Lean Six Sigma in Healthcare

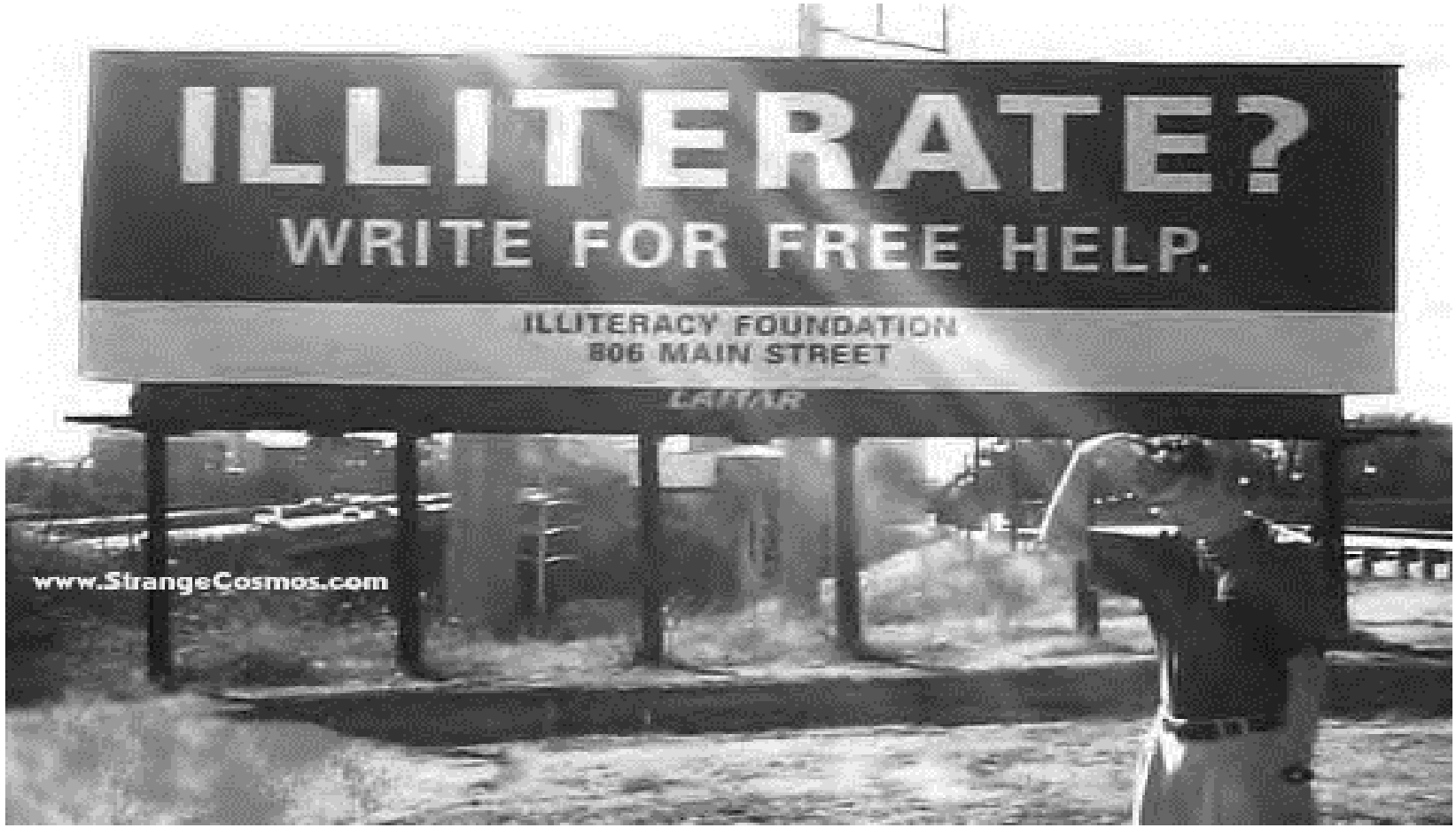
4 Simple BFO's that Change Everything

Presented By:

Joseph Duhig
Senior Vice President
Juran Institute, Inc.
February 23, 2008

JURAN

BFO's = Blinding Flashes of the Obvious



BFO's from the Great Guru's of Quality

"Establish an environment in which Quality can thrive"

Jim Reinertsen, MD

"Our business is clinical medicine" & "Quality improvement is the science of process management"

Brent James, MD

"Every system is perfectly designed to achieve the results it gets"

