Md Karimuzzaman, MS

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Contact

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Research-Interests Longitudinal & mixed-effects models, Latent class/transition modeling, Variable selection, zero-inflated count outcome, Spatial Statistics, Food Environment, Health Disparities

Education

2022–Ongoing **PhD in Biostatistics, Drexel University, Philadelphia, USA**
- Thesis: Fusion Learning and Quadratic Inference Function for Zero-inflated Data
  Advisor: Brisa N. Sanchez, PhD

2018 **MS and B.Sc. in Statistics, Jahangirnagar University, Bangladesh**
- MS Thesis: Forecasting performance of non-linear regime-switching threshold autoregressive models
- B.Sc. Thesis: Comparison of 32 technical stock indicators with ML and quantile regression
  Advisor: Md. Moyazzem Hossain, PhD

Research Appointments

2022–Running **Doctoral Research Fellow/ Data Analyst**, **Biostatistics for Social Impact Lab, Drexel University, USA**

- Served as lead biostatistician on large-scale real-world evidence (RWE) and longitudinal health studies, designing statistical analysis plans (SAP) and delivering actionable insights to multidisciplinary research teams.
- Managed and analyzed multi-million–record relational datasets integrating EHR, geospatial, retail environment, and longitudinal cohort data, ensuring, validation, and analytic readiness.
- Conducted comprehensive literature reviews, desk reviews, and systematic evidence syntheses to inform study design, real-world data definitions, methodological selection, and analytical strategies across research projects.
- Developed advanced fusion learning–based repeated-measures methodologies (GEE) framework for spatial and zero-inflated count outcomes to improve estimation efficiency to characterize food environment for health outcome.
- Designed and led statistical simulation studies to evaluate bias, and robustness under complex scenarios, including zero-inflation calibration, overdispersion, correlated data, and missing data.
- Applied advanced modeling techniques including latent class and transition models, zero-inflated and count models, survival analysis, and Bayesian hierarchical modeling, to characterize real-world evidence studies.
- Applied rigorous causal inference (PSM, IPW, IV), Regression Discontinuity designs, and natural experiments to strengthen validity.
- Developed structured R packages and interactive R Shiny dashboards and created ggplot2/plotly based visual analytics tools to translate complex statistical findings into decision-ready insights for non-technical stakeholders.
- Led manuscript preparation and scientific reporting for peer-reviewed publications and conference presentations.

Projects (See project details here)

- Adaptiveness of GEE, Fussed LASSO, and Penalized Regression for count data
- Using latent transition analysis to characterize longitudinal mixtures of retail environmental features and their associations with hemoglobin A1C
- Characterizing California public and private school food environment
- Evaluating differential exposure to food environment by data source in the MESA
- Developing Bayesian spatial temporal aggregated model for longitudinal spatial data
- Social Determinants of Obesity Among Hispanic Adults: A Longitudinal Study
- Assessing Schools Racial Diversity of California: A Longitudinal Study

2021 – 2022 **Research Associate, BRAC JPG School of Public Health, BRAC University**

- Led field-based epidemiologic studies from protocol development and power calculations through survey design, enumerator training, data collection oversight, quality assurance, and cleaning field datasets to produce validated, analysis-ready data.
- Served as REDCap data administrator, managing database architecture, survey design, and data quality assurance.
- Led statistical analyses and study design for large-scale public health datasets, including national surveys and administrative data systems addressing real-world health system challenges.
- Conducted sample size and power calculations, survival analysis, and advanced regression modeling for randomized and observational studies, and applied causal inference and quasi-experimental methods to evaluate program effects.
- Delivered extensive workshops and structured training programs on survival analysis, study design, statistical programming, and reproducible research workflows to strengthen institutional capacity.
- Contributed to grant proposals, protocol development, and peer-reviewed manuscripts, translating complex analyses into actionable public health recommendations.

