Data: Intuition and a Worked Example. *Epidemiology* **25**(6), 889–897.
48. Wing, S., A. Lowman, **A. P. Keil**, and S. Marshall (2014). Odors from sewage sludge and livestock: Associations with self-reported health. *Public Health Rep* **129**(6), 505–515.
49. Richardson, D. B., S. Wing, **A. P. Keil**, and S. Wolf (Mar. 2013). Mortality among workers at Oak Ridge National Laboratory. *Am J Ind Med* **56**(7), 725–732.
50. **Keil, A. P.**, S. Wing, and A. Lowman (2011). Suitability of public records for evaluating health effects of treated sewage sludge in north carolina. *N C Med J* **72**(2), 98–104.
51. **Keil, A. P.**, J. L. Daniels, U. Forssen, C. Hultman, S. Cnattingius, K. C. Söderberg, M. Feychting, and P. Sparen (Nov. 2010). Parental Autoimmune Diseases Associated With Autism Spectrum Disorders in Offspring. *Epidemiology* **21**(6), 805–808.

Book chapters

1. **Keil, A. P.** and J. K. Edwards (2018a). "Bias in environmental epidemiology" in *Reference Module in Earth Systems and Environmental Sciences*. Ed. by J. Nriagu. 2nd ed. Elsevier (Oxford).

Invited and symposia presentations

1. **Keil, A. P.** (2020a). Using Bayesian causal thinking to generate actionable results from exposure mixture data. In: *Society of Epidemiologic Research annual meeting*.
2. Rittenhouse, K. J., B. Vwalika, A. **Keil**, J. Winston, M. Stoner, J. T. Price, M. Kapasa, M. Mubambe, V. Banda, W. Muunga, and J. S. Stringer (2020). Machine learning assisted identification of preterm births in Zambia. In: *Society for Pediatric and Perinatal Epidemiologic Research annual meeting*.
3. **Keil, A. P.** (2019a). *Causal inference*. UNC quantitative psychology forum.
4. **Keil, A. P.** (2019b). *Causal inference*. UNC Causal inference research group seminar series.
5. **Keil, A. P.** (2019c). *Public health priority setting for environmental metals mixtures and birth defects*. CEHS Stakeholder meeting.
6. **Keil, A. P.** (2019d). *Super learner: prediction and causal inference*. UNC Pharmacoepidemiology seminar series.
7. **Keil, A. P.** (2018a). *A case for direct policy assessment in environmental and occupational epidemiology*. NIEHS invited speaker.
8. **Keil, A. P.** (2018c). *Small data, big questions: Bayesian marginal structural models*. Society of Epidemiologic Research annual meeting.

9. **Keil, A. P.**, A. Kalkbrenner, and J. P. Buckley (2018). *Applying the Bayesian g-formula to estimate impacts of public health actions on environmental exposure mixtures*. Society of Epidemiologic Research annual meeting.
10. **Keil, A. P.** (2017a). *A case for direct policy assessment in environmental and occupational epidemiology*. SERTalks – North Carolina.
11. **Keil, A. P.** (2017b). *Asbestos standards for the 21st century: the impact of currently uncounted asbestos fibers on lung cancer risk*. Society of Epidemiologic Research annual meeting.
12. **Keil, A. P.** (2017c). *Machine learning for causal inference*. Causal Inference Research Group Meeting, University of North Carolina at Chapel Hill.
13. **Keil, A. P.** (2016a). *Study designs to address healthy worker biases*. Epidemiology Congress of the Americas.
14. **Keil, A. P.** (2016b). *A Bayesian approach to the g-formula*. Causal Inference Research Group Meeting, University of North Carolina at Chapel Hill.
15. **Keil, A. P.** (2015). *Making sense of competing risks and occupational arsenic exposure using the parametric g-formula*. Society of Epidemiologic Research annual meeting.
16. **Keil, A. P.** (2014c). *Estimating the effects of occupational exposure interventions on cardiovascular outcomes using the parametric g-formula*. Cardiovascular Disease Epidemiology Seminar Series, University of North Carolina at Chapel Hill Department of Epidemiology.
17. **Keil, A. P.**, D. Richardson, and S. Cole (2014b). *Controlling healthy worker survivor bias of the radon-lung cancer dose-response in a cohort of uranium miners*. International Society of Environmental Epidemiology annual meeting.
18. **Keil, A. P.** and J. Edwards (2012). *Comparison of three causal models to control time-varying confounding in a cohort of bone marrow transplant recipients*. Causal Inference Research Group Meeting, University of North Carolina at Chapel Hill.

Conference workshops

1. **Keil, A. P.** (2020b). *Workshop: Causal inference for exposure mixtures*. International Society of Environmental Epidemiology annual meeting.
2. **Keil, A. P.** and J. S. Kaufman (2018b). *Workshop: Causal inference in environmental epidemiology*. International Society of Environmental Epidemiology annual meeting.