Don Berwick, MD

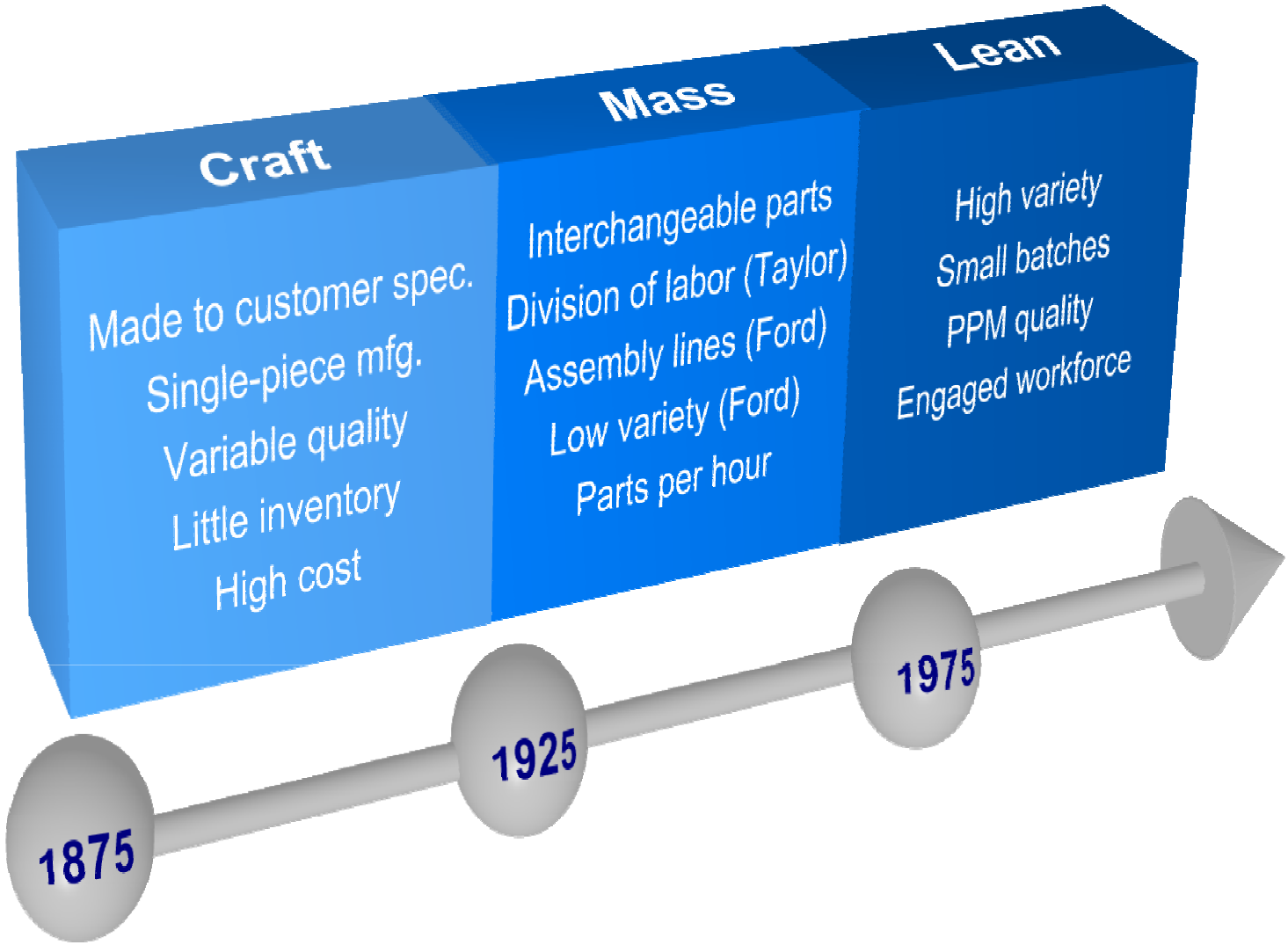
The Medical Profession is changing from: craft-based practice

- individual physicians, working alone
- handcraft a customized solution for each patient
- based on a core ethical commitment to the patient and
- vast personal knowledge gained from training and experience

