OPERATING IN HEALTHCARE LOGISTICS
INTENSIVE TRAINING COURSE
10 ECTS

10 -15th February 2020, LAHTI

Part 3: Logistics Improvement methods and tools in healthcare (3 ECTS)

Learning objectives part 3:

1. Is able to develop inventory management guidelines based on ABC-analysis, XYZ, Consignment stock, inventory turnover, etc. <mark>(Covered during contact day 2)</mark>

2. Is able to know when and how to apply Lean management, Six Sigma and ToC in Healthcare

3. Is able to know how the use of Lean Six Sigma and Theory of Constraints methodology can improve waiting times, lead times, accessibility times, nr of visits, utilization rate of resources like Operating Rooms

4. Is able to monitor AND improve patient/material logistical performance by using the Lean Six Sigma and Theory of Constrains methodology

5. Is able to formulate policy on processes of healthcare logistic processes (patients / materials)

HELP

2.   Is able to know when and how to apply Lean management, Six Sigma and ToC in Healthcare

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What do you know about Lean Six Sigma?

Primary objective:

"Produce / deliver the right amount of the right items / services the right moment so that it meets what the customer wants "

Secondary objective:

- Quantity check: allows the system to be adjusted so that daily and monthly fluctuations cause no problems.

- Quality control: ensure that every process delivers only defect-free units to the next process steps.

- Use of resources allows to use the full possibilities of people in order to reach objectives and minimize costs

Who is/ should be customer in Healthcare?

- The patient / client?

    OR

- Healthcare professionals?

- Both? Or others?

Brief history of Lean Management

What is the difference between Lean and Six Sigma

- Lean has a focus on waste reduction and flow

- Six Sigma has a focus on reduction of variation and defects and mainly based on data

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Combined both approaches do generate a structure and toolset to optimize (Healthcare) processes

So what is the structure about and what is the toolset about?

A Lean approach is based on the following principals:

(based on Womack)

1. Define Customer Value

- Voice of Customer (VOC, part of Define Phase)

- Value adding / Non value adding / Business value adding

- 8 types of waste (TIMWOODS)

