Continuous Process Improvement

Learning Objectives

At the end of this module, you should be able to:

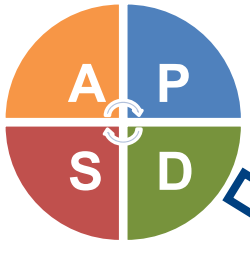
- Recognize PDSA as an effective process improvement approach
- Use a Continuous Process Improvement Framework for structured problem solving
- Apply VSM and basic lean tools to improve flow
- Utilize root cause analysis methods
- Devise an improvement plan to address root cause problems

What is Plan-Do-Study-Act (PDSA)?

PDSA is:

- Part of a continuous improvement culture
- A problem-solving process intended to improve the overall system
- A process intended to improve the problem solving skills of its practitioners

CPI Framework



Problem perceived

Grasp current situation

Diagnose root cause

Devise root cause treatment options

Visualize future state

Create implementation plan

Develop follow-up plan

Obtain stakeholder buy-in

Consult affected stakeholders

Plan

A culture of mentorship and personal growth

Do

Execute implementation plan

Execute follow-up plan

Study

Achieve an outcome acceptable enough to standardize?

No

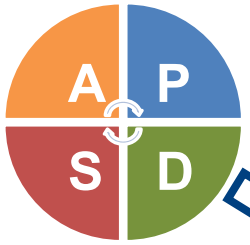
Yes

Act

Establish standard process

Adapted from: Sobek, Durward K., Smalley, Art., (2008). *Understanding A3 Thinking: A Critical Component of Toyota's PDCA Management System*. Boca Raton: Productivity Press, Taylor & Francis Group

CPI Framework



Problem perceived

Grasp current situation

Diagnose root cause

Devise root cause treatment options

Visualize future state

Create implementation plan

Develop follow-up plan

Consult affected stakeholders

Plan

A culture of mentorship and personal growth

- A detailed plan for implementing PDSA cycles
- Larger scale improvements require more detailed planning due to more complex processes affecting more stakeholders

Yes

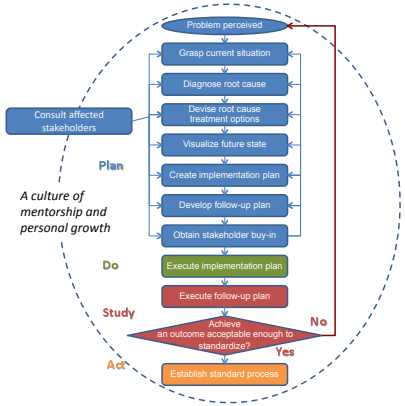
Act

Establish standard process

Adapted from: Sobek, Durward K., Smalley, Art., (2008). *Understanding A3 Thinking: A Critical Component of Toyota's PDCA Management System*. Boca Raton: Productivity Press, Taylor & Francis Group

Grasp the Current Situation

- Genchi Genbutsu – Have you gone to the gemba and used the three actuals?
- Value Stream – Have you mapped the current state and included pertinent process data?
- Metrics – What metrics represent the system performance?
  - Patient wait time?
  - Throughput?
  - Financial performance?
  - …..



