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## A holistic human factors framework and methodology for patient safety and quality of care

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In this paper we introduce a human factors analysis approach based on a holistic framework published originally by Parush et al. (2011). The fundamental premise of the framework is that the manner with which tasks are performed and goals are achieved is influenced by a variety of tightly inter-related factors. These factors are the nature of the tasks, the environmental context (physical and human) within which tasks are performed, and the capabilities and limitations of people. These in turn can result in further emergent factors (such as fatigue or stress) that have a direct impact on the eventual performance and outcomes. Within this framework, one implements a human factors analysis following a four-step methodology acronymed as MARC: Map people, tasks, and environment; Assess fit of task and environment support or demand to people's capabilities and limitations; Recognize any emergent factors as a result of lack of fit and Conclude about the most influencing factors on performance and outcomes. Consequently, the analyst can suggest interventions and mitigations. Those address primarily the factors that are found problematic in the foundation tier of the framework: tasks, people, and environments. The framework and associated analysis approach can be used in retrospective analysis of adverse events, as well as analyzing a site or a process in a proactive manner and introduce human factors considerations into quality improvement processes.