



TOCICO CONFERENCE 2007

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Viable Vision

...is achievable in Health Care

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Overview: Viable Vision

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... an achievable goal in health care

- ❑ Adirondack Oral & Maxillofacial Surgery 1st viable vision achieved using TOC/Lean/Six Sigma tools... *without formal TOC Training***
- ❑ 2nd Viable vision using Reliability & Rapid Response Template available in Public Domain**
- ❑ Viable Vision for larger Health Care Systems**

Detailed Overview

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□ **Case History of Adirondack Oral & Maxillofacial Surgery. 1st viable vision achieved using TOC/Lean/Six Sigma**

- TOC
- Lean Tools
- Six Sigma
- System Dynamics
- Balance Score Card

□ **2nd Viable vision using Reliability & Rapid Response Template**

- Conflicts in Goals, measurements and policies
- Culture in Health Care
- Staff Availability and Training
- Environmental Factors: Medico-legal, Regulatory

□ **Application to larger Health Care Systems**

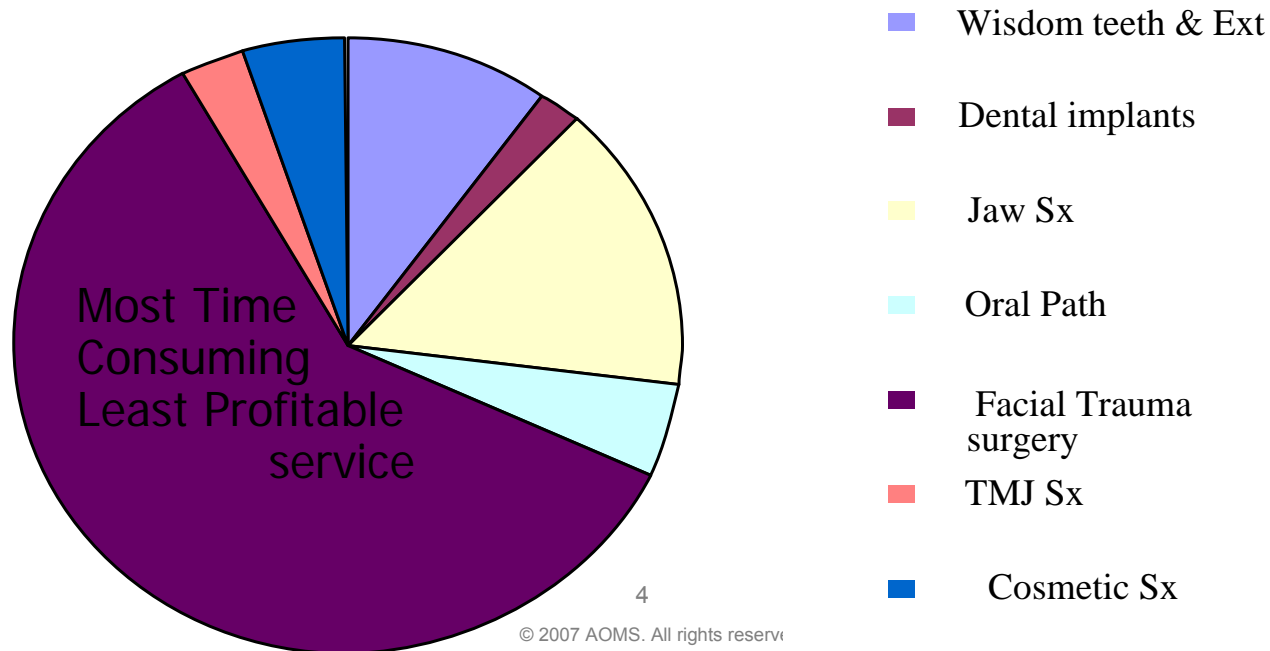
- Resolve Conflicts in Goal upfront, Set Goals and agree upon Measurements and policies
- Focus Lean Six Sigma efforts in Key areas, Operating Rooms, Emergency Departments and LOS
- Customer and Staff Development Focus



TOC

□ Oral & Maxillofacial Surgery department, a specialty practice affiliated with local university teaching hospital & medical college ...*identified constraints - doctor*

- **Space:** 1200 Sq ft and Operating Room availability on limited block time
- **Staff:** Surgeons 2 full time and 1 part time; Nursing and Administrative 9 or 10
- **Type of Services:** Trauma, Head & Neck Pathology/Reconstructive Surgery, Routine Oral surgery like wisdom teeth removal and Dental Implants
- **Reimbursement:** Medicaid, Medicare, Few Private insurers. and fewer fee-for-service



TOC

- Throughput (T) = (\$/Patient * # of patients) – variable cost of treating these patients (Materials)
 - *Increase the patients seen per doctor, **Exploit & Subordinate the Constraint***
 - **Space Constraint Elevated:** Hospital space was approx 1200 sq ft, opened two sites, total approx. 8000 sq ft; **it increased the OE but no increase in Profits**
 - **Hired more Doctors:** **It created more chaos, staff quit rate increased the company lost money**
 - **Support Staff Constraint Elevated:** **Trained and hired more staff to allow the maximization of Doctor time utilization. This resulted in significant financial improvements**
 - *Increase \$/Patients:* Pareto the patients & procedures into types A, B, C based upon revenue generated

Lean

Lean Implementation

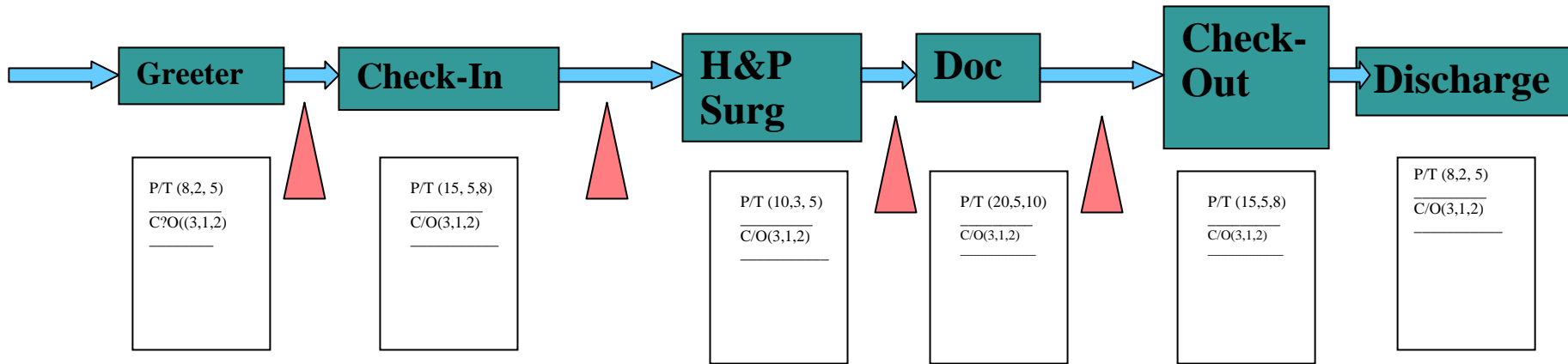
- Understand Value Stream Mapping**
 - Value Added Time
 - Non Value Added Time

