Capio

Unilabs

Case Study: Using Lean and Six Sigma to Advance Integrated Care in the Hospital

"A Journey towards the LEAN Laboratory supporting LEAN Healthcare"

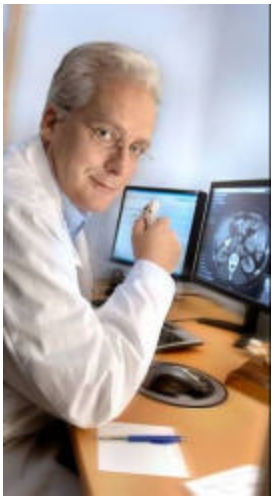
Tom M. Pettersson, Ph.D., Head of Development, Capio Diagnostics/Unilabs, St. Görans Hospital, Stockholm, Sweden

tom.pettersson@capio.se

Capio Diagnostics Unilabs

Unilabs

Unilabs 2008 16 Sept



We are a leading supplier of laboratory-and radiology services in Europe.

We supply diagnostic services – laboratory medicine and radiology services – to public and private health care units, insurance companies, occupational health units as well as to drug development companies.

Basic facts about Unilabs

Operations in 11 European countries
Denmark, Finland, France, Italy, Norway, Portugal, Russia, Spain, Sweden, Switzerland and the UK.

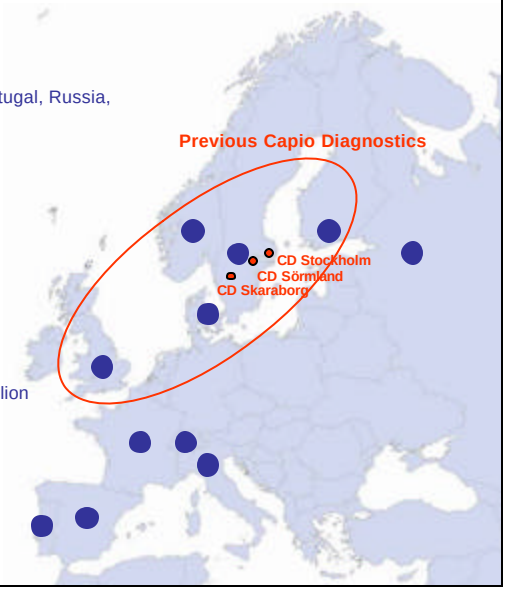
No of employees: 3,100

No of radiology examinations: 700,000
Radiology units: 20

No of mammography screenings: 95,000
Mammography units: 11

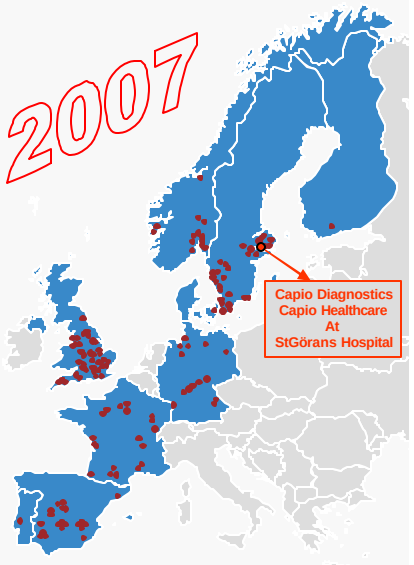
No of laboratory medicine analyses: 28 million
No of laboratories: 80

Turnover: € 360 M



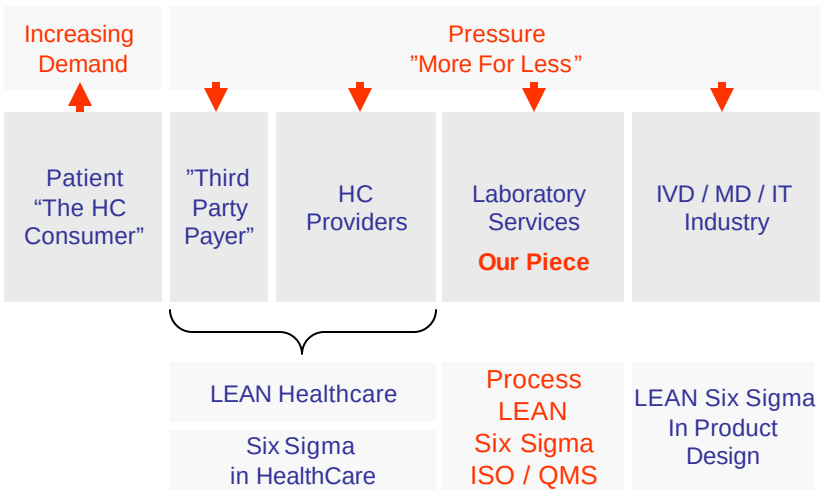
Capio — a pan European company

- Leading European healthcare services provider to the public and private sector:
  - hospitals
  - primary care
  - specialist clinics
  - management contracts
- Diverse customer base:
  - local, regional and national
  - health authorities
  - insurance companies
  - private customers
- Only industry player with a real multi-country presence in Europe
- 16,500 employees
- 2006 turnover CHF 2,210 million (SEK 13,000 million)