2. Map the value stream

- Value Stream Mapping

3. Make sure you reach Process Flow

- Process Flow

- Takt time

- Balancing processes

4. Shift from Push to Pull systems

- Kanban and WipCap / PCE

5. Strive for Perfection, eliminate mistakes
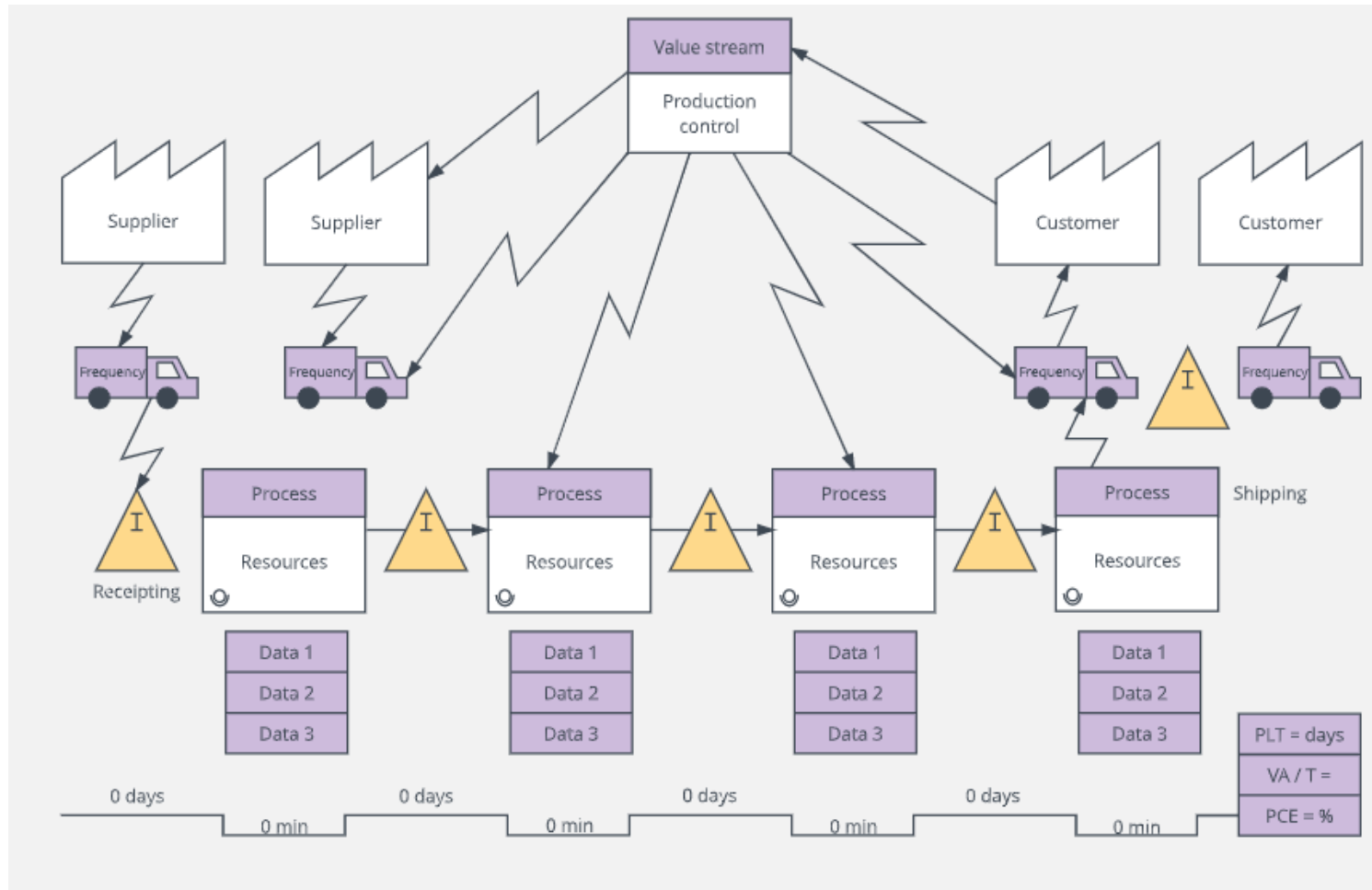
- Everyone, every day (KAIZEN)

1. Define Customer Value

VALUE $=$ $\dfrac{\text{Quality}}{\text{Cost}}$ $=$ $\dfrac{\text{Outcomes} + \text{Patient Experience}}{\text{Direct Costs} + \text{Indirect Costs}}$

Source: www.shplic.com

Why challenging to identify patient/ client value?

2.   Map the value stream

Source: https://www.lucidchart.com/

Example Healthcare

- https://www.youtube.com/watch?v=3mcMwlgUFjU

Three types of activities:

- Value Adding

- Non Value Adding

- Bussinus Value Adding

2. Map the value stream

How to determine which activity is adding value and which doesn't?

Simple rule: if the customer is willing to pay for the activity, it is value adding. If not, it could be considered waste!

But how about healthcare?