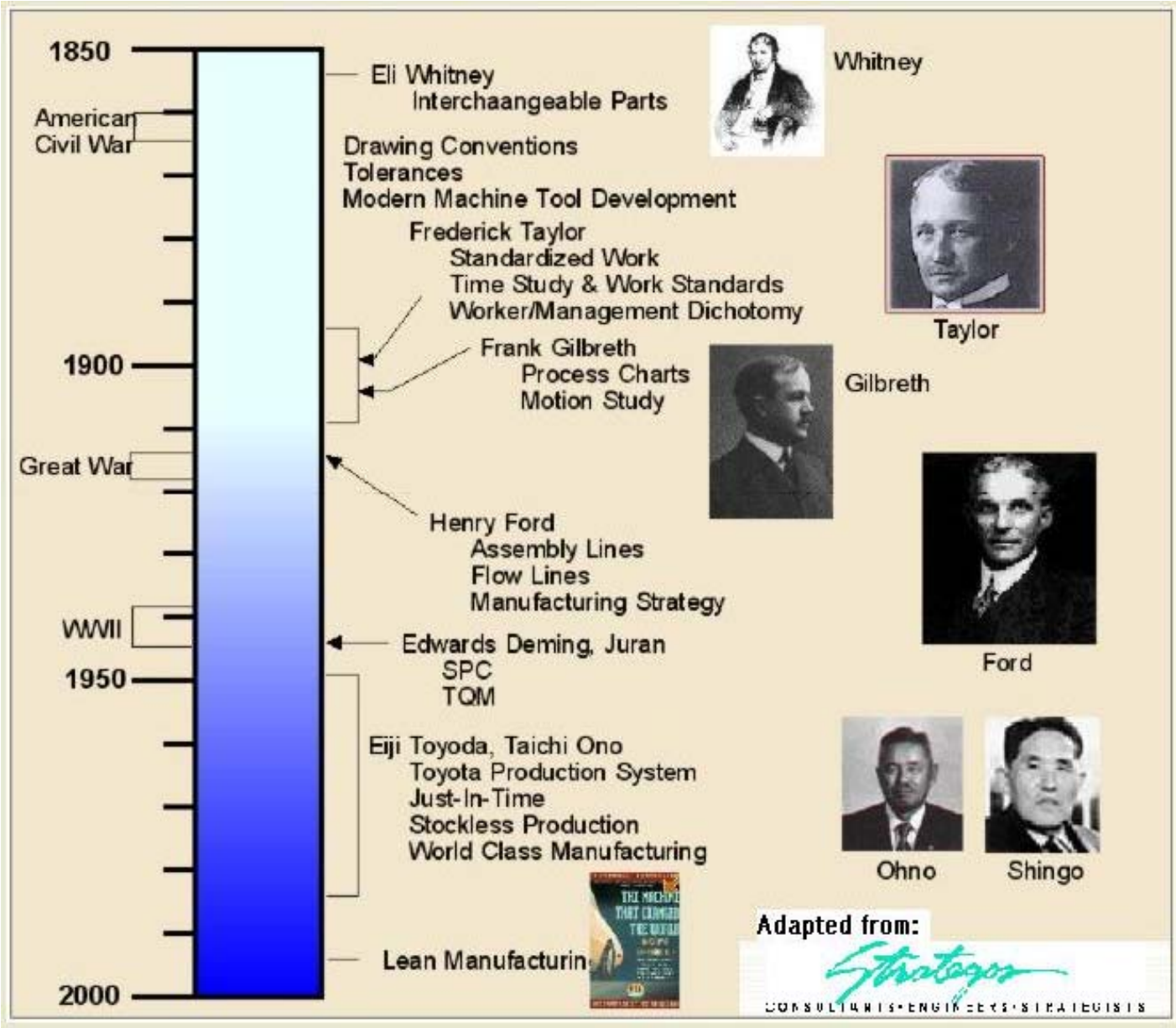
To Profession-based Practice

- groups of peers, treating similar patients in a shared setting
- plan coordinated care delivery processes (e.g., standing order sets)
- which individual clinicians adapt to specific patient needs

History of Manufacturing



History Timeline For Lean Manufacturing



Key Principles of Lean Thinking - adapted from James Womack

- Specify value in the eyes of the customer
- Identify the value stream for each product
- Make value flow without interruptions
- Let customers pull value
- Pursue perfection

Becoming a Lean Enterprise requires a fundamental rethinking of the design of our production system ...A Value Stream / Kaizen approach will not give us the transformation we need.

Batch-and-Queue – the mass production practice of making large lots of a part and then sending the batch to wait in the queue before the next operation in the production process. In health care we batch-and-queue people.

Single-piece-flow – a situation where products (or people) proceed one complete product at a time through various operations.

Other Terms: andon boards, cells, process villages, five whys, five S's, JIT, monuments, poka-yoke, Quality Function Deployment QFD, milk runs, right-sized tool, pull vs, push, flow, changeover, level schedule, takt time,visual control, kanban, value streams, turnback analysis

All these terms apply in healthcare, but some translation is required.

BFO # 2 – Our Business is Clinical Medicine

The health system of the future must transform from a batch and queue production-like system to a continuous flow, lean enterprise.

In healthcare the product lines are the clinical programs and we must design delivery systems that provide value as patient's access and utilize our services for specific diseases or conditions.

We work in a complex and highly specialized world and our healthcare providers, facilities, work processes and information system must be designed to support the delivery of services in a process oriented vs. a financial / administrative model.

