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Global Dynamics of a Staged Progression Model for Infectious Diseases with Amelioration

A mathematical model for infectious diseases that progress through distinct stages within infected hosts is considered. An example of such diseases is AIDS which results from HIV infection. For a general n-stage stage-progression (SP) model with amelioration, we prove that the global dynamics are completely determined by the basic reproduction number R_0. If $R_0 \leq 1$, then the disease-free equilibrium P_0 is globally asymptotically stable and the disease always dies out. If $R_0 > 1$, P_0 is unstable, and a unique endemic equilibrium P^* is globally asymptotically stable, and the disease persists at the endemic equilibrium.

This is joint work with Michael Y. Li, Dept. of Mathematical and Statistical Sciences, University of Alberta.