- The patient doesn't always know how to interpret value

- The patient doesn't directly pay for Healthcare services (mostly via insurance)
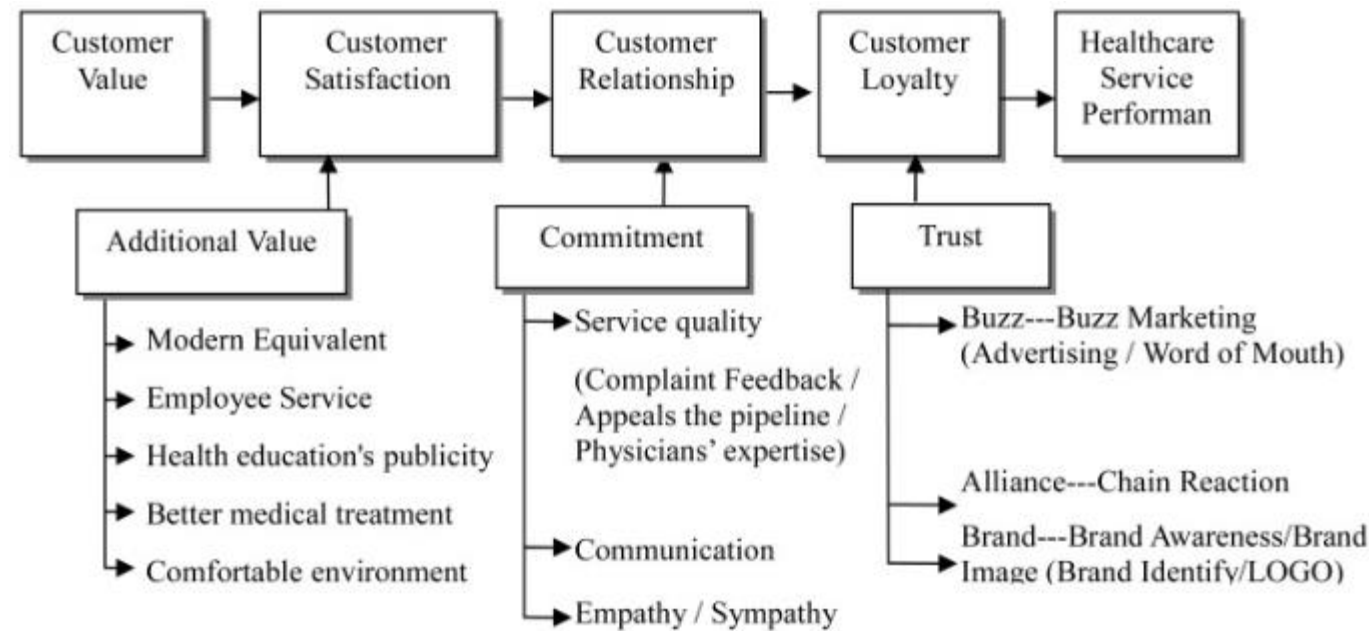
HELP

2. Map the value stream

So, what is a good way to determine customer value in Healthcare?

Collecting data by:
- Survey's

- Interviews

- Patient shadowing

2. Map the value stream

Simple rule: if the customer is willing to pay for the activity, it is value adding. If not, it could be considered waste!

But how to determine waste in a process?

2. Map the value stream

Within Lean management a distinction is made between 8 types of waste:

Transportation

Inventory

Motion

Waiting

Overproduction

Overprocessing

Defects

Skills

TIM WOODS examples in Healthcare

Defects

Example:
- Lab tests are performed twice because of errors
- An x-ray is read incorrectly
- Wrong site surgery

Overproduction

Example:
- Making more IV bags than are needed.
- Preparing 4 units of blood "just in case" for the OR

Waiting Time

Example:
- Delayed Cases waiting for instruments

kNowledge

Example:
- A resident's bright idea is "lost", or the resident is confused about how to do a task

Unnecessary Transportation

Example:
- Patient gets wheeled back and forth between the floor and radiology for multiple tests instead of taking one trip for all of them

Inventory

Example:
- Medicines held over the shelf-life because of excess ordering

Wasted Motion

Example:
- Pharmacy tech walks back and forth looking in multiple places for a particular med

Extra Processing

Example:
- Nurse records respiratory rate in multiple places in the chart
- Multiple copies of the same pathology report – in EPIC, in Medview, in SCM, on paper

