# Appendix A

The flow of individuals among the compartments is shown in Figure 1 and is described by the following system of differential equations:

$$\dot{S} = +\beta N - \mu S - \left( \sum_j \alpha \lambda_j I_j \right) S/N$$

$$\dot{I}_1 = -\mu I_1 + \left( \sum_j \alpha \lambda_j I_j \right) S/N - \sigma_1 I_1$$

$$\dot{I}_2 = -\mu I_2 + \sigma_1 I_1 - \sigma_2 I_2$$

$$\dot{I}_3 = -\mu I_3 + \sigma_2 I_2 - \sigma_3 I_3$$

$$\dot{I}_4 = -\mu I_4 + \sigma_3 I_3 - \sigma_4 I_4 - \tau_1 I_4$$

$$\dot{I}_5 = -\mu I_5 + \sigma_4 I_4 - \sigma_5 I_5 - \tau_2 I_5$$

$$\dot{I}_6 = -\mu I_6 - \sigma_6 I_6 + \tau_1 I_4$$

$$\dot{I}_7 = -\mu I_7 - \sigma_7 I_7 + \tau_2 I_5$$