- Lean Tools**
 - 5 S or 6 S
 - SWF
 - Set Up Reduction
 - TPM
 - Supplies and Material Management

- Demand and Capacity Management**

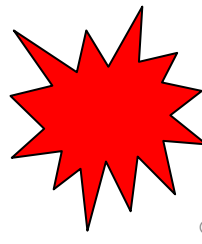
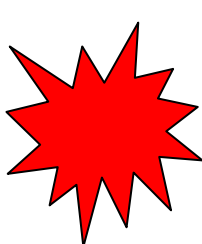
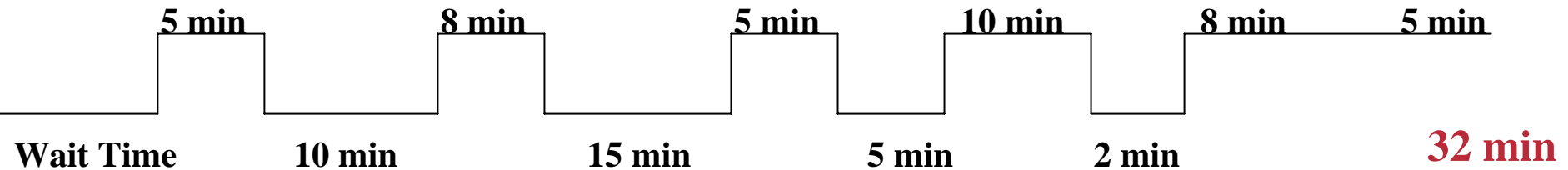
- Supply Chain Management**

Lean



Process Time: 41 min

Value Added Time



Total Value Quotient: $41 / (41 + 32) = 56\%$

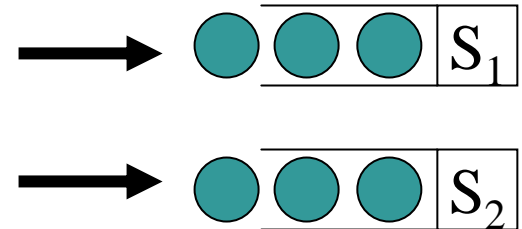
Lean Principles

To reduce this “flow time” through the network, we did the following things:

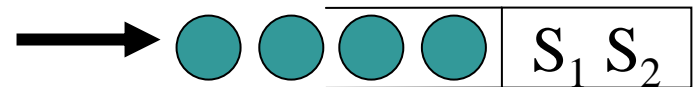
Reduce number of queues that hold up progress by:

