Ayesha S. Mahmud

University of California, Berkeley
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Academic appointments

Assistant Professor   July 2019 - Present
Department of Demography, University of California, Berkeley

Rockefeller Foundation Planetary Health Postdoctoral Fellow September 2017 - June 2019
Harvard T.H. Chan School of Public Health
Harvard University Center for the Environment

Education

Ph.D. Demography and Social Policy, Princeton University   September 2017

B.A. Economics and Physics, Carleton College   June 2009

Peer-reviewed publications

Note: * denotes equal contributions; † denotes senior authorship

Stamper, A. R., **Mahmud, A.**, Nuzzo, J. R., and Baker, R. E. (2025) "Modeling the impact of climate extremes on seasonal influenza outbreaks across tropical and temperate locations." *GeoHealth*, 9(4), e2024GH001138 **Link.**

Chin, T., Johansson, M.A., Chowdhury, A., Chowdhury, S., Hosan, K., Quader, M.T., Buckee, C.O., **Mahmud, A.†** (2025) "Bias in mobility datasets drives divergence in modeled outbreak dynamics." *Nature Communications Medicine*, 5(1) **Link.**

Mahmud, A., Bhattacharjee, J., Baker, R.E. and Martinez, P.P. (2024) "Alarming trends in dengue incidence and mortality in Bangladesh." *The Journal of infectious diseases* 229.1: 4-6. **Link.**

Mahmud, A., Martinez, P., Baker, R. (2023) "The impact of current and future climates on spatiotemporal dynamics of influenza in a tropical setting." *PNAS Nexus*. 2 (9) **Link.**

Larsen, S.L., Shin, I., Joseph, J., West, H., Anorga, R., Mena, G.E., **Mahmud, A.** and Martinez, P.P. (2023) "Quantifying the impact of SARS-CoV-2 temporal vaccination trends and disparities on disease control." *Science Advances*. 9(31): eadh9920. **Link.**

Sania, A.*, **Mahmud, A.***, Alschuler, D., Urmi, T., Chowdhury, S., Lee, S., Mostari, S., Shaikh, F., Sojib, K., Khan, T., Khan, Y., Chowdhury, A., Arifeen, S. (2023) "Risk factors for COVID-19 mortality among telehealth patients in Bangladesh: a prospective cohort study." *PLOS Global Public Health*. 3 (6): e0001971. **Link.**

Roubenoff, E., Feehan, D. **Mahmud, A.†** (2023) "Evaluating primary and booster vaccination prioritization strategies for COVID-19 by age and high-contact employment status using data from contact surveys." *Epidemics*. 43, 100686. **Link.**

McQuade, E., Blake, I., Brennhofer, S., Islam, M., Sony, S., Rahman, T., Bhuiyan, M., Resha, S., Wettstone, E., Hughlett, L., Reagan, C., Elwood, S., Mra, Y., **Mahmud, A.** *et al.* (2023) "Real-time sewage surveillance for SARS-CoV-2 in Dhaka, Bangladesh versus clinical COVID-19 surveillance: a longitudinal environmental surveillance study (December, 2019–December, 2021)." *The Lancet Microbe*. 4(6), e442-e451. **Link**

Martinez, P., Li, J., Cortes, C., Baker, R., **Mahmud, A.†** (2022) "The Return of Wintertime Respiratory Virus Outbreaks and Shifts in the Age Structure of Incidence in the Southern Hemisphere." *Open Forum Infectious Diseases*, Volume 9, Issue 12. **Link.**

Breen, C., **Mahmud, A.**, Feehan, D. (2022) "Novel Estimates Reveal Subnational Heterogeneities in Disease-Relevant Contact Patterns in the United States". *PLOS Computational Biology*. 18(12): e1010742. **Link.**

Ferguson, E., Brum, E, Chowdhury, A., Chowdhury, S., Kundegorski, M., **Mahmud, A.**, Purno, N., *et al.* (2022) "Modelling how face masks and symptoms-based quarantine synergistically and cost-effectively reduce SARS-CoV-2 transmission in Bangladesh" *Epidemics*. 2022 Sep;40:100592. **Link.**

