

How to design an urgent care team in home healthcare?

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Motivation:

- An **urgent care team** responds to all acute care incidents in home healthcare (HHC).
- A dedicated urgent care team can be set up to avoid disruption of the current schedules.

Tactical decisions:

1. Number of nurses per education level
2. Standby locations of the nurses

Aim:

Determine the number of HHC nurses per education level per standby location such that the urgent care team can respond to $(1-\alpha)\%$ of the care requests in time.

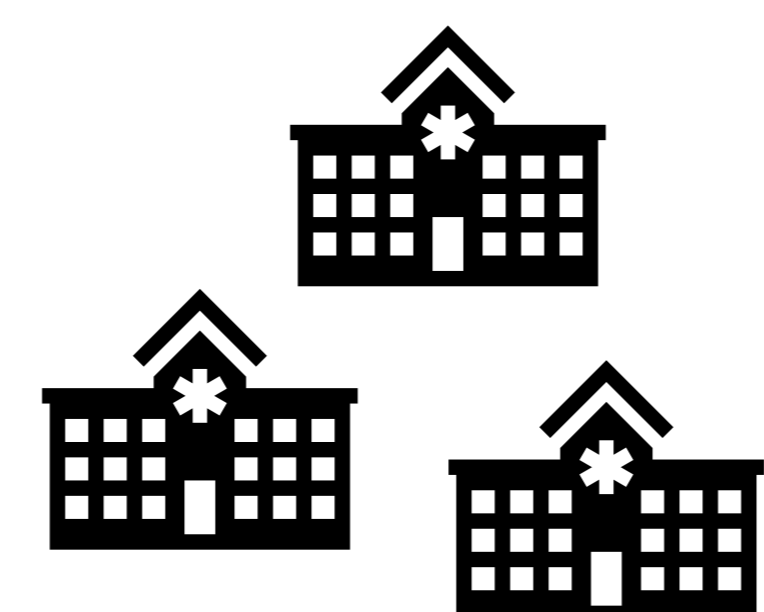
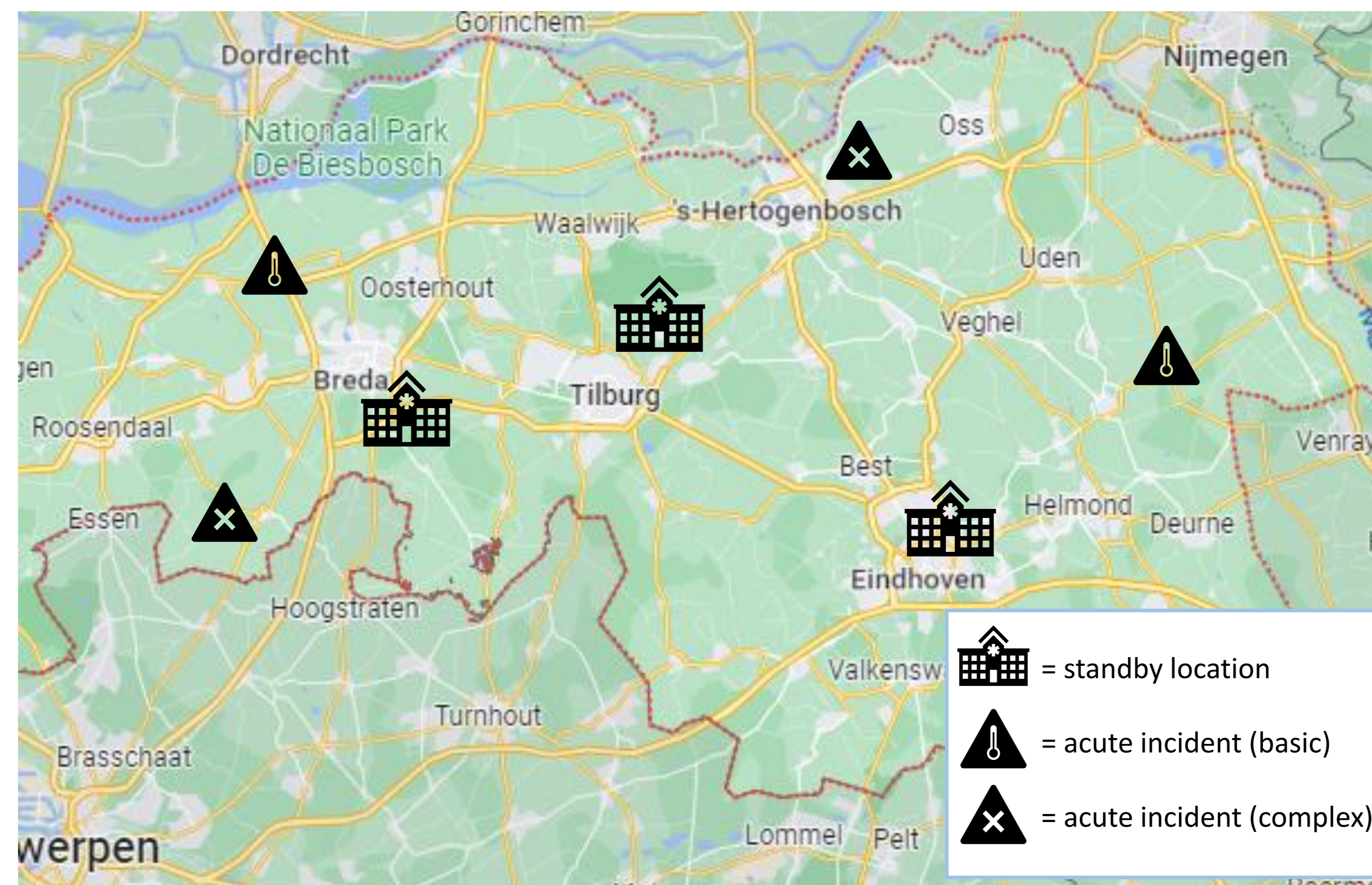


