

SCATTER (Strategische Patientenverlegung - Strategic transfer of patients) A computer-based simulation of inter-hospital transfer of critically ill patients

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During the COVID-19 pandemic an increased need of ICU (Intensive Care Unit) capacity at regional level was seen in many countries, including Germany. To ensure adequate medical care, referrals of critically ill patients were necessary, partially long distance. New organisational structures were implemented to allocate patients from highly to less affected regions (1).

Transporting critically ill patients is associated with risk of adverse events (2). Well-equipped vehicles and highly educated personnel are needed to reduce the risk for the patient and ensure continuous medical treatment throughout the transfer (3).

To date a nationwide transportation strategy for critically ill patients does not exist in Germany.

The object of SCATTER is to develop a computer-based simulation for strategic long-distance referrals of critically ill COVID-19 patients and to obtain recommendations for future referral requests. The simulation model uses Geographic Information Systems and combines discrete event and agent-based modelling.

To build a realistic simulation, a wide range of data has to be considered: location of hospitals, their level of patient care, ICU capacities, means of transportation, patient characteristics and their impact on transport duration and hand-over time in the sending and receiving hospitals. The data will be based on protocols and timestamps from past COVID-19 transports.

The simulation model is in the latter stages of development having implemented the core process logic, like information about intensive care transport resources and their behaviour, as well as available system data. Validation is done through exchange with process experts discussing the implemented logic and necessary assumptions for parameters. The simulation has already been used successfully to examine a set of test instances. The current focus is on choosing a suitable experiment design to extensively study tactics for strategic long-distance referrals.

This simulation can also be used for other scenarios such as loss of infrastructure, terror attacks, natural disasters etc. A broadening to international referrals of patients could also be of interest.

References:

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