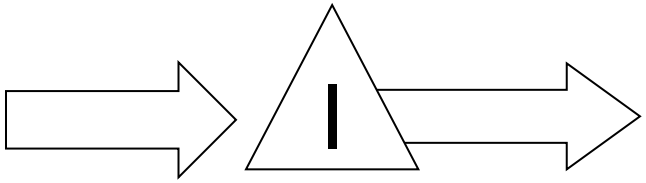
Team Exercise

Take 15 minutes to

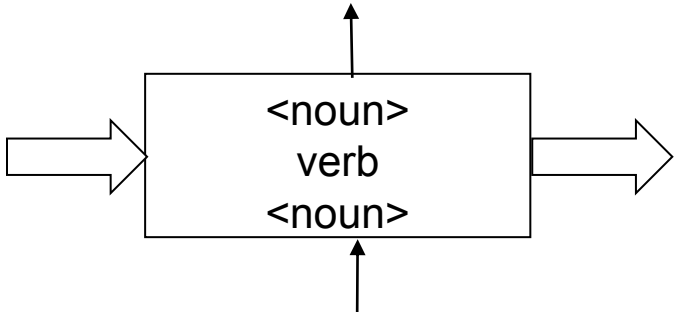
- Develop a current state process map
  - Write process steps on post-its
  - Organize them on a easel chart
  - Add decisions and waits/holds/inventories
  - Draw arrows for patient and information flow

- Present it to your table facilitator

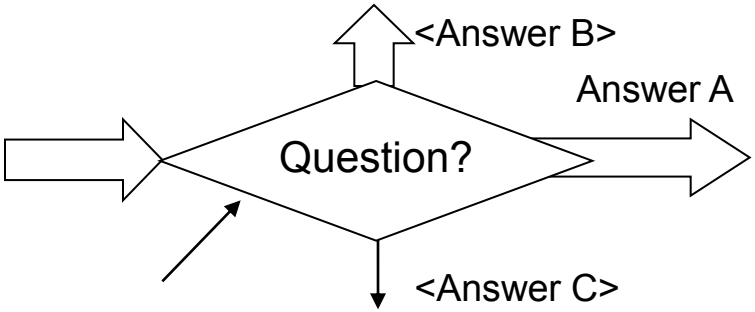
Basic Mapping Symbols



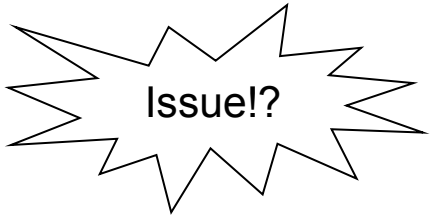
Inventory or waiting



Task



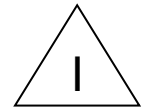
Decision



Burst

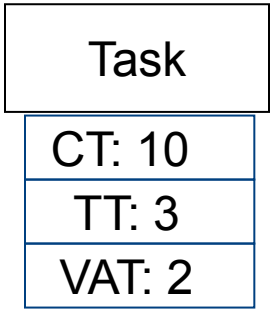
Adding Data

- **Wait time or Inventory Levels**

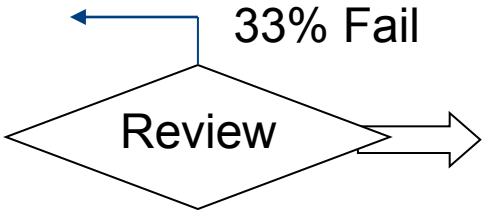


6 units

- **Time**
  - Cycle time (CT) - total end-to-end
  - Touch Time (TT) - something is happening to job
  - Value Added Time (VAT) - core process (hourglass)

