



Impact of Secured Areas on the Incidence of Infectious Diseases Transmission

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ABOUT THE STUDY

Humans have caused significant loss of natural resources and degradation of natural ecosystems through technological changes and cultural activities such as the use of irrigation systems, intensive exploitation of natural resources like reserve water and land for food production, logging, etc. Human interactions have resulted in the degradation or unsustainable use of 60% of the planet's ecosystem services, including water and air purification, local and global climate regulation of ecosystems, diseases and natural hazards. Furthermore, the factors responsible for these changes do not appear to have diminished, but in many cases only increased in intensity. At the same time, during the past century little attention has been shown that these changes in the structure of natural systems and their functions can affect human health. The causal relationship between ecosystem change and human health is complex because they are largely indirect, dispersed over time and space, and dependent on other factors. However, there is a growing of evidence on how environmental changes can, to varying degrees, produce impacts on human health, such as stress, allergens, and environmental hazards. Respiratory response, infectious disease, water shortage and related health problems, food insecurity, health problems related to population displacement due to environmental change, health problems related to air pollution, among many other problems. Among the above examples, it should be noted that the emergence and re-emergence of infectious diseases has become a global environmental problem with major consequences, both in terms of public health, economy and politics.

The etiological origins of most emerging diseases are zoonotic (i.e. these diseases and their spread. Currently, unprecedented environmental changes are occurring that will affect life. These changes alter the interactions between humans and infectious diseases, in addition to affecting the vectors that transmit parasites from animals to humans and their relationships with humans. At the same time, land-use variability in the form of deforestation is considered to be one of the important

environmental factors leading to the emergence and re-emergence of infectious diseases.

Outbreaks of emerging zoonotic diseases are affecting populations at an alarming rate. In this regard, over the past few decades, the number of emerging pathogens affecting the population has increased dramatically. Of these infectious diseases, 62% are zoonotic diseases. Knowledge of the relationships between the host, infectious agents and the environment is crucial in the fight against pathogens, especially zoonotic diseases. Human transmission of CoV is an animal-to-human disease, and the experience with SARS-CoV-2 has shown us how devastating and potentially deadly a zoonotic disease can be. Therefore, understanding the role of conservation policies in the transmission of infectious diseases will provide valuable information for better planning and designing future conservation actions.

The ecological factors involved in the occurrence of these diseases are complex and poorly understood. The main divisions of disease outbreaks are exponential population growth, consumption and waste generation. This has led to the intensification and expansion of urbanization and agriculture, as well as changes in forest habitats, which determine environmental change in an area. The emergence of infectious diseases is related to a combination of environmental factors. Furthermore, a common factor associated with emerging disease outbreaks has always been sudden social and ecological disruption, reflected in changing land use. Changes in vector and domestication, opportunistic aquatic habitat encroachment, and wild species encroachment on natural habitats are associated with this trend of land use change. Species become reservoirs for pathogens in altered and fragmented forests near human settlements. The interactions between humans and hosts, reservoirs and vector species in the ecosystem influence the behavior of the pathogen host, facilitating disease initiation. In addition, while there is ample evidence for the impact of the drivers of ecosystem change, the link between ecosystem change and benefits from ecosystem services is still under-recognized.

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To this end, we constructed a panel dataset containing information on mandatory disease notifications, land use, biophysical conditions, and demographic and socioeconomic factors. In addition, we summarize the available evidence suggesting how protected areas might influence the outcomes of selected diseases and calculate marginal effects, showing that different degrees of protection are associated to the different effects on morbidity. Human activities cause changes in ecosystems, but at the same time people are sensitive to changes in ecosystem services, affecting their own well-being. Human health is one of the least valued ecosystem services, and the specific relationship between health and ecosystem change is not well documented. In addition, the lack of evidence on the economic contribution of ecosystem services to people contributes to the perception that conservation initiatives, such

as protected areas, only constrain the benefits. We found that protected areas decrease the incidence of infectious disease outcomes. However, the health division's decrease the higher levels of protection which should be considered when designing future protection actions. In summary, there are important health co-benefits that can be attributed to conservation policies. These important co-benefits should be taken into account when evaluating benefits and costs associated to future conservation decisions. This implies that the design of protected areas can be socially rational not only because of their potential role in conserving ecosystems, but also because of their important health benefits. By showing that protected areas reduce the incidence of various infectious diseases, the study provides evidence that conservation policies can provide more than just the cost of living.