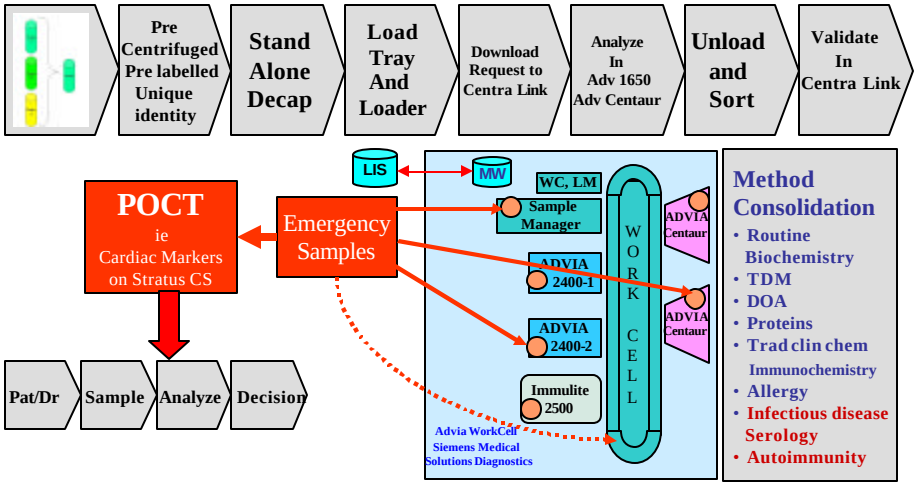
TP20071016 -02

The HealthCare Value Stream



Towards the LEAN Laboratory 1999 ……..

Planning, Realizing and Evaluating a Modern Clinical Information Production Site - 1999 at StGöran



TP20071016 -09

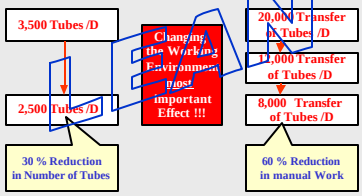
Effects of Work Cell Process

Medical Benefits

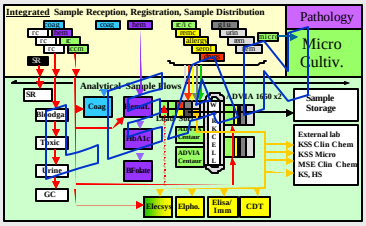
- Integrated Reports improves Timing in Decision Process
- Improved reproducible TAT
- Improved Quality and Medical Security (less error)
- Increased Focus on Clinical Value

Efficiency and Staff Satisfaction

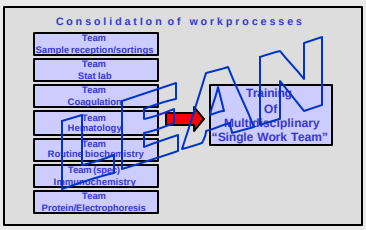
- Improved Working Environment
- Focus on Medical Value and Service



Process oriented production



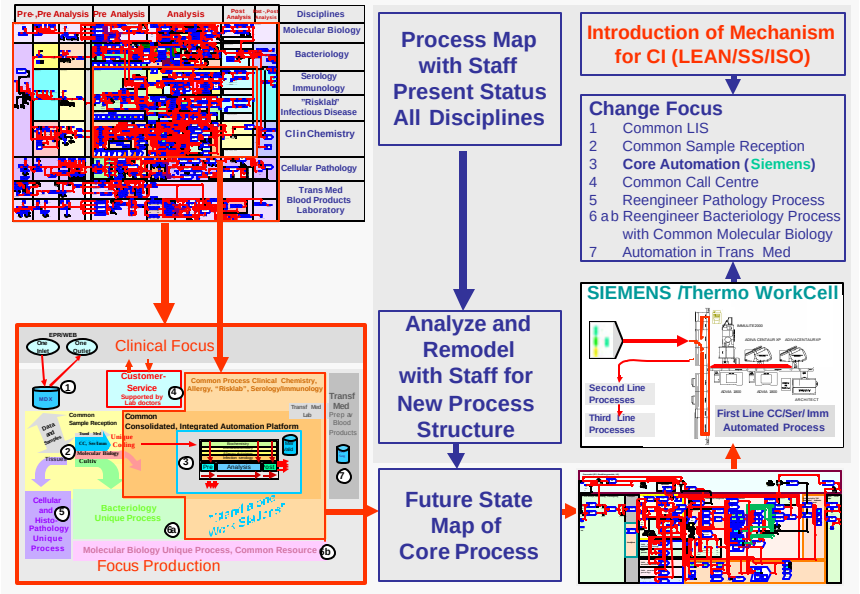
Reorganisation of Staff



TP20071016 -10

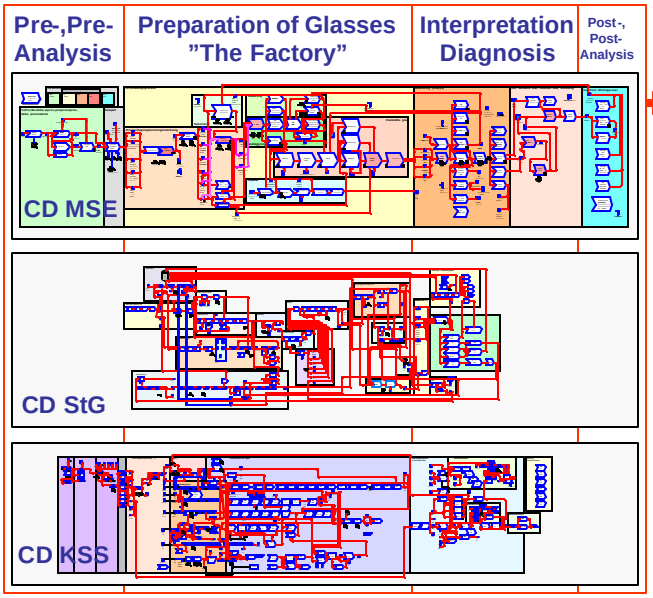
Creating the Multidisciplinary Core Laboratory
CD Skaraborg 2005-2008

