

Modeling and Discrete Event Simulation of KKH Outpatient Pharmacy

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Background

85.2% of patients waited < 30 mins for their prescription at the Outpatient Pharmacy between 7 Jan 2013 and 24 Aug 2013.



Aim

The objective of this study was to provide a model for reducing waiting time at Outpatient Pharmacy by using discrete event simulation.

Methodology



Eight patients were randomly selected daily from 15 to 19 July 2013 and followed through from triage to dispensing with the **process time** (*Triage, Type, Pack, Check and Dispense*) at each critical process step.



A sample of the outpatient *inter-arrival rate* was collected from the prescription system.



The pharmacy process is modeled by simulation software "*ARENA*". The model is validated to achieve 95% confidence and set to run for 30 replications.

For validation, the paediatrics dispensing station was increased by **1 FTE** between 9 to 13 September 2013. Eight patients were randomly selected daily and followed through from triage to dispensing with the **process time** at each critical process step.

Results

Simulation of increasing Paediatrics Dispensing by 1 FTE



Effect is a reduction in holding time at stations and increase actual time involved in processing prescription.





	15-19 July 2014	9-13 September 2014
Sample Size Collected	40	40
Mean time taken to process 1 prescription	20.53 mins	20.00 mins

Actual validation (0.53 min reduction) of the model from 9-13 September 2013, showed comparable results to the simulated model (1 min reduction).

Conclusion

Model simulation of the Outpatient Pharmacy process time provided recommendation that was robust and implementable. Simulated modeling is suitable for applications in a busy Outpatient Pharmacy setting before actual implementation of process changes.