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Global dynamics of a stage-structured differential infectivity model for HIV infection

A determistic model with stage-structured differential infectivities for HIV infection is proposed and analyzed. The stage structure allows for HIV patients to move to higher-level subgroups due to education campaign, etc. The global dynamics are completely determined by the basic reproduction number R_0. If $R_0 \leq 1$, then the disease-free equilibrium is globally asymptotically stable and the disease always dies out. If $R_0 > 1$, the disease-free equilibrium is unstable, and a unique endemic equilibrium is globally asymptotically stable, the disease persists at the endemic equilibrium. The global stability of the endemic equilibrium is established using a global Lyapunov function.

This is a joint work with Jianhong Wu and Ping Yan.