- Utilizing concurrency or continuous flow

- Concurrency



- Continuous Flow

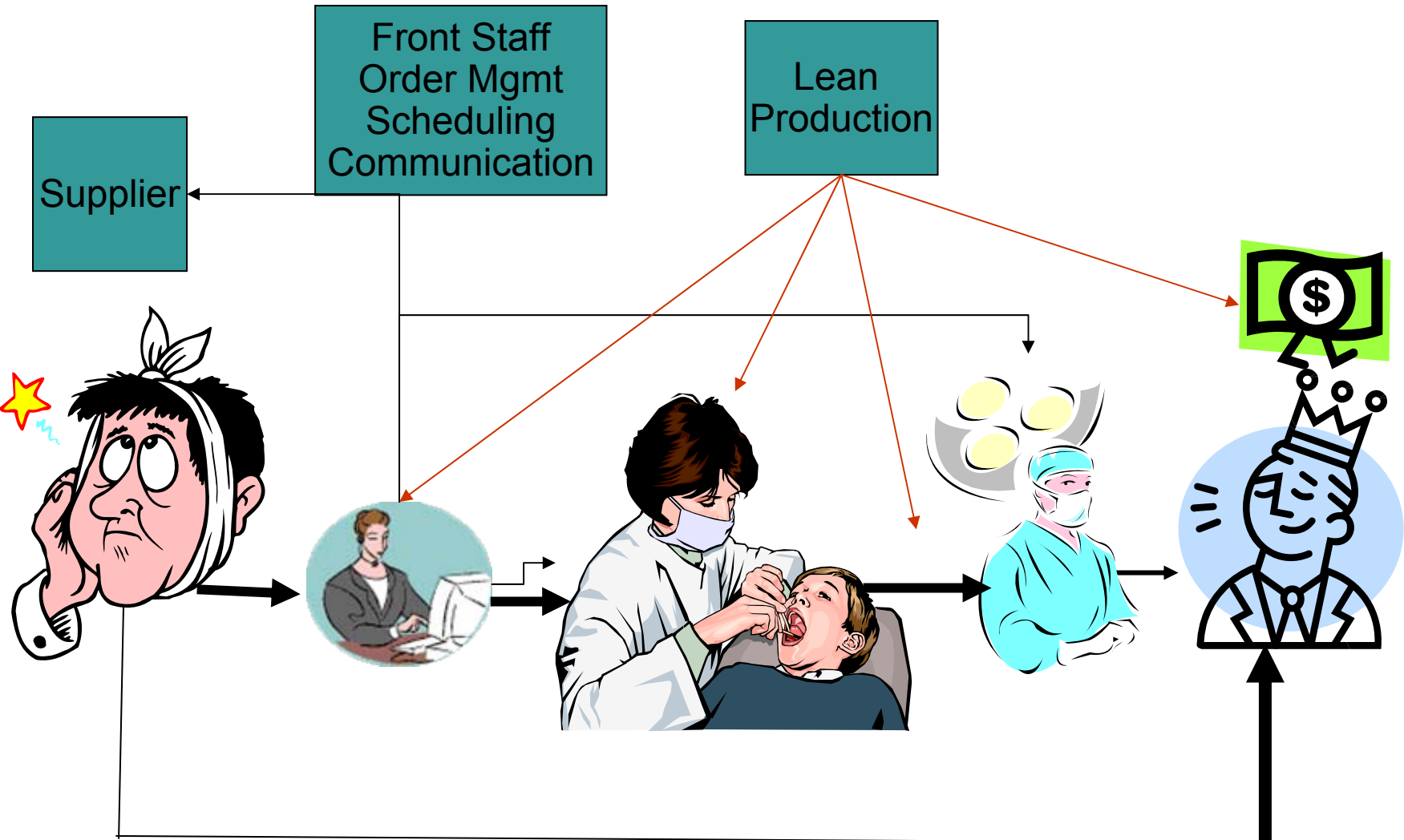


Greeting of patient and check in process

Doctor/Assistant and Check out process

Lean Supply Chain Management

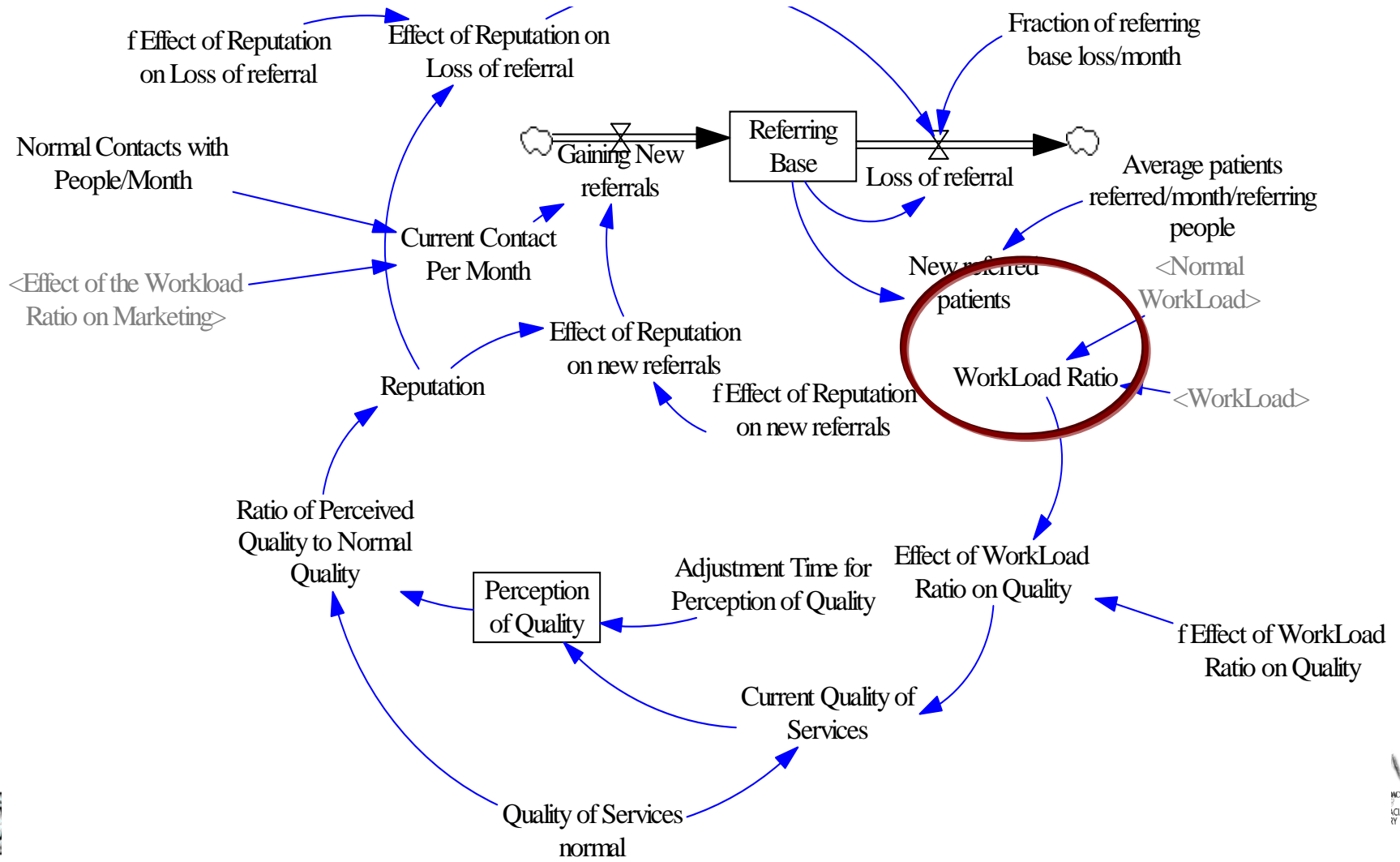
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System Dynamics

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Policy Development...Focus on Staff work Load & Training



Six Sigma

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Reduction in Accounts Receivables A/C > 30 days old

	2002	2006	%Improvement
Total Ins. Related	336	55	84%
Medicaid	90	15	83%
Private Pay	130	64	51%

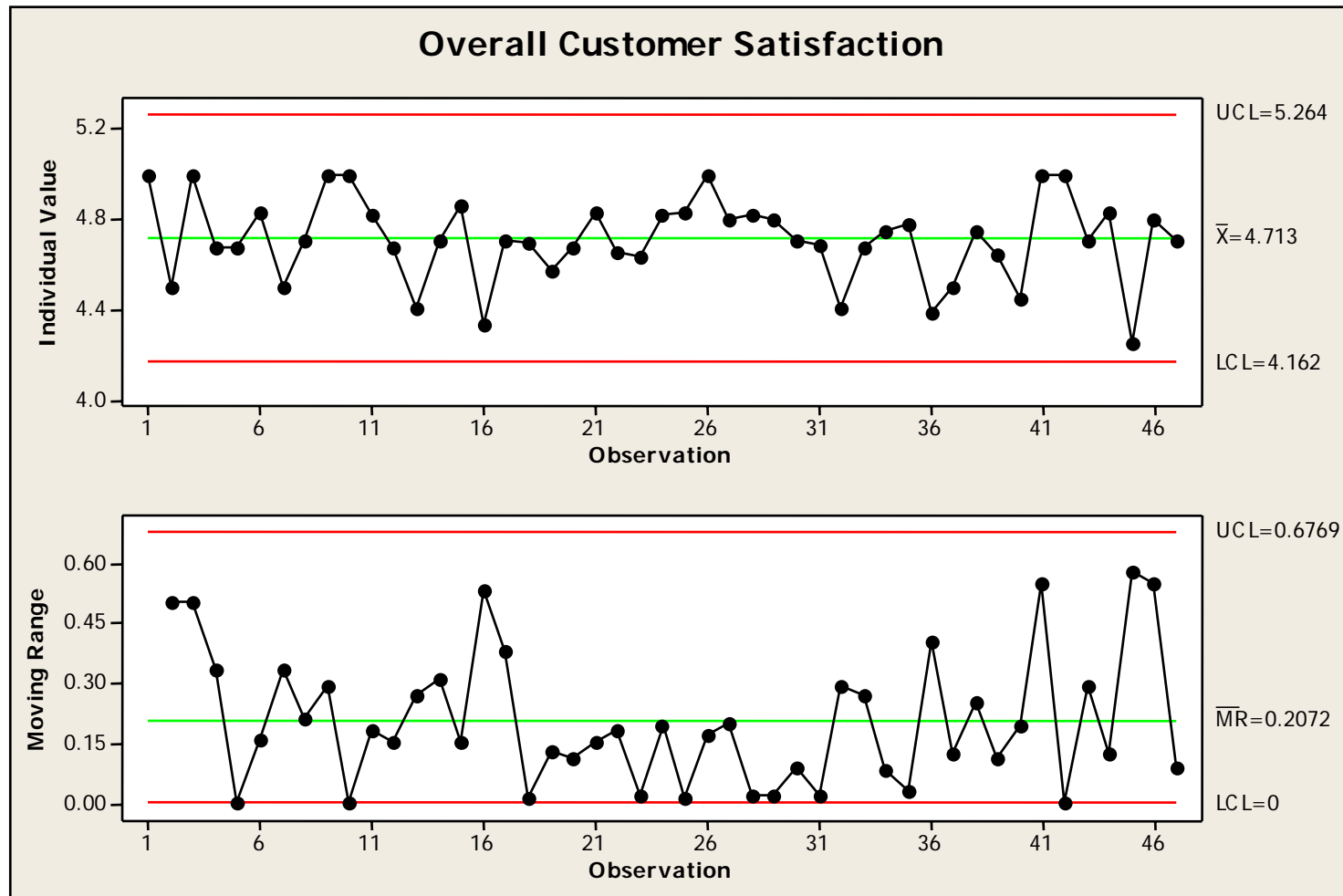
Private payment current A/R has less than 2% unpaid accounts now compared to 50% in 2002



