

SCIENTIFIC EVALUATION OF POLYCLINIC OPERATING STRATEGIES WITH DISCRETE-EVENT SIMULATION

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Abstract

A subsidized primary care clinic in Singapore wanted to evaluate the impact of different patient appointment apportionment and patient-doctor allocation strategies on the cycle time that their patients need to spend during their clinic visits. To the best of the authors' knowledge, there is limited literature on such studies. This paper aims to fill this research gap via scientific evaluation of these operating strategies. Based on simulation model projections, two key inferences are made. First, appointment system is a good patient classification strategy that reduces median and 95th percentile cycle times of appointment patients. But the magnitude of these reductions in median and 95th percentile cycle times diminish as the proportion of appointment patients in a patient population increases. Second, exclusive allocation of walk-in patients seeking consultation for their non-chronic conditions to selected doctors is not effective relative to appointment systems in reducing overall median and 95th percentile cycle times.

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Key Words: Cycle Time, Discrete-Event Simulation, Appointment Scheduling, Walk-in Patients

1. INTRODUCTION

Primary health care entails the provision of primary medical treatment, preventive healthcare and health education to the local community. In Singapore, about 20 % of primary health care is provided through an island network of 18 outpatient primary care centres (polyclinics) that provide heavily subsidized primary care to those seeking treatment. The remaining 80 % is provided through some 2000 private medical practitioner's clinics which can be located within business or shopping districts or among residential neighbourhoods. Each polyclinic serves as a one-stop health centre that provides government-subsidized outpatient medical care, follow-up of patients discharged from hospitals, immunization, health screening and education, investigative facilities and pharmacy services. In general, the costs incurred at polyclinics are low as compared to visits to private medical practitioners.

As a result of the highly affordable healthcare charges, polyclinics attract large patient attendance volumes which result in relatively long wait to see doctors by the patients during their polyclinic visits [1, 2]. In an effort to improve patient satisfaction, the polyclinics have implemented several measures over the years to enhance their health care service delivery. These measures include installation of self-service queue ticketing machines; Short Message Service (SMS) notification system, which sends an SMS to the patient shortly before his or her queue number is called; online web-cam queue watch which allows patients to check the real time queue lengths at various counters of all polyclinics.

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