Effects of atmospheric oscillations on infectious diseases: The case of chagas disease in Chile

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BACKGROUND Currently, there is an increasing global interest for the study of how infectious diseases could be linked to climate and weather variability. The Chagas disease was described in 1909 by Carlos Chagas, and is caused by the flagellate protozoan Trypanosoma cruzi. The Chagas disease is considered one of the biggest concerns in public health in Latin America. In Chile, the main vectors involved in the transmission of T. cruzi are arthropods of the Triatominae subfamily. Moreover, another main transmission way is through of vectors by fecal-urine way, however, oral way also has been described among others transmission form. OBJECTIVES In order to get understand outbreaks of Chagas-disease, we search for possible relationships between the frequency of cases in the Chilean population and atmospheric oscillations. METHODS We explored the two most important atmospheric oscillations in the Southern Hemisphere: Southern oscillation index (SOI) and Antarctic oscillation (AAO), during the available years with official data. Because the number of migrant people born outside from Chile increasing significantly between 2014 and 2018, we used for the analysis two different periods from data available official data: (i) 2001 to 2014, (ii) 2001 to 2017. FINDINGS For both periods we observed a significant and positive relation between AAO one year before. However, for the 2001 to 2014 period positive SOI one year before, which is related with La Niña phases, was the more important variable. MAIN CONCLUSIONS The Chagas disease frequency per year in Chile was found to depend mainly on SOI in previous year, whose values can be determined one year in advance. Therefore, it is possible to partially forecast annual frequency patterns. This could have important applications in public health strategies and for allocating resources for the management of the disease. © 2019, Bentham Science Publishers B.V.