Unilabs



Towards LEAN Histopathology

Unilabs



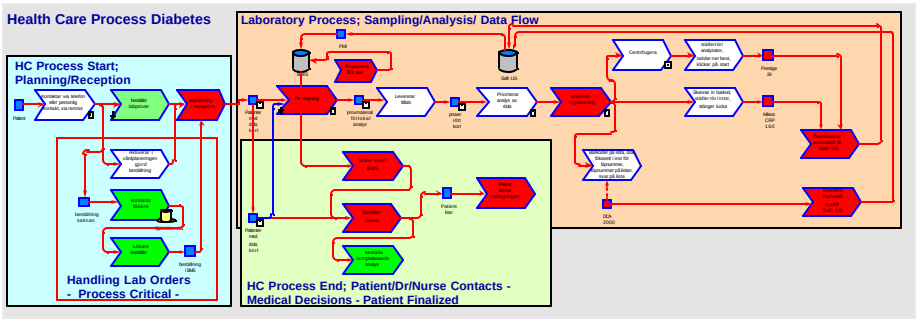
Process Maps Present Status Indicates;
- Error prone process
- Large process variation
- Non reproducible report

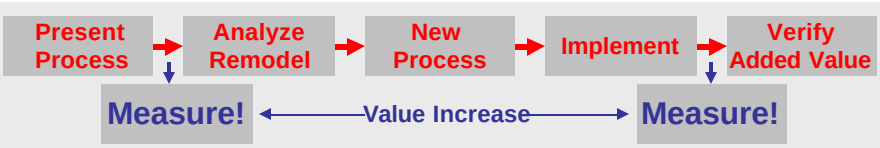
Goals
- Standardized Process
- "Single case/unit processing"
- "Continuous processing"
- Automated process (cf Chem.)
- Digitalisation (cf Radiology)
- Consolidated LIS
- Reporting in 24 hours

IVD Industry Input Based on Future State Map of Core Process

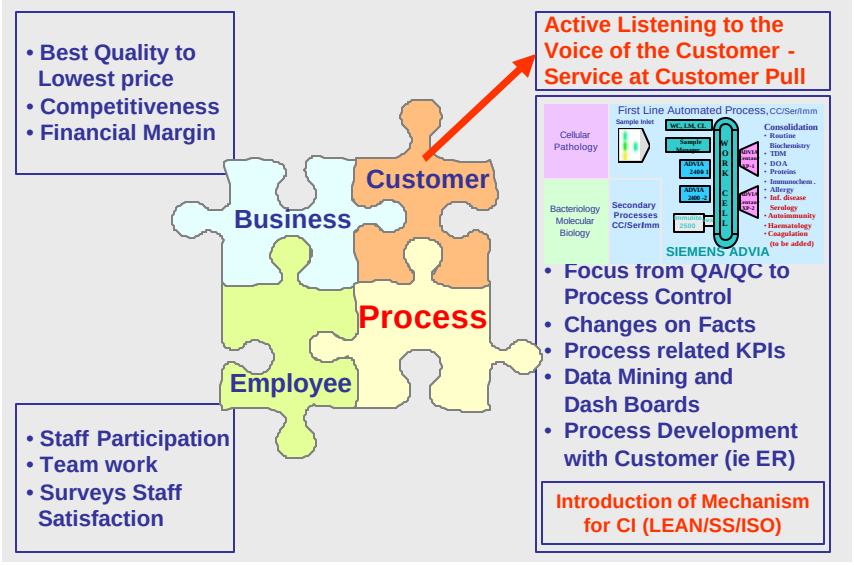
Introduction of Mechanism for CI (LEAN/SS/ISO)

Adopting Laboratory Services to Healthcare Processes in Primary Care





"Real Time Quality" for best "QCDM" in Core Laboratory



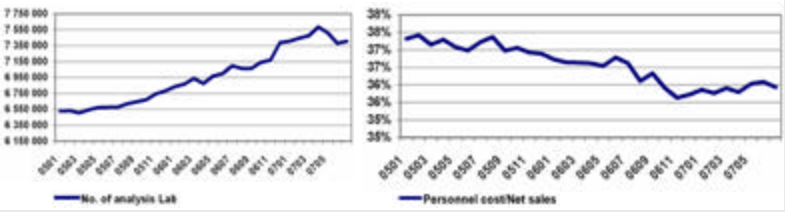
Unilabs

Map Present Processes

- Staff Participation
- Analyze and Redesign
- Introduce Innovative Technology
- Eliminate Waste (Lean)
- Reduce Variation (Six Sigma)

Implemented New Process

Achievements 2005 - 2007



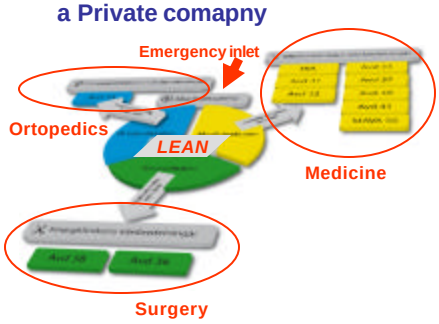
Productivity Increase Period 0501 to 0705 21%

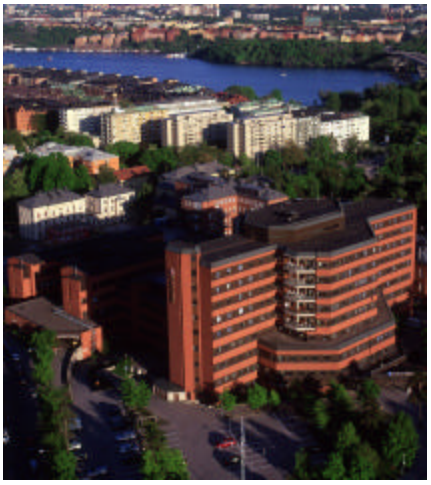
Increase in Margin Period 0501 to 0705 from 5% to 20%

Towards the LEAN Healthcare 2005……..

