

## MICHAEL LEUNG

Postdoctoral Research Fellow  
Department of Environmental Health  
Harvard T.H. Chan School of Public Health

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[epimikey.github.io](https://github.com/epimikey)

### EDUCATION

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- Doctor of Philosophy (PhD)** 2017 - 2021  
*Harvard T.H. Chan School of Public Health, Boston, MA*
- Epidemiology, Population Health Sciences
  - Dissertation: *Fetal Health & the Environment*
  - Advisor: Dr. Marc Weisskopf
- Master of Science (SM1)** 2017 - 2021  
*Harvard T.H. Chan School of Public Health, Boston, MA*
- Biostatistics
- Master of Science (MS)** 2013 - 2015  
*Queen's University, Kingston, ON*
- Epidemiology
  - Dissertation: *Melatonin patterns among female hospital workers on day and night shifts: assessment by different exposure metrics*
  - Advisors: Dr. Kristan Aronson & Dr. Joan Tranmer
- Bachelor of Science (BS)** 2009 – 2013  
*Queen's University, Kingston, ON*
- Life Sciences

### RELEVANT RESEARCH & PROFESSIONAL EXPERIENCE

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- Postdoctoral Research Fellow** Nov 2021 – Present  
*Harvard T.H. Chan School of Public Health, Boston, MA*
- Environmental Health
- Epidemiologist** Apr 2016 – Aug 2017  
*Centre for Global Child Health, The Hospital for Sick Children*
- Project: *Maternal-child exposures to persistent organic pollutants in Dhaka, Bangladesh*
  - Direct study personnel, ethical review processes, finances, and protocol implementation
  - Primary liaison among core investigator group in Dhaka, Toronto and Tromsø
  - Supervisors: Dr. Daniel Roth & Dr. Diego Bassani
- Data Analyst** Sept 2015 – Feb 2017  
*Centre for Global Child Health, The Hospital for Sick Children*
- Project: *Quantifying healthy birth, growth and development knowledge integration*
  - Member of the Healthy Birth, Growth and Development Knowledge Integration (HBGDki) Lifecycle Growth and Development Team, Bill & Melinda Gates Foundation
  - Supervisors: Dr. Daniel Roth & Dr. Diego Bassani

## PUBLICATIONS

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1. Weisskopf MG, **Leung M** (In Press). *Misclassification bias in the assessment of gene-by-environment interactions*. Epidemiology.
2. Wang VA, **Leung M**, Modest AM, Hacker MR, Vieira CLZ, Schwartz J, Coull BA, Koutrakis P, Papatheodorou S (In Press). *Association of solar and geomagnetic activity with fetal growth*. Science of the Total Environment.
3. **Leung M**, Modest AM, Hacker MR, Wylie BJ, Wei Y, Schwartz J, Iyer H, Hart JE, Coull BA, Laden F, Weisskopf MG, Papatheodorou S (In Press). *Traffic-related air pollution and ultrasound parameters of fetal growth in Eastern Massachusetts, USA*. American Journal of Epidemiology.
4. Wang VA, **Leung M**, Li L, Modest AM, Schwartz J, Coull BA, Hacker MR, Wylie BJ, Koutrakis P, Papatheodorou S. *Prenatal exposure to ambient particle radioactivity and fetal growth in Eastern Massachusetts*. Air Quality, Atmosphere & Health. 2023 Apr;16(4):805-15.
5. **Leung M**, Laden F, Coull BA, Modest AM, Hacker MR, Wylie BJ, Iyer HS, Hart JE, Wei Y, Schwartz J, Weisskopf MG. *Ambient temperature during pregnancy and fetal growth in Eastern Massachusetts, USA*. International Journal of Epidemiology. 2022 Dec 10.
6. **Leung M**, Rowland ST, Coull BA, Modest AM, Hacker MR, Schwartz J, Kioumourtzoglou MA, Weisskopf MG, Wilson A. *Bias Amplification and Variance Inflation in Distributed Lag Models Using Low-Spatial-Resolution Data*. American Journal of Epidemiology. 2023 Apr;192(4):644-57.
7. Ritonja JA, Aronson KJ, **Leung M**, Flaten L, Topouza DG, Duan QL, Durocher F, Tranmer JE, Bhatti P. *Investigating the relationship between melatonin patterns and methylation in circadian genes among day and night shift workers*. Occupational and Environmental Medicine; 2022 May 2; doi: 10.1136/oemed-2021-108111
8. **Leung M**, Weisskopf MG, Laden F, Coull B, Modest AM, Hacker MR, Wylie BJ, Wei Y, Schwartz J, Papatheodorou S. *Exposure to PM<sub>2.5</sub> during pregnancy and fetal growth in Eastern Massachusetts, USA*. Environmental Health Perspectives. 2022 Jan 6;130(1):017004
9. Jahn J, Krieger N, Agenor M, **Leung M**, Davis BA, Weisskopf MG, Chen JT. *Gestational exposure to fatal police violence and pregnancy loss in US Core Based Statistical Areas, 2013-2015*. EClinicalMedicine. 2021;36:100901
10. **Leung M**, Kioumourtzoglour MA, Raz R, Weisskopf MG. *Bias due to selection on live births in studies of environmental exposures during pregnancy: a simulation study*. Environmental Health Perspectives. 2021; 129(4)
11. **Leung M**, Krishna A, Yang S, Bassani DG, Roth DE. *Linear growth and mid-childhood cognitive outcomes in three birth cohorts of term-born children: an approach to integrating three growth models to explore critical windows*. BMJ Open. 2020;10:e036850.