Projects (See project details here)

- World Bank Group: Feasibility of Trauma Registry and Trauma System Improvement
- program in four district hospitals of BD with high burden RTI patients.
- SONAR Global: COVID-19 Vulnerability Assessment in Bangladesh
- BRAC International: Impact of COVID-19 on drop out from schools in BD **(Projects Led)**

2019 – 2021 **Projects Led** and **Research Assistant, Jahangirnagar University**

Projects (See project details here)

- SAARC Development Fund: Impact Evaluation of Regional MRS Program of CRP
- Finding best Kernel for stock market
- Weather Prediction by Non-linear time series models
- Characterizing and Forecasting COVID-19
- Text mining for newspaper word analysis

2017 – 2023 **Independent Research Group Coordinator and Projects Led**

Projects *(Advisor: Azizur Rahman, PhD, Charles Stuart University, Australia)*

- Characterizing maternal and child health in Bangladesh **(6 Publication)**

Technical Skills

- **Programming & Analytics:** R, SAS, Python, SQL, Stata, SPSS, MPlus, WinBUGS; statistical simulation
- Reproducible analytical pipelines (RAP), R package development, algorithm implementation, Git/GitHub
- **Data Management & Systems:** REDCap (data administrator), relational databases, EHR and survey workflows
- **Data Visualization & Reporting:** ggplot2, plotly, Tableau, R Shiny dashboards, LaTeX, Quarto
- Statistical Analysis Plans (SAPs), and scientific reporting
- Cross-functional collaboration, stakeholder communication, and presentation of complex results
- SAS Certified Specialist – Clinical Trials Programming Professional (in progress)
- Longitudinal modeling, survival analysis, zero-inflated/count models, latent class/transition models, and Bayesian hierarchical modeling
- Causal inference (PSM, IPW, Instrumental Variables, quasi-experimental designs), statistical simulation, power/sample size evaluation

Technical Skills

- Clinical trial design, real-world evidence (RWE) methodologies, and regulatory-aligned statistical analysis
- Handling large-scale EHR and cohort data and commercial databases

Teaching Appointment

2026 **Instructor:** Introduction to Biostatistics (BST 571) in Summer 2026 *(graduate level course)*

2025 **Guest Lecturer**: Intermediate Biostatistics *(graduate level course)*

Graduate Teaching Assistant, **Department of Epidemiology and Biostatistics, Drexel University.**

2024 • BST557/PBHL459: Survival Data Analysis, Fall 2024
2023 • BST 560: Intermediate Biostatistics I, Fall 2023
2022 • BST 571: Introduction to Biostatistics Winter Quarter 2022

2022 **Teaching Fellow, BRAC James P Grant School of Public Health, BRAC University**

- PBH: Intro to Biostatistics, Conducting Statistics lab, and recitation classes, & Grading
- Mentoring a group of students for final projects

2022 **Instructor, Department of Statistics, Govt. Titumir College under Dhaka University**

- Instructor for two courses e.g., Biostatistics and Epidemiology as guest teacher

2017 – 2018 **Statistics Mentor, Durbin Labs Limited, Dhaka, BD**, see video demonstration here

- Teaching intermediate level statistics course for an academic app
- Creating content for websites and online

2015 – 2017 **Freelance Statistics Tutor** for college level students

Lectures by Invitation

2026 "Fast-food and convenience outlets near schools in California: a comparison of private and public schools", Seminar on Urban Health Collaborative (UHC), Drexel University.

2025 "Fusion Learning Approach for High-Dimensional Spatial Setting", Research in Progress, Seminar, Drexel University.

2023 "Spatial distribution of food outlets near schools", Part of Seminar Series of Department of Epidemiology and Biostatistics, Drexel University.

2022 "Text Mining in Public Health Research", Seminar on Urban Health Collaborative (UHC), Drexel Dornsife School of Public Health, Drexel University.

