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Scale-free correlations in the geographical spreading of obesity

LAZAROS GALLOS, City College of New York, PABLO BARTTFELD, Buenos Aires University, SHLOMO HAVLIN, Bar-Ilan University, MARIANO SIGMAN, Buenos Aires University, HERNAN MAKSE, City College of New York — Obesity levels have been universally increasing. A crucial problem is to determine the influence of global and local drivers behind the obesity epidemic, to properly guide effective policies. Despite the numerous factors that affect the obesity evolution, we show a remarkable regularity expressed in a predictable pattern of spatial long-range correlations in the geographical spreading of obesity. We study the spatial clustering of obesity and a number of related health and economic indicators, and we use statistical physics methods to characterize the growth of the resulting clusters. The resulting scaling exponents allow us to broadly classify these indicators into two separate universality classes, weakly or strongly correlated. Weak correlations are found in generic human activity such as population distribution and the growth of the whole economy. Strong correlations are recovered, among others, for obesity, diabetes, and the food industry sectors associated with food consumption. Obesity turns out to be a global problem where local details are of little importance. The long-range correlations suggest influence that extends to large scales, hinting that the physical model of obesity clustering can be mapped to a long-range correlated percolation process.

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