Six Sigma

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AOMS Customer Satisfaction Index



Six Sigma Tools

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- ❑ FMEA to reduce Anesthesia Problems, Medical Records completion, Insurance billing
- ❑ Analyzing the patient calls to nursing station using DMAIC tools to reduce number of calls
- ❑ DMAIC tools for billing cycle improvements
- ❑ Pareto analysis:
 - Doctor time waste analysis
 - Patient complaints analysis
 - Reconciliation errors
- ❑ DFSS tools like Axiomatic Design tools to customize each patient treatment, identify steps and communicate across the network, place controls at critical points

❑ DOE tools to improve client relationship development



Adirondack OMS 1st Viable Vision

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Year	Charges	Collections	Expenses	Profits
2001	4190250	2174567	2073383	101184
2002	4806307	2819595	2213722	606228
2003	5544649	3201432	2315061	886371
2004	6469285	4002588	2828885	1173703
2005	6502818	4503835	2821954	1681882
2006	7115183	5311128	3196018	2115110

Expenses/Collections Decreased from 95% to 60%

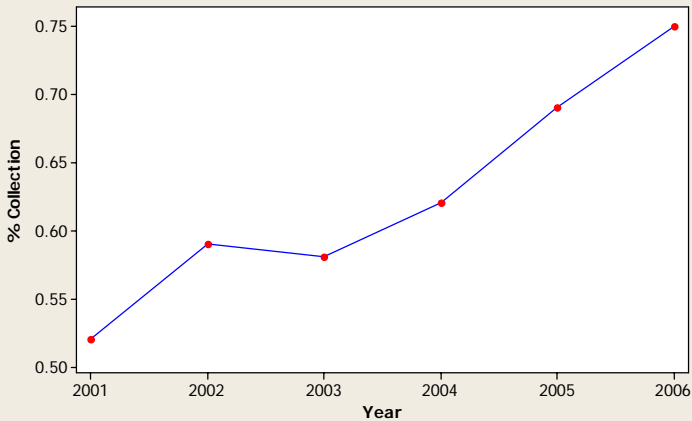
Profits increased by 1990%



AOMS Performance Metrics

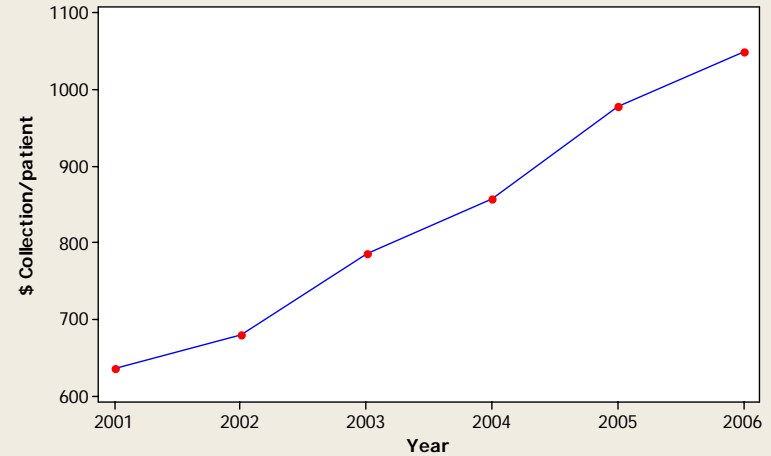
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Time Series Plot of % Collection



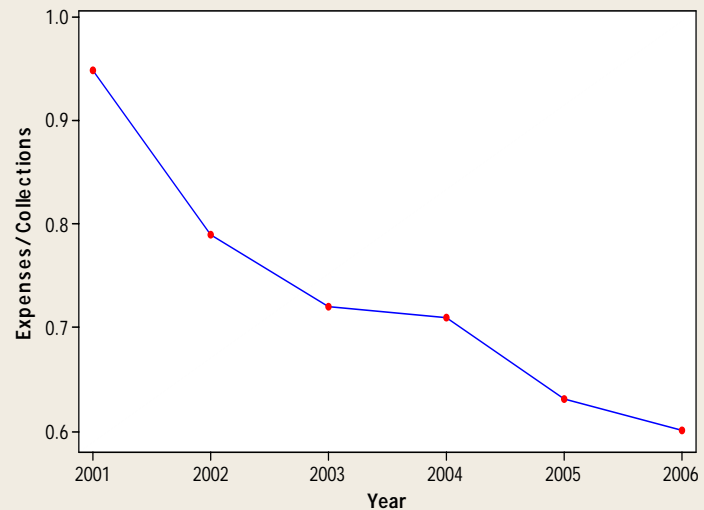
**Increase
in
Collections**

Time Series Plot of \$ Collection/patient



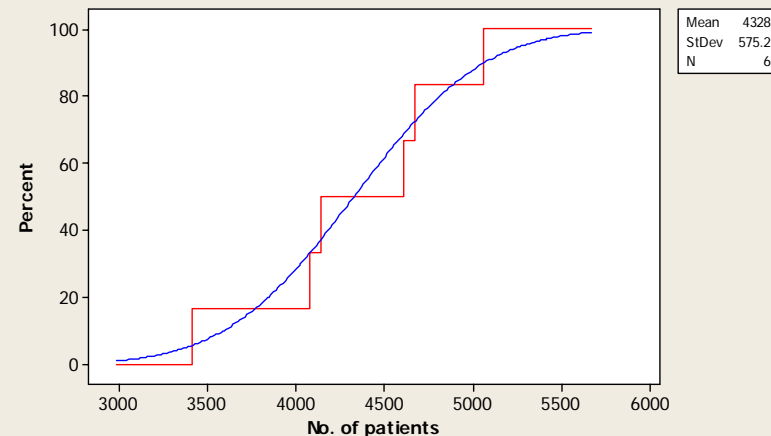
**Increase
in
Profits**

Time Series Plot of Expenses/Collections



**Increase
in
\$/Patient
Value**

Empirical CDF of No. of patients
Normal



Key Success Factors

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□ Physical Constraints removed using tools

