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Sustainability for resilience, and resilience for sustainability

Population density as a catalyst factor for communicable diseases: the Covid-19 case in Vietnam

Despite remarkable advances in public health over the past fifty years, communicable diseases (e.g., HIV/AIDS, malaria, tuberculosis, acute respiratory infections) still pose a major challenge for modern society, and the ongoing outbreak of Covid-19 a case in point. At present, almost one-third of all deaths in the world is attributable to communicable diseases. The Covid-19 pandemic has to date (October 5, 2021) killed 4.85 million people worldwide. Delineation of risk factors that affect the spread of communicable diseases is a critical task to prevent future spread. Research over the past 5 decades have identified three major groups of factors that are associated with the severity of infectious disease outbreaks: education, income, and environmental exposure. One important environmental factor is population density. Indeed, high population density has been hypothesized to be linked to increased risk of communicable diseases, especially covid-19 because its transmisson takes place through air. In order to test this hypothesis, I analyzed the covid-19 prevalence data in 63 provinces or cities in Vietnam, and I found that localities with higher population density had a greater chance of covid-19 infection and a greater risk of covid-related mortality. This finding confirms previous observation of a positive correlation between population density and basic reproduction rate (R0), an index of covid-19 transmissibility. These empirical findings are therefore consistent with the hypothesis that regions with a denser population tend to have a higher extent of social interactions, and therefore elevate the probability of transmission between individuals. The findings also have implication for future pandemic-resistant urban planning.

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