Conference presentations

1. **Keil, A. P.** and J. K. Edwards (2018b). Causal inference in little data: Bayesian marginal structural models. In: *Society of Epidemiologic Research annual meeting*.
2. **Keil, A. P.**, A. K. Kalkbrenner, and J. P. Buckley (2018a). Applying the Bayesian G-Formula to Estimate Impacts of Public Health Actions on Environmental Exposure Mixtures. In: *Society of Epidemiologic Research annual meeting*.
3. **Keil, A. P.**, A. K. Kalkbrenner, and J. P. Buckley (2018b). Applying the Bayesian G-Formula to Estimate Impacts of Public Health Actions on Environmental Exposure Mixtures. In: *International Society of Environmental Epidemiology Annual Meeting*.
4. **Keil, A. P.**, J. K. Edwards, and J. P. Buckley (2016). A Bayesian approach to the g-formula for estimating intervention effects in sparse data. In: *Epidemiology Congress of the Americas*.
5. **Keil, A. P.**, J. K. Edwards, and J. P. Buckley (2015). Direct assessment of public health impacts of exposure mixtures: a Bayesian g-formula approach. In: *Statistical Approaches for Assessing Health Effects of Environmental Chemical Mixtures in Epidemiology Studies*.
6. **Keil, A. P.**, D. Richardson, and S. Cole (2014a). Controlling healthy worker survivor bias of the radon-lung cancer dose-response in a cohort of uranium miners. In: *EPICOH: Scientific Committee on Epidemiology in Occupational Health annual meeting*.

7. **Keil, A. P.**, J. Edwards, A. Naimi, and S. Cole (2013). Comparison of three causal models to control time-varying confounding in a cohort of bone marrow transplant recipients. In: *Society of Epidemiologic Research annual meeting*.
8. **Keil, A. P.**, D. Richardson, and S. Cole (2011). Are Marginal Structural Models useful to appropriately control the Healthy Worker Survivor Effect for occupational epidemiological studies? In: *EPICOH: Scientific Committee on Epidemiology in Occupational Health annual meeting*.
9. **Keil, A. P.**, J. Daniels, and I. Hertz-Picciotto (2009a). Prenatal Imidacloprid Exposure and Subsequent Diagnosis of Autism Spectrum Disorder in a California Case-Control Study. In: *International Conference on Role of Environmental Stressors in the Developmental Origins of Disease*.

Papers under review/in preparation

1. Buckley, J. P., **A. P. Keil**, and J. K. Edwards (2019). An intervention framework for exposure mixtures in environmental epidemiology. *Int J Epidemiol* **In preparation**.
2. Edwards, J. K., S. R. Cole, **A. P. Keil**, D. J. Westreich, and S. Wheeler (2019). A randomized trial of data adaptive doubly robust estimators versus standard practice. *Am J Epidemiol* **In preparation**.
3. **Keil, A. P.** (2019e). Super learning in the SAS system. *Epidemiology* **In preparation**.
4. **Keil, A. P.**, J. P. Buckley, and A. K. Kalkbrenner (2019). The Bayesian G-Formula to Estimate Impacts of Interventions on Exposure Mixtures: Demonstration with Metals from Coal-fired Power Plants and Birth-weight. *Am J Epidemiol* **Under Review**.
5. **Keil, A. P.**, E. Tchetgen Tchetgen, and S. R. Cole (2019). Bayesian causal inference: marginal structural models without weights. *Stat Med* **In preparation**.
6. **Keil, A. P.**, M. Jonsson Funk, S. R. Cole, S. Mooney, J. K. Edwards, and D. J. Westreich (2019). On being wrong: model misspecification and causal misspecification. *Epidemiology* **In preparation**.
7. **Keil Alexander P.** and Edwards, J. K., A. I. Naimi, and S. R. Cole (2019). Markov unchained: a guided walk through the Metropolis algorithm. *Am J Epidemiol* **Under review**.
8. Mooney, S. J., **A. P. Keil**, and D. J. Westreich (2019). Ten Questions About Using Machine Learning to Estimate Causal Effects (You Won't Believe the Answer to Number Nine!) *Epidemiology* **Under review**.
9. Chanti-Ketterl, M., **A. P. Keil**, F. Kamel, H. Chen, K. M. Hayden, G. Potter, S. Shrestha, and C. Parks (2018). Pesticides and cognitive functioning in the Ag Health Study. *Environ Health Perspect* **In preparation**.
10. Edwards, J. K., C. R. Lesko, **A. P. Keil**, and D. J. Westreich (2018). Generalized counterfactual risk functions in the presence of competing events. *Epidemiology* **In preparation**.
11. Gellert, K. S., **A. P. Keil**, D. Zeng, L. C. R, R. E. Aubert, C. L. Avery, E. Selvin, A. M. Siega-Riz, B. G. Windham, and G. Heiss (2018). Changes in Burden of Peripheral Artery Disease Following a Hypothetical Change in the Population Distribution of Adiposity. *PLoS One* **In preparation**.
12. **Keil, A. P.**, D. Zeng, M. G. Hudgens, and D. J. Westreich (2018). Improving inference with machine learning: black box algorithms in service of epidemiology. *Am J Epidemiol* **In preparation**.

