Supplementary material

According to the model in Figure 1a of the main article, the probability of each node to be a smoker and a never-smoker at time $t+dt$ are respectively given by:

$$P_S^i(t+dt) = P_S^i(t)[1-\omega_{S\to Q}^i]dt + P_Q^i(t)\omega_{Q\to S}^i dt + P_N^i(t)\omega_{N\to S}^i dt \tag{S1}$$

$$P_N^i(t+dt) = -P_N^i(t)\omega_{N\to S}^i dt \tag{S2}$$

where

$$\omega_{S\to Q}^i = \delta_{S\to Q} + \sum_{j=1}^{N} a_{ij}(\beta_{S,Q\to Q,Q}P_Q^j(t) + \beta_{S,N\to Q,N}P_N^i(t)) \tag{S3}$$

$$\omega_{Q\to S}^i = \delta_{Q\to S} + \sum_{j=1}^{N} a_{ij}\beta_{Q,S\to S,S}P_S^j(t) \tag{S4}$$

$$\omega_{N\to S}^i = \delta_{N\to S} + \sum_{j=1}^{N} a_{ij}\beta_{N,S\to S,S}P_S^j(t) \tag{S5}$$

In the limit of $dt \to 0$ and dividing Equation. (S1) and (S2) by dt we obtain the master equations of the model without the influence of an external node:

$$\begin{cases} \dfrac{dP_S^i(t)}{dt} = -\left[\delta_{S\to Q} + \beta_{S,Q\to Q,Q}\sum_{j=1}^{N} a_{ij}\left(1-P_S^j(t)-P_N^j(t)\right) + \beta_{S,N\to Q,N}\sum_{j=1}^{N} a_{ij}P_N^j(t)\right]P_S^i(t) \\ \qquad\qquad + \left[\delta_{N\to S} + \beta_{N,S\to S,S}\sum_{j=1}^{N} a_{ij}P_S^j(t)\right]P_N^i(t) \\ \qquad\qquad + \left[\delta_{Q\to S} + \beta_{Q.S\to S,S}\sum_{j=1}^{N} a_{ij}P_S^j(t)\right]\left(1-P_S^i(t)-P_N^i(t)\right), \\ \dfrac{dP_N^i(t)}{dt} = -\left[\delta_{N\to S} + \beta_{N,S\to S,S}\sum_{j=1}^{N} a_{ij}P_S^j(t)\right]P_N^i(t). \end{cases} \tag{S6}$$