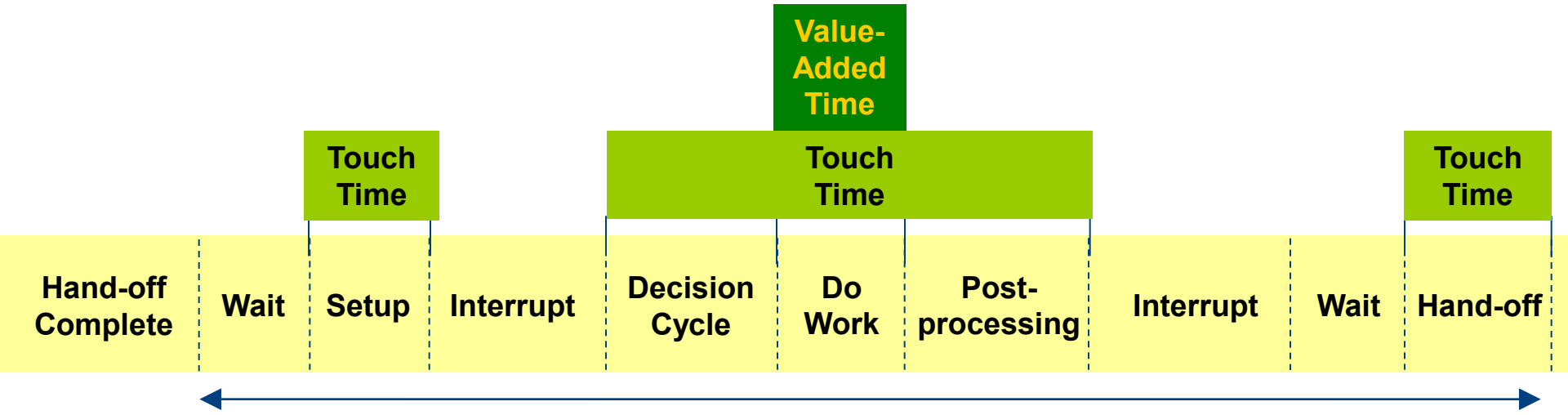


- **Quality/Decision outcomes**
  - Rework rate (incident of defects)
  - Probability of different outcomes



- **Can use averages (e.g. CT = 10) or ranges (e.g. CT = 6 – 13)**

Time Definitions



Cycle Time

- Waiting and interruptions cause work to sit idle
- "Touch time" is when workers are busy, resources are being used
- Only some of the touch time is value added

Team Exercise

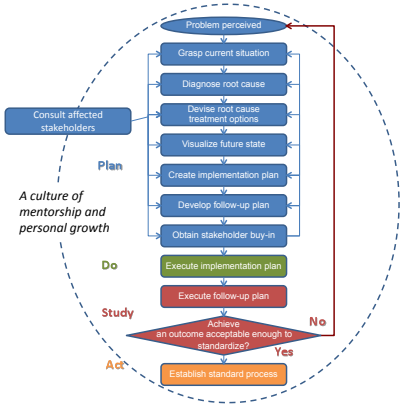
Take 5 minutes to

- Add data to your process map
  - Loads (how many patients/rd?)
  - Times (average/extremes)
  - Chances of errors or positive/negative tests
  - Inventories or waits

- Present it to your table facilitator

Diagnose Root Cause

- Distinguish between cause and effect
- Seek root causes of process problems
- Avoid short term "work arounds"
- Four useful root cause analysis tools
  - 5 Whys
  - Capacity analysis
  - In tomorrow's Quality module
    - Cause and effect diagrams
    - Pareto charts



5 Whys Refresher

Problem: Patients are being incorrectly charged for their visits.

- ***Why?*** **The charges of another patient with a similar name may be captured incorrectly**
- ***Why?*** **Confusion when more than one name is used for the patient (i.e., nicknames)**
- ***Why?*** **Patient is not admitted with his/her registered Medicare name**
- ***Why?*** **Admissions doesn't always ask for the patient's insurance card**
- ***Why?*** **Admission activity is not clearly specified**

References: Jimmerson, Cindy (2007). *A3 Problem Solving for Healthcare: A Practical Method for Eliminating Waste*. New York: Productivity Press.

5 Whys Pitfalls

Possible pitfalls to be aware of when conducting a 5-Whys analysis

- 5 maybe too many or not enough Whys. It is a guideline, not a strict requirement
- Results will likely not be repeatable – different people may identify different causes for the same problem
- Difficult to explore / identify all possible causes – you can't find causes that are outside your current knowledge level