12. O'Callaghan KM, Taghivand M, Zuchniak A, Onoyovwi A, Korsiak J, **Leung M**, Roth DE. *Vitamin D in Breastfed Infants: Systematic Review of Alternatives to Daily Supplementation*. *Advances in Nutrition*. 2020 Jan 1;11(1):144-59.
13. **Leung M**, Nøst TH, Wania F, Papp E, Herzke D, Mahmud A, Roth DE. *Maternal-child exposures to persistent organic pollutants in Dhaka, Bangladesh*. *Exposure and Health*. 2018; p1-9.
14. **Leung M**, Perumal N, Mesfin E, Krishna A, Yang S, Johnson W, Bassani DG, Roth DE. *Metrics of early childhood growth in recent epidemiological research: a scoping review*. *PLoS ONE*. 2018 March; 13(3):e0194565.
15. Roth DE, **Leung M**, Mesfin E, Qamar H, Watterworth J, Papp E. *Vitamin D supplementation during pregnancy: current and future state of the evidence from randomized controlled trials*. *The BMJ*. 2017 November; 359:j5237.
16. Roth DE, Krishna A, **Leung M**, Shi J, Bassani DG, Barros AJD. *Early childhood linear growth faltering in low-income and middle-income countries as a whole-population condition: analysis of 179 Demographic and Health Surveys from 64 countries (1993-2015)*. *The Lancet Global Health*. 2017 December; 5(12):e1249-e1257.
17. Korsiak J, Tranmer J, **Leung M**, Borghese MM, Aronson KJ. *Actigraph measures of sleep among female hospital employees working day or rotating day and night shifts*. *Journal of Sleep Research*. 2017 July; doi: 10.1111/jsr.12579.
18. **Leung M**, Bassani DG, Racine-Poon A, Goldenberg A, Ali SA, Kang G, Premkumar PS, Roth DE. *Conditional random slope: a new approach for estimating individual child growth velocity in epidemiological research*. *American Journal of Human Biology*. 2017 April 1;e23009.
19. Hung EW, Aronson KJ, **Leung M**, Day A, Tranmer J. *Shift work parameters and disruption of diurnal cortisol production in female hospital employees*. *Chronobiology International*. 2016 Sep 13;33(8):1045-55.
20. **Leung M**, Tranmer J, Hung E, Korsiak J, Day AG, Aronson KJ. *Shift work, chronotype, and melatonin patterns among female hospital employees on day and night shifts*. *Cancer Epidemiology Biomarkers & Prevention*. 2016 May 1; 25(5):830-8.

