Lauren A. Eaves, PhD IBCLC
laeaves@live.unc.edu
919-904-0273

Education and Certifications

PhD	University of North Carolina at Chapel Hill Gillings School of Global Public Health Degree: Environmental Sciences and Engineering Minor: Epidemiology Mentor: Dr. Rebecca Fry Dissertation topic: Prenatal metal mixtures exposure and preterm birth	2018-2022
BSPH	University of North Carolina at Chapel Hill Gillings School of Global Public Health Major: Environmental Health Sciences With Highest Distinction	2014-2018
IBCLC	Certification number: L-308286	certified 2022

Professional Experiences

Adjunct Assistant Professor, Environmental Sciences and Engineering	UNC	2023-present
Research Scientist, Institute for Environmental Health Solutions	UNC	2022-present
Graduate Research Assistant, Fry Lab	UNC	2018-2022
Undergraduate Research Assistant, The Water Institute	UNC	2016-2018

Other Professional Experiences

Member of Inaugural Cohort, Women's Health Multidisciplinary Consortium	UNC	2023
Board of Directors, The Meantime Coffee Company	UNC	2021-present
Trainee, Mary Rose Tully Training Initiative (MRT-TI), Carolina Global Breastfeeding Initiative	UNC	2021-2022
Co-President, Carolina Birth and Breastfeeding Evidence-Based Education and Support (BEBES) Student Group	UNC	2021-2022
Trainee, Superfund Research Program	UNC	2020-2022
SHARP Environmental Mixtures Workshop	Columbia	2020
High Throughput Sequencing course, Department of Biostatistics and Bioinformatics	Duke	2018
Co-Founder, The Meantime Coffee Company	UNC	2015-2018
Co-President, Center for Social Justice	UNC	2016-2017

Honors and Awards

The Graduate School Impact Award	UNC	2020
Morehead-Cain Scholarship	UNC	2014-2018

Scientific membership

International Society for Environmental Epidemiology	2021-present
Society for Epidemiologic Research	2021-present
Society for Toxicology	2018-present
US Developmental Origins of Health and Disease Society	2018-present

Bibliography

Peer-reviewed publications (19 and *in press or review*). Note: * indicates undergraduate student mentees
https://orcid.org/0000-0001-6056-923X