Acosta, R., Patnaik, B., Buckee, C., Kiang, M., Irizarry, R., Balsari, S.*, **Mahmud, A.*†**, (2022) "All-cause excess mortality across 90 municipalities in the State of Gujarat, India, during the COVID-19 pandemic (March 2020-April 2021)" *PLOS Global Public Health*, 2(8): e0000824. **Link.**

Lewnard, J. A., **Mahmud, A.**, Narayan, T., *et al.* (2021) "All-cause mortality during the COVID-19 pandemic in Chennai, India: an observational study" *Lancet Infectious Diseases*. **Link.**

Chang, H., Chang, M., Kiang, M., **Mahmud, A.** *et al.* (2021) "Low parasite connectivity among three malaria hotspots in Thailand" *Nature Sci Rep*, 11, 23348. **Link.**

Baker, R.E., **Mahmud, A.**, Miller, I.F. *et al.* (2021) "Infectious disease in an era of global change." *Nature Reviews Microbiol*. **Link.**

Cowley, L. A., Afrad, H. M., Rahman, S. I. A., Mamun, M., M., Chin, T., **Mahmud, A.**, *et al.* (2021) "Genomics, social media and mobile phone data enable mapping of SARS-CoV-2 lineages to inform health policy in Bangladesh". *Nature Microbiology*. **Link.**

Mena, G. E., Martinez, P. P., **Mahmud, A.**, Marquet, P. A., Buckee, C. O. and Santillana, M., (2021) "Socioeconomic status determines COVID-19 incidence and related mortality in Santiago, Chile." *Science*. **Link.**

Mahmud, A., Chowdhury, S., Sojib, K. H., Chowdhury, A., Quader, M. T., Paul, S., Saidy, M. S., Uddin, R., Engø-Monsen, K. and Buckee, C. O. (2021) "Participatory syndromic surveillance as a tool for tracking COVID-19 in Bangladesh." *Epidemics*, 35, p.100462. **Link.**

Kishore, N., Kahn, R., Martinez, P. P., De Salazar, P. M., **Mahmud, A.**, Buckee, C.O. (2021) "Lockdowns result in changes in human mobility which may impact the epidemiologic dynamics of SARS-CoV-2". *Nature Sci Rep*,11. **Link.**

Brown, S. T., Engø-Monsen, K., Kiang, M. V., **Mahmud, A.**, Maude, R. J., Buckee, C. O. (2021) "The impact of mobility network properties on predicted epidemic dynamics in Dhaka and Bangkok". *Epidemics*, 35, p.100441 **Link.**

Feehan, D. and **Mahmud, A.** (2021) "Quantifying population contact patterns in the United States during the COVID-19 pandemic". *Nature Communications.* 12:893. **Link.**

Mahmud, A.*, Kabir, I. M.*, Engø-Monsen, K., *et al.* (2021) "Megacities as drivers of national outbreaks: the 2017 chikungunya outbreak in Dhaka, Bangladesh". *PLOS NTD*. 15(2): e0009106. **Link.**

Mahmud, A., Martinez, P. P., He, J., Baker, R. E., (2020) "The Impact of Climate Change on Vaccine-Preventable Diseases: Insights from Current Research and New Directions". *Curr. Environ. Health Rep.* **Link.**

Lewnard, J.A., Liu, V.X., Jackson, M.L., Schmidt, M.A., Jewell, B.L., Flores, J.P., Jentz, C., Northrup, G.R., **Mahmud, A.**, Reingold, A.L.,Petersen, M., Jewell, N. P., Young, S., Bellows, J. (2020) "Incidence, clinical outcomes, and transmission dynamics of severe coronavirus disease 2019 in California and Washington: prospective cohort study". *BMJ* 369:,1923. **Link.**

Chin, T., Buckee, C. O., **Mahmud, A.**[†] (2020) "Quantifying the success of measles vaccination campaigns in the Rohingya refugee camps". *Epidemics.* 30:100385. **Link.**

Martinez, P. P.*, **Mahmud, A.***, Yunus, M., Faruque, A. S. G., Ahmed, T., Pascual, M., Buckee, C. (2020) "Tubewell use protects against rotavirus infection during the monsoons in an urban setting". *Journal of Infectious Diseases*. 221: 22.f **Link.**