- 5 Focusing steps of TOC
- **Drum/Buffer/Rope ?**
- Lean, Continuous Flow
- Six Sigma

□ Cultural Constraints removed

- Innovative Leadership
- Transparency, openness
- Teamwork & communication, weekly staff meetings
- Staff cross training and staff retention
- Performance Reviews with incentive systems like bonus
 - *Presence at work*
 - *Attendance at Process Improvement meetings*
 - *Giving innovative ideas for improvement*
 - *Team work 360 degree review*
 - *Number of cross trained skills, Flexibility at work*



Detailed Overview

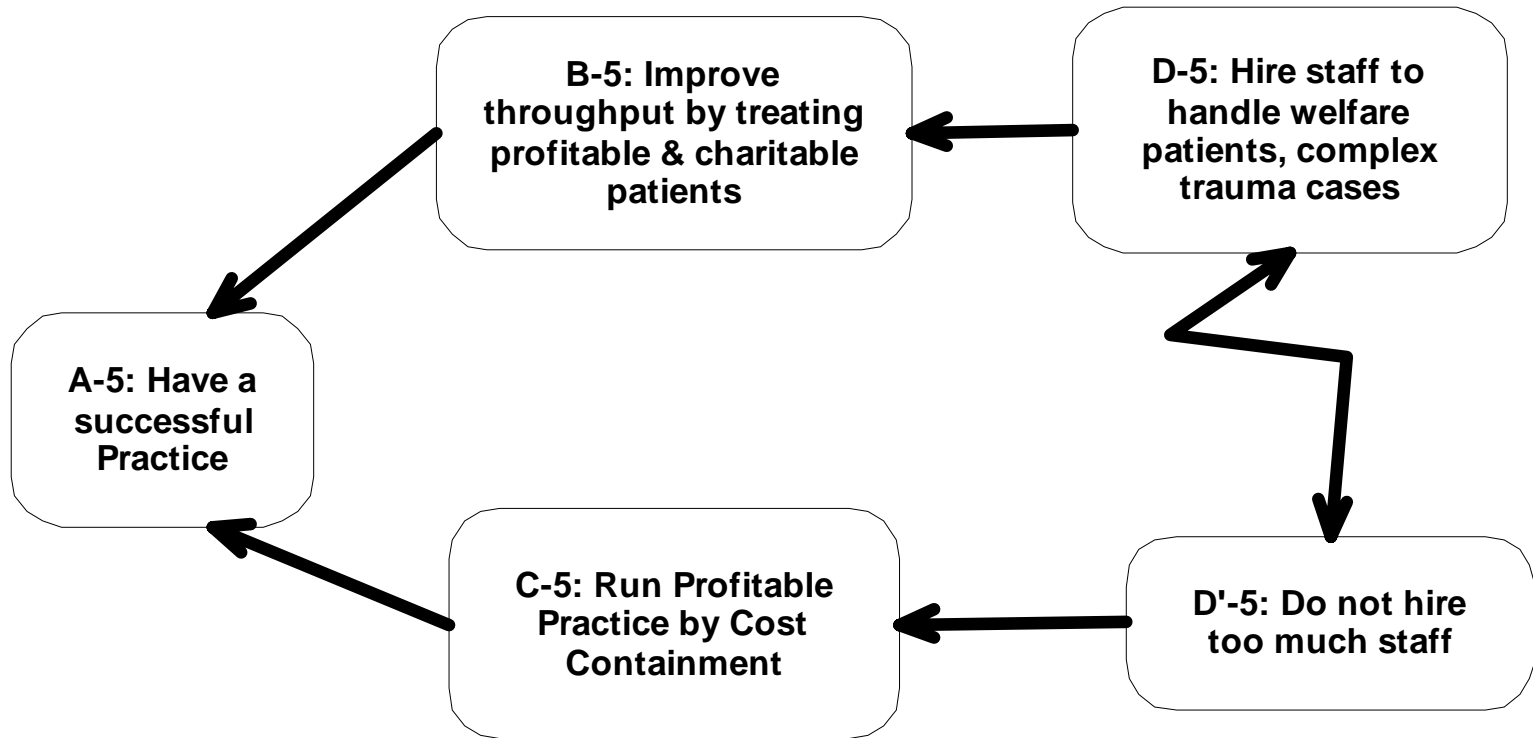
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Core Conflict

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Core Conflict is Throughput vs. Cost Accounting

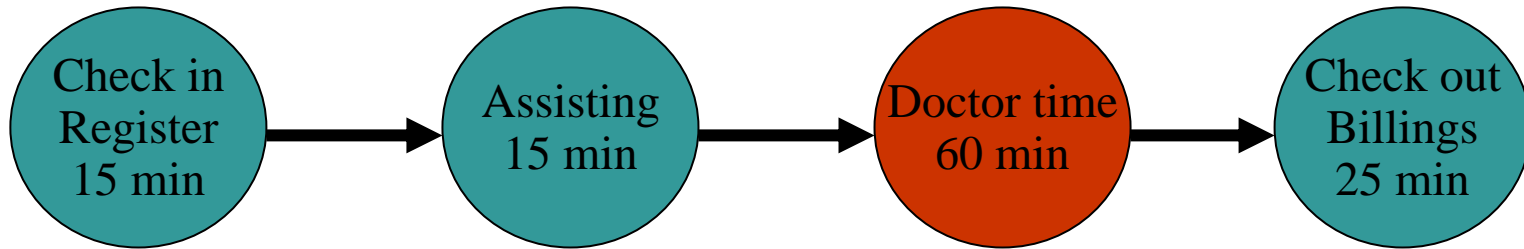
TOC

- **Simple Financial Measurements adopted despite cost accounting and Activity Based Costing in Executive MBA**
 - P (Profits) = $T - OE$ {(Money Collected for patient care-money returned to patients-variable costs like labs, material costs) – Operating Expenses}
 - ROI (Return on Investment) = $(T - OE)/I$ (Investment)
 - EVA (Economic value Added) = $NOPAT$ (Net Operating Profits after Taxes – $WACC$ (Weighted Average Cost of Capital) * $\$ I$ (Capital Investment)