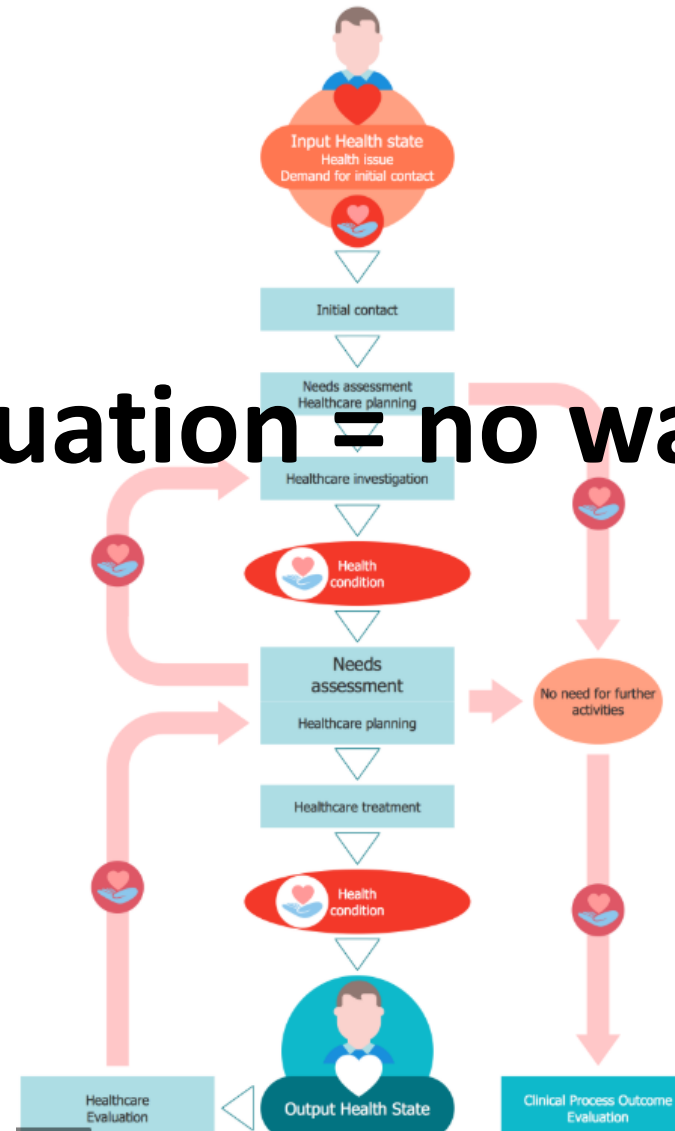*Source: creativesafetysupply.com*

TIM WOODS class assignment

Watch the following 'ist situation' of a husband makking toast for his wife and meanwhile try to find as many Tim Woods as you can:

The Current Condition
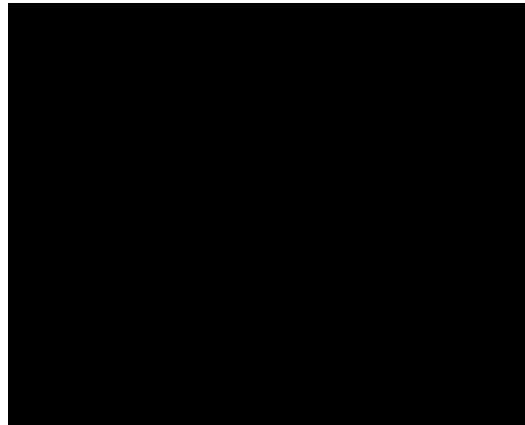
3. Make sure you reach Process Flow

Ideal situation = no waiting time for patient

Source: conceptdraw.com

3. Make sure you reach Process Flow

TAKT TIME

Takt comes from it German word stroke / beat or pace

The pace at which products must be made or delivered in order to meet **customer demand**.

Why? In order to create process flow

Formula:

Available time (sec/min/hrs) / customer demand

!! The takt time has not relation with number of people working in a process

Exercise calculating Takt time

Example X-ray in hospital

- One shift = 7.5 hours x 60 minutes / hour = 450 minutes.

- Minus lunch = 45 minutes / shift

- Customer demand is 25 X-rays per day

Exercise

- Can you calculate the Takt time for this process?

- Available time (sec/min/hrs) / customer demand

Calculation

- Single shift * 405 min. * 60 sec./ 25 x-rays

- 24,300 sec/ 25 X-Rays = <mark>972 sec.</mark>

What does this mean? In average each x-ray must not exceed 972 seconds (=16 min) to avoid the process being out of balance

4. Shift from Push to Pull systems

Little's law:

" Law that determines the fact that process lead time (=PLT) is related to amount of work in progress (WIP) or pipe line inventory (PLI)"

Formula:

PLT = WIP(PLI) / exit rate

Exit rate = amount of 'finished items' meeting customer requirements

In Healthcare 'finished item' is discharged or treated patient

4. Shift from Push to Pull systems

According to little's law: one 'piece flow' means 'exit triggers input'