1. ***Eaves LA,*** *Choi G, Hall E, Sille FCM, Fry RC, Buckley JP, Keil AP. Prental exposure to toxic metals and neural tube defects: a systemtic review of the epidemiologic evidence. Environmental Health Perspectives (in review)*
2. ***Eaves LA*** *and Fry RC. Invited Perspective: Toxic Metals and Hypertensive Disorders of Pregnancy. Environmental Health Perspectives (accepted)*
3. **Eaves LA**, Lanier P, Enggasser AE, Chung G, Turla T*, Rager JE and Fry RC. Generation of the Chemical and Social Stressors Integration Technique (CASS-IT) to identify areas of holistic public health concern: an application to North Carolina. *Sci Total Environ.* 2022;160409. doi:10.1016/j.scitotenv.2022.160409.
4. **Eaves LA**, Bulka CM, Rager JE, Galusha AL, Parsons PJ, O'Shea TM and Fry RC. Metals mixtures modeling identifies birth weight-associated gene networks in the placentas of children born extremely preterm. *Chemosphere*. 2022;137469. doi:10.1016/j.chemosphere.2022.137469.
5. Bulka CM, **Eaves LA**, Gardner AJ, Parsons PJ, Kyle RR, Smeester L, O"Shea TM, Fry RC. Prenatal exposure to multiple metallic and metalloid trace elements and the risk of bacterial sepsis in extremely low gestational age newborns: A prospective cohort study. *Front Epidemiol*. 2022;2. doi:10.3389/fepid.2022.958389
6. Freedman AN, **Eaves LA**, Rager JE, *Gavino-Lopez N, Smeester L, Bangma J, Santos HP, Joseph RM, Kuban KC, O'Shea TM, Fry RC. The placenta epigenome-brain axis: placental epigenomic and transcriptomic responses that preprogram cognitive impairment. *Epigenomics*. 2022;14(15):897-911. doi:10.2217/epi-2022-0061
7. **Eaves LA**, Enggasser AE, Camerota M, Gogcu S, Gower WA, Hartwell H, Jackson WM, Jensen E, Joseph RM, Marsit CJ, Roell K, Santos HP Jr, Shenberger JS, Smeester L, Yanni D, Kuban KCK, O'Shea TM, Fry RC. CpG methylation patterns in placenta and neonatal blood are differentially associated with neonatal inflammation. *Pediatr Res*. June 2022. doi:10.1038/s41390-022-02150-4
8. *Gavino-Lopez N, **Eaves LA**, Enggasser AE, Fry RC. Developing Toxic Metal Environmental Justice Indices (TM-EJIs) for Arsenic, Cadmium, Lead, and Manganese Contamination in Private Drinking Wells in North Carolina. *Water*. 2022;14(13):2088.
9. **Eaves LA**, Keil AP, Rager JE, George A, Fry RC. Analysis of the novel NCWELL database highlights two decades of co-occurrence of toxic metals in North Carolina private well water: Public health and environmental justice implications. *Sci Total Environ*. 2022;812:151479. doi:10.1016/j.scitotenv.2021.151479
10. Clark J, Avula V, Ring C, **Eaves LA**, Howard T, Santos HP, Smeester L, Bangma JT, O'Shea TM, Fry RC, Rager JE. Comparing the Predictivity of Human Placental Gene, microRNA, and CpG Methylation Signatures in Relation to Perinatal Outcomes. *Toxicol Sci*. 2021;183(2):269-284. doi:10.1093/toxsci/kfab089
11. Clark J, **Eaves LA**, Gaona AR, Santos HP Jr, Smeester L, Bangma JT, Rager JE, O'Shea TM, Fry RC. Pre-pregnancy BMI-associated miRNA and mRNA expression signatures in the placenta highlight a sexually-dimorphic response to maternal underweight status. *Sci Rep*. 2021;11(1):15743. doi:10.1038/s41598-021-95051-1
12. *Oldenburg KS, **Eaves LA**, Smeester L, Santos HP, O'Shea TM, Fry RC. Development of the genomic inflammatory index (GII) to assess key maternal antecedents associated with placental inflammation. *Placenta*. 2021;111:82-90. doi:10.1016/j.placenta.2021.06.010
13. Manuck TA, **Eaves LA**, Rager JE, Sheffield-Abdullah K, Fry RC. Nitric oxide-related gene and microRNA expression in peripheral blood in pregnancy vary by self-reported race. *Epigenetics*. July 2021:1-15. doi:10.1080/15592294.2021.1957576
14. Rager JE, Clark J, **Eaves LA**, Avula V, Niehoff NM, Kim YH, Jaspers I, Gilmour MI. Mixtures modeling identifies chemical inducers versus repressors of toxicity associated with wildfire smoke. *Sci Total Environ*. 2021;775:145759. doi:10.1016/j.scitotenv.2021.145759
15. Manuck TA, **Eaves LA**, Rager JE, Fry RC. Mid-pregnancy maternal blood nitric oxide-related gene and miRNA expression are associated with preterm birth. *Epigenomics*. April 2021. doi:10.2217/epi-2020-0346
16. **Eaves LA**, Nguyen HT, Rager JE, Sexton KG, Howard T, Smeester L, Freedman AN, Aagaard KM, Shope C, Lefer B, Flynn JH, Erickson MH, Fry RC, Vizuete W. Identifying the Transcriptional Response of Cancer and Inflammation-Related Genes in Lung Cells in Relation to Ambient Air Chemical Mixtures in Houston, Texas. *Environ Sci Technol*. October 2020. doi:10.1021/acs.est.0c02250