Capio S:t Görans Hospital, Stockholm

- Serves population of 420 000
- In a typical year, Capio St. Görans Hospital treats 200,000 outpatients and 21,000 inpatients. It has 1,400 employees and 250 beds
- Public Healthcare produced by a Private comapny

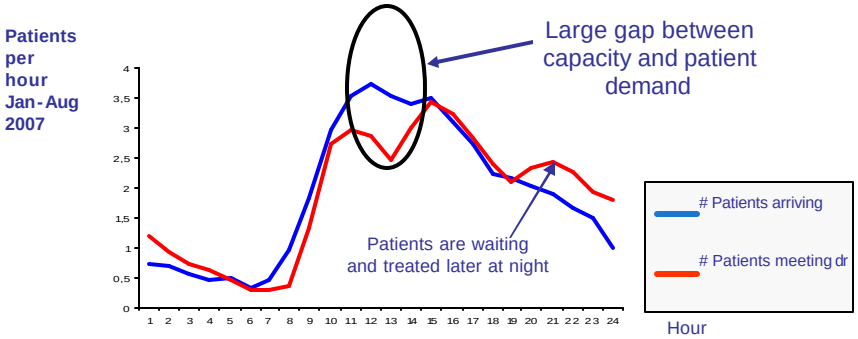




How did we start ?

- The Hospital Management decided to introduce process management of Emergency Processes in 2005.
- The purpose was to create a learning organization as to process steering and continuous improvement.
- The improvements should focus on strategically important areas - ”The Swamps” – to identify and eliminate problems.

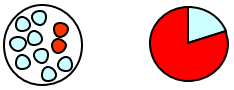
The Dilemma



Systematic and Structured Approach

- Strategic process mapping
  - Clear delimitation
  - Data on flow
- Strategic process planning = Identify Problems !
  - What do we want to achieve ?
  - Clear delimitation
  - Potential for improvement
- Strategic process prioritization -SPP
  - Prioritize problems by voting
- Cause and effect analysis
- Suggestions for improvements
  - Tests
  - Evaluation
  - Implementing
- Process steering - DALTIS
  - KPIs
  - Scorecards

The Pareto Principle



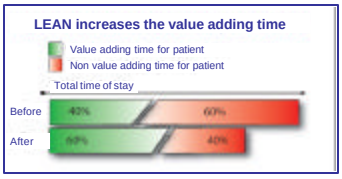
Improve and Learn through Doing

- Strategic process planning, SPP
- D, definie a improvement project
- A, analyze the chosen problem
- L, find solution to the problem
- T, test the solution and learn
- I, implement the new way of working
- S, follow up and steer the process

(cf LEAN - PDCA and Six Sigma DMAIC improvement wheels)

LEAN principles used

- Enable employees to drive improvement efforts supported by line-management
- Work with continuous improvements, Kaizen
- Focus on customer value-adding activities and reducing waste
  - E.g. waiting time, defects, transportation, overproduction, over-processing, inventory, motion
- Create continuous flow
  - Creating a pull system linking activities
  - Analyzing the tact and cycle time
  - Leveling activities
- Standardizing key processes
- Visualizing the results and creating clear feedback

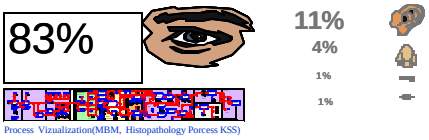


Focus on five problems

1. We do too few things in **parallel** – this increases waiting time and reduces value.
2. The best **competences** examine too few patients and that too late.
3. Lack of **coordination** and routines.
4. **Working hours** of doctors not synchronized with patient flows.
5. There is much **distractions** and **waste** (Muda) in doctors work

Important Flow Principles

- **Link activities** – to recognize problems early.
- **Activities in parallel** – to gain time.
- **Pull** - next step in chain is prepared to receive the patient.
- **Visualize** – all sees what must be done.
- **Takting the flow** – improve the working environment.
- **Standardize** – that we can see problems to solve (waste to eliminate).



Develop
The LEAN Eye !

Some Problems in Process

- Vacant **beds do not match the need** – patients arrive at wrong time to ward.
- **Too few decision points** – decisions are delayed.
- Work in ward is done in **sequence.**
- **Uneven Intensity** in work during the day.
- **Investigated do not match** actual needs.

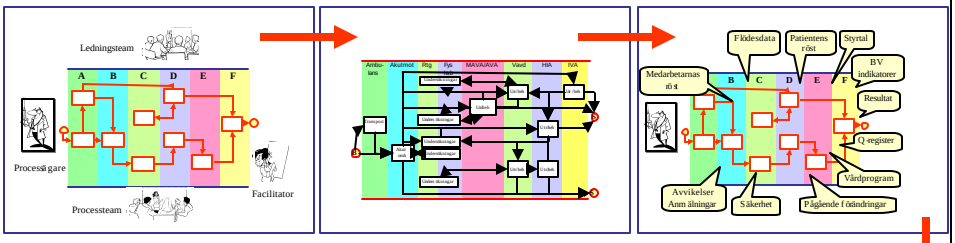
Find Root Cause – ask Why !

