

Evaluating hospitals' decision-makers risk preferences, employing a stock-flow simulation model of COVID-19 impact: a methodological approach

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The COVID-19 pandemic has urged healthcare decision-makers to handle a tight trade-off between the level of services delivery, organizational capacity and direct costs. Throughout an epidemic wave, it is crucial to establish the number of medical devices needed to support the most severe patients with COVID-19 while taking care of not exceeding financial thresholds. The presence of two possible and known options, together with the uncertainty and the complexity of the epidemic scenario, indicates decision-making under risk. It implies that the risk profiles of the individuals who decide at the hospital level could affect the overall management of the epidemic. Therefore, the purpose of this work is to propose a new methodology to elicit risk preferences of hospital decision-makers.

The methodology consists of four steps (Figure 1). The first is developing a stock-flow simulation model of a hospital, in a region struck by the COVID-19 pandemic, such as Lombardy Region. The model includes both epidemiological and organizational variables (patients accepted in hospital, number of beds for each ward and equipment acquired), but also economic results (i.e., devices and beds' costs). The platform employed to develop the model allows creating simulations with a graphical interface and inputs that users could intuitively operate, managing the simulated hospital organization. The second step consists of calibrating the model on real-world cases. We selected five different scenarios from Italian hospitals data retrieval. For those structures, both the hospital features and the dynamic of the epidemic were collected and processed. Later, the model was calibrated for these five scenarios. The model was then provided to healthcare decision-makers, which use it, during simulations. Ultimately, the outputs of the simulations performed by decision-makers were collected and examined. From the timing and the magnitude of investment decisions was possible to infer the users' risk preferences.

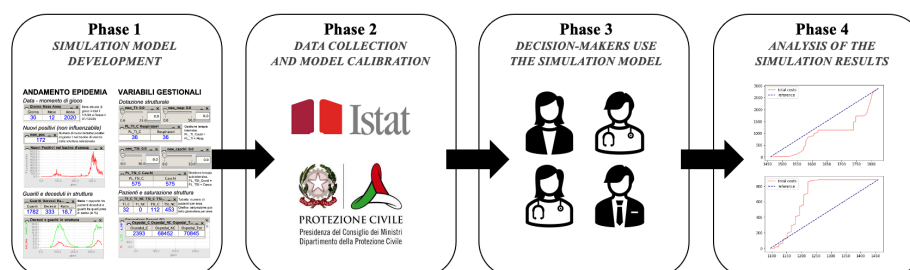


Figure 1: The four-steps process for measuring hospitals' decision makers risk preferences

Future developments comprise investigating the relationship between risk preferences and quality of the treatments, comparing the results of the proposed methodological approach with existing tests such as Holt-Laury.

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