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History and innovation in disease ecology in health and medical geography

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This paper reviews the history of the disease ecology tradition of health and medical geography summarizing the main themes and innovations since the 1950s. It then highlights two empirical examples of innovations including incorporating landscape genetics into the subfield and how ecological approaches are used in intervention research. Disease ecology is grounded in the field of health and medical geography which uses a holistic approach to investigate health and disease. The human ecology of disease involves the complex interaction among human behavior, cultural and socioeconomic contexts, and environmental conditions, influencing disease emergence or prevention in populations. Political ecology has emerged as a response to the need to understand the political, social, and economic structures that shape health risks. The paper includes a case study of the ecology of swine influenza in the United States and China using a landscape genetics approach. Most infectious disease ecology studies have focused on incidence of diseases; landscape genetics studies focus on ecological drivers of the genetic variation and evolution of pathogens. Ecological drivers of the genetic variation of swine influenza virus include farm, farm system, landscape, and regional level factors. The paper also includes an empirical example of ecological approaches in intervention research, namely how spatial ecology contributes to the understanding deep tubewell interventions for groundwater arsenic mitigation in rural Bangladesh. We describe how the protective effect of deep tubewells on diarrheal disease incidence is unevenly distributed across space because of spatially heterogenous ecological factors.

Primary authors: EMCH, Michael (University of North Carolina at Chapel Hill); GOEL, Varun (University of North Carolina Chapel Hill)

Presenter: EMCH, Michael (University of North Carolina at Chapel Hill)

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