Development of a generic emergency department discrete-event simulation model

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Background

Emergency Departments (EDs) have a critical role in patient care and their process complexity presents challenging operational questions, e.g.,

- staffing decisions,
- resource allocation,
- patient flow.

Discrete-Event Simulation (DES) models can help evaluate the performance of process improvement approaches.

DES models are often built with site-specific constraints that limit their applicability to other hospital sites.

Methodology

High-fidelity generic DES model represents the ED flow by mimicking the key actions and rules of real systems.

Validated the output of the model with data sets belonging to 9 sites in Canada, U.S.A, and U.K.

Results

A single input-driven generic model in Simul8.

Diagnosis

- Procedure
- Diagnostic
- Admit
- Nurse
- Visit
- Treatment, Lab, DI
- Admission, Triage, Placement
- Discharge
- Decision to Admit or Discharge
- Reassessment and Consult
- Route to Treatment and Tests
- Route to Reassessment
- Ambulance Arrivals
- Ambulance Arrivals
- First Assessment 1
- First Assessment 2
- First Assessment 3
- First Assessment 4
- First Assessment 5
- First Assessment 6
- First Assessment 7
- First Assessment 8
- First Assessment 9
- First Assessment 10
- Pediatrics
- Diagnostic Imaging
- Laboratory
- Mental Health
- Other Units
- High severity
- Medium severity
- Low severity
- Resuscitation
- Areas to perform specific procedures
- E.g., for patients waiting to be admitted
- Areas to triage, register, and route patients
- LWOS

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