Placing a patient "off-service" increases risk of harm

BFO # 2 – Our Business is Clinical Medicine

Required Changes:

1. Clinical program “Door” Theory – we need to help patients find the right door to access the system and then that should be the last door they have to find.
2. Professional practice model.
3. Universal beds / Every bed is capable of being converted to an intensive care bed.
4. Hospitalist and Intensivist who drive the quality agenda

Hand-offs between levels of care not only causes safety problems, but results in a 30% loss of bed capacity each day

The Dilemma of Adopting Professional Standards of Practice

- Failure to adopt nationally accepted standards such as 100,000 lives, Leapfrog, CMS place organizations at increased liability risk. Adoption of professional standards without ensuring compliance to standards increases the liability risk.

- The largest repository of professional standards are nursing policies and procedures.

The EHR can dramatically increase compliance with standards. Charting by exception, use of standard orders, immediate access to current evidence (Zynx, CPMRC) offers opportunities to improve outcomes and reduce costs.

Healthcare must adopt a "Process Mental Model"

For Example: Each morning we prepare the operating rooms for a busy day of cases, but most lack a "Mental Model" of how we get the cases to roll.

Healthcare has been slow to adopt the process discipline for understanding how we do the things we do every day.

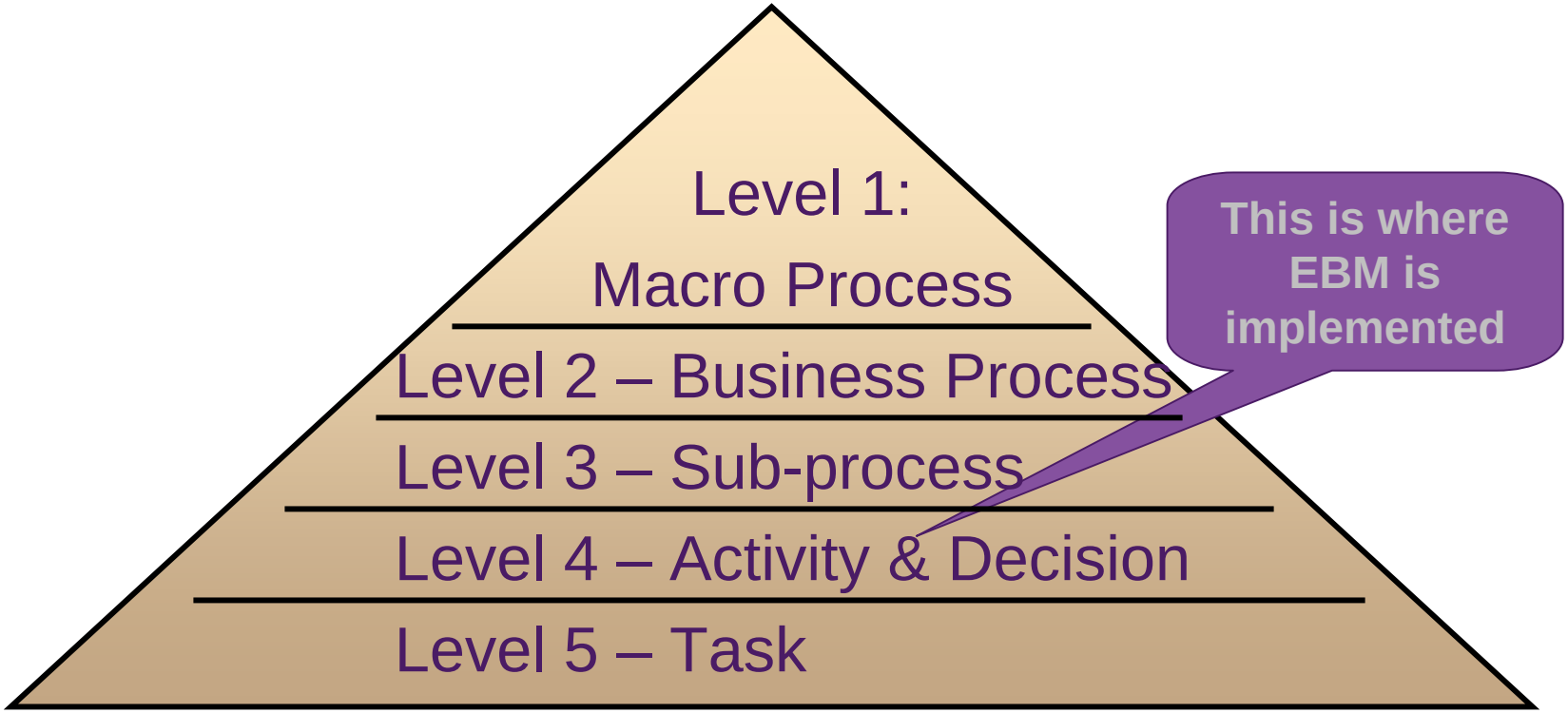
- Evidence Based Medicine is conceptually the same as Mass Customization in Manufacturing

- If processes are redesigned and standardized, the Electronic Health Record offers the potential to significantly reduce the largest contributor to Costs of Poor Quality in Hospitals...the unexplained variation in clinical practice.