Source: http://trilogiqusa.com/the-benefits-of-one-piece-flow/
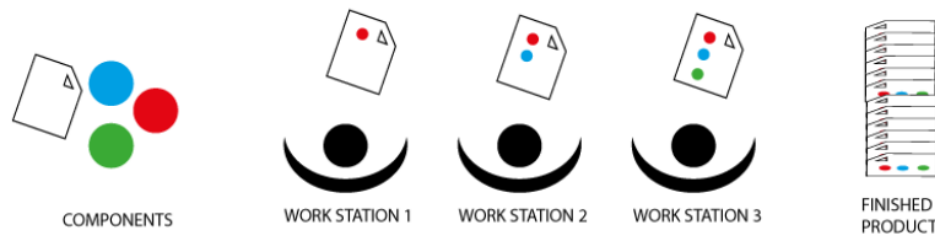
With the addition of one piece flow, inventory is not being built up at one station, errors are found sooner, and everybody is working.

4. Shift from Push to Pull systems

Motives	Availability	Perception of quality	Need for a second opinion	Familiarity
Push factors	Long waiting lists for specialised care	Long waiting lists for specialised care	Feeling uninformed	Communication barriers
	Restricted access to specialised care	Restrained access to specialised care	Lack of trust between patient and health professionals	Different expectations among patients and professionals
			Little familiarity with healthcare system in the country of origin	
			Lack of further options for treatment	
Pull factors	Perceived easy access: • No waiting lists • No need for referral	Fast and efficient treatment	Familiarity with the healthcare system in the country of origin	Feeling comfortable and secure in the healthcare system
		Specialised doctors	Perception of quality as better	No barriers in communication or language
			Searching for further options	

5. Strive for Perfection, eliminate mistakes

Six Sigma approach

Remember Six Sigma is systemized approach in order to achieve reduction in defects and variation

Why are variation and defects so bad in Healthcare?

Why in particular Six Sigma?
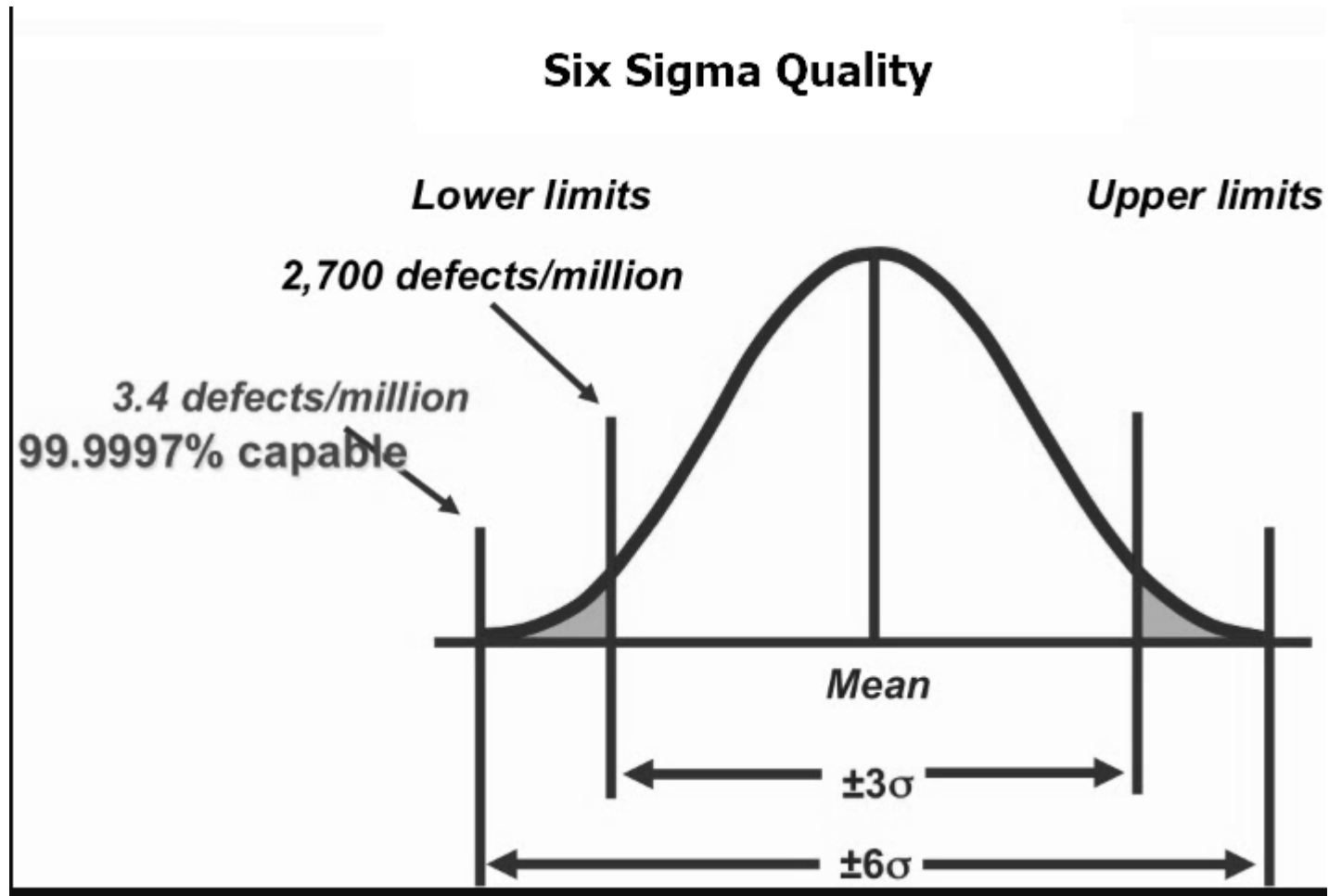
Six Sigma levels