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## MANUSCRIPTS IN PREPARATION

1. Shupler M, Huybrechts K, **Leung M**, Wei Y, Schwartz J, Hernandez-Diaz S, Papatheodorou S. *Racial and ethnic disparities in the association between short-term increases in ambient PM<sub>2.5</sub> concentrations and temperature with stillbirth among Medicaid enrollees: A time-stratified case-crossover analysis*. Submitted to *Environmental Science and Technology*.
2. **Leung M\***, Rowland S\*, Kioumourtzoglou MA, Wilson A, Coull B, Raanan Raz, Weisskopf MG. *A novel method for examining associations of time-varying exposures with pregnancy loss*. \*Joint first author

3. **Leung M**, Im S, Rowland ST, Papatheodorou S, Coull BA, Kioumourtzoglou MA, Weisskopf MG, Wilson A. *Prenatal exposure to wildfire smoke and pregnancy loss in Colorado, USA*.
4. **Leung M**, Weisskopf MG, Modest AM, Hacker MR, Iyer HS, Hart JE, Wei Y, Schwartz J, Coull BA, Laden F, Papatheodorou S. *Fine particulate matter and preterm birth: a causal survival approach*.
5. **Leung M**, Iyer H, Modest AM, Tang I, Hart JE, Hacker MR, Wylie BJ, Wei Y, Schwartz J, Coull BA, Laden F, Papatheodorou S, Weisskopf MG. *On the importance of addressing spatial confounding in estimating health effects of green spaces*.
6. **Leung M**, Iyer H, Modest AM, Tang I, Hart JE, Hacker MR, Wylie BJ, Wei Y, Schwartz J, Coull BA, Laden F, Papatheodorou S, Weisskopf MG. *Residential greenness and ultrasound parameters of fetal growth in Eastern Massachusetts, USA*.
7. Delaney S, Spangler K, **Leung M**, Nethery R, Tiemeier H, Weisskopf MG. *Childhood cognitive and behavioral effects of high summer temperatures*.
8. Delaney S, Spangler K, **Leung M**, Nethery R, Tiemeier H, Weisskopf MG. *Childhood cognitive effects of ambient temperature deviations: differences by socioeconomic position*.
9. Felske LR, Ritonja J, **Leung M**, Korsiak J, Tranmer J, Aronson KJ. *Investigating potential bi-directional relationships between sleep and melatonin among day and night rotating shift workers*

## INVITED PRESENTATIONS

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1. Harvard T.H. Chan School of Public Health Reproductive Epidemiology T32 Meeting, Harvard T.H. Chan School of Public Health, Boston, MA. *A novel approach for examining associations of prenatal exposures with pregnancy loss*. February 9, 2023.
2. Seminar in Occupational and Environmental Health Research, Harvard T.H. Chan School of Public Health, Boston, MA. *Gestational exposure to PM<sub>2.5</sub> and ultrasound parameters of fetal growth in Massachusetts*. January 29, 2021.
3. Seminar in Occupational and Environmental Health Research, Harvard T.H. Chan School of Public Health, Boston, MA. *On the determinants of pregnancy loss: seeing the invisible*. November 8, 2019.
4. Child Health Evaluative Sciences weekly rounds, SickKids Research Institute, Toronto, ON. *Maternal-child exposures to persistent organic pollutants in Dhaka, Bangladesh*. June 7, 2017.
5. Occupational & Environmental Health seminar series, Public Health Ontario, Toronto, ON. *Light at night as a potential cause of breast cancer*. February 24, 2017.
6. International Development Week, SickKids Research Institute, Toronto, ON. *Maternal-child exposures to persistent organic pollutants (POPs) in Dhaka*. February 8, 2017.

