

$$g\left(Z_a, \tilde{Z}_a\right) = \sum_{p \in \mathcal{P}} \sum_{a \in \mathcal{A}} \left(\sum_{k \in \mathcal{K}_A} w_k \lambda_{pk} \hat{\Psi}_{kpa} + \sum_{k \in \mathcal{K}_B} w_k \lambda_{pk} \Psi_{kpa} \right)$$

Expected number of patients surviving, given allocations Z_a and \tilde{Z}_a

Number of patients of a speciality in \mathcal{K}_A surviving

Number of patients of a speciality in \mathcal{K}_B surviving

Weights

$$\Psi_{kpa} = s_k(t_{pa}) \left(1 - \pi_a^{Z_a}\right) \prod_{\alpha \in \mathcal{A}} \pi_{\alpha}^{(Z_{\alpha} \beta_{p\alpha a})}$$

Probability of patient speciality k at location p being seen by a *primary* vehicle from station a and surviving

Probability of surviving

Probability of that a *primary* vehicle is not busy

Probability all closer *primary* vehicles are busy

$$\begin{aligned} \hat{\Psi}_{kpa} = & s_k(\hat{t}_{pa}) \left(1 - \tilde{\pi}_a^{\tilde{Z}_a}\right) \prod_{\alpha \in \mathcal{A}} \tilde{\pi}_{\alpha}^{(\tilde{Z}_{\alpha} \beta_{p\alpha a})} \pi_{\alpha}^{(Z_{\alpha} R_{p\alpha a})} \\ & + s_k(t_{pa}) \left(1 - \pi_a^{Z_a}\right) \prod_{\alpha \in \mathcal{A}} \pi_{\alpha}^{(Z_{\alpha} \beta_{p\alpha a})} \tilde{\pi}_{\alpha}^{(\tilde{Z}_{\alpha} (1 - R_{p\alpha a}))} \end{aligned}$$

Probability of patient speciality k at location p being seen by a vehicle from station a and surviving

Probability of surviving

Probability of that a *secondary* vehicle is not busy

Probability all closer *secondary* vehicles are busy

Probability all closer *primary* vehicles are busy

Probability of that a *primary* vehicle is not busy

Probability all closer *secondary* vehicles are busy

Probability all closer *primary* vehicles are busy