Carilion Clinic Tertiary Care Facility Improves Patient Management

Carilion Clinic

Success Story

Healthcare

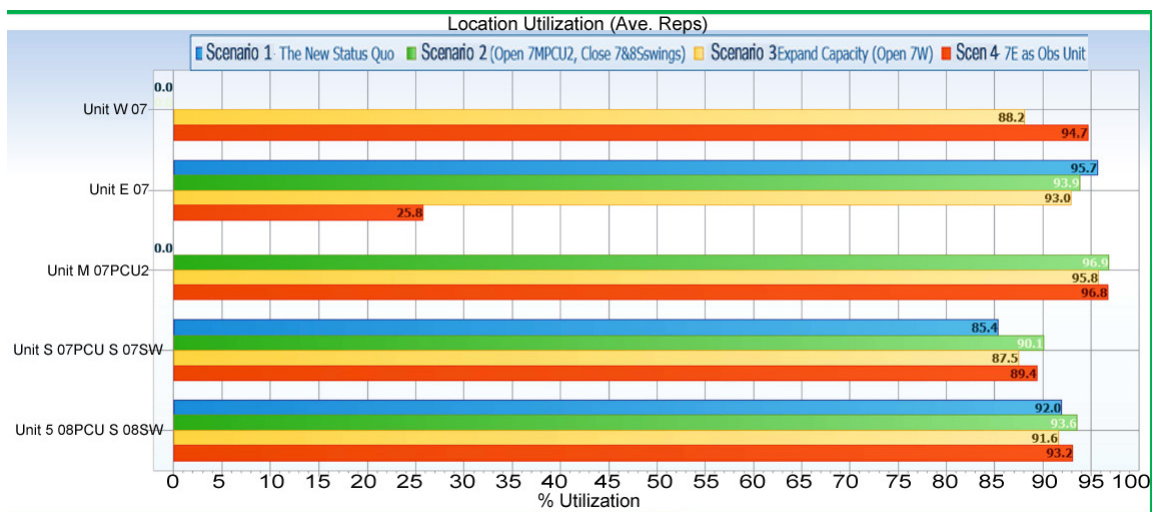MedModel

CHALLENGES

Carilion Clinic is a not–for–profit health care organization based in Roanoke, Va with a comprehensive network of hospitals, primary and specialty physician practices, and complementary services. James B. Montgomery, Senior Performance Improvement Consultant in the Center for Innovation at Carilion Clinic and a Certified Six Sigma Black Belt has chosen MedModel to help with the Carilion tertiary care facility overcrowding issues. Hospital overcrowding is a serious problem that threatens patient quality and a health system's bottom line. In light of the Affordable Care Act, which has increased the insured base, this problem is likely to increase in severity. Discrete-event simulation (DES) accurately predicts outcomes in complex systems and is well-suited for studying organizations with elevated variation like most hospitals. A facility model was built in MedModel, and scenario options were evaluated. The tool provided a place to test a host of options and mitigate the risk of investing in non-value added policies.

OBJECTIVES

To create a method where a variable could be modified to forecast its affect upon another variable to determine the impact of some of the following:
• Raising or lowering the number of beds on a specific nursing unit
• Closing or opening a nursing unit
• Reducing the time required to discharge a patient
• Raising or lowering the arrival volume by specific patient types

Location Utilization (Ave. Reps)

Scenario 1 The New Status Quo   Scenario 2 (Open 7MPCU2, Close 7&8Sswings)   Scenario 3 Expand Capacity (Open 7W)   Scen 4 7E as Obs Unit