7. Child Health Evaluative Sciences weekly rounds, SickKids Research Institute, Toronto, ON. *Maternal-child exposures to persistent organic pollutants in Dhaka, Bangladesh*. June 1, 2016.

## GRANTS

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1. Boston University Initiative on Cities, 2023 (Submitted)
  - Project: *Ambient heat and pregnancy loss across the United States, 2000-2021*
  - Role: Consultant
  - Funding: Boston University
  - Amount: 25,000 USD
2. Catalyst Grant, 2016-2017 (Completed)
  - Project: *Maternal child exposures to persistent organic pollutants in Dhaka, Bangladesh*
  - Role: Principal Investigator
  - Funding: The Hospital for Sick Children
  - Amount: 25,000 CAD

## AWARDS & HONORS

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1. Teaching Certificate of Distinction, Harvard University, 2018-2019
2. Poster Award Winner, 18<sup>th</sup> Annual Meeting for Health Sciences Research Trainees, Queen's University, 2015
3. Canada Graduate Scholarship, Canadian Institutes of Health Research, 2014-2015
4. Dean's Honor List with Distinction, Queen's University, 2009-2015
5. R.S. McLaughlin Fellowship, Queen's University, 2013-2014
6. Queen's Graduate Award, Queen's University, 2013-2014
7. Queen's University Chancellor's Scholarship, Queen's University 2009-2013
8. Canada Millennium Foundation National Award, Millennium Foundation, 2009-2013

## TEACHING EXPERIENCE

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### Guest Lecturer

March 2023

Harvard T.H. Chan School of Public Health, Boston, MA

- ID 215: Environmental and Occupational Epidemiology
- Lecture: *Time Series and Case Crossover Designs*

### Head Teaching Fellow

Aug 2019 – Mar 2021

Harvard T.H. Chan School of Public Health, Boston, MA

- EPI 201: Introduction to Epidemiology (Prof. Murray Mittleman), Fall 2019
- EPI 202: Elements of Epidemiologic Research (Prof. Murray Mittleman), Fall 2019
- EPI 289: Models for Causal Inference (Prof. Barbra Dickerman), Spring 2021

### Teaching Fellow

Aug 2018 – May 2021

Harvard T.H. Chan School of Public Health, Boston, MA

- EPI 201: Introduction to Epidemiology (Prof. Murray Mittleman), Fall 2018
- EPI 202: Elements of Epidemiologic Research (Prof. Murray Mittleman), Fall 2018
- EPI 289: Models for Causal Inference (Prof. Miguel Hernan), Spring 2019, 2020

- EPI 203: Study Design in Epidemiologic Research (Prof. Sonia Hernandez-Diaz), Spring 2020, 2021
- EPI 202S: Elements of Epidemiologic Research Summer (Prof. Murray Mittleman), Summer 2019

### Teaching Assistant

Sept 2014 – Dec 2014

Queen's University, Kingston, ON

- EPID 821: Introductory Biostatistics (Prof. Michael McIsaac), Fall 2014

## CONFERENCE ABSTRACTS & PRESENTATIONS

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1. *International Society for Environmental Epidemiology*, September 2022
2. *Society for Epidemiologic Research*, June 2022
3. *Society for Pediatric and Perinatal Epidemiologic Research*, June 2022
4. *International Society for Environmental Epidemiology*, August 2021
5. *International Society for Environmental Epidemiology*, August 2020
6. *Nutrition*, Baltimore, MD, June 2019
7. *Canadian Society for Chronobiology*, Montreal, QC, May 2019
8. *Canadian Association for Research on Work and Health*, Vancouver, BC, October 2018
9. *Experimental Biology*, Chicago, IL, April 2017
10. *Eighteenth Annual Meeting for Health Sciences Research Trainees*, Kingston, ON, June 2015
11. *Canadian Society for Epidemiology and Biostatistics*, Mississauga, ON, June 2015
12. *Canadian Society for Chronobiology*, Montreal, QC, May 2015
13. *Canadian Society for Epidemiology and Biostatistics*, Hamilton, ON, May 2014

