

DSS Statistics Seminar

April 4, 2022, 14:00

In person Room 14 Tumminelli (CU007)

Webinar <https://uniroma1.zoom.us/j/86881977368?pwd=SWRFcVFjMDZTa0lXZk05TE1zNm5adz09>
Passcode: 432940

How much evidence do you need?
Data Science and Bayesian Statistics to
inform Environmental Policy during the
COVID-19 Pandemic

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In this talk, I will provide an overview of data science methods, including methods for Bayesian analysis, causal inference, and machine learning, to inform environmental policy. This is based on my work analyzing a data platform of unprecedented size and representativeness. The platform includes more than 500 million observations on the health experience of over 95% of the US population older than 65 years old linked to air pollution exposure and several confounders. Finally, I provide an overview of studies on air pollution exposure, environmental racism, wildfires, and how they also can exacerbate the vulnerability to COVID-19.

Press Coverage

- <https://www.nytimes.com/2021/08/13/climate/wildfires-smoke-covid.html>
- <https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html>
- <https://www.nytimes.com/2020/12/07/climate/trump-epa-soot-covid.html?smid=tw-share>
- <https://science.sciencemag.org/content/360/6388/473>
- <https://www.npr.org/sections/health-shots/2017/06/28/534594373/u-s-air-pollution-still-kills-thousands-every-year-study-concludes>
- <https://www.statnews.com/2016/11/14/climate-change-agreements/>
- <https://news.harvard.edu/gazette/story/2016/08/smoke-waves-will-affect-millions-in-coming-decades/>
- <https://sites.sph.harvard.edu/francesca-dominici/senator-cory-booker-talking-about-nejm-study/>

References

1. Zhou X, Josey K, Kamareddine L, Caine MC, Liu T, Mickley LJ, Cooper M, **Dominici F** (2021) Excess of COVID-19 Cases and Deaths due to Fine Particulate Matter Exposure During the 2020 Wildfires in the United States. *Science Advances*, Vol. 7(33); eabi8789 DOI: 10.1126/sciadv.abi8789
2. Di Q, Wang Y, Zanobetti A, Wang Y, Koutrakis P, **Dominici F**, Schwartz J (2017) Air Pollution and Mortality in the Medicare Population. *New England Journal of Medicine*, 376:2513-2522. PMID: 28657878, PMCID: PMC5766848, doi: 10.1056/NEJMoa1702747.
3. Wu X, Braun D, Schwartz J, Kioumourtzoglou M, **Dominici F** (2020). Evaluating the Impact of Long-term Exposure to Fine Particulate Matter on Mortality Among the Elderly, *Science Advances*, *Science Advances*. 17;6(29):eaba5692. PMID: 32832626, PMCID: PMC7439614, doi: 10.1126/sciadv.aba5692
4. Wu, X., Nethery, R. C., Sabath, M. B., Braun, D. and **Dominici, F.**, 2020. Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis. *Science advances*, 6(45), p.eabd4049.
5. Abdulrahman Jbaily, Xiaodan Zhou, Jie Liu, Ting-Hwan Lee, Stéphane Verguet, **Francesca Dominici** (2020), Air pollution exposure disparities across US population and income groups, *Nature*, in press
6. Liu JC, Mickley LJ, Sulprizio MP, **Dominici F**, Yue X, Ebisu K, Anderson GB, Khan RFA, Bravo MA, Bell ML. (2016) Particulate pollution from wildfires in the Western US under climate change. *Climatic Change*, DOI: 10.1007/s10584-016-1762-6.

Biography

Francesca Dominici, PhD is the co-Director of the Harvard Data Science Initiative, at Harvard University and the Clarence James Gamble Professor of Biostatistics, Population and Data Science at the Harvard T.H. Chan School of Public Health and Co-Editor in Chief of the Harvard Data Science Review. She is an elected member of the National Academy of Medicine and of the International Society of Mathematical Statistics. She leads an interdisciplinary group of scientists to address important questions in environmental health science, climate change, and health policy. Her contributions to the field have been remarkable including more than 250 peer-reviewed published articles, and has provided her knowledge on the topics on joint panels with New Jersey Senator Cory Booker, and European Commission). Dr. Dominici has provided the scientific community and policy makers with comprehensive and compelling evidence on the adverse health effects of air pollution, noise pollution, and climate change. Her studies have directly and routinely impacted air quality policy. Dr. Dominici was recognized in Thomson Reuter's 2019 list of the most highly cited researchers—ranking in the top 1% of cited scientists in her field. Her work has been covered by the New York Times, the Los Angeles Times, BBC, the Guardian, CNN, and NPR. In April 2020 she has been awarded the Karl E. Peace Award for Outstanding Statistical Contributions for the Betterment of Society by the American Statistical Association. She is an advocate for the career advancement of women faculty, and her work on the Johns Hopkins University Committee on the Status of Women earned her the campus Diversity Recognition Award in 2009. At the Harvard T.H. Chan School of Public Health, she has led the Committee for the Advancement of Women Faculty.



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