Follow the Route - Use the Tools

Establish Infrastructure and Culture !

Visualize Process

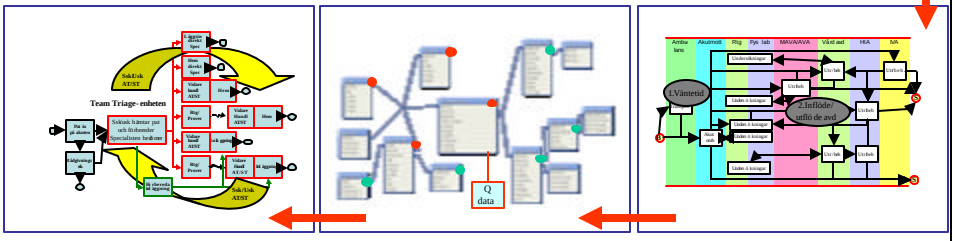
Inventory of Problems, Facilitated Work Shops



New Design

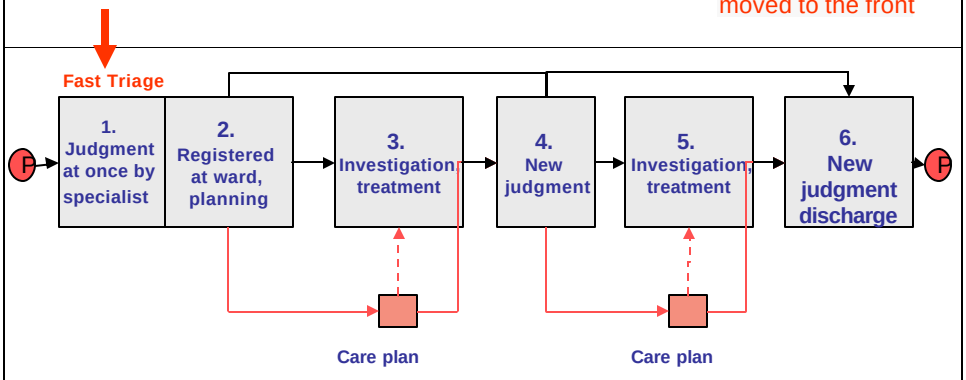
Data Stores

Identify "The Swamps"

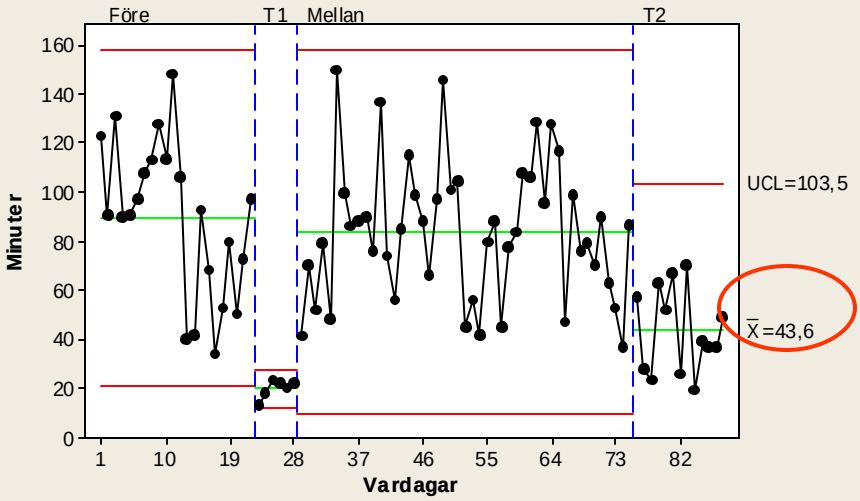


The New Process Design

Best Competence moved to the front



Visualize - Do Tests - Put Targets



Do Frequent Evaluations of Progress

Evaluation Matrix

Evaluation 070614

Utvärdering – krav och principer

Hur klarade vi våra uppställda krav?	Krav	0 %	25%	50%	75%	100%
	Tidig läkarbedömning					
	Rätt beslut från början					
	Läkarbed. prioriteras efter pat´s behov					
	Alla patienter har en tydlig plan					
	Alla aktiviteter klara direkt					
	Våra krav på akuten					

Hur klarade vi att tillämpa våra flödesprinciper?	Principer	0 %	25%	50%	75%	100%
	Länka våra aktiviteter					
	Vara beredd på nästa patient (Pull)					
	Arbeta parallellt					
	Jämna ut flödet					
	Visualisera					
	Standardisera					