2019 Statistics LEAD Club, Department of Statistics, Jahangirnagar University

- Data Visualization with R
- Basics of R: Data Handling and Manipulation

Presentation at Conferences

2024 Eastern North American Region (ENAR), International Biometric Society Spring Meeting, Baltimore

- **Session Chair:** Non-parametric statistical methods
- **Poster Competition Judge**
- **Paper Presentation:** Using LASSO to examine income differences in the spatial distribution of FENS

2023 Joint Statistical Meeting (JSM), Toronto, Ontario, Canada

- **Paper**: Spatial distribution of food outlets near private and public schools in California

2022 International Conference of Covid-19 Impact, BRAC University, Bangladesh

2019 Applied Statistics and Policy Analysis Conference, organized by Charles Stuart University, Australia.

- **Paper Presentation:** Finite Mixture Modelling Approach to Identify Factors Affecting Children Ever Born for 15–49-Year-Old Women in Asian Country

2018 International Conference on Recent Advances in Mathematical and Physical Sciences, BD, 2016.
Proceedings: A Comparative Study among Poisson, Negative Binomial and Hermite Regression.

Awards and honor

2023 Drexel Global Travel Award, Drexel University.

2023 International Travel Award, Department of Epidemiology and Biostatistics, Drexel University.

2018 Scholarship for academic excellency by Ministry of Education, Bangladesh

2015 – 2016 Academic Merit Scholarship by Jahangirnagar University, Bangladesh

2015 Excellent Member Award of Debate Organization of JU

Memberships in professional and scientific societies

- Active member of the American Statistical Association (ASA) and the Eastern North American Region (ENAR) of the International Biometric Society (IBS), engaging in professional development, conference participation, and scientific exchange within the biostatistics community.
- Served as peer reviewer for international journals including PLOS One, BMC Public Health, and Social Network Analysis and Mining, critically evaluating statistical methodology, study design, and analytical rigor to ensure scientific quality and reproducibility.
- Coordinated an international independent research group, facilitating cross-institutional collaboration, organizing research discussions, mentoring junior researchers, and supporting manuscript and proposal development
- Provided mentorship and academic guidance to graduate students and early-career researchers, fostering technical skill development in statistical modeling, study design, and reproducible research practices.

Additional training and coursework

2025 Clinical Research Training,
- Regulatory administration
- Root cause analysis and event reporting
- Protocol compliance and how to avoid common challenges

2024 DC annual environmental epidemiology methods workshop - “Innovative Methods for Analysis of Environmental Mixtures"

2024 ENAR workshop - An Introductory Tutorial on Structural Equation Modeling in R with Lavaan

2024 AllofUS Research Data handling and Privacy: Research Workbench, AllofUS

2022 Scoping and systematic review. Instructor: Shaikh A. Shahed Hossain, PhD BRAC University

2022 International Teaching Assistant (ITA) summer training, Drexel University.
- Recommended as Instructor

2022 CITI Program
- Health Information Privacy and Security - Medical, Biomedical, Nursing, Public Health and Psychology; Public Health Research; Group 2: Social Behavioral COI; RCR;

2019 The Use of Bio-Conductor for Detecting Genome Sequence; *Instructor:* Tapati Basak, PhD Jahangirnagar University

2018 Handling Big Data in R. *Instructor:* Romana Rois, PhD Jahangirnagar University

Leadership and community involvement

2017 – 2018 President and Founder, Statistics LEAD Club, Jahangirnagar University
- Organized National Level Competition
- Several workshops, seminars, competitions, and lead a bunch of statistics students.

2016 –2018 IT Secretary & Executive member of Jahangirnagar University Debate Organization (JUDO)

- National level debater for the University

2015 Joint Secretary of Lakshmipur Student Union (JU)

- Helping Lakshmipur district students to achieve higher study goals.

