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Predicting the HIV/AIDS epidemic and measuring the effect of mobility in mainland China

HIV has spread widely in mainland China, but there is significant geographic variation in the severity of the epidemic. We aimed to assess the HIV/AIDS epidemic in mainland China accurately, and address the effect of population mobility on it. Markov-Chain Monte-Carlo simulations and Latin Hypercube Sampling were used to estimate the basic reproductive ratio and its sensitivity to parameter variations. We estimated a mean reproduction number of 1.708 (95% CI 1.440–1.977). Our analysis using national surveillance data indicates that HIV-positive individuals most likely move from economically devel- oped regions to regions with more numerous HIV cases, while mobility of AIDS patients likely flows in the opposite direction, due to the current policy that AIDS patients must return to their registered residence to receive free antiretroviral therapy. Our results based on a spatially stratified population dynamical model show increasing mobility rates of HIV/AIDS cases can have a significant effect on the number of HIV/AIDS cases per province and has the potential to decrease the overall number of HIV/ AIDS cases in the country. We recommend that the community-based HIV/AIDS support and care program should be implemented by some local governments (especially in epidemically severe areas) to mitigate HIV infections in China.