Evaluation Matrix

Evaluation 070722

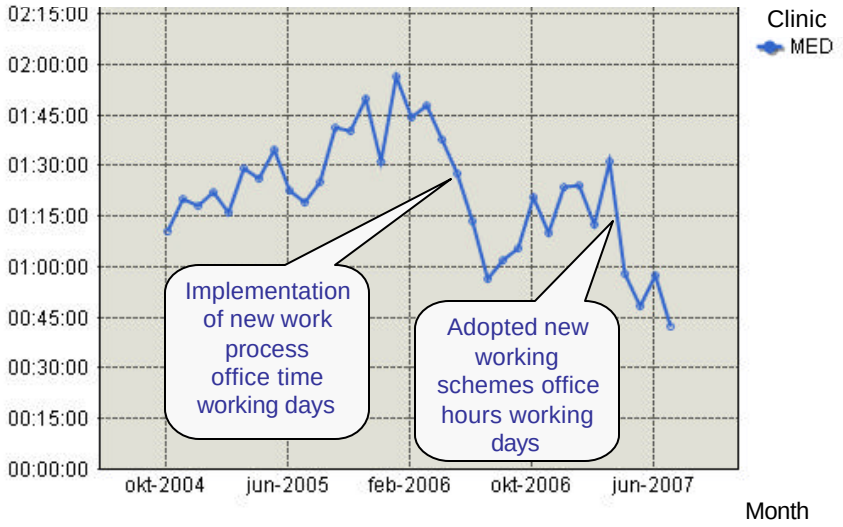
Utvärdering – krav och principer

Hur klarade vi våra uppställda krav?	Krav	0 %	25%	50%	75%	100%
	Tidig läkarbedömning					
	Rätt beslut från början					
	Läkarbed. prioriteras efter pat´s behov					
	Alla patienter har en tydlig plan					
	Alla aktiviteter klara direkt					
	Våra krav på akuten					

Hur klarade vi att tillämpa våra flödesprinciper?	Principer	0 %	25%	50%	75%	100%
	Länka våra aktiviteter					
	Vara beredd på nästa patient (Pull)					
	Arbeta parallellt					
	Jämna ut flö det					
	Visualisera					
	Standardisera					

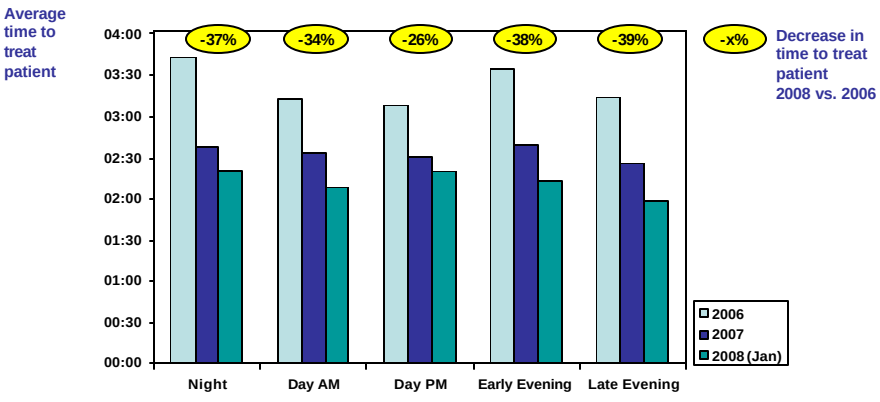
Continuously Improve !

"Waiting for the Doctor" per month, working days 24 hours



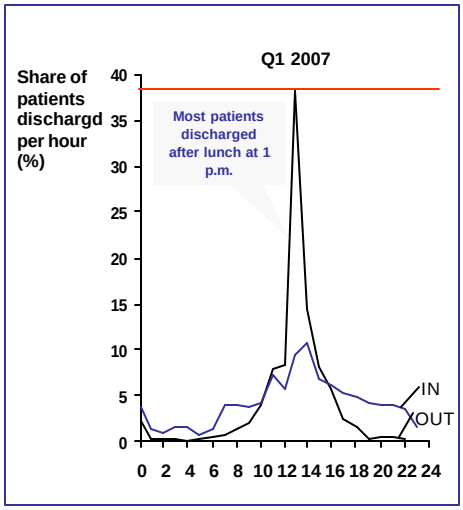
Process improvement reducing lead-times by ~30-40%

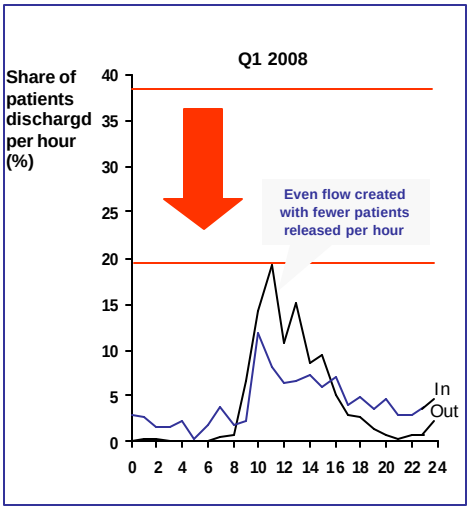
Example: A&E Surgical total time to treat patient, week-days 2006-2008



Source: Akutliggaren; QlickView

Ward: Continuous flow of patients to and from the wards





Individual Planning – No Classical Rounds

Visualization and teamwork key parts of LEAN improvement

Example: Process work at cardiac ward - Overview of white-board

Personnel	Room	Patient	Monitoring	Tests	Individual round	Planning	Coordination
Red Team			A	Trop-I 10	11		
			A		10	Angio	
			etri				
	20:1	K.K-23					Leave at 11
	20:2	W.O-40					Leave after breakfast
Blue Team	14	E.R-45	MIDA				
	15	T.Y-29					Leave at 13
	16	U.I-34	A-kabel				Waitin 37
	21:1						
	21:2	K.K-22	MIDA				
	Beh rum						
	IVA						

Teams including physician and nurse defined for each patient

Clear patient prioritization

Clearly visualized of patient plan

LEAN Laboratory supporting LEAN Healthcare

"An Integrated Delivery System"

2008……

Common Tools

Design for Six Sigma (DFSS)

