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Risk perception and 2009 H1N1 pandemic influenza spread in Italy

In Italy, the 2009 H1N1 pandemic influenza spread in a peculiar way: after an initial period characterized by a slow exponential increase in the weekly H1N1 incidence, a sudden and sharp increase of the growth rate was observed. Were behavioral changes spontaneously performed by the population responsible for such a notable pattern? In order to answer this question, a mathematical model of influenza transmission is proposed and validated. The performed investigation, based on model fit to epidemiological data and on the analysis of antiviral drugs purchase, reveals that an initial overestimation of the risk of infection during the early stage of the epidemic, possibly induced by the high concern for the emergence of a new influenza pandemic, results in a pattern of spread compliant with the observed one. This study suggests that individual choices may have driven the H1N1 dynamics in Italy during its initial phases and that they can drastically affect the spread of future epidemics, by altering timing, dynamics and overall number of cases. In conclusion, to correctly inform public health decisions, spontaneous behavioral changes cannot be neglected in epidemic modeling.