Capacity: A Formal Definition

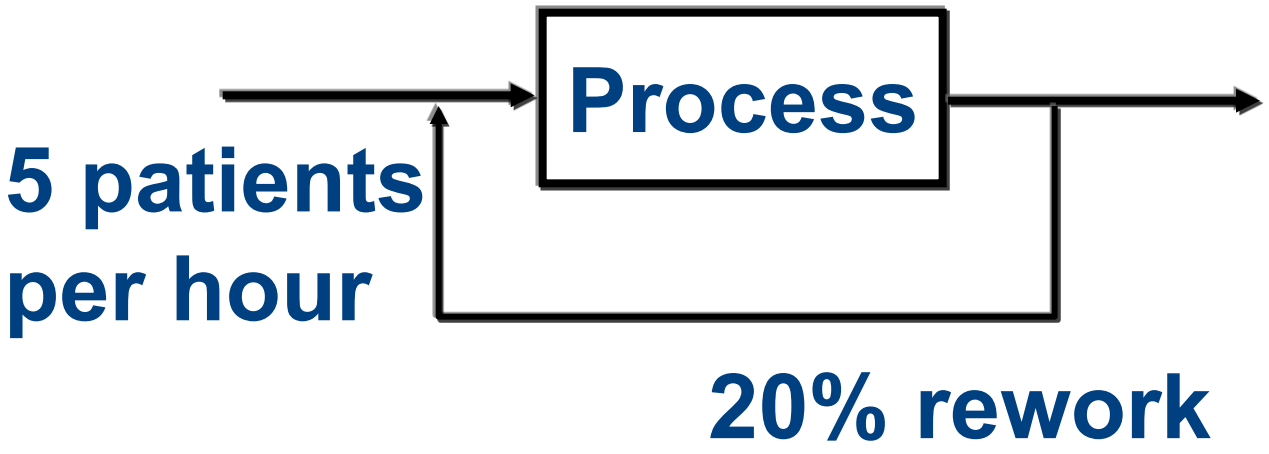
- **Theoretical Capacity:** Maximum sustainable flow rate at an activity

- **Effective Capacity:** Capacity of the activity accounting for detractors

Image; Wikimedia. Mario Roberto Duran Ortiz Mariordo. CC-BY.