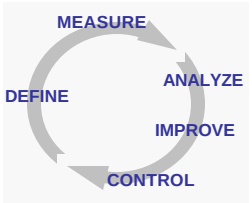
Invention-**I**nnovation-**D**esign-**O**ptimize-**V**erify (I2DOV)
Define-**M**easure-**A**nalyze-**D**esign-**V**erify (DMADV)

Project Assignment

New Processes

Innovative Organization
"Lean Bacteriology"
"Lean Histopathology"
" Lean IT"

Six Sigma
DMAIC



LEAN
PDCA
Continuous Improvement (CI)

Larger Projects (6 - 12 months)

Continuous Improvement (CI)

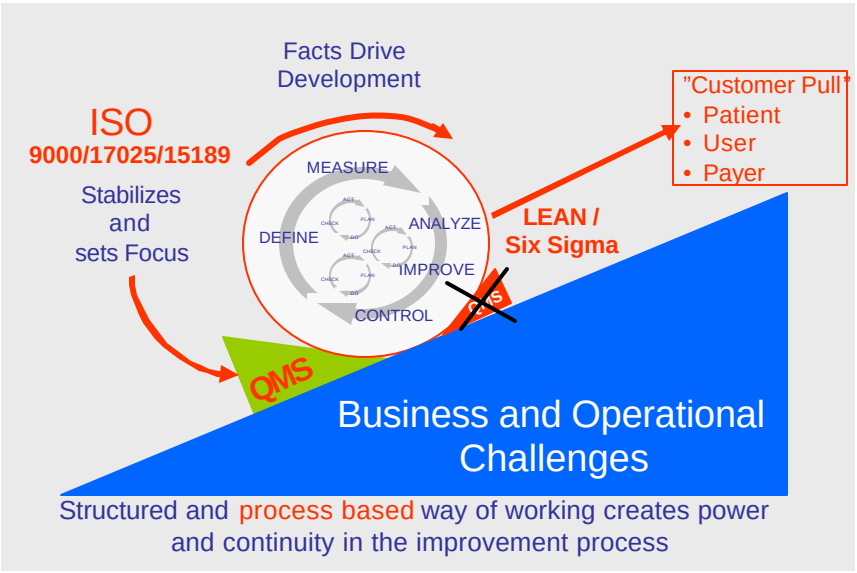
Short Projects (1 – 5 days)

Improve Present Processes

"Real Time Quality"
" LSSPC"

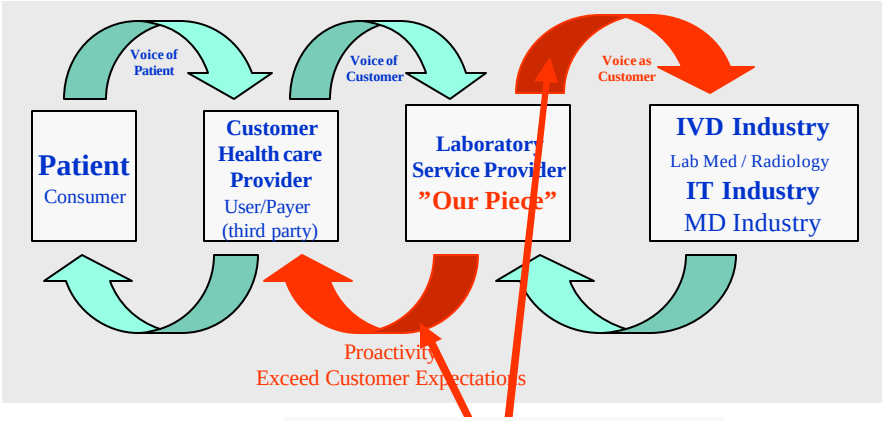
Basics is Common Process Visualisation and Understanding (Model Based Management, Business Modeller XDIN)

Synchronizing Tools



Structured and process based way of working creates power and continuity in the improvement process

Understanding Stakeholder Roles in Healthcare Value Stream



Communications to master by Lab Service provider

Unilabs

Buildning - "The LEAN Healthcare Enterprise"

Kaizen (Muda elimination, 5S) + Innovation Kaizen

Maintenance → I m p r o v e m e n t (continuous effort)

Improve Total Process

IT Process Support

Start of Process
"Buying raw material"

Gemba – Production Process
Products / Services

End of Process
"Getting payment"

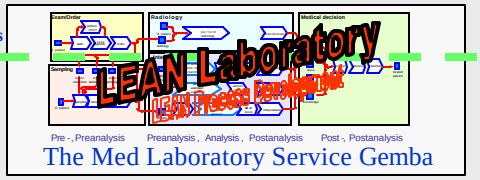
Result

LEAN IVD Industry products support LEAN laboratory Processes

LEAN IT Laboratory Process Support

Total Company Process

LEAN Purchasing
LEAN Finance



The Med Laboratory Service Gemba

LEAN Finance

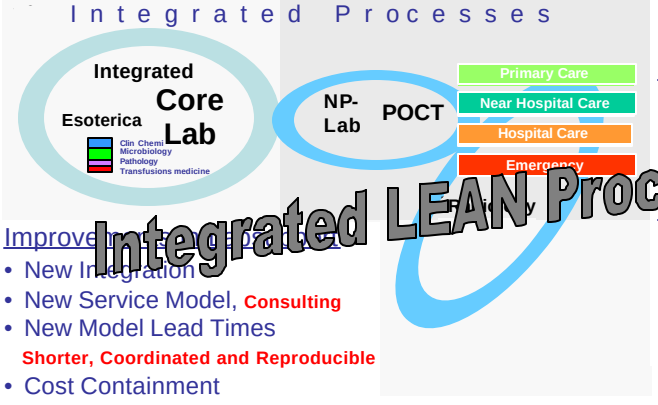
HC VALUE STREAM

LEAN Healthcare
Patients – Access to Care

Unilabs

Business and Service Oriented CD Lab Models

I n t e g r a t e d P r o c e s s e s



Integrated LEAN Processes

Improve Interoperability

- New Integration
- New Service Model, **Consulting**
- New Model Lead Times
  Shorter, Coordinated and Reproducible
- Cost Containment