2013 Executive Member, Learners Association

- Organized lots of workshops, seminars, and motivational sessions to achieve their higher study goal among the school and college-going students of Lakshmipur (*a marginalized community).*

Reviewer PLOS One, BMC public health, Social Network Analysis and Mining

Publications

2026

1. Tasnim, Z., **Karimuzzaman, M.**, Naher, N. *et al.* Developing a Trauma System Improvement Program (TSIP) in Bangladesh: findings from a pilot study. *BMC Emerg Med* (2026). https://doi.org/10.1186/s12873-026-01490-2

2. **Karimuzzaman M,** Sanchez B, Sanchez-Vaznaugh E. Fusion learning approach for count data: examining income differences in the spatial distribution of food outlets. *In preparation*.

3. Tara P. McAlexander, **Karimuzzaman M.,** Reyhaneh A. Nejad Yazdi, Kari Moore, Jana A. Hirsch, Steven Melly, Jingjing Li, Brisa Sánchez; Using latent transition analysis to characterize longitudinal mixtures of retail environment features and their associations with hemoglobin A1C: the Multi-Ethnic Study of Atherosclerosis. *In Preparation*

2025

4. **Md Karimuzzaman**, Sydney Miller, Emma V Sanchez-Vaznaugh, Brisa N Sánchez, Fast-food and convenience outlets near schools in California: a comparison of private and public schools, *American Journal of Epidemiology*, Volume 195, Issue 1, January 2026, Pages 126–134, https://doi.org/10.1093/aje/kwaf025

5. McAlexander, Tara P. and **Karimuzzaman, Md** and Nejad Yazdi, Reyhaneh and Moore, Kari and Hirsch, Jana A. and Melly, Steven and Li, Jingjing and Auchincloss, Amy H. and Sanchez, Brisa N., Evaluating Differential Exposure to Food Environment by Data Source: The Multi-Ethnic Study of Atherosclerosis. Available at SSRN: *https://ssrn.com/abstract=5525131* *In revision at Soc Sci Humanities Open.*

6. Miller S, Karimuzzaman M, Sanchez-Vaznaugh EV, Sanchez BN. Assessing school racial diversity in California: a longitudinal study. *In revision at American Journal of Epidemiology*

7. Miller S, **Karimuzzaman M**, Sanchez-Vaznaugh EV, Sanchez BN. Social determinants of obesity among a national sample of Hispanic adults. *In revision at Obesity.*

8. Chowdhury, R., Jahangir, K.B., Mohosin, A.B., Zoha, N.S., Bonny, F.A., Kaiser, A., **Karimuzzaman, Md.**, Ferdousei, P., Nath, S.R., Quayyum, Z., Hasan, M.T., Primary school dropout rate among children in selected hard-to-reach areas of Bangladesh and the factors associated with it. *In revision at Heliyon.*

2024

9. **Md Karimuzzaman,** Obesity in Bangladesh: Study food near schools. Science385,266-266(2024). DOI: https://www.science.org/doi/10.1126/science.adp6537

10. **Karimuzzaman, M.,** Afroz, S., Hossain, M. et al. Modelling COVID-19 cases and deaths with climate variables using statistical and data science methods. Soft Comput 28, 12561–12574 (2024). https://doi.org/10.1007/s00500-024-10352-7

11. Ahmed, K.T., Afrin, A., Hasan, M. **Md Karimuzzaman**, et al. Age and sex-specific disability-free life expectancy in urban and rural settings of Bangladesh. Popul Health Metrics 22, 7 (2024). https://doi.org/10.1186/s12963-024-00327-z

12. Hasan, M., **Karimuzzaman, Md.,** Abdulla, F., & Hossain, Md. M. (2024). Mobile Use in the Classroom is a Mixed Bag, and Lecturers Need to Provide Students with Guidelines. Sage Open, 14(4). https://doi.org/10.1177/21582440241299481

2023

13. Ahmed KT**, Karimuzzaman M**, Afroz S, et al. Trends and long-term variation explaining nutritional determinants of child linear growth: analysis of Bangladesh Demographic and Health Surveys 1996–2018. Public Health Nutrition. 2023;26(12):2758-2770. DOI: https://doi.org/10.1017/S1368980023002288