Baker, R, **Mahmud, A.**, Wagner, C., Yang, W., Pitzer, V., Viboud, C., Vecchi, G., Metcalf, C., Grenfell, B. (2019) "Epidemic dynamics of respiratory syncytial virus in current and future climates". *Nature Communications*. 10:5512. **Link.**

Kahn, R.*, **Mahmud, A.***, Schroeder, A., Aguilar Ramirez, L.H., Crowley, J., Chan, J., Buckee, C.O. (2019) "Rapid forecasting of cholera risk in Mozambique: translational challenges and opportunities." *Prehosp Disaster Med.* 34(5):557-562. . **Link.**

Rahman, M. R., Ahmed, S., **Mahmud, A.** *et al.* (2019) "Health consequences of climate change in Bangladesh: An overview of the evidence, knowledge gaps and challenges". *Wiley Interdisciplinary Reviews: Climate Change*. e601. **Link.**

Mahmud, A., Lipsitch, M., and Goldstein, E. (2019) "On the role of different age groups during pertussis epidemics in California, 2010 and 2014". *Epidemiology and Infection*. 147 (e184). **Link.**

Chang, H.H., Wesolowski, A., Sinha, I., Jacob, C.G., **Mahmud, A.**, *et al.* (2019) "Mapping imported malaria in Bangladesh using parasite genetic and human mobility data." *eLife*. 8:e43481. **Link.**

Bhatia, A., **Mahmud, A.**, Fuller, A., *et al.* (2018) "The Rohingya in Cox's Bazar: When the Stateless Seek Refuge." *Journal of Health and Human Rights*. 20 (2) pp 105 -122. **Link.**

Kishore, N., Marques, D., **Mahmud, A.** *et al.* (2018) "Mortality in Puerto Rico after Hurricane Maria". *New England Journal of Medicine*, 379 (2) pp 162-170. **Link.**

Baker, R.*, **Mahmud, A.***, and Metcalf , C. J. E. (2018) "Dynamic response of airborne infections to climate change: predictions for varicella". *Climatic Change*, 148 (4) pp 547-560. **Link.**

Buckee, C. *et al.* (2018) "Productive disruption: opportunities and challenges for innovation in infectious disease surveillance." *BMJ Global Health*, 3 (1). **Link.**

Mahmud, A., Alam, N., and Metcalf, C. J. E. (2017) "Drivers of measles mortality: the historic fatality burden of famine in Bangladesh". *Epidemiology and Infection*, 145 (16), pp 3361-3369. **Link.**

Mahmud, A., Metcalf, C. J. E., and Grenfell, B.T. (2017) "Comparative dynamics, seasonality in transmission, and predictability of childhood infections in Mexico". *Epidemiology and Infection*, 145 (3), pp 607-625. **Link.**

Carton, S.*, Helsby, J.*, Joseph, K.*, **Mahmud, A.***, Park, Y.*, Walsh, J., Cody, C., Patterson, E., Haynes, L., and Ghani, R. (2016) "Identifying Police Officers at Risk of Adverse Events." *Proceedings of the 22nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, KDD '16. **Link.**

Mahmud, A. (2016) "Behavioral or Biological: Taking a Closer Look at the Relationship between HIV and Fertility." *Applied Demography and Public Health in the 21st Century.* Springer International Publishing, pp. 361-380. **Link.**

Caudron, Q., **Mahmud, A.**, Metcalf, C. J. E., Gottfredsson, M., Viboud, C., Cliff, A. D., and Grenfell, B. T. (2015). "Predictability in a Highly Stochastic System: Final Size of Measles Epidemics in Small Populations." *Journal of The Royal Society Interface*, 12(102), 20141125. **Link.**

Grants and Fellowships

"Novel data and approaches for dynamic modeling of human behavior and infectious disease ecology", NIH NIGMS R35 Maximizing Investigators' Research Award (MIRA) (Primary Investigator) Project period: 2024 - 2029.

"Uncovering Life Course Constellations of Exposures through Big Data on Place, Time, and Family Factors", NIH R01 (co-Investigator, PI: Jason Fletcher, University of Madison, Wisconsin), Project period: 2022 - 2026.

"Workshops in Formal Demography", NIH R25 (co-Investigator, PI: Joshua Goldstein, UC Berkeley), Project Period: 2022 - 2026.