Methods:

- Chance-constrained programming
- Discrete-event simulation
- Sample average approximation

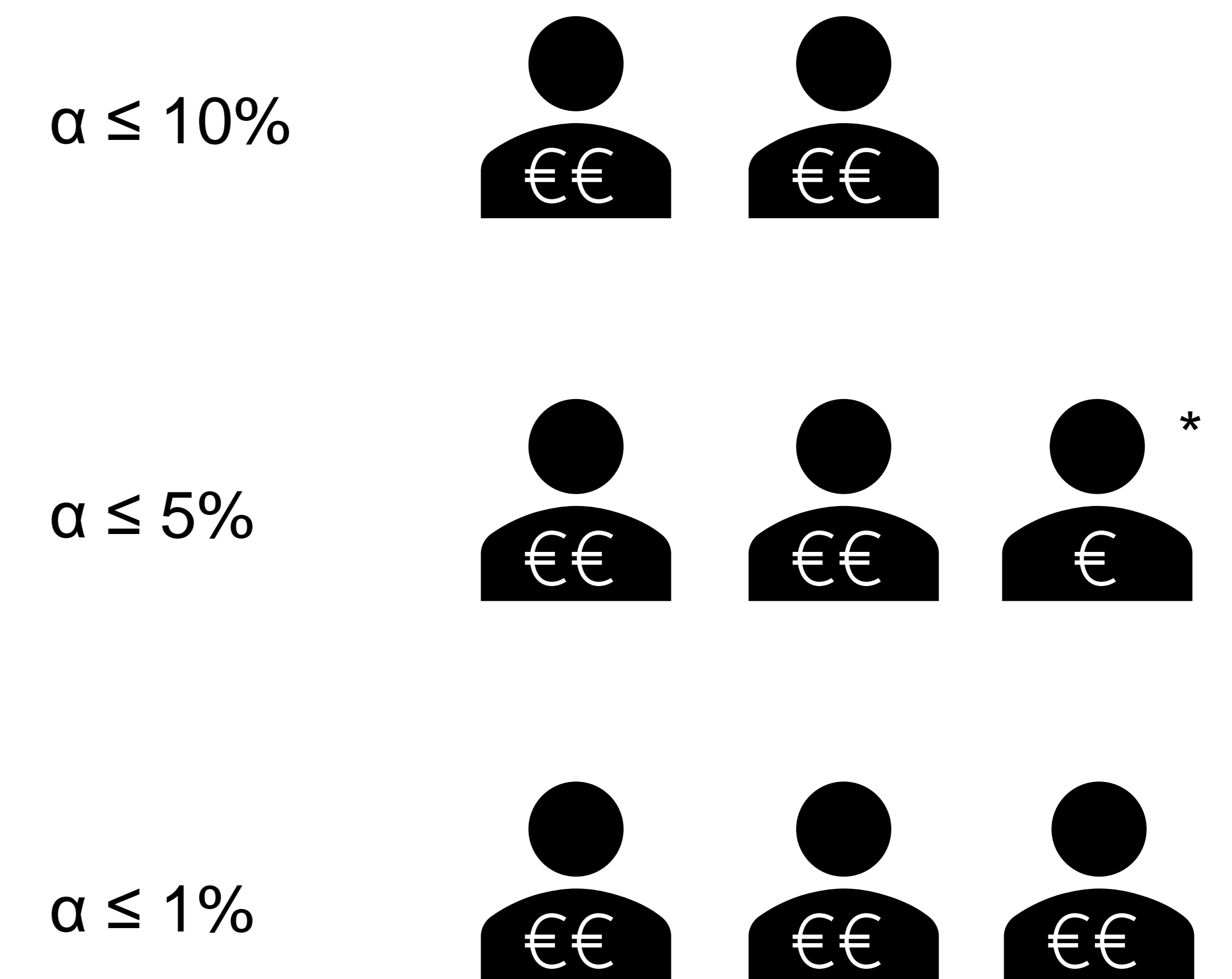


$$\begin{aligned} \min_x \quad & \sum_{j \in J} c_j x_j \\ \text{s. t.} \quad & P\left(\sum_{l=j}^{|J|} x_l \geq \max_t \left\{ \sum_{i \in I} a_{ijt} \right\}\right) \geq (1 - \alpha_j), \forall j \in J \\ & x_j \in \mathbb{Z}_+, \forall j \in J \end{aligned}$$



$$\begin{aligned} \min c^t x \\ P(Tx \geq \xi) \geq p \\ x \in \{0,1\}^n \end{aligned}$$

Results for a real-life case study in the southern part of the Netherlands:



* *Currently being piloted in practice.*

= district nurse (can respond to all incidents)
 = basic care nurse (only responds to basic care incidents)

Contributions of this research:

- Results are a benchmark for similar urgent care teams.
- Our models support the tactical decision making of home healthcare organizations.
- Basic care nurses are only required if the number of basic care incidents is high enough and the district nurses cannot cover all this demand.