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Operations Management:
Modeling, Analyzing & Optimizing Processes

Part II: Shouldice Hospital

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Outline

- Shouldice Case Analysis
- Little's Law
- Summary of Types of Processes
- Summary of Session

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Outline of Case Analysis

- 3 Cs
  - Company: Shouldice
  - Customers
  - Competition
- Process audit
  - process flow diagram
  - process analysis: capacity at stages, determining the bottleneck
  - calculation of relevant performance metrics
- Improvement opportunities
  - expanding capacity by adding more beds
  - expanding capacity by working on Saturdays
  - open new facilities
  - competitive strategy
- Lessons learned

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3Cs

- Company: Shouldice
- Customer
- Competition

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How is Shouldice Doing?

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Cost Comparison

	Shouldice	Other Hospitals
1. Cost of typical operation	$969 $450+$60+$0.2($75)+4($111)	$2,000 - $4,000
2. Transportation	$200 - $600	(see page 9)
3. Value of time lost to employer ($50-$500/day)	$400 - $4,500	$750 - $9,000
- Time lost from work while at hospital	3-4 days	5-8 days (see page 5)
- Time lost from work while recovering	5 days	10 days
4. Subtotal before allowance for recurrence	$1,570 - $6,070	$2,750 - $13,000
5. Expected cost of recurrence = Probability x Subtotal	$13 - $49 0.8% x [$1,500 - $6,000]	$275 - $1,300 10% x [$2,750 - $11,150]
6. Total cost to patient, employee and insurer	$1,583 - $6,119	$3,025 - $14,300

How Do You Account for Its Performance?

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The Service-Profit Chain

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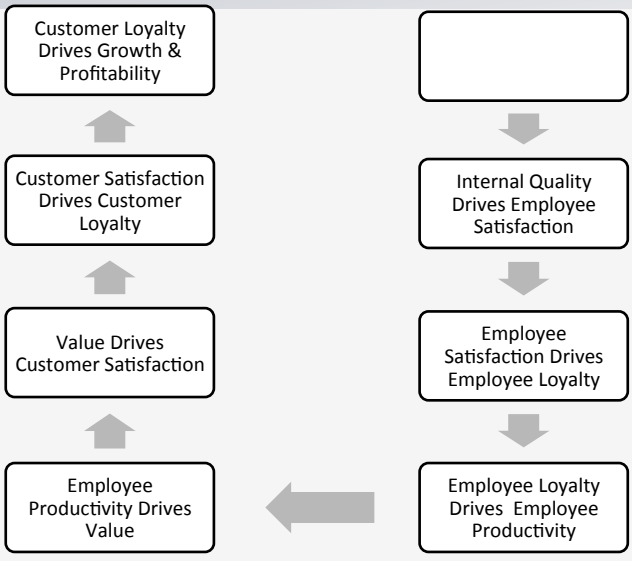

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Process Audit: Admissions Process

Process Audit: Process Flow Diagram – Day 1

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Process Audit: Process Flow Diagram – Day 2

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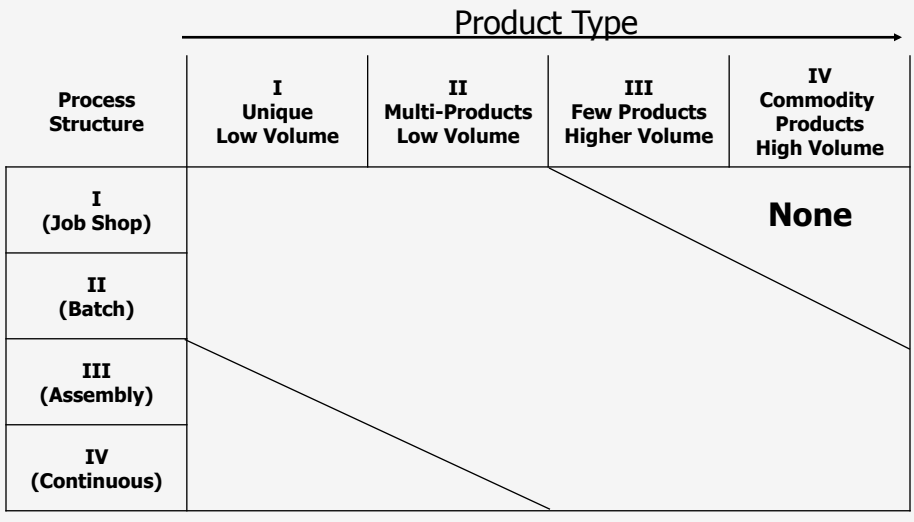
The Shouldice Process