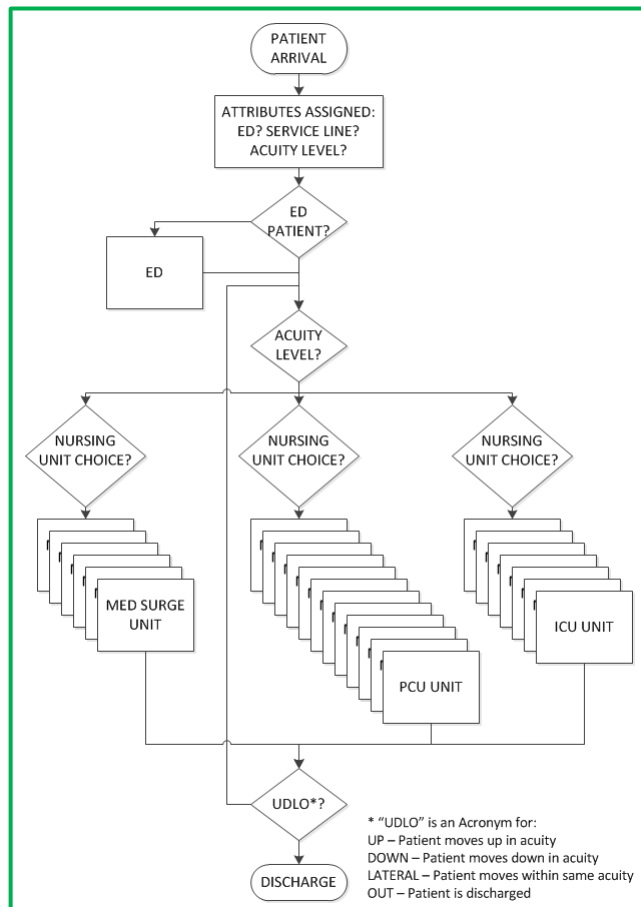| Unit	Scen 1	Scen 2	Scen 3	Scen 4
Unit W 07	0.0		88.2	94.7
Unit E 07	95.7	93.9	93.0	25.8
Unit M 07PCU2	0.0	96.9	95.8	96.8
Unit S 07PCU S 07SW	85.4	90.1	87.5	89.4
Unit 5 08PCU S 08SW	92.0	93.6	91.6	93.2

% Utilization

SOLUTION

ProModel consultants and the Carilion team looked closely at all tertiary clinic non-obstetric and non-pediatric units. 426 beds spread throughout 26 nursing wards were included in the model. ICU, PCU and Med/Surge units were analyzed. The average daily census was 368 patients. All data converged into a flow diagram of the hospital patient from arrival to discharge.
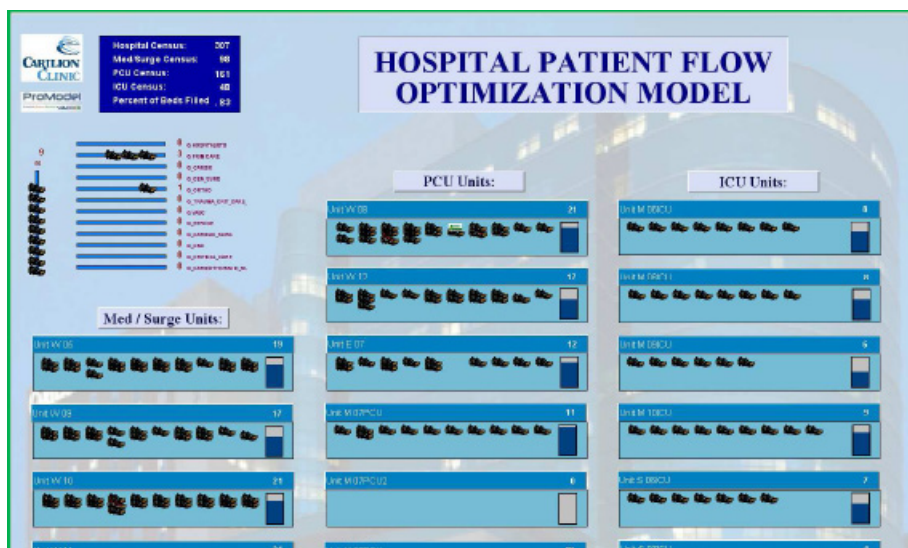
Logic focused on point of admission, ED or direct admits, for which probability distributions were developed. Service line of the admitting physician was another critical consideration, as well as patient acuity level. Multiple routing sequences were created based upon these two attributes.

Two years of admissions data were analyzed to build model logic. Data were also gathered from interviews with various hospital personnel. The resulting model was simulated for 365 days of operations. 109 possible Length-of-Stay (LOS) distributions resulted. A 365 day operational model was run for 40 replications or 40 years. This particular analysis determined whether Carilion should set aside 7E, a 12-bed medical/surgical unit, exclusively for observation patients.

VALUE PROVIDED

The model showed a major reduction in the occupancy rate of the unit (93% to 26%) due to an inefficient use of space in the proposed re-structuring. Thus, the plan was not implemented.

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