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Dynamics of Pollution-induced Illnesses in Fishing Communities, with Social Feedbacks

Pollution-induced illnesses are caused by toxicants that result from human activity and should be entirely preventable. However, social pressures and misperceptions can undermine the efforts to limit pollution, and vulnerable populations can remain exposed for decades. This talk presents a human-environmental system model for the effects of water pollution on the health and livelihood of a fishing community in the developing world. It incorporates dynamic social feedbacks that determine how effectively the population recognizes the injured, and acts to reduce the pollution exposure. The model, which is motivated by an incident from 1949-1968 in Minamata, Japan (where methylmercury effluent from a local factory poisoned fish populations and humans who ate them), will be rigorously analysed to gain insight into its dynamical features. In particular, conditions that allow for the outbreak of a pollution-induced epidemic will be derived. This research is joint work with Dr. Chris Bauch.