14. Ahmed, K.T., **Karimuzzaman, M**., Pinky, G.N. et al. Association of dietary diversity of 6–23 months aged children with prenatal and postnatal obstetric care: evidence from a nationwide cross-sectional study. J Health Popul Nutr 42, 120 (2023). https://doi.org/10.1186/s41043-023-00470-7

15. Ahmed, K.T., **Karimuzzaman, M.,** Mahmud, S. et al. Influencing factors associated with maternal delivery at home in urban areas: a cross-sectional analysis of the Bangladesh Demographic and Health Survey 2017–2018 data. J Health Popul Nutr 42, 83 (2023). https://doi.org/10.1186/s41043-023-00428-9

2022

16. Abdulla F, Hossain MM, **Karimuzzaman M**, Ali M, Rahman A (2022) Likelihood of infectious diseases due to lack of exclusive breastfeeding among infants in Bangladesh. PLoS ONE 17(2): e0263890. https://doi.org/10.1371/journal.pone.0263890

17. Rahman A, Abdulla F, Karimuzzaman M, Hossain MM. Burden of COVID-19 on health and wellbeing, education, and economy of Bangladesh. Clin Case Rep. 2022; 10:e06639. https://doi.org/10.1002/ccr3.6639

2021

18. Hossain, A.; **Karimuzzaman, M**.**; Hossain, M.M.; Rahman, A. Text Mining and Sentiment Analysis of Newspaper Headlines. Information 2021, 12, 414. https://doi.org/10.3390/info12100414

19. Abdulla, F.; Nain, Z.; **Karimuzzaman, M**.; Hossain, M.M.; Rahman, A. A Non-Linear Biostatistical Graphical Modeling of Preventive Actions and Healthcare Factors in Controlling COVID-19 Pandemic. Int. J. Environ. Res. Public Health 2021, 18, 4491. https://doi.org/10.3390/ijerph18094491

20. **Md. Karimuzzaman** & Nusrat Islam & Sabrina Afroz & Md. Moyazzem Hossain, 2021. "Predicting Stock Market Price of Bangladesh: A Comparative Study of Linear Classification Models," Annals of Data Science, Springer, vol. 8(1), pages 21-38, March. https://doi.org/10.1007/s40745-020-00318-5.

2020

21. **Book Chapter: Karimuzzaman, M.,** Moyazzem Hossain, M., Rahman, A. (2020). Finite Mixture Modelling Approach to Identify Factors Affecting Children Ever Born for 15–49 Year Old Women in Asian Country. In: Rahman, A. (eds) Statistics for Data Science and Policy Analysis. Springer, Singapore. https://doi.org/10.1007/978-981-15-1735-8_17

22. Shezan A., **Karimuzzaman M.**, and Hossain M. M., (2020), Modeling of Mean Sea Level of Bay of Bengal: A Comparison between ARIMA and Artificial Neural Network. International Journal of Tomography & Simulation, Issue No. 1, Vol. 33, 2021.

23. Hossain Md M, Abdulla F, **Karimuzzaman Md**, Rahman A. Routine Vaccination Disruption in Low-Income Countries: An Impact of COVID-19 Pandemic. Asia Pacific Journal of Public Health. 2020;32(8):509-510. https://doi.org/10.1177/1010539520957808

Preprint

24. **Karimuzzaman M.,** S Afroz, MM Hossain, A Rahman (2020), Forecasting the covid-19 pandemic with climate variables for top five burdening and three South Asian countries. https://doi.org/10.1101/2020.05.12.20099044

25. F Abdulla, Z Nain, **Karimuzzaman M.,** MM Hossain, UK Adhikari, AZ Rahman (2020), Effect of preventive actions and health care factors in controlling the outbreaks of COVID-19 pandemic. https://doi.org/10.1101/2020.05.09.20096255