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Título: Relation on Transmissibility and population size: evidence and limitation after COVID19

Resumo:

A large amount of data available on the same disease in different locations, due to the COVID-19 pandemic, contributes to the study of parameters such as the basic reproduction number, R0. This work proposes to analyze the R0 for different functional urban areas (FUA), seeking a better understanding of the behavior of the dynamics of infectious diseases. For this, data were obtained from time series of accumulated cases, population estimates, and tables with codes for FUA or equivalent units in different countries. Different ways of calculating R0 were implemented, based on the SIR and SEIR models and on statistical methods commonly used to obtain the effective reproduction number, Rt, during epidemics. The results confirm the existence of a logarithmic scaling law between the basic reproduction number and the population size for urban units, regardless of the method used for analysis. This result contrasts with the basic assumptions of epidemic models where the number of contacts is independent of the population size. Extensions and limitations of the "law" will be discussed.