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The Shouldice Service Factory

- **What makes this "assembly process" work for Shouldice?**

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Process Audit: Capacity Analysis

6,850 operations / 50 weeks = 137 patients/week

Key Resources	Capacity	Utilization
1. Exam		
2. Admit Process		
3. Nurses Station		
4. Operating Room		
5. Surgeons		
6. Beds		

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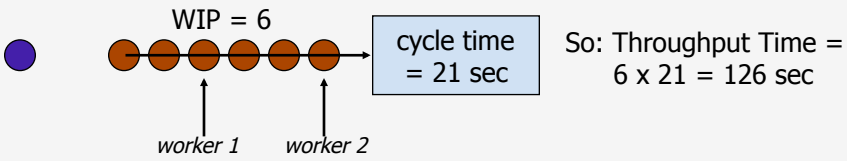
Little's Law: Definition

- Long Lead time and high WIP go hand-in-hand
  - Long Lead Time: Slow response time, loss of revenue
  - High WIP: High inventory carrying costs, slow feedback on quality



So: Throughput Time =
6 x 21 = 126 sec

- "Little's Law": Lead Time = WIP x Cycle Time

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Little's Law: Examples

- **ATM:**
  - 5 people in line ahead of you
  - Average transaction time: 2 minutes
  - Your Lead time: 2 min/customer x (5+1) customers = 12 min
- **A visit to a fast food restaurant:**
  - 9 people ahead of you waiting to "be served"
  - It takes 1 minutes on average to be served
  - You will have been served after 10 minutes

Number of Beds ➔ Number of Patients

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(assume 3.5 days average stay)

Day of the Week	S	M	T	W	Th	F	Sa	Su	M	T
Admittances	25	25	25	25	25	-	-	25	25	25
Expected Discharges	-	-	-	12.5	25	25	25	25	12.5	-
Expected Balance	25	50	75	87.5	87.5	62.5	37.5	37.5	50	75
(max = 89 – p.2)										

➔ 25 x 5 = 125 patients

Number of Beds ➔ Number of Patients

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Day of the Week	S	M	T	W	Th	F	Sa	Su	M	T
Admittances	29	29	29	29	29	-	-	29	29	29
Expected Discharges	-	-	-	14.5	29	29	29	29	14.5	-
Expected Balance	29	58	87	101.5	101.5	72.5	53.5	43.5	29	58
(max = 103)										

(including 14 "hostel" rooms)

➔ 29 x 5 = 145 patients

Improvement Opportunities: Add Floor

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Day of the Week	S	M	T	W	Th	F	Sa	Su	M	T
Admittances	38	38	38	38	38	-	-	38	38	38
Expected Discharges	-	-	-	19	38	38	38	38	19	-
Expected Balance	38	76	114	133	133	95	57	57	76	114
(max = 134)	*(new 45-room addition – 50% increase from 89)*									

From 125 patients/week to 190 patients/week

Pros:

Cons:

Improvement Opportunities: Work Saturdays

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Day of the Week	S	M	T	W	Th	F	Sa	Su	M	T
Admittances	25	25	25	25	25	25	-	25	25	25
Expected Discharges	-	-	-	12.5	25	25	25	25	25	12.5
Expected Balance	25	50	75	87.5	87.5	87.5	62.5	62.5	62.5	75
(max = 89)	*(Saturday)*									

From 125 patients/week to (25 x 6) = 150 patients/week

Pros:

Cons:

Improvement Opportunities: New Facility

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- **Pros:**
- **Cons:**

Improvement Opportunities: Competitive Strategy

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Competitors	What you can do ?	How practical is this?
Own Doctors	Pay them well	Does not solve backlog problem
Other Doctors	Franchise ?	Quality Control
Imitators (Quacks)	Patent Process	Not easy to do

So what can we do ?

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Shouldice: Lessons Learned

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Summary of Part 2

- Analyzing a service process : Shouldice hospital
- Putting the service profit chain to work
- Little's law
- Product process matrix
- Application of the framework for process analysis