## PEER REVIEW ACTIVITIES

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### Journal article reviewer

- Exposure and Health 2020 – 2022
- Fertility and Sterility 2021
- Environmental Health Perspectives 2021, 2023
- Annals of Human Biology 2022
- BMJ Open 2022
- Environmental Research 2022
- American Journal of Epidemiology 2023

### Conference abstract reviewer

- Society for Epidemiologic Research 2018, 2019, 2022
- International Society for Environmental Epidemiology 2022

## PROFESSIONAL SOCIETY MEMBERSHIP

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- American Society for Nutrition 2017 – 2018
- Society for Epidemiologic Research 2017 – Present
- International Society for Environmental Epidemiology 2022 – Present
- Society for Pediatric and Perinatal Epidemiologic Research 2022 – Present

## PRESS RELEASES

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1. **Leung M**, Laden F, Coull BA, Modest AM, Hacker MR, Wylie BJ, Iyer HS, Hart JE, Wei Y, Schwartz J, Weisskopf MG. *Ambient temperature during pregnancy and fetal growth in Eastern Massachusetts, USA*. International Journal of Epidemiology. 2022 Dec 10.
  - a. <https://news.harvard.edu/gazette/story/newsplus/the-dangers-of-heat-during-pregnancy>, Harvard Gazette, January 24, 2023
2. Jahn J, Krieger N, Agenor M, **Leung M**, Davis BA, Weisskopf MG, Chen JT. *Gestational exposure to fatal police violence and pregnancy loss in US Core Based Statistical Areas, 2013-2015*. EClinicalMedicine. 2021;36:100901
  - a. <https://stonecenter.gc.cuny.edu/the-mental-health-impacts-of-police-stops-on-adolescent-boys-and-girls-and-the-connection-between-police-violence-and-pregnancy-loss/>, City University of New York, August 16, 2021
  - b. <https://speakingofmedicine.plos.org/2022/05/24/a-formula-for-disaster/>, PLOS BLOGS: Speaking of Medicine and Health, May 24, 2022
3. Roth DE, **Leung M**, Mesfin E, Qamar H, Watterworth J, Papp E. *Vitamin D supplementation during pregnancy: current and future state of the evidence from randomized controlled trials*. The BMJ. 2017 November; 359:j5237.
  - a. <https://theobjective.com/sociedad/2022-10-18/mes-nacimiento-altura/>, The Objective, October 18, 2022
  - b. <https://www.lanacion.com.ar/lifestyle/puede-influir-el-mes-de-nacimiento-en-la-altura-de-un-bebe-nid17102022/>, La Nacion, October 18, 2022
  - c. <https://theconversation.com/influye-el-mes-de-nacimiento-en-la-altura-191967>, The Conversation, October 16, 2022
  - d. <https://www.nutraingredients-usa.com/Article/2018/05/31/New-JAMA-Pediatrics-meta-analysis-supports-vitamin-D-role-in-improving-infant-growth>, Nutra Ingredients USA, May 31, 2018
  - e. <https://www.spiegel.de/gesundheit/ernaehrung/vitamin-d-tabletten-wie-sinnvoll-sind-ergaenzungsmittel-a-1196086.html#ref=rss>, Spiegel Online, May 3, 2018
  - f. <https://www.forbes.com/sites/tarahaelle/2017/11/30/what-the-research-says-about-vitamin-d-supplements-in-pregnancy-%C2%AF%E3%83%84%C2%AF/?ref=altdnt&sh=75e4d42947d3>, Forbes, November 30, 2017
  - g. <https://consumer.healthday.com/obgyn-women-s-health-11/pregnancy-news-543/evidence-lacking-for-prenatal-vitamin-d-supplementation-728890.html?AID=728890>, Health Day, November 30, 2017