Managing →

processes
systems (processes interacting together)
human psychology
variation
a system for ongoing learning

The Hierarchical Nature of Process



A documented written model for each level is essential for consistent, low risk performance of a process.

Y = f(x)

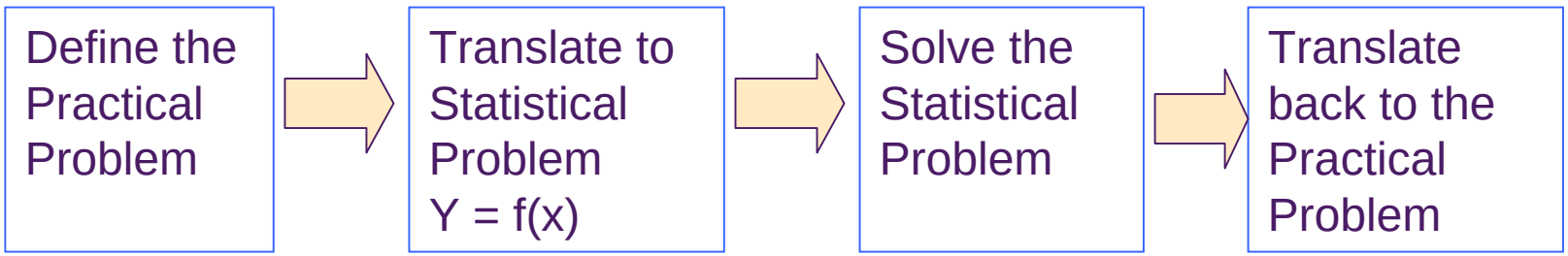
Mortality = f(x)

Surgical Infections = f(x)

Patient Satisfaction = f(x)

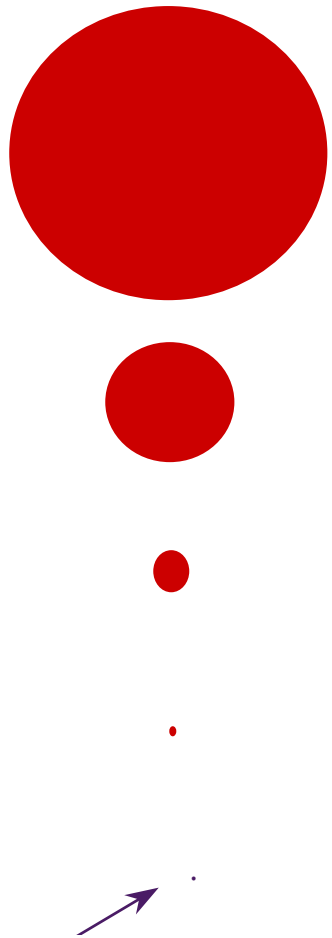
Beta Blocker Compliance = f(x)

Medication Errors = f(x)



