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# Analysis of an Age Structured SEIRS Epidemic Model with Varying

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摘要 This article focuses on the study of an age structured

SEIRS epidemic model with a vaccination program when the total

population size is not kept at constant. We first give the

explicit expression of the reproduction number  $\mathcal{R}(\psi, \widehat{\lambda})$

in the presence of vaccine ( $\widehat{\lambda}$  is the exponent of growth of total

population), and show that the infection-free steady state is

linearly stable if  $\mathcal{R}(\psi, \widehat{\lambda}) < 1$  and

unstable if  $\mathcal{R}(\psi, \widehat{\lambda}) > 1$ , then we apply

the theoretical results to vaccination policies to determine the

optimal age or ages at which an individual should be vaccinated.

It is shown that the optimal strategy can be either one- or

two-age strategies.

关键词

[age-structured SEIRS epidemic model, vaccination](#) [varying total population size, reproduction number, stability, optimal vaccination strategies](#)

分类号

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### Abstract

### Key words

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