Spark Grant, University of California, Berkeley (PI), Project period: July 2023 - August 2024

Society of Hellman Fellows, University of California, Berkeley (PI), Project period: July 2022 - July 2023

"Climate shocks and population dynamics: Characterizing climate-driven population migration and displacement patterns in Bangladesh", Meta Platforms Inc. (PI), Project period: December 2021 - November 2023.

Center on the Economics and Demography of Aging, University of California, Berkeley, Pilot Grant (PI). Project period: June 2022 - June 2023.

"COVID-19: Citywide Sewage Surveillance for SARS-CoV-2 in Dhaka, Bangladesh", Bill and Melinda Gates Foundation, (co-Investigator, PI: Mami Taniuchi, University of Virginia), Project period: September 2020 - June 2021.

National Socio-Environmental Synthesis Center (SESYNC) Grant, (co-PI with Chris Golden, Harvard T H Chan School of Public Health), 2020-2022. *Declined due to COVID-19 disruptions.*

Berkeley Population Center, Pilot Grant (PI), University of California, Berkeley, Project period: June 2020 - June 2021.

Rockefeller Foundation Planetary Health Fellowship, Harvard University, 2017-2019.

Fellowship of Woodrow Wilson Scholars, Princeton University, 2016-2017.

Health Grand Challenge Graduate Research Funding, Center for Health and Wellbeing, Princeton University, 2016.

Data Science for Social Good Fellowship, University of Chicago, 2015.

Starr International Scholar, Carleton College, 2005 - 2009.

Professional Service and Memberships

Member, Steering Committee, Models of Infectious Disease Agent Study (MIDAS) Network, 2023 - 2025

Associate Editor, Proceedings of the Royal Society B: Biological Sciences, 2021 - 2025

Member, Population Association of America, 2012-

Talks and conference presentations

"Identifying malaria elimination strategies in the presence of human mobility in Bangladesh", Ecology and Evolution of Infectious Disease meeting, Stanford, CA. June 2024.

"Infectious diseases in an era of global change", Stanford University, Environmental Social Sciences Seminar Series, April 2024. *Invited talk.*

"Modeling heterogeneities in respiratory disease transmission using data from contact surveys", US COVID-19 Scenario Modeling Hub, April 2024. *Invited talk.*

"Modeling heterogeneities in respiratory disease transmission using data from contact surveys", Statistical Methods for Infectious Disease Across Scales, CIDD Workshop, April 2024. *Invited talk.*

"Modeling heterogeneities in respiratory disease transmission using data from contact surveys", Society for Epidemiologic Research (SER) Webinar, April 2024. *Invited talk.*

"Contact across scales: How human behavior shapes infectious disease dynamics", University of California, Berkeley, Faculty Forum, March 2024. *Invited talk.*

"Modeling heterogeneities in respiratory disease transmission using data from contact surveys", UCSF EPPIcenter seminar, October 2023. *Invited talk.*

"Impact of climate on influenza dynamics in a tropical setting" MIDAS Annual Meeting, October 2023. (paper presented by co-author Martinez as I could not travel)

"Impact of climate change on vaccine-preventable diseases" National Vaccine Advisory Committee meeting, September 2023. *Invited talk.*

"Evaluating primary and booster vaccination prioritization strategies for COVID-19 by age and high-contact employment status using data from contact surveys." Ecology and Evolution of Infectious Disease meeting, Atlanta, GA, June 2022.

"Effects of increases in climate sensitive infectious disease prevalence on older adults." Committee on Population (CPOP), National Academies of Sciences, Engineering, and Medicine, May 2022. *Invited talk.*

"Use of 'big data' for infectious disease surveillance and forecasting." University of California, Berkeley, College of Letters and Science Advisory Board Meeting, March 2022. *Invited talk.*

"The impact of population mobility on the spread of local epidemics." Sociology Department Colloquium, University of California, Berkeley, February 2022. *Invited talk.*

"Quantifying population contact patterns in the United States during the COVID-19 pandemic." UT COVID-19 Modeling Consortium, September 2021. *Invited talk.*

"Promises and pitfalls: Use of "big data" for infectious disease surveillance and forecasting." National Academies of Sciences, Engineering, and Medicine Workshop on Pivotal Interfaces of Environmental Health and Infectious Disease Research to Inform Responses to Outbreaks, Epidemics, and Pandemics, June 2021. *Invited talk.*

"Participatory syndromic surveillance as a tool for tracking COVID-19 in Bangladesh." Population Association of America conference, April 2021.