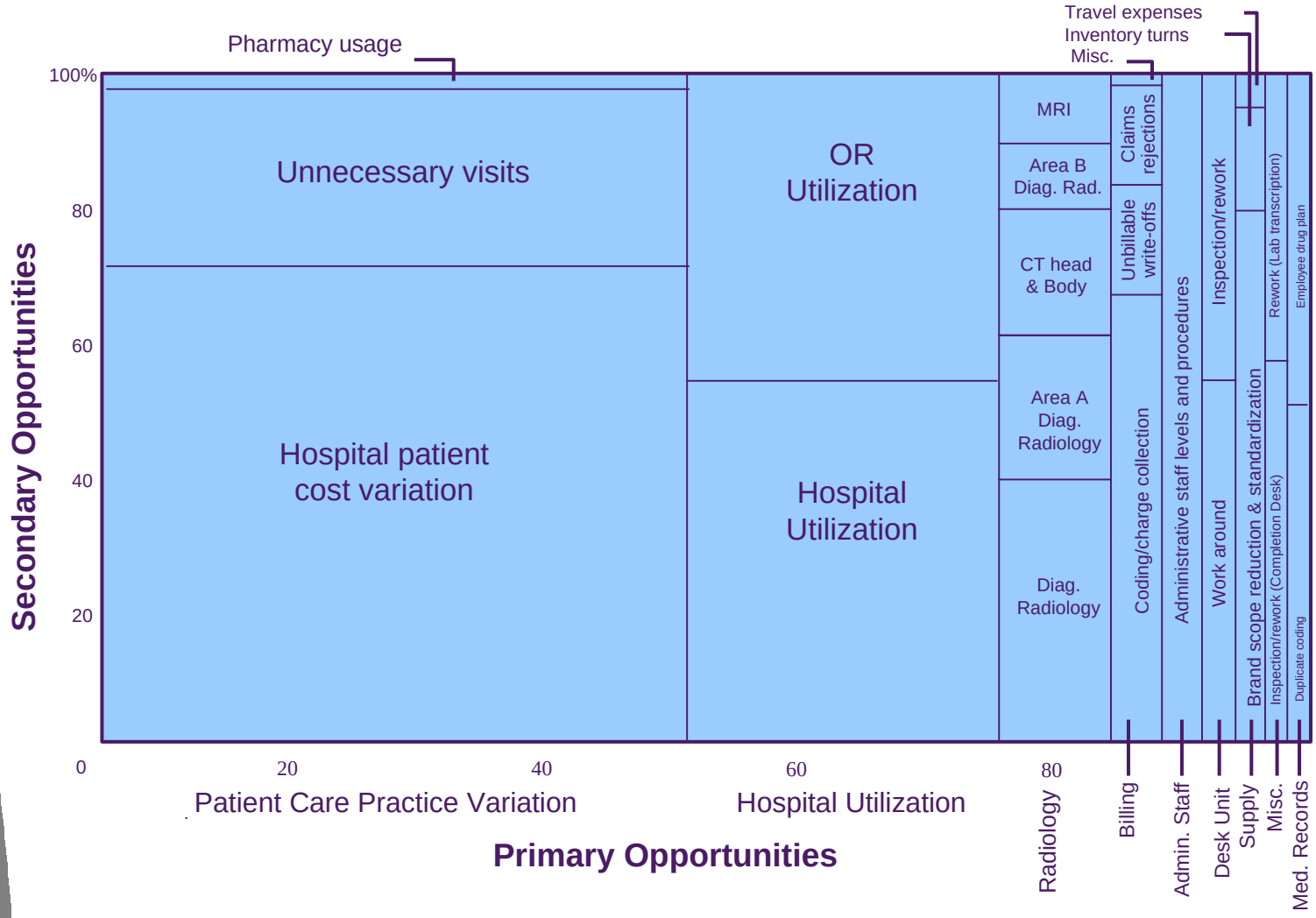
What is Six Sigma?

Sigma	Defects per Million opportunities
2	308,537 (69.1% good)
3	66,807 (93.3% good)
4	6,210 (99.4% good)
5	233 (99.98% good)
6	3.4 (99.99966% good)



3s to 6s - 20,000 Times Improvement... A True Quantum Leap

Pareto Principle – Focus on the Vital Few

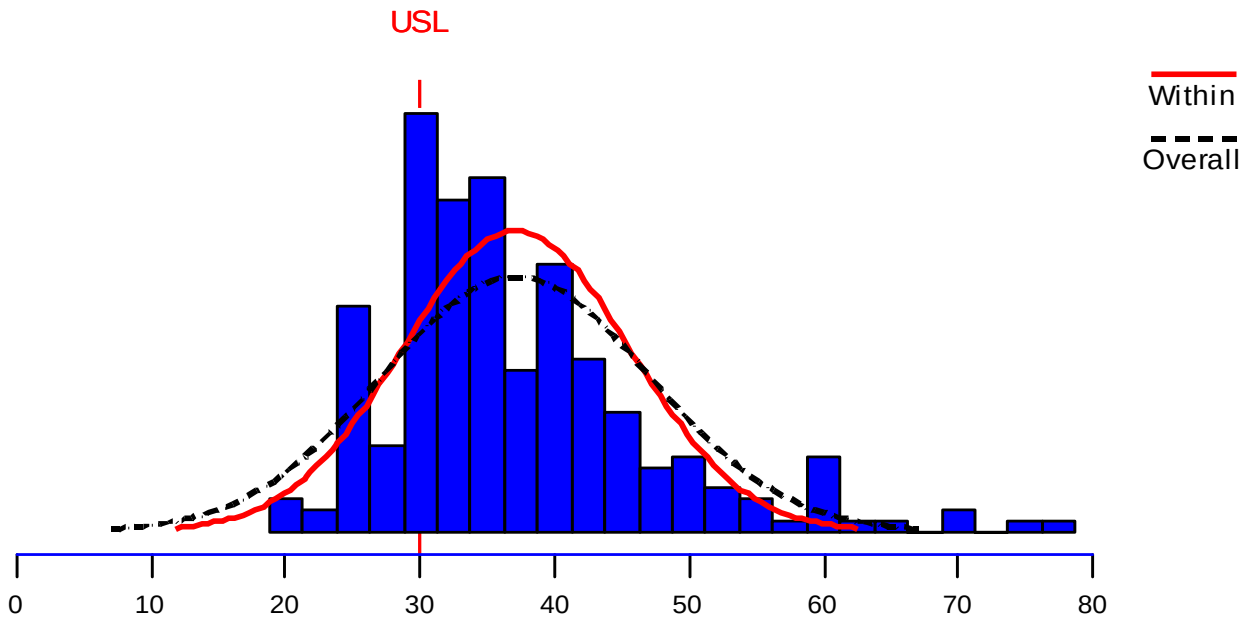


Process Capability Analysis for Case Rolled

Process Data	
USL	30.0000
Target	*
LSL	*
Mean	37.1050
Sample N	238
StDev (Within)	8.4564
StDev (Overall)	10.0149