17. **Eaves LA**, Phookphan P, Rager JE, Bangma J, Santos HP Jr, Smeester L, O'Shea TM, Fry RC. A role for microRNAs in the epigenetic control of sexually dimorphic gene expression in the human placenta. *Epigenomics*. September 2020. doi:10.2217/epi-2020-0062
18. Payton A, Clark J, **Eaves L**, Santos HP Jr, Smeester L, Bangma JT, O'Shea TM, Fry RC, Rager JE. Placental genomic and epigenomic signatures associated with infant birth weight highlight mechanisms involved in collagen and growth factor signaling. *Reprod Toxicol*. 2020;96:221-230. doi:10.1016/j.reprotox.2020.07.007
19. Bangma J, **Eaves LA**, *Oldenburg K, Reiner JL, Manuck T, Fry RC. Identifying Risk Factors for Levels of Per- and Polyfluoroalkyl Substances (PFAS) in the Placenta in a High-Risk Pregnancy Cohort in North Carolina. *Environ Sci Technol*. 2020;54(13):8158-8166. doi:10.1021/acs.est.9b07102
20. **Eaves LA**, Smeester L, Hartwell HJ, Lin YH, Arashiro M, Zhang Z, Gold A, Surratt JD, Fry RC. Isoprene-Derived Secondary Organic Aerosol Induces the Expression of MicroRNAs Associated with Inflammatory/Oxidative Stress Response in Lung Cells. *Chem Res Toxicol*. 2020;33(2):381-387. doi:10.1021/acs.chemrestox.9b00322
21. Stýblo M, Douillet C, Bangma J, **Eaves LA**, de Villena FP-M, Fry R. Differential metabolism of inorganic arsenic in mice from genetically diverse Collaborative Cross strains. *Arch Toxicol*. 2019;93(10):2811-2822. doi:10.1007/s00204-019-02559-7

Books and Chapters:

1. **Eaves LA**, Gardner AJ, Fry RC. Tools for the assessment of epigenetic regulation. In: *Environmental Epigenetics in Toxicology and Public Health*. Elsevier; 2020:33-64. doi:10.1016/B978-0-12-819968-8.00002-0

Oral presentations:

1. **Eaves LA**, Keil AP, Jukic AM, Dhingra R, Rager JE, Fry RC. Prenatal metal mixture exposure via private well water and risk of preterm birth in North Carolina. UNC Superfund Research Program Monthly Meeting (Chapel Hill, May 2022)
2. **Eaves LA**, Keil AP, Jukic AM, Dhingra R, Rager JE, Fry RC. Prenatal metal mixture exposure via private well water and risk of preterm birth in North Carolina. UNC Women's Health Multidisciplinary Consortium Seminar (Chapel Hill, May 2022)
3. **Eaves LA**, Bulka CM, Rager JE, Parsons PJ, Galusha AL, O'Shea TM, Fry RC. Prenatal exposure to toxic and essential metal/metalloid mixtures is associated with placental genomic signatures. US Developmental Origins of Health and Disease Annual Meeting (Chapel Hill, November 2021)
4. **Eaves LA,** Bulka CM, Rager JE, Parsons PJ, Galusha AL, O'Shea TM, Fry RC. Mixing it Up: Prenatal Exposure to Metal Mixtures and Placental Gene Expression. ESE ENVR400 Department-wide seminar series. (Chapel Hill, August 2021)
5. **Eaves LA**, Keil AP, Rager JE, Fry RC. Identifying patterns in Metal concentrations in private well water in North Carolina: 1998-2019. UNC Superfund Research Program Trainees Meeting (Chapel Hill, March 2021)

Poster presentations:

1. Jones M, Roell K, **Eaves LA**, Fry RC, Manuck TA. Accelerated epigenetic clock aging in peripheral blood is associated with obstetric metabolic syndrome-related outcomes. Society for Maternal and Fetal Medicine Meeting (accepted for February 2023)
2. Wilson T, Roell K, **Eaves LA**, Fry RC, Manuck TA. DNA methylation-estimated blood cell immune subtypes in early pregnancy are associated with preterm birth (PTB). Society for Maternal and Fetal Medicine Meeting (accepted for February 2023)
3. Manuck TA, Roell K, **Eaves LA**, Fry RC. Accelerated epigenetic clock aging in peripheral blood is associated with preterm birth (PTB). Society for Maternal and Fetal Medicine Meeting (accepted for February 2023)
4. Hayes W, **Eaves LA**, Jones CN, Hochard J, Fry RC, Pieper KJ. Demographic and data bias in North Carolina well water testing. American Geophysical Union Fall Meeting (accepted for December 2022)