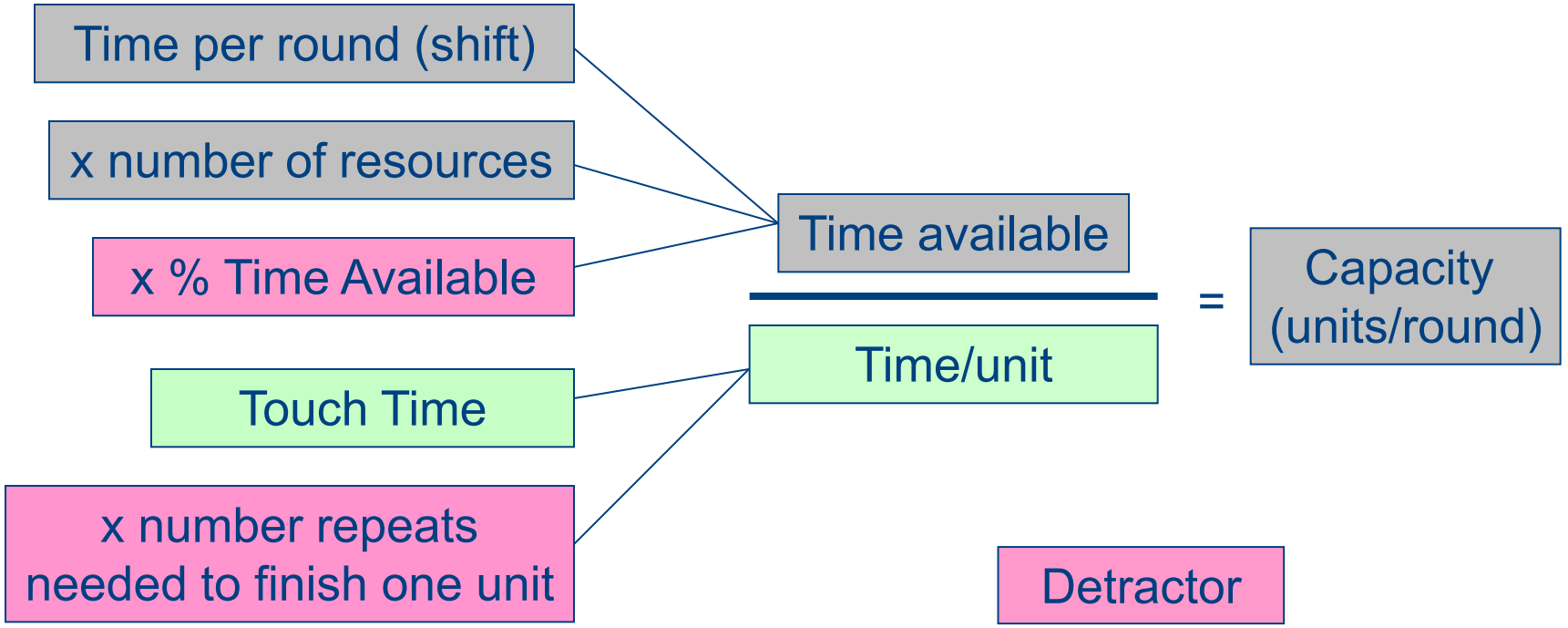
Capacity Detractors

- Example: Rework (defects) as a detractor



- Other detractors include unevenness and unreasonableness, multitasking, equipment downtime…