Potential (Within) Capability	
Cp	*
CPU	-0.28
CPL	*
Cpk	-0.28
Cpm	*

Overall Capability	
Pp	*
PPU	-0.24
PPL	*
Ppk	-0.24



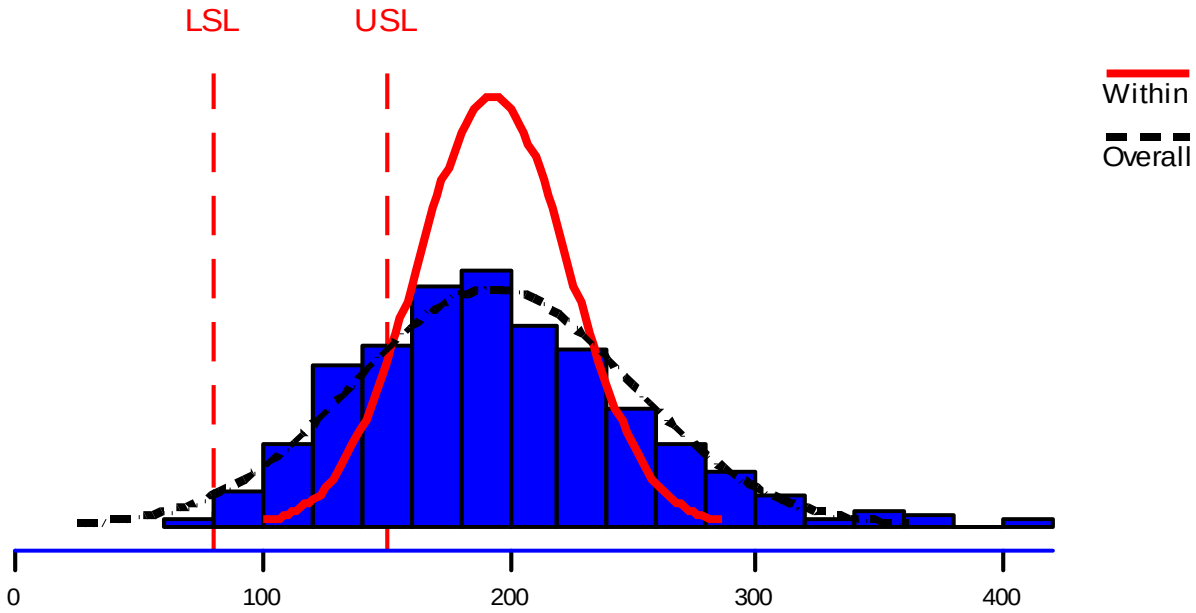
Observed Performance	
PPM < LSL	*
PPM > USL	710084.03
PPM Total	710084.03

Exp. "Within" Performance	
PPM < LSL	*
PPM > USL	799601.67
PPM Total	799601.67

Exp. "Overall" Performance	
PPM < LSL	*
PPM > USL	760977.44
PPM Total	760977.44

Glucose Levels of Diabetic Cardiac Surgery Patients

Process Capability Analysis for Blood Sugar



Process Data	
USL	150.000
Target	*
LSL	80.000
Mean	193.386
Sample N	329
StDev (Within)	30.8392
StDev (Overall)	55.9094

