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Mathematical and Statistical Science, P.O. Box 871804, Tempe, AZ 85287-1804. *Is the resurgence of
syphilis a backward bifurcation?*

Syphilis was believed to disappear in US and other developed countries after the effective treatment by penicillin half a century ago. However, recent resurgence of syphilis in several communities questions the effectiveness of medical treatment in controlling the spread of the disease. In particular, whether the resurgence signals cycling from the point view of mathematical modeling is under debate.

We study a mathematical model of syphilis, incorporating the fact of partial immune protection after treatment and behavioral protection through education. Our model suggests that a backward bifurcation can occur if a condition is satisfied. The resurgence of syphilis could be a result of changes of behavioral protection among the “high risk” group. (Received September 21, 2009)