PhD thesis

1. **Keil, A. P.** (2014a). "Healthy Worker survivor bias in a cohort of uranium miners from the Colorado Plateau". PhD thesis. University of North Carolina at Chapel Hill.

Teaching activities

Courses

2020	Instructor	<i>Motivating and practicing Bayesian data analysis for epidemiologic problems: independent study</i> ; 2 students
2016-2019	Instructor	<i>Perspectives in Epidemiology and Public Health (EPID 890)</i> ; 5-10 students
2018	Instructor	<i>Introduction to Epidemiology and Causal Inference (ULM Summer School of Epidemiology)</i> ; 20 students

2011	Instructor	<i>SAS and Data Management (EPID 700)</i> ; 30 students
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Guest lectures

2020	Instructor	"Reliability" in <i>Design of Clinical Research (EPID 804)</i> ; 20 students
2019	Instructor	"Missing data in survival analysis" in <i>Biomarkers in Population-Based Research (EPID 742)</i> ; 25 students
2019	Instructor	"Inference in studies with biomarkers subject to limits of detection" in <i>Epidemiologic Analysis Of Time-To-Event Data (EPID 722)</i> ; 15 students
2016-2018	Instructor	"G-formula" in <i>Epidemiologic Analysis Of Time-To-Event Data (EPID 722)</i> ; 25 students
2018	Instructor	Bayesian statistics and simulations in R <i>Introduction to R (EPID 799C)</i> ; 15 students
2016,17	Instructor	Various topics in <i>Fundamentals of Epidemiology (EPID 710)</i> ; 30 students
2016-20	Instructor	"Ionizing radiation and cancer: Epidemiology and studies of survivors of the atomic bombings of Hiroshima and Nagasaki" in <i>Environmental Epidemiology (EPID 785)</i> ; 10 students
2014	Instructor	"BUGS is not WinBUGS (and vice versa)" in <i>Advanced Methods for Epidemiology: Introduction to Bayesian Statistics (EPID 730)</i> ; 15 students

Current grant and other support

09/2018- Current	R01ES029531 (NIH/NIEHS): Public Health Priority Setting For Environmental Metals Mixtures And Birth Defects	(Keil, Fry) Role: MPI. Duration: 5 years.
08/2019- Current	R01OH011409 (CDC/NIOSH): Occupational Exposure To Ionizing Radiation: Models For Policy Making	(Richardson) Role: Investigator. Duration: 3 years.
09/2018- Current	8323751 (NIH/NIEHS): Inter-governmental personnel act agreement: advanced methods for mixtures research	Role: Investigator. Duration: 2 years.
03/2019- Current	Patient-Centered Outcomes Research Institute (PCORI): Enhancing Hybrid Study Designs for Comparative Effectiveness Research	(Lund) Role: Co-Investigator. Duration: 3 years.

Service

I serve as a review editor for *Frontiers in Public Health* (Occupational Health and Safety section). I have performed peer reviews for the following publications: *Epidemiology*, *American Journal of Epidemiology*, *International Journal of Epidemiology*, *European Journal of Epidemiology*, *Biometrics*, *Statistics in Medicine*, *Annals of Statistics*, *Environmental Health Perspectives*, *Patterns*, *Occupational and Environmental Medicine*, *Annals of Epidemiology*, *American Journal of Industrial Medicine*, *Demography*, *BMC Public Health*, *Radiation and Environmental Biophysics*, *IEEE Journal of Biomedical and Health Informatics*, *International Journal of Hygiene and Environmental Health*, *Autism Research*, and more. I have served as a grant reviewer for the Research Opportunities Program, Ministry of Labor, Ontario Canada.

At UNC, I have served on a number of Master's paper and Dissertation committees:

Student	Year of Degree	Position
Adrien Wilkie	2014	Master's paper reader
Nathan De Bono	2018	Dissertation committee member
Jean Strelitz	2018	Dissertation committee member
Nicole Niehoff	2019	Dissertation committee member
Giehae Choi	*	Dissertation committee member
Danielle Chun	*	Dissertation committee member
Ibrahim Zaganjor	*	Dissertation committee member
Kristin Sullivan	*	Dissertation committee member
Kenny Chen	*	Dissertation committee member
Bailey DeBarmore	*	Dissertation committee member
Tiansheng Wang	*	Dissertation committee member

*Current