5. **Eaves LA**, Keil AP, Jukic AM, Dhingra R, Rager JE and Fry RC. Metal mixtures in private well water are associated with preterm birth in North Carolina. Superfund Research Program Annual Meeting (December 2022).
6. Bulka CM, **Eaves LA**, Gardner AJ, Parsons PJ, Galusha AL, O'Shea TM, Fry RC. Umbilical Cord Tissue Metal Concentrations and Placental Cellular Composition: A Descriptive Molecular Epidemiology Study Leveraging DNA Methylation. International Society for Environmental Epidemiology (August 2022)
7. **Eaves LA**, Enggasser AE, Camerota M, Gogcu S, Gower WA, Hartwell H, Jackson WM, Jensen E, Joseph RM, Marsit CJ, Roell K, Santos HP Jr, Shenberger JS, Smeester L, Yanni D, Kuban KCK, O'Shea TM, Fry RC. CpG methylation patterns in placenta and neonatal blood are differentially associated with neonatal inflammation. Developmental Origins of Health and Disease World Congress (August 2022)
8. Hayes W, **Eaves LA**, Jones CN, Hochard J, Fry RC, Pieper KJ. Demographic and data bias in North Carolina well water testing. AEESP Research and Education Conference (St. Louis MO, June 2022)
9. **Eaves LA**, Bulka CM, Rager JE, Parsons PJ, Galusha AL, O'Shea TM, Fry RC. Prenatal exposure to toxic and essential metal/metalloid mixtures is associated with placental genomic signatures. Society of Toxicology (San Diego, March 2022)
10. Jensen C, **Eaves LA**, Daniels J, Fry RC, Manuck TA. High Ambient Temperature Exposure During Pregnancy is Associated with Early Preterm Birth less than 34 Weeks' Gestation. Society of Toxicology (San Diego, March 2022)
11. Gavino-Lopez N, **Eaves LA**, Fry RC. Developing an Environmental Justice Index for Toxic Metal Well Water Contamination in North Carolina. Society of Toxicology (San Diego, March 2022)
12. Manuck TA, Roell K, **Eaves LA**, Fry RC. Epigenome-wide DNA methylation in maternal blood and preterm birth (PTB). Society for Maternal Fetal Medicine Annual Meeting (February 2022)
13. **Eaves LA,** Bulka CB, Rager JE, Galusha AL, Parsons PJ, O'Shea TM, Fry RC. Prenatal exposure to metal mixtures is associated with altered expression of NF-kB- and EIF2- signaling pathways in the placentas of children born extremely preterm. North Carolina Society of Toxicology Annual Meeting (January 2022)
14. Gavino-Lopez N, **Eaves LA**, Fry RC. Developing an Environmental Justice Index for Toxic Metal Well Water Contamination in North Carolina. North Carolina Society of Toxicology Annual Meeting (January 2022)
15. **Eaves LA**, Bulka CM, Rager JE, Parsons PJ, Galusha AL, O'Shea TM, Fry RC. Prenatal exposure to toxic and essential metal/metalloid mixtures is associated with placental genomic signatures. International Society for Environmental Epidemiology (August 2021)
16. **Eaves LA**, Keil AP, Dhingra R, Rager JE, Manuck TM, Fry RC. A systematic review of the epidemiologic evidence supporting the association between prenatal exposure to toxic and essential metals and preterm birth. Society for Epidemiologic Research (June 2021)
17. **Eaves LA**, Keil AP, Tomlinson MS, Fry RC. Multi-metal analysis of private well water in North Carolina: implications for exposure assessment and public health. Society for Toxicology (March 2021)
18. **Eaves LA**, Keil AP, Tomlinson MS, Fry RC. Multi-metal analysis of private well water in North Carolina: Implications for Public Health. Superfund Research Program Annual Meeting (December 2020)
19. **Eaves LA,** Nguyen HT, Rager JE, Sexton KG, Howard T, Smeester L, Freedman AN, Aagaard KM, Shope C, Lefer B, Flynn JH, Alvarez S, Erickson MH, Fry RC, Vizuete W. Identifying the transcriptional response of cancer and inflammation-related genes in lung cells in relation to ambient air chemical mixtures in Houston, Texas. North Carolina Society of Toxicology Annual Meeting (September 2020)
20. Bangma J, Szilagyi J, Meakin CJ, Plazas C, Kepper S, **Eaves LA,** Reiner J, Manuck T, Fry RC Assessing the effect of Per- and Polyfluoroalkyl Substances on the expression of epigenetic machinery-associated genes in the placenta in a clinical study and *in vitro.* Society of Environmental Toxicology and Chemistry (November 2019)
21. **Eaves LA,** Phookphan P, Rager JE, Bangma, J, Santos HP, Smeester L, O'Shea TM, Fry R.C. Sexual epigenetic dimorphism in the human placenta: differential miRNA expression between the male and female placenta; Environmental Mutagenesis and Genomics Society Annual Meeting (Washington D.C, September 2019)
22. **Eaves LA,** Phookphan P, Rager JE, Bangma J, Santos HP, Smeester L, O'Shea TM, Fry RC. Sexual epigenetic dimorphism in the human placenta: differential miRNA expression between the male and female placenta; Developmental Origins of Health and Disease Annual Meeting (Chapel Hill, September 2019)

