

# **Modelling the impact of human mobility on transmission dynamics of HIV/AIDS**

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Human mobility has been observed to be one of the main factors of transmission of communicable diseases from one area to another. However, most of the existing epidemiological models tend to ignore this factor. This study used the n-patches SIR mathematical met population model to investigate the impact of human mobility on HIV transmission dynamics in different parts of Kenya and a two patches SIR model to determine the impact of urban to rural human mobility on the transmission of HIV/AIDS in rural areas of Njombe region in Tanzania. Furthermore, sexual behavior among mobile men and women from rural and urban areas of Njombe were also investigated. In Kenya, the results showed that human mobility had a relatively small overall effect on the total increase in HIV cases in Kenya. However, the most important consequences of movement patterns showed that mobility tends to slightly decrease the HIV transmission in the regions with initial high infection and tends to increase the HIV/AIDS infections to regions with initial low HIV/AIDS prevalence. Furthermore, mobility slightly increases HIV incidence rates in regions with initially low HIV prevalences and slightly decreases incidences in regions with initially high HIV prevalence. In case of Njombe region, mobility data and sexual behaviours among mobile individuals were estimated from the responses in the questionnaires conducted from June 2016 to August 2016 in the region. The results showed that, mobile rural and urban individuals equally had the tendency of having regular and multiple sexual partners. Moreover, a model simulation showed that urban to rural human mobility played a big role on the increase of HIV infections in rural areas by increasing the rural HIV incidence rate and decreases the urban HIV incidence rate in the region.