**Hethcote, Herbert W.**
**A thousand and one epidemic models.** (English) Zbl 0819.92020
Levin, S. A. (ed.), Frontiers in mathematical biology. Berlin: Springer- Verlag. Lect. Notes Biomath. 100, 504-515 (1994).

The first goal of this paper is to present a building block approach to the construction of deterministic epidemiological models. Each model is built from components such as the epidemiological compartment structure, the form of the incidence, the distributions of waiting times in the compartments, the demographic structure, and the epidemiological- demographic interactions. Because there are many choices for each aspect, the combinatorial possibilities are enormous. The title of this article suggests that the number of possible epidemiological models is very large; indeed, I show that there are more possibilities than 1001.

The second goal of this paper is to convince modelers and mathematicians that it may be inappropriate to analyze the many different possible models one by one in published papers. Only the analyses of models which break new ground or illustrate the importance of some new aspect are of significant interest. Analyses which consider some slight variation of a previous model and which lead to essentially the same solution behavior may not be worth publishing. If the thresholds and behavior of the new model are predictable based on the insight gained from the analysis of previous models, then the analysis of the new model is probably not an important contribution. However, if a change in a model leads to different results such as periodic solutions, multiple thresholds or multiple endemic equilibria, then it is interesting and significant.

For the entire collection see [Zbl 0810.00005].

**MSC:**

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**Keywords:**

form of incidence; construction of deterministic epidemiological models; compartment structure; distributions of waiting times; demographic structure; epidemiological-demographic interactions