

To

Dr. Erfanul Hoque,

I am writing to express my strong interest in the PhD program in Collaborative Biostatistics Program or Community and Population Health Sciences at The University of Saskatchewan.

My research journey in public health began with my degree in Statistics from Shahjalal University of Science and Technology, Bangladesh, with an undergraduate project on "Cesarean Delivery and Early Childhood Diseases in Bangladesh", which was later published in *PLoS One*. This foundation equipped me with applied knowledge through hands-on research, underscoring my passion for biostatistics and epidemiology as vital tools for addressing public health challenges. Currently, I focus on some research with rabies control and dengue outbreaks.

My educational background has provided me with numerous opportunities to address real-world challenges faced by research scientists. I am currently working as a Data Management and Reporting Officer with the Rohingya Response Program run by a local NGO in collaboration with the Directorate General of Health Services of Bangladesh. A recent initiative I led, "Community Health, WASH, Health System Support & Health Post for Forcibly Displaced Myanmar Nationals (FDMN) and Host Community Population". The goal of this initiative is to improve health status through the provision of standard, free, dignified and immediate access to essential health care services to the FDMN of and adjacent host community. In this role, I develop protocols, implement projects, conduct scientific analyses, and report on health initiatives aimed at improving healthcare access in Cox's Bazar.

With experience in data management and statistical analysis, my research primarily focuses on developing research methodologies and contributing to data analysis. My current research aligns with Bangladesh's goal to eliminate dog-mediated rabies deaths by 2030. Understanding transmission trends is crucial for effective control measures. Recently, we analyzed the correlation between mass dog vaccination (MDV) and anti-rabies vaccines (ARV) with human rabies cases. Using hierarchical clustering, Seasonal Autoregressive Integrated Moving Average, and count time series following generalized linear models in R, we found a positive association between increased MDV and ARV usage and a reduction in human rabies cases, which was published in *The Lancet Regional Health - Southeast Asia*. This study's findings can inform policy decisions for national rabies control in Bangladesh and similar countries, advancing efforts to eliminate dog-mediated human rabies globally and achieve the Zero by 30 target. The severe dengue outbreak in 2023 highlighted the need for advanced predictive methods. My team analyzed dengue infection data and mortality rates from 2022, focusing on meteorological factors influencing transmission. By employing machine learning techniques, we forecasted dengue cases based on historical data. Our findings revealed that rising temperatures and altered rainfall patterns significantly contribute to outbreaks in Bangladesh using generalized linear mixed model, with results appearing in *IEEE, Journal of Medical Entomology, and International Journal of Infectious Diseases*. Those studies suggests that Bangladesh requires active surveillance of cases, deaths, and vectors, integrating meteorological data to identify causes of increased dengue deaths for better care. Estimating mild or subclinical cases and their risk factors is crucial for effective public health interventions. Dengue also poses a significant threat to rural communities, contrary to the notion of it being an urban disease.

My commitment to public health is driven by merging innovative methodologies with statistical tools in large data, deep learning, and machine learning. I want to be an expert in the methods of research in public health and be running a leading lab that advances statistical methodologies while mentoring future researchers. Taking into consideration such critical health issues as infectious diseases and maternal health, I want to contribute to the translation of evidence-based practices to improve health outcomes within my community and beyond. Building on a strong foundation in statistics and applied research, I look forward to using my skill set in a way that improves health services to advance global health equity. Following my PhD, I envision heading a research laboratory at the forefront of academia focused on addressing global health challenges and look forward to the exchange with academia at The University of Saskatchewan.

Sincerely

Mohammad Nayeem Hasan