Purdue University
Purdue e-Pubs

RCHE Presentations | Regenstrief Center for Healthcare Engineering

12-17-2005

St. Vincent Surgery Department Reorganization

Mark Lawley
Purdue University, malawley@purdue.edu

Yuehwern Yih
Purdue University, yih@purdue.edu

Charles Spry
Purdue University, charliespry@gmail.com

Follow this and additional works at: http://docs.lib.purdue.edu/rche_pre

Lawley, Mark; Yih, Yuehwern; and Spry, Charles, "St. Vincent Surgery Department Reorganization" (2005). *RCHE Presentations.* Paper 5.
http://docs.lib.purdue.edu/rche_pre/5

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

REGENSTRIEF CENTER
FOR HEALTHCARE ENGINEERING

St. Vincent Surgery Department Reorganization

Purdue: Mark Lawley, Yuehwern Yih, Charlie Spry

St. Vincent: Kelly McCarthy, Kerin Hanson

May to December 2005

PURDUE
UNIVERSITY

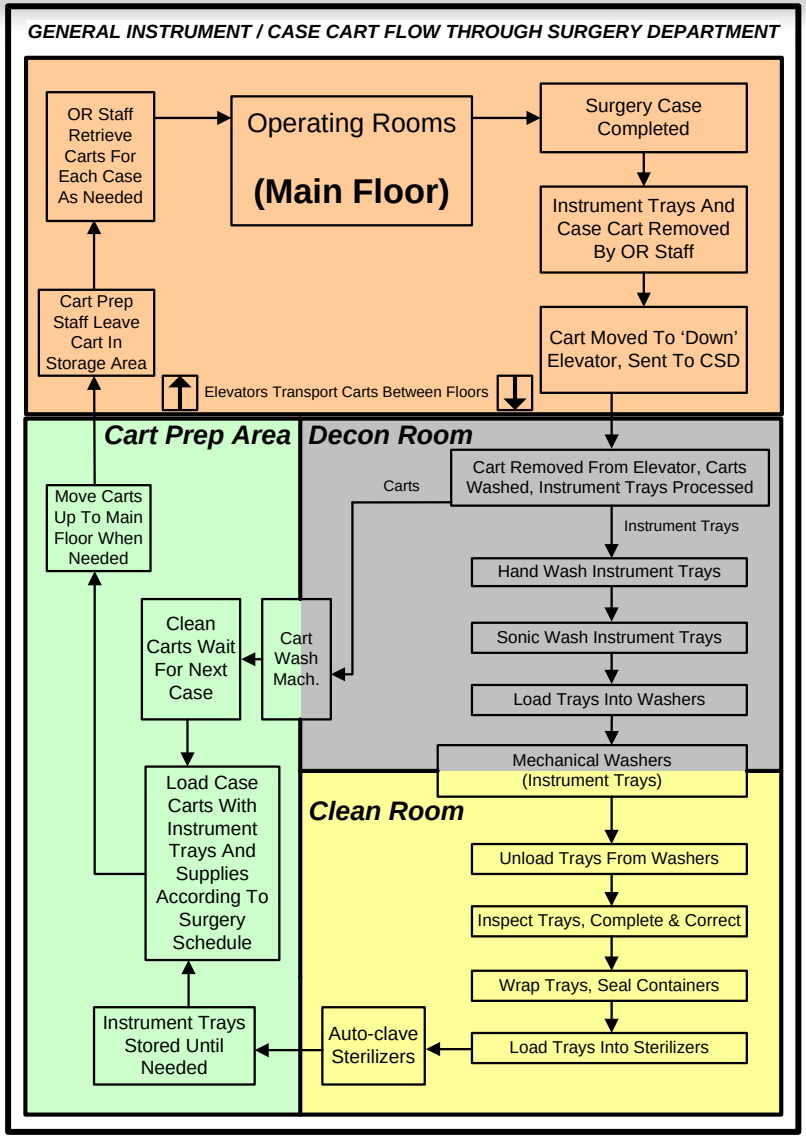
Discovery Park

Project Goals and Objectives

- Help make the best choices while redesigning the instrument processing and case cart systems.
- Analyze current and future use of:
  - Equipment – How many machines?
  - Space – How best to use storage space?
  - Staff – How to schedule staff hours?
  - Cart / tray flow – Is there sufficient time and space?
  - Volume – Can system handle expected growth?