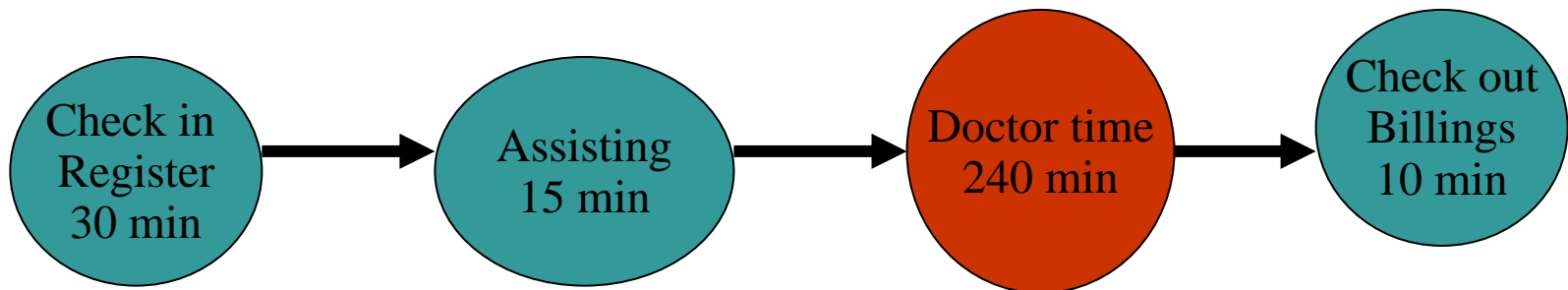
- **Common Sense Business Decisions**
 - Select the Customers that you want to serve, provide WOW service
 - Increase Throughput
 - Make Investments that result in higher ROI in a long run
 - Develop Staff

TOC

■ **Scenario A Treatment plan: Extractions, Anesthesia Total Payment = \$ 2000, total time utilization is as follows**



■ **Scenario B Treatment plan: Implants, Extractions, Bone grafts. Total Payment = \$ 4000, total time utilization is as follows**



TOC

■ Scenario A using accounting based upon constraints

- ❑ Throughput (T) = \$2000 – \$200 (Lab & Material Cost) = \$ 1800
- ❑ Rolled Yield = 0.999
- ❑ Overhead Expense/hour = \$200
- ❑ Profits/hr = T – OE = \$ 1800 - \$ 200 = \$ 1600/hour

■ Scenario B using the same accounting method

- ❑ Throughput (T) = \$ 4000 - \$ 1000 (Lab, bone graft, implant cost)
- ❑ Rolled Yield = 0.9 (10% failure rate)
- ❑ Adjusted T = 0.9 * 3000 = \$ 2700
- ❑ Overhead Expense/hour = \$ 200 * 4 hours = \$ 800
- ❑ Profits/hr = T- OE (\$ 2700 – \$800)/4 = \$ 475/hour
- ❑ We have not added the Medico-legal risk factors

■ Scenario C (Hospital Based Procedures)

- ❑ Throughput (T) = \$ 2000 - \$ 0 (hospital bears the material costs)
- ❑ Rolled Yield = 0.999
- ❑ Overhead Expenses/hour = \$ 200 * 5= \$ 1000
- ❑ Profits/hr = T – OE (\$ 2000 – 1000)/5 = \$ 200/hr

2nd Viable Vision

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1
Viable Vision
Profits equal to current
collections
by 2010

Base Growth

Enhanced Growth

2:1
Reliability
Comp. edge

2:2
Rapid
Comp. edge

Build

Capitalize

Sustain

Build

Sustain

Capitalize

3:1
 99%
 DDP

3:2
 Reliability
 Selling

3:3
 Expand
 Client
 Base

3:4
 Load
 Control

3:5
 Capacity
 Elevation

3:6
 LT
 1/4

3:7
 RR Load
 Control

3:8
 RR
 Selling

3:9
 Expand
 RR client
 base

4:11
 4:12
 4:13

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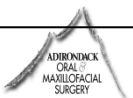
4:91
 4:92

Strategy:

AOMS Company is solidly on the Process improvement path using TOC, Lean, Six Sigma
Viable Vision is realized in less than 4 years.

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Parallel assumptions	<p>For AOMS to realize the V V its T must grow (and continue to grow) OE <u>in relation</u> to T must decrease</p> <p>Avoiding high risk procedures like Trauma, Treatment to sue happy welfare patients and stopping influx of low paying patients, is advisable</p> <p>Availability of Oral & Maxillofacial surgeons & trained staff is severely limited</p> <p>Market is saturated with well established Oral & Maxillofacial Surgeons</p>
Tactic	<p>Build a decisive competitive edge and capabilities to capitalize on <i>Reliable Services</i> and keep hand in <i>different markets</i> <u>except</u> where we have high risk of failures and law suits like trauma, cosmetic surgery</p>
Sufficient assumptions	<p>The way to have a decisive competitive edge is to satisfy Referring doctors and patients significant need to an extent that no significant competitor can</p> <p>Use Market Segmentation principles</p>



Necessary Assumption

Wait time in health care industry is notoriously bad and long lead time has major consequences both for patients and for the company, reliability is a significant need.

Strategy

A decisive competitive edge is gained minimizing wait time, eliminating waste in between hand offs, decrease the total Lead Time per patient within the different family of procedures

Parallel assumptions

Promises are cheap. Putting money to back-up promises. Paying patients money back for their wait from scheduled due time + predetermined tolerance limits for patients

Tactic

The Company is remarkably good at meeting its promised On-Time care and offers of hefty penalties for each time patient has to wait a long time. The competitors are in a different world, they will not even dare try it. Their assumptions are that the patient should wait for the doctors

Sufficient assumptions

Building a decisive competitive edge is not easy; building the capabilities to capitalize on it is not less difficult. But, sustaining these two elements is the real challenge.

Necessary assumptions

Offering a penalty and having to pay the penalty can create the opposite reputation to the one desired.

Hefty penalties can erase the Company's profits

Strategy

The Company has very high on time, and due-date performance

Parallel assumptions

S-DBR, CCPM together with Buffer Management brings most environments to due-date performance of >99%

Small organization with limited resources has difficulty in implementing

Tactic

The Company implements S-DBR, CCPM and BM; Using Pareto charts on daily basis, a log is kept for what uses the buffer time most. Process improvements are focused on that.

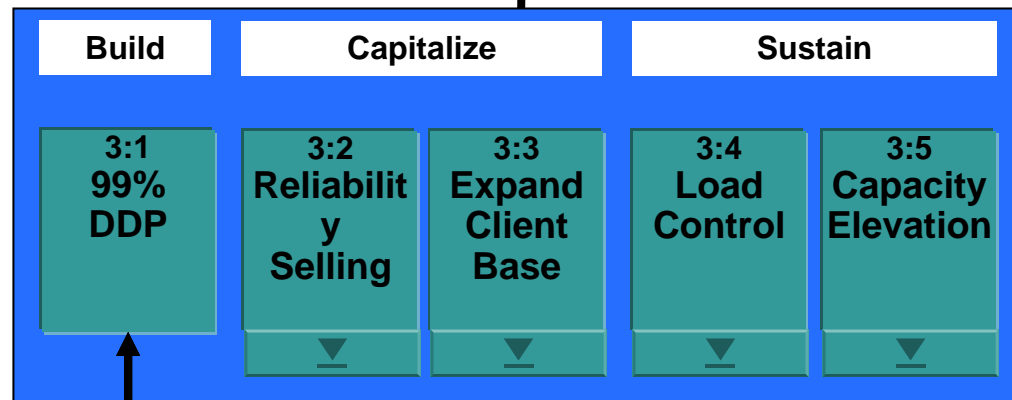
Sufficient assumptions

To ensure an outstanding start of a major project like achievement of over 99% on time care, it is vital to ensure each patient is treated on time without delays

1
Viable Vision

Base Growth

2:1
Reliability Comp. edge



Necessary assumptions

Having too many patients in the schedule, and in the pipeline masks priorities, increases wait time between stations, disrupts On-Time -performance.

