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Insights from neglected tropical diseases and deforestation: a revision

The resurgence of various 'neglected tropical diseases' (NTDs) has been recently linked to human-driven environmental changes. Among those changes, phenomenon such as deforestation and its related land use changes, agricultural expansion, urbanization, road construction, as well as human migration, and increased contact between humans and non-humans, have been identified (Bacon et al. 2013; Ortiz et al. 2021; Codeço et al. 2021; Grifferty et al. 2021; Ellwanger et al. 2020). By modifying diverse environmental factors, these environmental changes favour conditions for the generation and propagation of neglected tropical diseases (Bacon et al. 2013; Ortiz et al. 2021; Codeço et al. 2021; Grifferty et al. 2021). Among these, deforestation seems to be a major factor of environmental change. This has caused growing concern, in the spheres of global health analysis and epidemiology, given that neglected tropical diseases are present in more than 100 countries and present a risk for more than 2 billion people (Harvard University 2014; Grifferty et al. 2021). Concerns that have been heightened under the recent global epidemiological context of COVID-19, which has shown the need to further understand the direct relationships between environmental and biodiversity changes, their effects, vulnerabilities and risks for human health (Codeço et al. 2021). The 'One Health' approach which considers animal and environmental health as an interconnected whole, and which seeks to integrate multidisciplinary knowledge and is oriented towards the optimal health of people, animals and their environments (Carmena and Cardona 2014) can contribute to deepening our understanding of these issues. Inspired by these aspects, this paper aims to review the existing literature on NTDs and their diverse relationships with deforestation. To organise it, the review pays special attention to the existing knowledge on environmental and social risk factors for infection, on transmission vectors, and on possible solution or mitigation pathways identified in the literature. In order to do this, the MedlinePlus and PubMed catalogues were reviewed. The reviewed literature points to deforestation, forest fragmentation and related processes, as a relevant factors in the re-emergence and increasing rates of transmissions of NTDs. Yet, there is a wide range of complexities and further research is required to have a more adequate understanding of the multiple NTDs' transmission mechanisms in diverse and complex environmental contexts.

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Bibliographic references

Bacon, Kristina M., Peter J. Hotez, Stephanie D. Kruchten, Shaden Kamhawi, Maria Elena Bottazzi, Jesus G. Valenzuela, and Bruce Y. Lee. 2013. 'The Potential Economic Value of a Cutaneous

Leishmaniasis Vaccine in Seven Endemic Countries in the Americas'. Vaccine 31 (3): 480–86. https://doi.org/10.1016/j.vaccine.2012.11.032.

Carmena, David, and Guillermo A. Cardona. 2014. 'Echinococcosis in Wild Carnivorous Species: Epidemiology, Genotypic Diversity, and Implications for Veterinary Public Health'. Veterinary Parasitology 202 (3–4): 69–94. https://doi.org/10.1016/j.vetpar.2014.03.009.

Codeço, Claudia T., Ana P. Dal'Asta, Ana C. Rorato, Raquel M. Lana, Tatiana C. Neves, Cecilia S. Andreazzi, Milton Barbosa, et al. 2021. 'Epidemiology, Biodiversity, and Technological Trajectories in the Brazilian Amazon: From Malaria to COVID-19'. Frontiers in Public Health 9 (July): 647754. https://doi.org/10.3389/fpubh.2021.647754.

Ellwanger, Joel Henrique, Bruna Kulmann-Leal, Valéria L. Kaminski, Jacqueline María Valverde-Villegas, Ana Beatriz G. Da Veiga, Fernando R. Spilki, Philip M. Fearnside, et al. 2020. 'Beyond Diversity Loss and Climate Change: Impacts of Amazon Deforestation on Infectious Diseases and Public Health'. Anais Da Academia Brasileira de Ciências 92 (1): e20191375. https://doi.org/10.1590/0001-3765202020191375.

Grifferty, Grace, Hugh Shirley, Jamie McGloin, Jorja Kahn, Adrienne Orriols, and Richard Wamai. 2021. 'Vulnerabilities to and the Socioeconomic and Psychosocial Impacts of the Leishmaniases: A Review'. Research and Reports in Tropical Medicine Volume 12 (June): 135–51. https://doi.org/10.2147/RRTM.S278138.

Harvard University. 2014. 'Neglected Tropical Diseases: Progress and Challenges for the Post-2015 Development Era'. Science in the News. Harvard University. the Graduate School of Arts and Sciences (blog). 31 December 2014. https://sitn.hms.harvard.edu/flash/special-edition-on-infectious-disease/2014/neglected-tropical-diseases-progress-and-challenges-for-the-post-2015-development-era/.

Ortiz, Diana I., Marta Piche-Ovares, Luis M. Romero-Vega, Joseph Wagman, and Adriana Troyo. 2021. 'The Impact of Deforestation, Urbanization, and Changing Land Use Patterns on the Ecology of Mosquito and Tick-Borne Diseases in Central America'. Insects 13 (1): 20. https://doi.org/10.3390/insects13010020.