

A Comprehensive Key Performance Indicators Dashboard for Emergency Medical Services

Authors : Giada Feletti, Daniela Tedesco, Paolo Trucco

Abstract : The present study aims to develop a dashboard of Key Performance Indicators (KPI) to enhance information and predictive capabilities in Emergency Medical Services (EMS) systems, supporting both operational and strategic decisions of different actors. The employed research methodology consists of the first phase of revision of the technical-scientific literature concerning the indicators currently used for the performance measurement of EMS systems. From this literature analysis, it emerged that current studies focus on two distinct perspectives: the ambulance service, a fundamental component of pre-hospital health treatment, and the patient care in the Emergency Department (ED). The perspective proposed by this study is to consider an integrated view of the ambulance service process and the ED process, both essential to ensure high quality of care and patient safety. Thus, the proposal focuses on the entire healthcare service process and, as such, allows considering the interconnection between the two EMS processes, the pre-hospital and hospital ones, connected by the assignment of the patient to a specific ED. In this way, it is possible to optimize the entire patient management. Therefore, attention is paid to the dependency of decisions that in current EMS management models tend to be neglected or underestimated. In particular, the integration of the two processes enables the evaluation of the advantage of an ED selection decision having visibility on EDs' saturation status and therefore considering the distance, the available resources and the expected waiting times. Starting from a critical review of the KPIs proposed in the extant literature, the design of the dashboard was carried out: the high number of analyzed KPIs was reduced by eliminating the ones firstly not in line with the aim of the study and then the ones supporting a similar functionality. The KPIs finally selected were tested on a realistic dataset, which draws us to exclude additional indicators due to the unavailability of data required for their computation. The final dashboard, which was discussed and validated by experts in the field, includes a variety of KPIs able to support operational and planning decisions, early warning, and citizens' awareness of EDs accessibility in real-time. By associating each KPI to the EMS phase it refers to, it was also possible to design a well-balanced dashboard covering both efficiency and effective performance of the entire EMS process. Indeed, just the initial phases related to the interconnection between ambulance service and patient's care are covered by traditional KPIs compared to the subsequent phases taking place in the hospital ED. This could be taken into consideration for the potential future development of the dashboard. Moreover, the research could proceed by building a multi-layer dashboard composed of the first level with a minimal set of KPIs to measure the basic performance of the EMS system at an aggregate level and further levels with KPIs that can bring additional and more detailed information.

Keywords : dashboard, decision support, emergency medical services, key performance indicators

Conference Title : ICHSOPFO 2022 : International Conference on Healthcare Systems Optimization and Patient Flow Optimization

Conference Location : Lisbon, Portugal

Conference Dates : October 27-28, 2022