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**The stability of an SEIRS model with nonlinear incidence, vertical transmission and time delay.** (English) [Zbl 1329.92139](#)

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**Summary:** In this paper, nonlinear incidence with a more general form and vertical transmission and the immunity period are considered in an SEIRS epidemic model. The basic reproductive number is obtained. If the basic reproductive number is smaller than one, the disease free equilibrium is asymptotically stable. When the basic reproductive number is bigger than one, regardless of the time delay length there exists a unique endemic equilibrium which is locally asymptotically stable under some conditions. By mathematical analysis and numerical simulations, the result shows that the immunity period and vertical transmission can influence the dynamic behaviors of the SEIRS system. To prolong the immunity period of the recovered and to reduce the part of vertical transmission by some measures are both favorable for controlling the disease.

**MSC:**

**92D30** Epidemiology

**34K20** Stability theory of functional-differential equations

Cited in 4 Documents

**Keywords:**

SEIRS model; stability; nonlinear incidence; vertical transmission; time delay

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