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Strategy

The office is populated **ONLY** with patients that have to be taken care within a predefined horizon.

Parallel assumptions

- Total touch time is approximately 60% of the lead time at present
- In health care there is Random Arrival time of patients and there is Queues at every station. Standardization of the stations and processes but flexibility with patients and referring doctors will improve, if the scheduling process chokes the release of the patients which is hard.
- Focusing on high end patients gives the company bad reputation
- Marketing to get high end patients also has negative Public Relation effect
- Training staff is hard in these concepts

Tactic

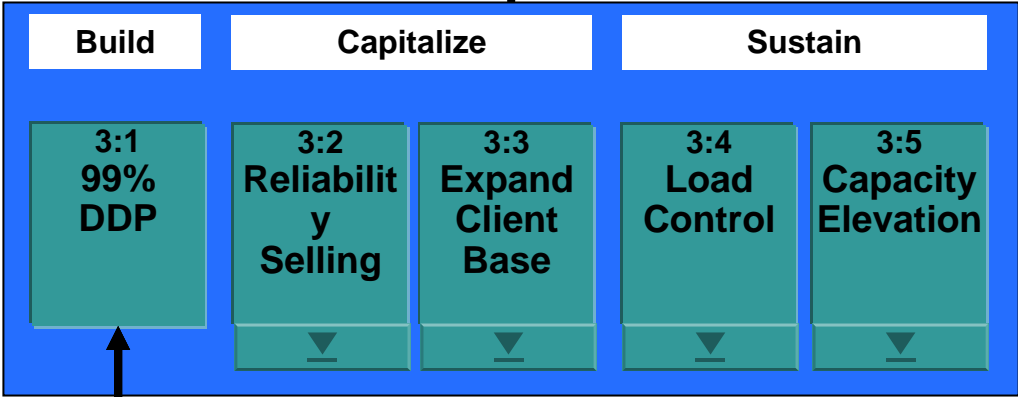
For each service family, a buffer time is set to be equal to 50% of the current lead-time. The Doctor time is paced and resource buffers are placed around the doctor. To compensate for random arrivals and variations, block of patients booked and buffers placed equal to 50% of total lead time



1
Viable Vision

Base Growth

2:1
Reliability Comp. edge



4:11
**Choking
the
release**

4:12
**Managing
priorities**

4:13
**Dealing
with
CCR's**



Necessary assumptions

Hectic priorities (hot, red-hot and do-it-NOW) cause chaos in the office.

Even when patient release is properly choked, not having a priority system can cause some delays.

Strategy

The Operating room and Consultation room usage is governed by a simple, yet robust, priority system.

Parallel assumptions

Vast experience has shown that Buffer Management* is a robust priority system that leads to even better OTP or DDP.

****BM is setting priorities (three color-code system) only according to the degree the buffer-time is consumed.***

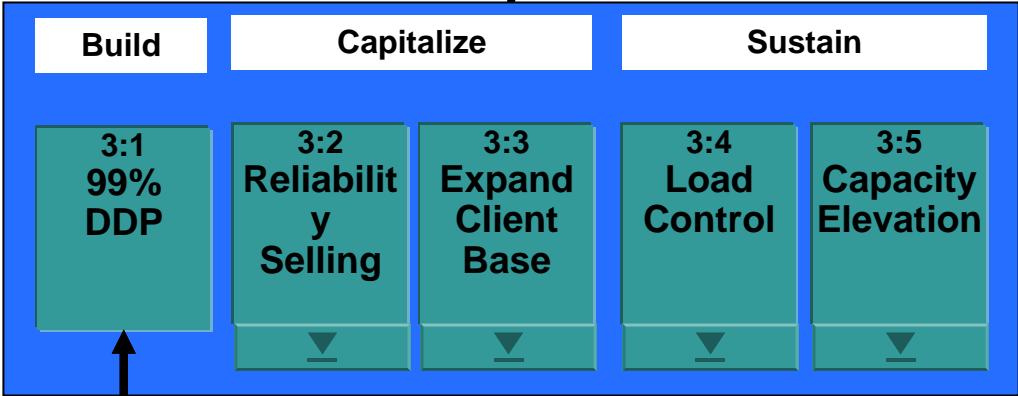
Tactic

Buffer Management is the ONLY priority system used in health care practice.

1
Viabile Vision

Base Growth

2:1
Reliability Comp. edge



- 4:11 Choking the release
- 4:12 Managing priorities
- 4:13 Dealing with CCR's



Necessary assumptions

There are Capacity Constraint Resources (CCR's) that prevent the attainment of 99% DDP or On Time Care

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Strategy

Patients are seen and treatment completed on time (over 99%)

Parallel assumptions

- Doctors/Nurses are CCR and work-in-process piles up in front of it.
- In most of the cases additional capacity can be exposed by simple means like:
 - Ensuring that CCR is adequately buffered
 - Offloading work from the CCR's to less "effective" work centers that are maintained at ample excess capacity
 - Using LEAN techniques to shrink the set-up time between patients and move set up outside the operating area.
 - Giving overtime approval to staff that protects the CCR's, etc.

Note – In most cases the steps taken so far will be sufficient to prevent the CCR's from jeopardizing On Time Performance

Tactic

CCR's are identified and effectively buffered. When On Time Performance >99% is achieved, the green light is given to Customer service to increase referrals. To prevent remerging of CCR's it is essential to move rapidly to implement training and buffer staff around CCR



