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Horst R Thieme* (thieme@math.asu.edu), Department of Mathematics and Statistics, Arizona State University, Tempe, AZ 85287-1804. *Pathogen competition and coexistence and the evolution of virulence.*

Competition between different strains of a micro-parasite which provide complete cross-protection and cross-immunity against each other selects for maximal basic replacement ratio, R_0 , if, in the absence of the disease, the host population is exclusively limited in its growth by a nonlinear population birth rate. For mass action incidence, the principle of R_0 -maximization can be extended to exponentially growing populations, if the exponential growth rate is small enough that the disease can limit population growth. For standard incidence, though not in full extent, it can be extended to populations which, without the disease, either grow exponentially or are growth-limited by a nonlinear population death rate, provided that disease prevalence is low and there is no immunity to the disease. If disease prevalence is high, strain competition rather selects for low disease fatality.

The mathematical tools are persistence theory and a certain type of Lyapunov like functions. (Received February 20, 2008)