

Minimising rostering deviations when re-planning home healthcare services

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Home healthcare nurses in the Flemish context face a significant challenge: the irregularity of working rosters, which disrupts their ability to plan personal activities. This issue affects their job satisfaction and contributes to high turnover rates within the industry. Existing literature predominantly addresses nurse satisfaction in HHC through single-objective models using a weighted sum, often failing to capture the complex trade-offs involved. In addition, decision-makers struggle to assign appropriate weights to each factor in this function.

This study proposes a bi-objective model to balance costs and care worker satisfaction, defined by roster regularity in the context of re-planning. Our novel approach utilizes a multi-directional local search (MDLS) framework with an embedded large neighbourhood search (LNS) heuristic to approximate the Pareto frontier between the conflicting objectives (i.e., costs and care worker satisfaction). This heuristic constructs multi-day planning in an integrated manner by rostering nurses, assigning patients to nurses, scheduling patient visits and constructing routes. Our model offers decision-makers valuable insights for optimizing rostering practices by presenting multiple solutions that highlight trade-offs. Finally, the effectiveness and performance of our solution approach will be demonstrated by discussing the results of some empirical experiments.