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SIMULATION WITH DATA SCARCITY: DEVELOPING A SIMULATION MODEL OF A HOSPITAL EMERGENCY DEPARTMENT

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ABSTRACT

Our research was motivated by the resource allocations problem in the Emergency Department at the Prince of Wales Hospital in Hong Kong. We adopted a simulation approach to analysis how the allocation decisions impact patient's experience in the department. The development of the model is complicated by the fact that there are different categories of patients (with different time-varying arrival rates, treatments and procedures), and the data records were incomplete to allow direct estimation of many of the key operational parameters (e.g. the duration of doctor's consultation). To tackle the first issue, patients' arrivals are modelled as Poisson processes with category and time-dependent arrival rates. The second issue is resolved by positing a general distribution (Weibull) for some key processes, and developing meta-heuristic approaches to *jointly* estimate the distribution parameters. Our computational results show that accurate estimates of the distribution parameters are found using our proposed search procedure, in that the simulated results and the actual data were consistent.

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