REGENSTRIEF CENTER FOR HEALTHCARE ENGINEERING

Central Sterile Department Overview



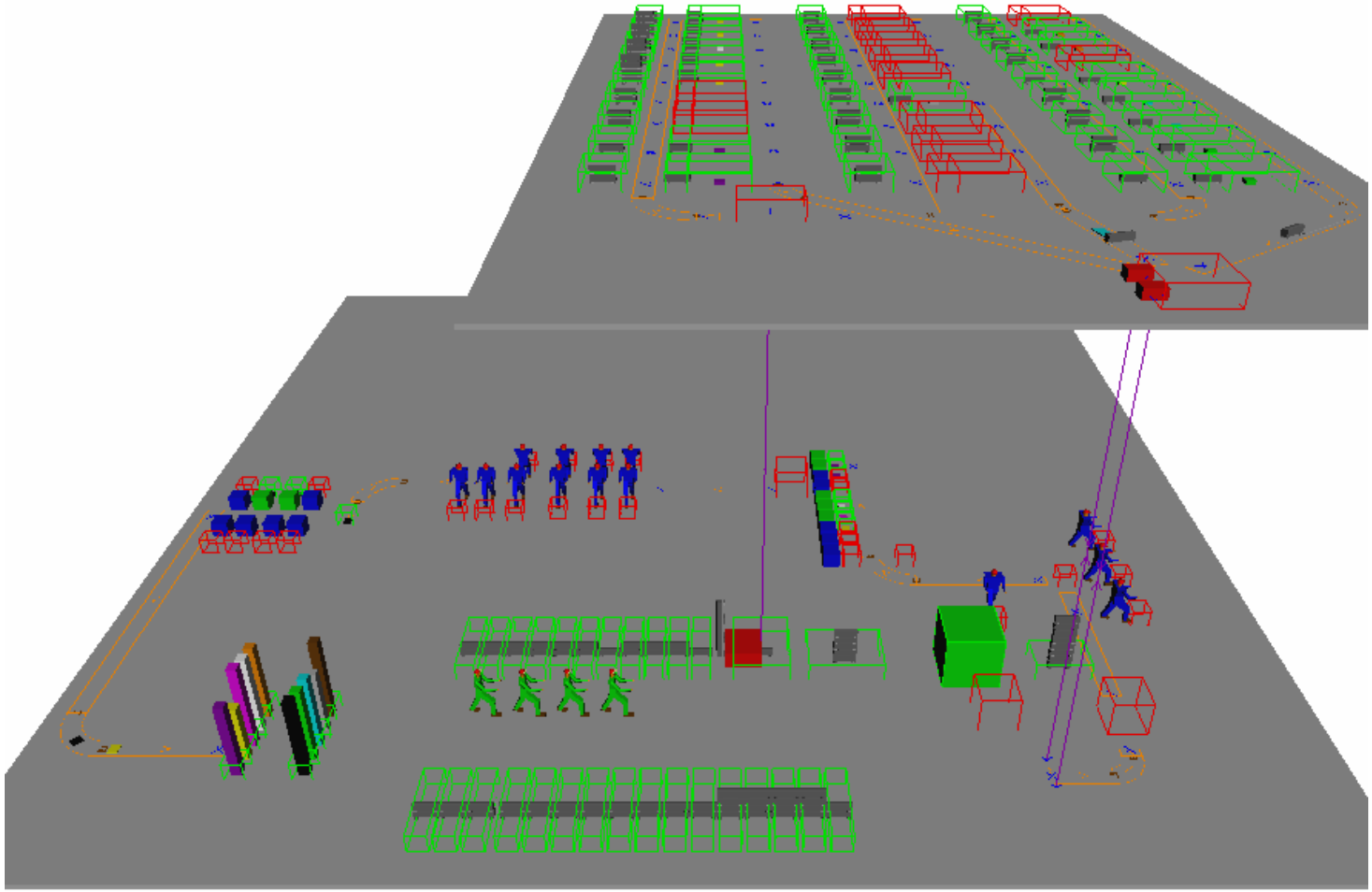
Methods

Discrete Event Simulation and Designed Experiments

- Computer model mimics the system (Logical, Animated)
- Logic code guides carts / trays through surgical cycle
- Animation allows user to watch
- Simulation parameters based on data collected from current system and experimental scenarios
- Simulation configurable for easy experimentation
- Designed experiment to capture the effect of system parameter settings on performance measures

REGENSTRIEF CENTER
FOR HEALTHCARE ENGINEERING

Simulation Snapshot



Factors Tested

- Number of case carts in the system
- Percent of carts washed by machine
- Surgery patient case volume

	Case Carts	% Carts Machine Washed	Case Volume
Low	**85**	**15%**	**'Current'**
High	**100**	**50%**	**25% increase**

- Staff Schedules (Options: Six 8 hour shifts, One 8 hour Four 10 hour, Two 8 hour Four 10 hour)

System Performance Measures

- Average time for trays to be processed
- Number of cases delayed by missing carts
- Machine utilization (Tray & Cart washers, Autoclaves)
- Number of trays / carts waiting between each step

Results

- % of Carts Machine washed

Volume - Current		
	15%	50%
Washer UTL	17%	55%
Wait AVG	0.10	5
Wait MAX	5	28

Volume - Increased		
	15%	50%
Washer UTL	22%	75%
Wait AVG	0.18	9
Wait MAX	7	35

Results

- Avg. number of cases delayed by cart in 100 days

Current Case Volume			
Staff Option			
	1	2	3
Delays	15	5	1

Increased Case Volume			
Staff Option			
	1	2	3
Delays	98	36	7

Results

- Clean room staff effect on tray throughput time

Current Case Volume			
Staff Option			
	1	2	3
Time	220	187	179

Increased Case Volume			
Staff Option			
	1	2	3
Time	251	199	190

Findings Summary

- Additional clean room staff required to meet demand.
- Decon staff levels are sufficient.
- Additional washers and autoclaves not yet needed.
- Increasing autoclave size not helpful.
- Cart wash system inadequate to handle 50% of carts.
- Plan on at least 85 case carts.
- Planned elevator capacity is adequate.

Opportunities and Challenges

- Educating surgery managers about our role
- Gaining access to surgery
- Learning all the detail
- Modeling the necessary detail
- Identifying and collecting required data

Research Deliverables

- Several presentations and reports for SV
- Spry, C., Analysis of Surgical Instrument Processing, Masters Thesis, School of Industrial Engineering, Purdue University, 2006.
- Spry, C., Coyle-Rogers, P., Lawley, M., Yih. Y. “Using Simulation to Analyze Surgical Case Cart Flow” Under preparation for *The Journal of Hospital Infection*.
- Spry, C., Coyle-Rogers, P., Lawley, M., Yih. Y. “Design and Analysis of Surgical Instrument Sterilization System for a Large-Scale Surgical Suite” Under preparation for *Health Care Management Science*.

Contact Information

Mark Lawley, Associate Professor

School Of Industrial Engineering, Purdue Univeristy

malawley@purdue.edu

765 567 6193