2nd Viable Vision

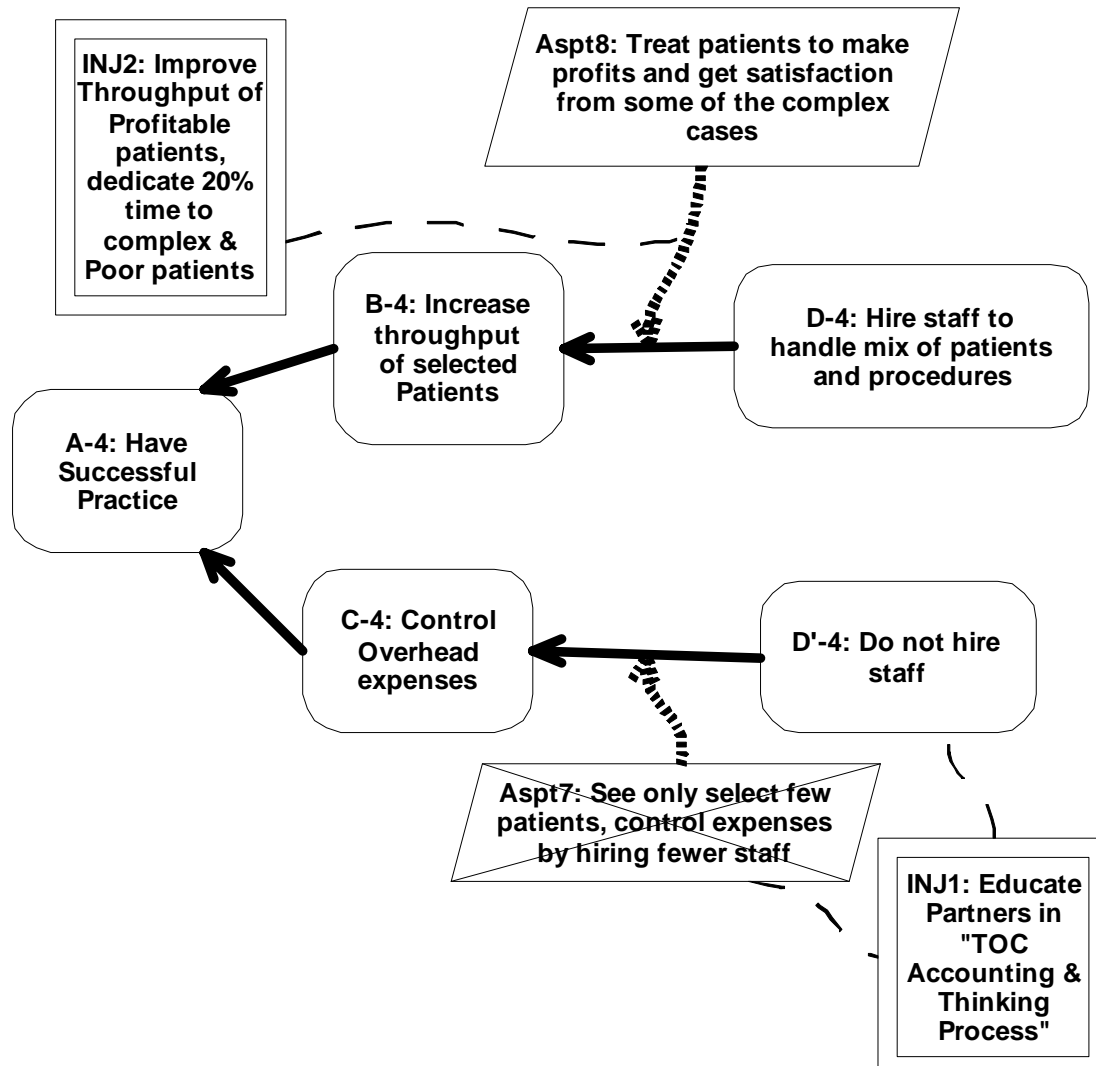
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	Patients	Charges	Collections
1Q/2007	1354	\$ 2,055,108.00	\$ 1,483,288.00
1Q/2006	1177	\$ 1,796,621.00	\$ 1,412,943.00
Change	177	\$ 258,487.00	\$ 70,345.00
2Q/2007	1319	\$ 1,962,265.00	\$ 1,518,373.00
2Q/2006	1204	\$ 1,687,788.00	\$ 1,241,257.00
Change	115	\$ 274,477.00	\$ 277,116.00
3Q/2007	1458	\$ 2,401,251.00	\$ 1,762,460.00
3Q/2006	1322	\$ 1,889,207.00	\$ 1,344,673.00
Change	136	\$ 512,044.00	\$ 417,787.00
1,2,3 Q/2007	4131	\$ 6,418,625.00	\$ 4,766,121.00
1,2,3 Q/2006	3703	\$ 5,373,617.00	\$ 3,998,874.00
Change	428	\$ 1,045,008.00	\$ 767,247.00

..... same number of doctors and same number of staff

Core Conflict Resolution

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Still need to work on this with Partners



Culture

Problem

- ❑ **Departmental Mentality: nursing vs. administrative, individual vs. team work**
- ❑ **High specialization & poor cross training**
- ❑ **Shift workers vs. demand for services**
- ❑ **Multi-tasking**
- ❑ **Blame game especially the doctors**

Solutions:

- **Educate Leaders, Managers, staff in TP and Strategy/Tactics**
- **Educate in Problem Solving, Root Cause Analysis Techniques**
- **Incentives for Cross Training & Team Work**
- **Project Portfolio Management, CCPM**

Staffing

Problems:

- ❑ **Shortage of skilled staff for health care industry**
- ❑ **Shortage of Oral & Maxillofacial Surgery specialists**
- ❑ **Shortage of training programs for staff**

Solutions:

- **Increase attractiveness of your practice due to higher salaries, state of the art equipment, and less chaos**
- **Create internal training program by recruiting teachers trained in TOC/Lean/Six Sigma methods and using internal subject matter experts-the experienced workers**
- **Use CCPM to develop projects in staff and doctor training**
- **Incentives for more skills obtained**

Environmental, Medico-Legal, Regulatory

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FMEA

Customer Satisfaction Index

Reliability of Services, Rapid Response to Emergency

needs of patients

Concept of Patients as Customers

Detailed Overview

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□ Case History of Adirondack Oral & Maxillofacial Surgery. 1st viable vision achieved using TOC/Lean/Six Sigma; working on a 2nd Viable vision using Reliability & Rapid Response Template

- TOC
- Lean Tools
- Six Sigma
- System Dynamics
- Balance Score Card
- Viable Vision RRR Template

□ Obstacles and how to overcome them

- Conflicts in Goals, measurements and policies
- Culture in Health Care
- Staff Availability and Training
- Environmental Factors: Medico-legal, Regulatory

□ **Application of Viable Vision RRR Template to Larger Health Care Systems**

- Resolve Conflicts in Goal upfront, set Goals and agree upon Measurements and Policies
- Focus on Key areas, Operating Rooms, Emergency Departments and LOS
- Focus Lean and Six Sigma Efforts
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Viable Vision

Health Care Industry in General

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Start with Top Management:

- Clear Goals
- Agree upon Measurements and Decision Process (Shun Cost Accounting)
- Resolve Conflicts

Global System Thinking vs. Department Thinking (Global Throughput Accounting)

Focusing steps/Lean/Six Sigma efforts to Constraints in Flow

Patient/Customer

- Select desired patient segments to treat
- Select procedures offered
- Improve throughput of patients by identifying constraint, exploiting and subordinating to the constraint
- Provide reliable service, Rapid Response to patient needs
- Elevate the constraint to the Market

Align your Staff and Capacity to Patient care

Market the Reliability and Rapid Response in the community

Offer 10 to 20 % capacity to community Charitable service



Thank You!