Potential Improvements in Health Care

New Conditions for
- HC Planning
- Lab Orders
- Sampling
- Result Communications

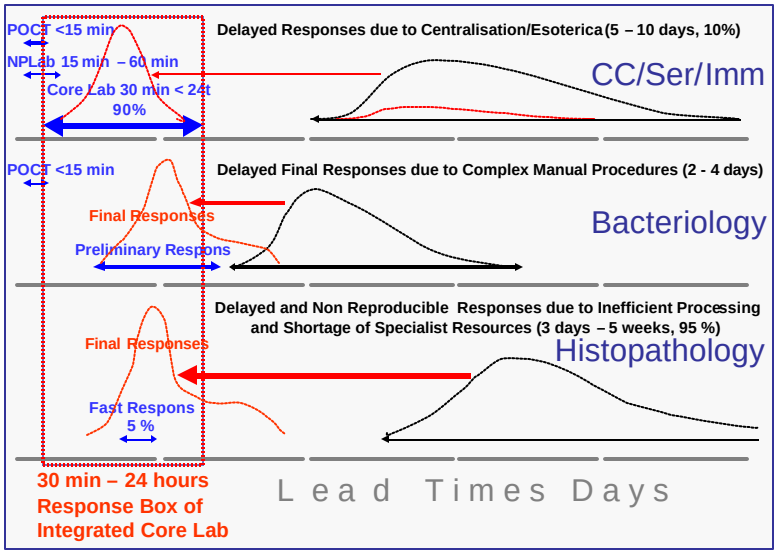
Improvements in Flow of
- Patients
- Samples
- Work
- Information
- Knowledge
- Medical Decision

"More for Less"

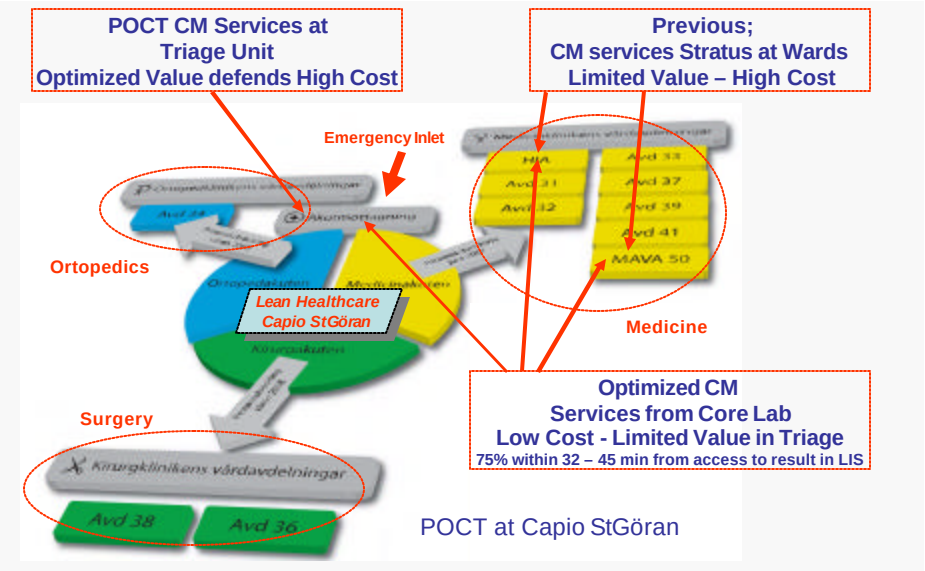
- **Improved Resource Utilization**
- **Increased Productivity**
- **More Relevant Time for Patient**

TP20071016 - 32

Improving Lead Times (QCDM)



Fitting POCT to LEAN Healthcare process



It is About People

There is No Such Thing as Operator Error

✍ It is **PROCESSES** – not **PEOPLE** that Fail.

LEAN Team Leaders
Capio St Göran

Göran Örnung (med)
Jonas Leo (surg)
Hans Lundberg (ortop)
Annika Johansson (ortop/recep)
Ylva Östlund (surg/radiol)
Lars Eurenius (cardiac)
Bengt Löfdahl (cardiac)
Palmqvist Sofia (adm)

LEAN Team
Unilabs St Göran

Emma Lindbäck (Lab Manager)
Rolf Olsson (Prod Manager)
Andreia Bunescu (Med Officer cc)
Johan Geijer (Facilitator)
David Afzelius (IT syst Manager)
Ann Westgren (Q manager)
Members of LEAN Production Team

Top Management
Unilabs North

Martin Swegmark (CEO)
Lars Lundgren (Medical Director)
Ann Kersti Adolfsson (HR)
Annelie Vestlund (Lab Manager)
Lennart Nordström (Medical Officer, cc)
Andreas Matussek (Medical Officer, micro)
Jakub Szczypinski (Medical Officer, path)
Åsa Björkenor (Q manager)
Maria Reis (IT Manager)
Tom M Pettersson (Development)