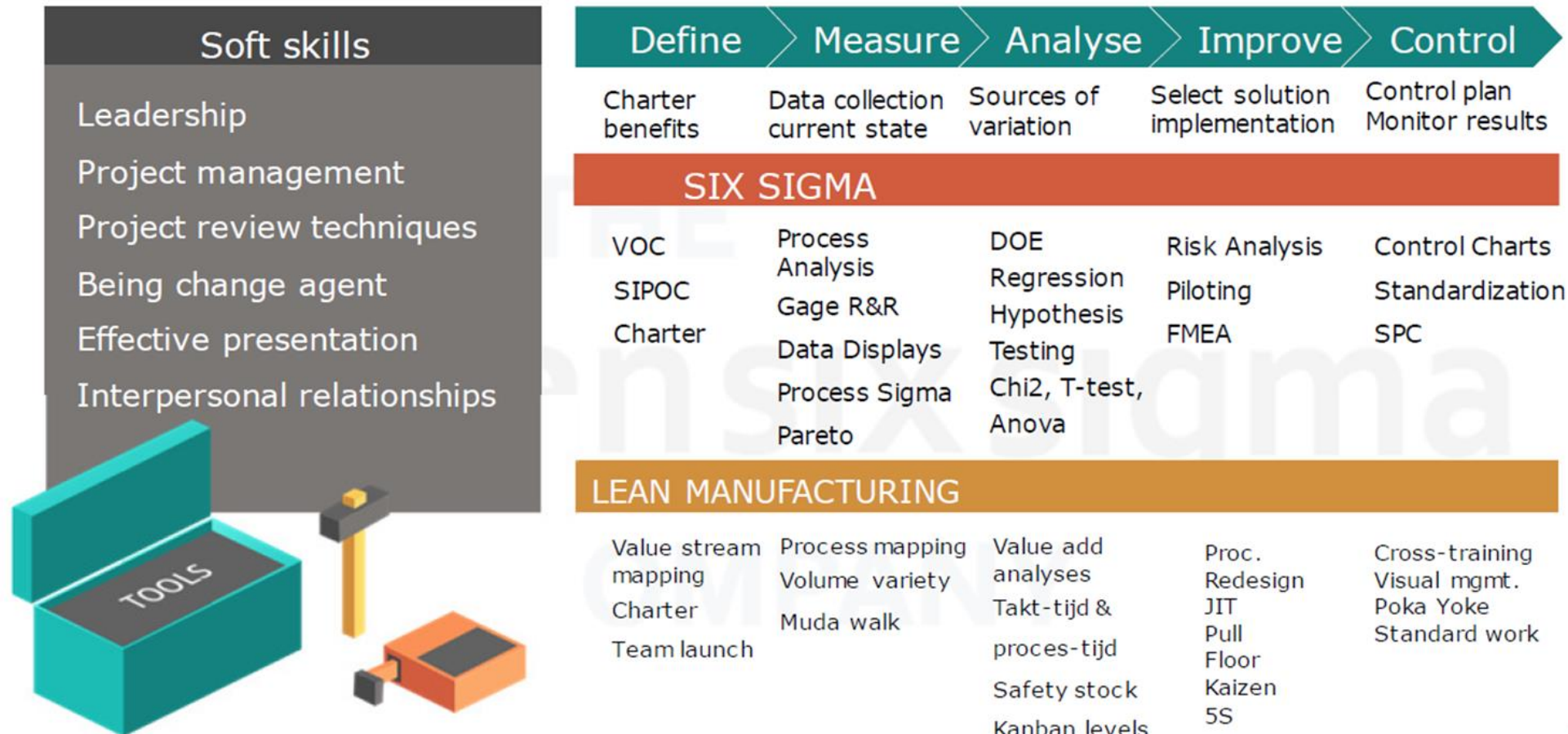| Sigma Level (Process Capability)	Defects per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

