Simulation Modelling to Evaluate General Medicine Rosters

Amelia White, Michael O'Sullivan, Cameron Walker – Department of Engineering Science, University of Auckland.
Rupert Handy, Nicolas Szecket, Art Nahill – General Medicine Department, Auckland District Health Board.
Tim Denison, Andrew Peterson – Central Project Office, Auckland District Health Board.

Introduction

Demand on health care services is continuing to increase. To ensure quality of patient care, health care services must manage their resources efficiently. However, the complexity of health care services makes this difficult to do. Simulation is a way to handle this problem and evaluate potential improvements. In this project we developed a simulation model of patient flow in General Medicine (GM) at Auckland Hospital to evaluate changes to the registrar roster.

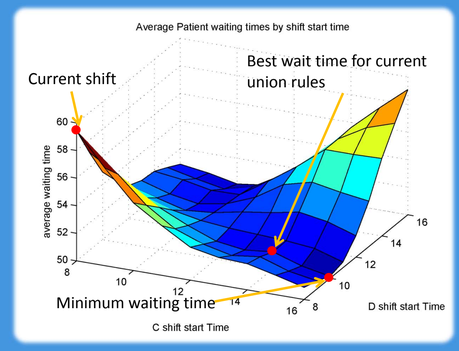
Problem Description

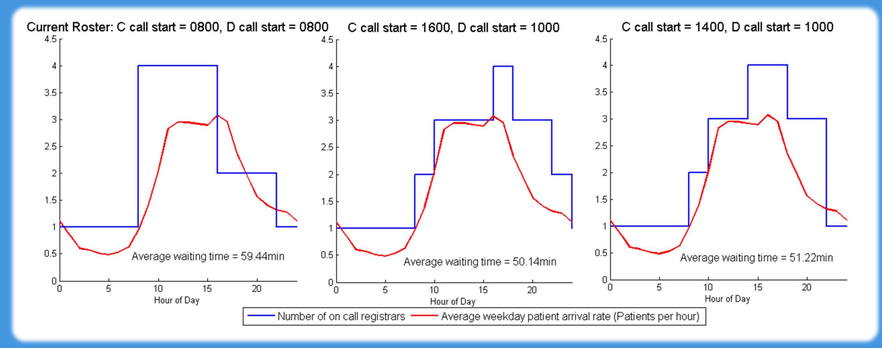
GM registrars admit new patients who have been referred from the Emergency Department (ED) or their General Practitioners. Inefficiencies in the way registrars are assigned to on call shifts could impact the ability of these staff to manage random surges in patient arrivals.

Image retrieved from www.freeimageworks.com

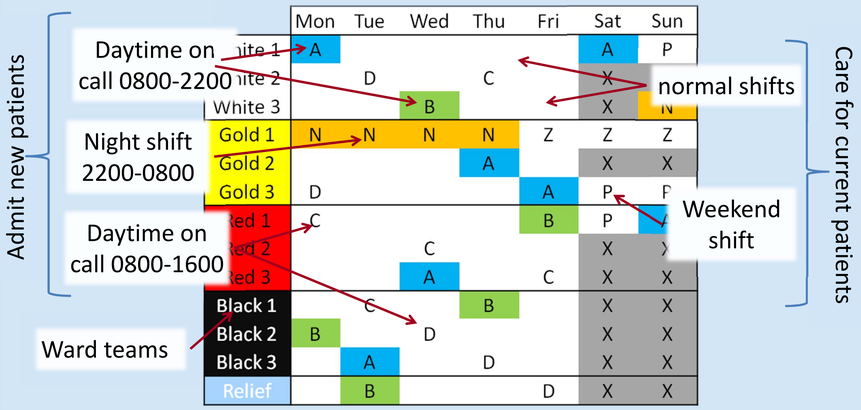
Results

Sliding start times of C and D call to better align with peak arrival times gave a reduction in wait times of 16%. If shifts conform to current union rules then the reduction is 14%.





Example of GM registrar roster

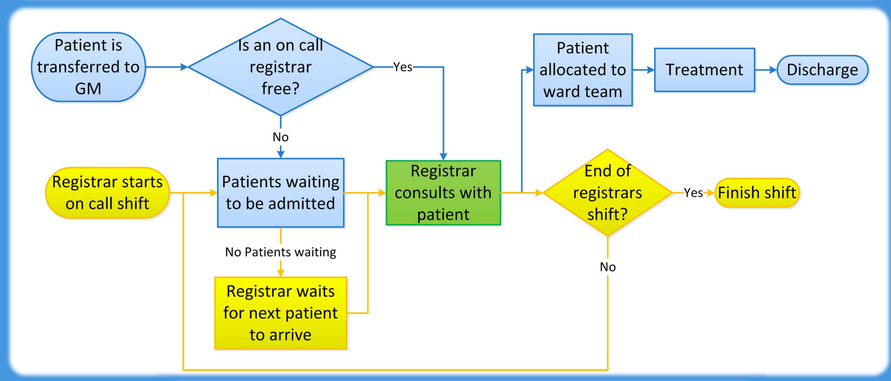


Project Aims

- Build a simulation model of patient flow in GM that can be transferred to other health care applications
- Provide a tool to assess improved rosters
- Determine the effect of changing shift times

Model Development

Patient and registrar interactions were built into the simulation model. The flow chart below illustrates the logic implemented in the model. The model was validated against historical data to ensure it was representative of patient numbers in each ward, and patient waiting times. Different start times of C and D on call shifts were trialled to determine the effect on patient waiting times.



Patient and registrar interactions in simulation model

Conclusions

- Model is representative of patient flow in GM.
- Changing the start times of some of the on call shifts to better align with peak patient admissions would reduce patient waiting times and improve patient flow.
- This model provides a valuable tool for health care decision makers to evaluate the benefits of any changes to the current roster system.

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THE UNIVERSITY OF AUCKLAND
FACULTY OF ENGINEERING
Department of Engineering Science