"When a megacity goes on holiday: The impact of population mobility on the spread of local epidemics." Population Association of America conference, April 2021.

"When a megacity goes on holiday: The impact of population mobility on the spread of local epidemics." Sustainable Development Seminar, Columbia University, March 2021. *Invited talk.*

"When a megacity goes on holiday: The impact of population mobility on the spread of local epidemics." Chowdhury Center for Bangladesh Studies, University of California, Berkeley, March 2021. *Invited talk.*

"Participatory syndromic surveillance as a tool for tracking COVID-19 in Bangladesh". COVID-19 Dynamics and Evolution Conference, UCSD, October 2020.

"Participatory syndromic surveillance as a tool for tracking COVID-19 in Bangladesh". Berkeley Ecology and Evolution of Infectious Diseases Seminar, Berkeley, CA, September 2020.

Panelist, "Mathematical Models in Understanding COVID-19." organized by Institute for Pure and Applied Mathematics, UCLA, August 2020. *Invited talk.*

Panelist, "Voices: The Risk of Coronavirus for Rohingya Refugees" organized by Rise for Rohingya, April 2020. *Invited talk.*

"Megacities as drivers of national outbreaks: The role of holiday travel in the spread of infectious diseases". Berkeley Ecology and Evolution of Infectious Diseases Seminar, Berkeley, CA, October 2019. *Invited talk.*

"When a megacity goes on holiday: The impact of population mobility on the spread of local epidemics." Ecology and Evolution of Infectious Disease meeting, Princeton, NJ, June 2019.

"The impact of population mobility on the spread of local epidemics". Massachusetts General Hospital HIV Conference Series, Boston, MA, May 2019. *Invited talk.*

"Drivers of dengue dynamics in Brazil: quantifying the role of human demography and climate". Planetary Health Annual Meeting, Edinburgh, UK, May 2018.

"Drivers of infectious disease dynamics: Quantifying the impact of demography and climate". Department of Demography Seminar Series, University of California, Berkeley, CA, January 2018. *Invited talk.*

"Climate drivers of infectious diseases" Epidemics, Sitges, Spain, November 2017.

"Drivers of seasonal disease dynamics" UTokyo-Princeton Infectious Disease Modeling Symposium, Tokyo, Japan, July 2017. *Invited talk.*

"Dynamic response of airborne infections to climate change: predictions for varicella." Planetary Health / GeoHealth Annual Meeting, Boston, MA, April 2017.

"Comparative Dynamics, Seasonality in Transmission, and Predictability of Childhood Infections in Mexico." Population Association of America conference, Chicago, IL, April 2017.

"Drivers of infectious disease dynamics: Childhood infections in Mexico." 5th Annual Institute for Disease Modeling Symposium, Bellevue, WA, April 2017. *Invited talk.*

"Drivers of seasonal transmission of childhood infections." Center for Communicable Disease Dynamics Seminar, Harvard University, Cambridge, MA, December, 2016. *Invited talk.*

"Comparative dynamics, seasonality in transmission, and predictability of childhood infections in Mexico." Ecology and Evolution of Infectious Disease meeting, Cornell, NY, June 2016.

"Identifying Police Officers at Risk of Adverse Events." Population Association of America conference, Washington, DC, April 2016.

"HIV and Fertility in sub-Saharan Africa." Population Association of America conference, San Diego, CA, May 2015.

"Stratospheric Photochemistry on Neptune: Constraints from Spitzer Observations." American Astronomical Society Division of Planetary Sciences conference, Cornell, NY, October 2008.

Work experience

World Bank, Washington, D.C.	June 2016 - June 2017
Data Science for Social Good Summer Fellowship, Chicago, IL	June - August 2015
National Bureau of Economic Research, Cambridge, MA	July 2011 - August 2012
NORC at the University of Chicago, Bethesda, MD	July 2009 - June 2011

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