Why striving to reach 4 or 5 Sigma in healthcare is not good enough?

Six Sigma structure

Define
- Define the problem (outcome) the team will work on
- Define the customer and their definition of value

Measure
- Determine which processes and inputs have the greatest impact on variation in the outcome
- Develop a data collection plan and gather data

Analyze
- Analyze data gathered with statistical methods to determine the part of the process causing the most (unwanted) variation in the outcome

Improve
- Decide on a solution or a solution set
- Develop implementation and monitoring plans for the solution

Control
- Sustain gains achieved during the previous phase
- Transition solutions (new process) to person responsible

Lean Six Sigma combined DMAIC Tool box

Soft skills
Leadership
Project management
Project review techniques
Being change agent
Effective presentation
Interpersonal relationships

TOOLS

Define	Measure	Analyse	Improve	Control
Charter benefits	Data collection current state	Sources of variation	Select solution implementation	Control plan Monitor results

SIX SIGMA

Define	Measure	Analyse	Improve	Control
VOC	Process Analysis	DOE	Risk Analysis	Control Charts
SIPOC	Gage R&R	Regression	Piloting	Standardization
Charter	Data Displays	Hypothesis	FMEA	SPC
	Process Sigma	Testing		
	Pareto	Chi2, T-test, Anova		

LEAN MANUFACTURING

Define	Measure	Analyse	Improve	Control
Value stream mapping	Process mapping	Value add analyses	Proc. Redesign	Cross-training
Charter	Volume variety	Takt-tijd & proces-tijd	JIT	Visual mgmt.
Team launch	Muda walk	Safety stock	Pull	Poka Yoke
		Kanban levels	Floor	Standard work
			Kaizen	
			5S	

20

Source: theleansixsigmacompany.com

HELP

3.	Is able to know how the use of Lean Six Sigma and Theory of Constraints methodology can improve waiting	times, lead times, accessibility times, nr of visits, utilization rate of resources like Operating Rooms

4.	Is able to monitor AND improve patient/material logistical performance by using the Lean Six Sigma and Theory of Constrains methodology

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Integrated case study

Time line:

(1) Read the case → 15 min

(2) Design in a group of four students a

   (a)Value Stream Map

   (b) deciding on VA/NVA/BVA activities

   (c) to which type of waste (TIMWOODS) can you relate the NVA?

                   → 30 min

(3) Feedback and discussion → 15 min
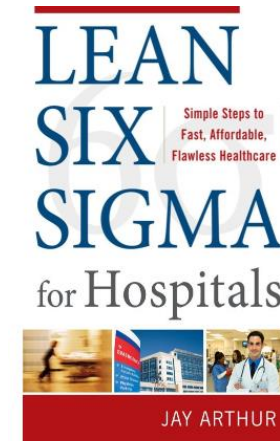
Literature to consider:

Authors: Mast, Ronald J.M.M. Does, Henk de Koning

Publisher: Beaumont

Author: Jay Arthur

Publisher: Mcgraw-Hill Professional

THANK YOU!

Next: Capacity management

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