MedModel OR Case Cart Implementation Study Shows How to Improve Patient Throughput by 38%

Major Healthcare Provider

Success Story

Healthcare

MedModel

Situation

Hospitals face increasing pressure to reduce costs while continuing to provide quality care to patients. The operating room, one of the most difficult and expensive wings to manage, must run efficiently in order to avoid unnecessary costs. Hospital managers often implement case cart systems which create a centralized materials management system. Case carts carry medical supplies within an operating room. The case cart system ensures that the staff obtain the necessary materials and instruments in time for their upcoming procedures (1. Making a Case for a Case Cart System).

This study was undertaken to test the impact of implementing a case cart system on the OR process in a client's newly configured OR Suite. The impact was determined by patient delays in any stage of the OR process that was attributable to case carts.

Objectives

The client wanted a predictive analytic model which would help answer the following key questions:

- Has the medical center acquired enough carts to satisfy the volume requirements?
- Are there enough Sterile Processing Department resources to support the case cart process?
- Will the case carts introduce any new delays in the patient process?
- How many carts need to be staged prior to morning start to ensure smooth OR Suite flow?

Results

The model outputs suggest that maximum patient throughput could increase by 38% in 6 months with the implementation of a case cart system. The following additional insights were also gained from the study.

- Determined that 55 small carts and 28 large carts are needed to ensure there are no delays due to case carts.
- Determined that 6 SPD FTE's are required to pack the morning case carts and 4-5 SPD FTE's are required during normal OR operation hours.
- Realized that cart picking must begin as soon as possible after midnight to ensure there are enough carts ready at the start of the day. To maintain a steady flow, the carts must be available and ready for the first two procedures. The modelers found that maximum case cart use time occurs early for a maximum of 1 hour.
- The implementation of case carts caused no significant delays in patient flow times.

Maximum System Volume

At these higher volumes both POCU and PACU spaces become limiting factors.

Metric	Current State	Maximum Throughput	Percent Difference
Throughput	1572/Month	2172/Month	+38 %
Cycle Time	425 Min	476 Min	+12 %
Large Carts	28	32	+14 %
Small Carts	55	65	+18 %
Staged Carts	~60	60+	

Solutions

Defining the Process
A spreadsheet defines the "patient flow" process as it relates to patient type, location sequence, staffing utilized and task times. The spreadsheet "Staff" columns work together to schedule the first staff member required for each procedure step. Some procedure steps have the staffing flexibility of allowing an alternate position to "back up" the primary position. Times for each process step are defined in the Process spreadsheet using triangular distributions which account for work time as well as wait time.

Cases Defined by Historical Data
The medical center provided historical data such as original date of surgery, the service which performed the procedure, the surgeon assigned to the case, and the OR assignment.

Block Schedule
Operating room schedules are entered onto a spreadsheet. The model solution places the previously entered cases into schedule blocks and continues through the process until the patient completes the surgical experience.

Staffing
The simulation model uses the data on a worksheet to perform scheduling tasks by staff person, primary or secondary resource group, and times that shifts begin and end.

Sterile Processing Department Input Worksheet
Data entered into the Sterile Processing Department (SPD) worksheet is matched with the procedure from the "Cases" worksheet. The model solution will produce results indicating the turnaround time on the carts, and will predict the performance of SPD.

Location Assignments
A worksheet defines the primary and secondary uses of each location in the model.

Procedure Requirements
Three triangular time distributions are used on this model (Min / Mode / Max) to represent procedure times for all clinic procedures. The first triangular is used for the procedure itself. The second triangular is used for room turnover. The third and last triangular distribution is the set-up time occurring before the next procedure is performed.

Room Restrictions
"Special Restrictions" may apply for up to five ORs. These restrictions define the rooms that may be used by each service. An entry of "999" indicates that "any" OR may be used.

Services Using Case Carts Chart
Services using carts receive a "1" in corresponding column while services not using case carts remain blank.

References:

"1. Making a Case for a Case Cart System." Making a Case for a Case Cart System – Research – Herman Miller. Herman Miller Inc., n.d. Web. 14 June 2017.