Capacity Calculation

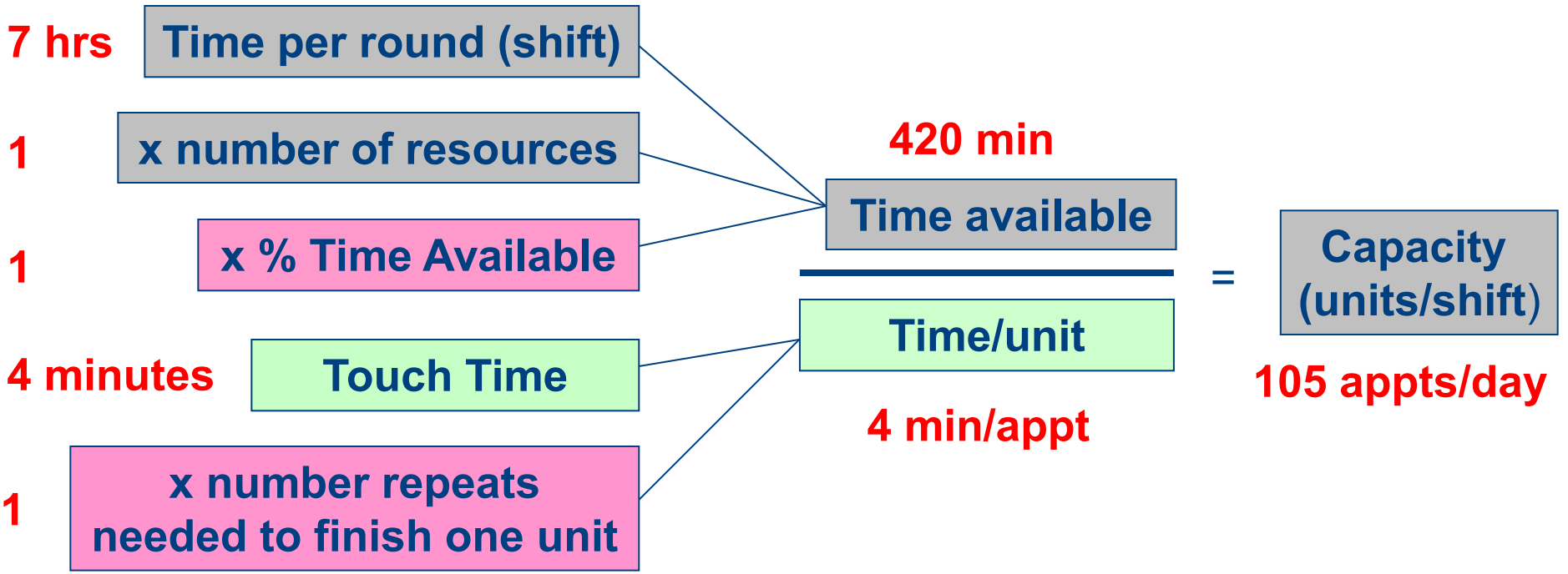


- **Local terminology and practices will vary**
- **Basic concepts do not**

Capacity Calculation – Typical Example

Assume "perfect" availability and no repeats

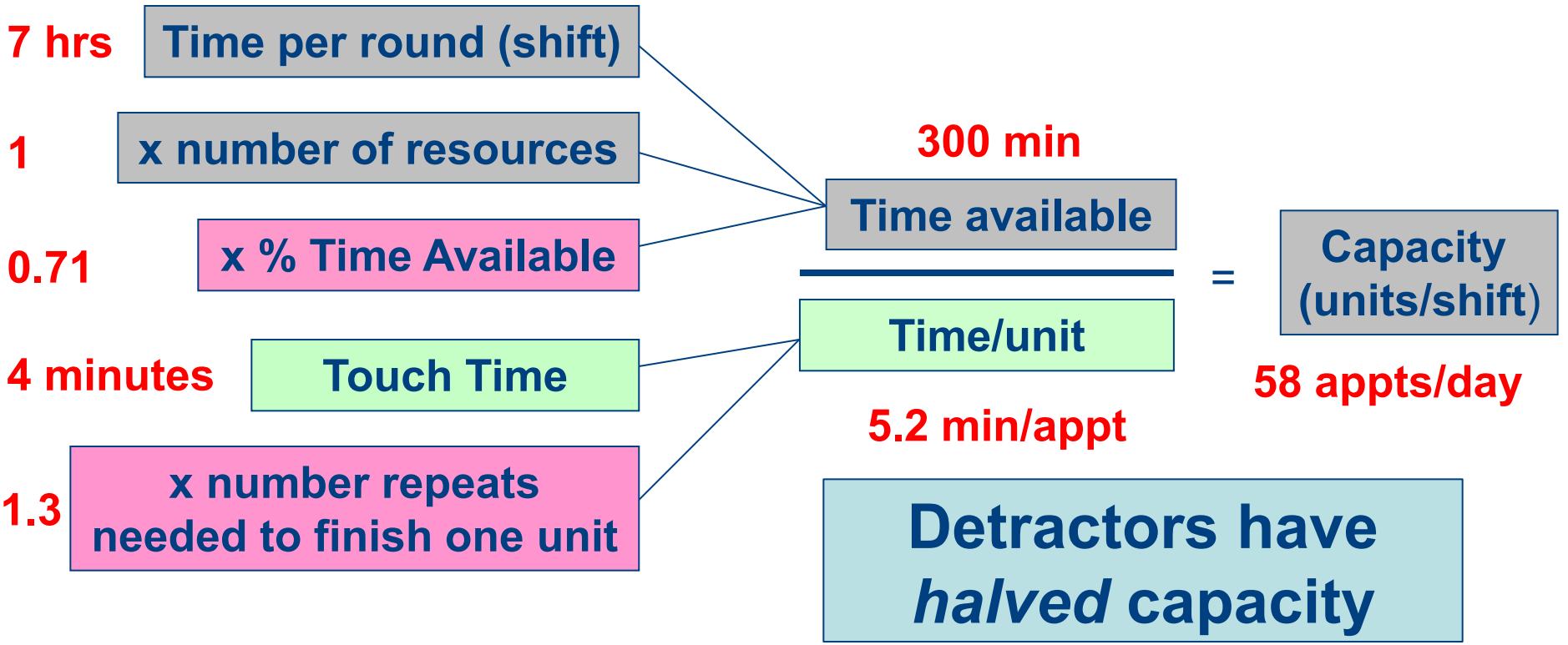
Appointment system:
- 7 hour shifts
- 4 minutes per call
- 1 operator

