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Impact of variability of reproductive ageing and rate on childhood infectious disease prevention and control

In this study, we propose a stage-structured model of childhood infectious disease transmission dynamics, with the population demographics dynamics governed by a certain family and population planning strategy giving rise to nonlinear feedback delayed effects on the reproduction ageing and rate. We first describe the long-term aging-profile of the population by describing the pattern and stability of equilibrium of the demographic model. Then we investigate the disease transmission dynamics, using the epidemic model when the population reaches the positive equilibrium (limiting equation). We establish conditions for the existence, uniqueness and global stability of the disease endemic equilibrium. We then prove the global stability of the endemic equilibrium for the original epidemic model with varying population demographics. The global stability of the endemic equilibrium allows us to examine the effects of reproduction ageing and rate, under different family planning strategies, on the childhood infectious disease transmission dynamics. We also examine demographic distribution, diseases reproductive number, infant disease rate and age distribution of disease.