Teaching Activities

Guest Lecturer **ENVR240-001, UNC** 2022
Title: Developmental Origins of Health and Disease.

Guest Lecturer **Environmental Science, RTP High School** 2022
Title: Identifying patterns in metal concentrations in private well water in North Carolina: 1998-2019.

Teaching Assistant, co-Course Developer **ENVR240-001, UNC** 2019-2020
Title: Introduction to Human Exposure and Health Effects Research
Co-developed and co-taught course that that launched in Spring 2020 in collaboration with Dr. Fry and another PhD student to introduce undergraduates to human exposure and health effects research with the goal of expanding access to research, particularly for underrepresented students.

Graduate Student Lead **Undergraduate Research Opportunities Program (UROP)** 2018-2021
Co-organized first cohort of the UROP, a year-long, structured research program for undergraduates interested in environmental health; this effort included recruiting students, co-leading 7-session series of workshops and providing mentorship and support. Part of team coordinating the first Folt Internship Researching Environmental Health, which included 10 students conducting paid research over summer 2019, partnered with graduate students and post-docs.

Peer Mentor **BIOL201-001, UNC** 2016
Guided students through interactive in-class learning exercises and hosted office hours for an introductory ecology and evolution class.

Teaching Fellow **Breakthrough San Francisco** 2015
Planned and delivered 8-week biology curriculum for high-potential, underserved 6th grade students.

Advising/mentoring activities

Undergraduate UNC B.S.P.H Honors Student Supervision

1. **Noemi Gavino-Lopez** 2021-2022
   Committee member of supervisory committee, Environmental Sciences and Engineering. Primary advisor: Rebecca Fry. Topic: *Developing Toxic Metal Environmental Justice Indices (TM-EJI) for Arsenic, Cadmium, Lead, and Manganese Contamination in Private Drinking Wells in North Carolina*
2. **Kirsi Oldenburg** 2019-2020
   Committee member of supervisory committee, Environmental Sciences and Engineering. Primary advisor: Rebecca Fry. Topic: *The Evaluation of Placental Inflammation via the Genomic Inflammatory Index (GII) in Relation to Key Perinatal Factors.*

Grant support

Libby and Lucy Overman Fund to Support Prematurity Pilot Grant Award (Eaves/Potter)
Amount: **$6,000**
The MEND (Meeting Emotional Needs with Doulas) Initiative: A doula program supporting individuals at high-risk for preterm birth
Role: Principal Investigator

Service

To Discipline:
Invited reviewer:
Environmental Research 2022-2023
European Journal of Pediatrics 2023

To the State of North Carolina:
Invited presentations:

1. "Environmental health and breastfeeding", WIC Perinatal Care Region VI, Eastern AHEC (February 2022)

2. "Environmental Justice at Home"; EJ@HOME: UNC Gillings School of Global Public Health, UNC Science Expo (April 2021)

Internal to the SPH:

1. Member, Environmental Health Solutions MPH admission committee 2022-2023
2. Member, Search Committee for Research Program Manager for IEHS 2022

To local community:

1. Refugee Community Partnership Volunteer Doula 2021-present
2. Birth Partners Volunteer Doula 2019-present
    - Doula trainer 2021-present
    - Mentor Doula of the year 2020