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Influence of HDI in the Spread of RSV Bronchiolitis in Children Aged 0 to 2 Years

Authors : Chloé Kernaléguen, Laura Kundun, Tessie Lery, Ryan Laleg, Zhangyun Tan

Abstract : This study explores global disparities in respiratory syncytial virus (RSV) bronchiolitis incidence among children aged 0-2 years, focusing on the human development index (HDI) as a key determinant. RSV bronchiolitis poses a significant health risk to young children, influenced by factors, including socio-economic conditions captured by the HDI. Through a comprehensive systematic review and dataset selection (Switzerland, Brazil, United States of America), we formulated an HDI-SEIRS numerical model within the SEIRS framework. Results show variations in RSV bronchiolitis dynamics across countries, emphasizing the influence of HDI. Modelling reveals a correlation between higher HDI and increased bronchiolitis spread, notably in the USA and Switzerland. The ratios HDIcountry over HDImax strengthen this association, while climate disparities contribute to variations, especially in colder climates like the USA and Switzerland. The study raises the hypothesis of an indirect link between higher HDI and more frequent bronchiolitis, underlining the need for nuanced understanding. Factors like improved healthcare access, population density, mobility, and social behaviors in higher HDI countries might contribute to unexpected trends. Limitations include dataset quality and restricted RSV bronchiolitis data. Future research should encompass diverse HDI datasets to refine HDI's role in bronchiolitis dynamics. In conclusion, HDI-SEIRS models offer insights into factors influencing RSV bronchiolitis spread. While HDI is a significant indicator, its impact is indirect, necessitating a holistic approach to effective public health policies. This analysis sets the stage for further investigations into multifaceted interactions shaping bronchiolitis dynamics in diverse socio-economic contexts.

Keywords : bronchiolitis propagation, HDI influence, respiratory syncytial virus, SEIRS model
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