

# Capacity Planning of an Outpatient Clinic Using Simulation

Academic Medical Center

Success Story

Healthcare

MedModel



## CHALLENGES

An outpatient clinic at an academic medical center offers comprehensive evaluations/consultations to patients undergoing an anesthesia-related, low to medium risk, planned surgery/procedure. Implementation of surgical process improvement initiatives across various surgical specialties led to an increase in demand for the clinic services. The administration believed insufficient consultation rooms would hinder their ability to expand services.

## OBJECTIVE

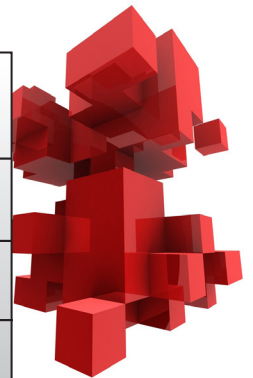
Determine the capacity requirements, both facility and personnel, needed to support the expected growth in patient volumes.

## RESULTS

The simulation model results indicated that there were a sufficient number of rooms at the outpatient clinic to meet the increase in demand. However, imbalance in patient scheduling across the day was causing a bottleneck in the system. By redistributing the workload more evenly across the day, the patient throughput in the clinic could be increased by 30 additional appointments.

Implementation of the recommended patient appointment schedules and associated change in staff work schedules could accommodate the increase in demand in the existing facility with minimal addition of staff. These results were reviewed and approved for implementation by a multi-disciplinary team comprised of the clinical staff - providers, respiratory therapists, and administrators.

	Current State	Recommended Future State	Productivity Gains
Exam Rooms	47%	63%	+16%
Providers	70%	80%	+10%
RT	64%	77%	+13%
Throughput	56	86	+54%

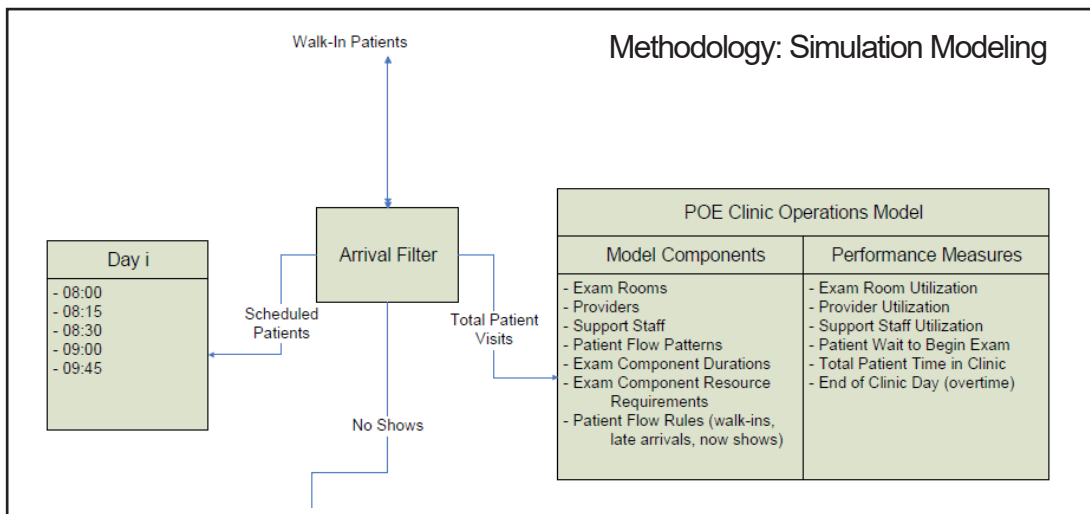


**Increase in patient throughput by 30 patients/day in the existing exam rooms at an increased resource utilization**

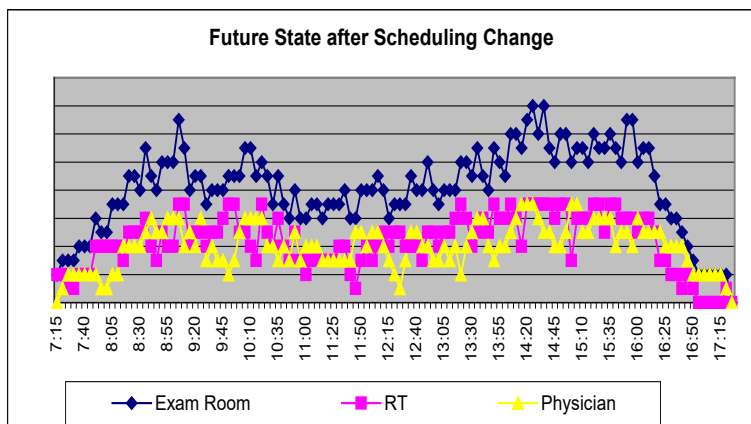
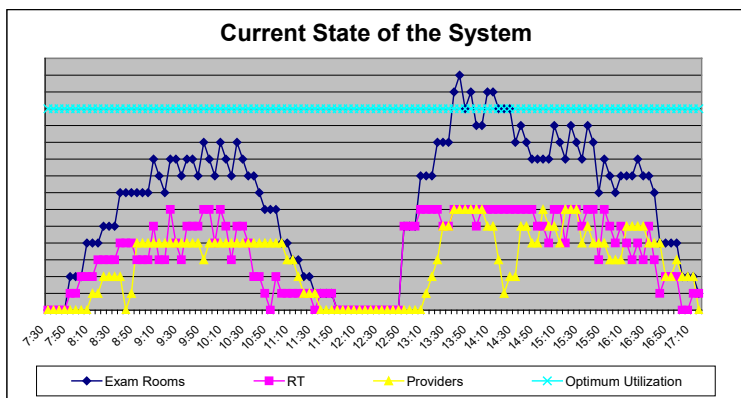
# SOLUTION

Simulation is a powerful tool that can be used to estimate capacity requirements of an outpatient clinic, by determining the best combination of all the control variables in order to optimize the performance of the system.

Preliminary investigational process review was conducted through staff interviews and patient shadowing in order to understand the processes and patient flow at the clinic. Discrete event simulation was used to model the current state of the system. Inputs into the model included scheduled patient appointments, duration of each process step, and staff work schedules.



The simulation model of the current system indicated existence of underutilized capacity. This initial current state model was used as a framework to investigate possible improvements in the system.



Multiple future state scenarios were developed to evaluate the impact of potential changes to scheduling patterns and capacity reallocation on patient wait time and resource utilization. The most optimal future state was determined based on the utilization of consultation rooms and clinical staff.