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DEVELOPMENT OF A WAIT LIST COMPUTER SIMULATION MODEL FOR ELECTIVE ORTHOPAEDIC SURGERY.

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Data from the wait list management system and hospital databases was used to develop a computer model simulating the resource requirements required during patient flow into, through, and out of orthopaedic surgery for TKR, THR and knee arthroscopy. Results from the simulation model suggested that inpatient beds, rather than operating room time was the constraining resource and an extra twenty-five beds and 30% more OR time would stabilize and subsequently reduce the wait time at the institution. In addition, simulations suggested that pooling surgeon wait lists reduced patient wait time. Simulation models are an effective resource allocation decision-making tool for orthopaedic surgery.

To develop and implement a wait list simulation model to analyze the existing system and guide resource allocation decision-making at the QEII Health Sciences Centre.

The simulation model suggests an immediate increase in inpatient surgical beds from sixty-six to ninety-one followed by a 30% increase in OR time in thirty months to stabilize and subsequently reduce patient wait times.

Simulations showed that pooling surgeon waiting lists reduced patient wait time, however, dividing orthopaedics resources among two facilities had little effect. Adding twenty-five beds reduced the wait time growth rate substantially, but not to zero, while adding fifty beds reduced the wait time growth rate to zero. Adding twenty-five beds and 30% more OR time had the same result as adding fifty beds.

Simulation models can be effective for guiding resource allocation decisions for orthopaedic surgery. Recommendations based on the wait list simulation model results were immediately adopted by the provincial Department of Health.

A simulation model of the orthopaedic surgery system at the institution was created using Arena simulation software. Empirical statistical distributions were developed based on Wait List Management System and administrative data to assign values to model variables: number of patient referrals seen per office session; proportion of patient referrals actually converting to a surgery booking; type of procedure required; admission status; time required for surgery; and length of stay. The model was tested, and validated. Several scenarios with adjusted levels of resources variables (OR time, number of surgeons, length of stay, inpatient bed availability) were simulated.

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