Potential (Within) Capability	
Cp	0.38
CPU	-0.47
CPL	1.23
Cpk	-0.47
Cpm	*

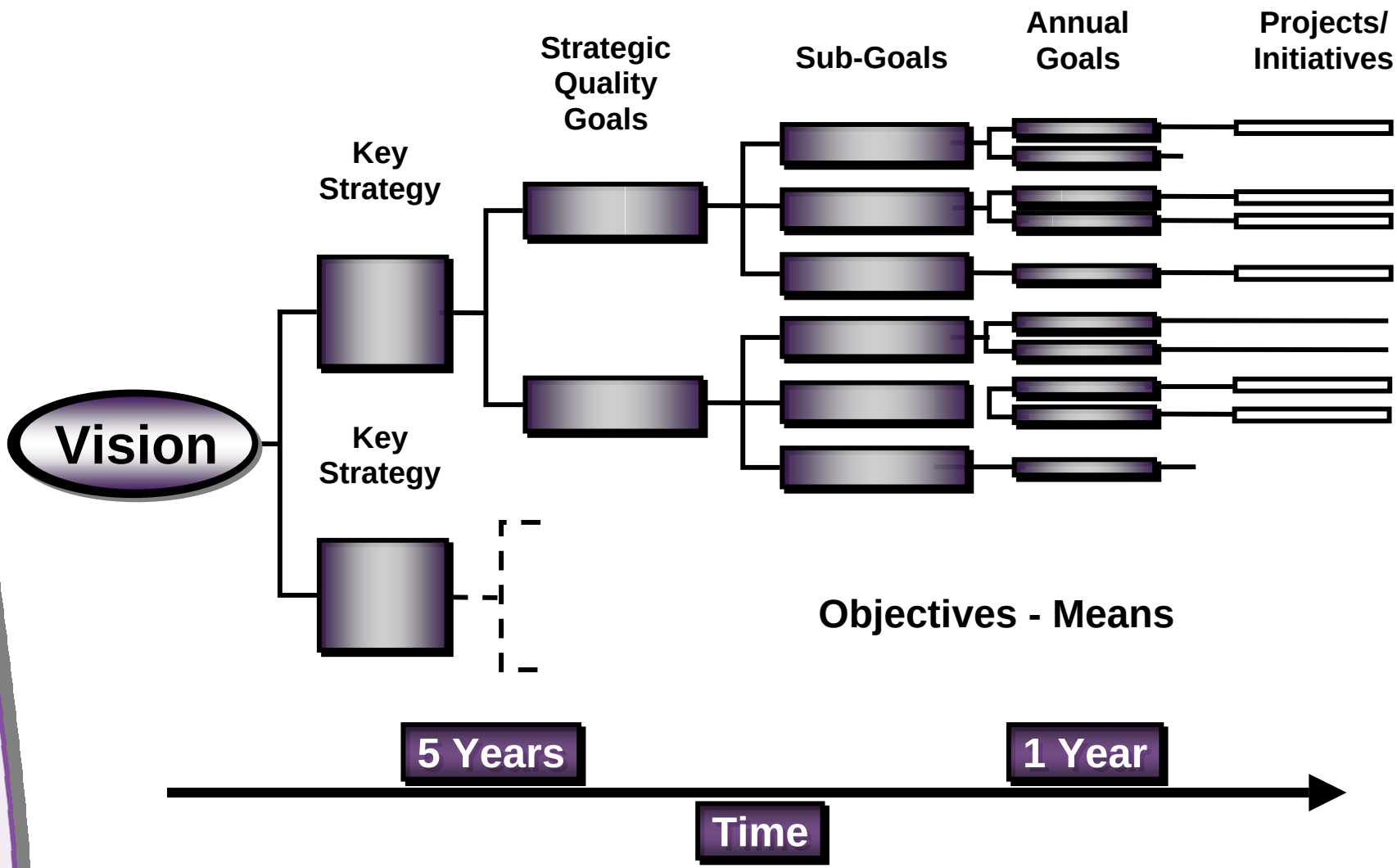
Overall Capability	
Pp	0.21
PPU	-0.26
PPL	0.68
Ppk	-0.26

Observed Performance	
% < LSL	0.30
% > USL	76.60
% Total	76.90

Exp. "Within" Performance	
% < LSL	0.01
% > USL	92.03
% Total	92.04

Exp. "Overall" Performance	
% < LSL	2.13
% > USL	78.11
% Total	80.24

Hoshin Planning, Strategic Deployment



"Trying is just a noisy way of not doing something."

– Ken Blanchard

"Try?! There is no try! There is just do … and not do."

– Yoda

Impact on Net Income

Change to cost structure	Discounted FFS	Per Case	Per Diem	Shared Risk
Decreased cost/unit	↑	↑	↑	↑
Decreased # units/case	↓	↑	↑	↑
Decreased LOS	↓	↑	↓	↑
Decreased # of cases	↓	↓	↓	↑

Who Pays for the Cost of Error?

CLABS Scorecard

	Optimal Care	Less than optimal care	Less than optimal + CLAB
Patient	+	- -	---
Payor	+	--	---
Provider Hospital	++	+	---
Provider Physician	+	++	+++

Creating a Lean Healthcare System

- Care based on continuous healing relationships
- Customization based on patient needs and values
- The patient as the source of control
- Shared knowledge and the free flow of information
- Evidenced-based Decision Making
- Safety as a system priority
- The need for transparency
- Anticipation of needs
- Continuous decrease in waste
- Cooperation among clinicians

IOM Report – Crossing the Quality Chasm