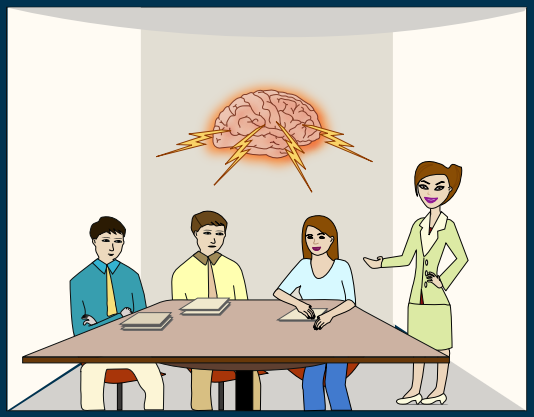


Capacity Calculation – Realistic Example

Assume 2 hours lost per day to meetings, coordination, slack time etc.

Assume 30% of the appointments need a second call to resolve conflicts and correct mistakes





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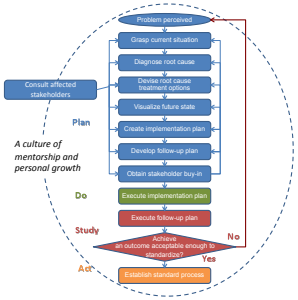
Team Exercise

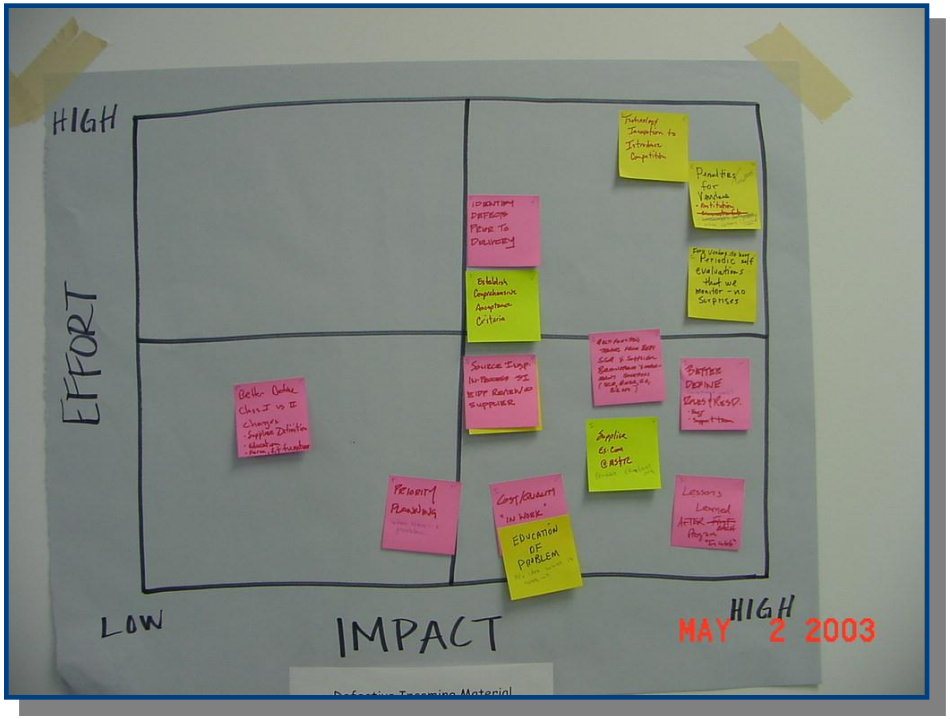
- Take 10 minutes to do a root cause analysis for your clinic's operation
- Identify the causes that can be remedied using lean principles and tools introduced yesterday.
- Capture results on an easel chart, and present your results to your table facilitator

Devise Root Cause Treatment Options



- Brainstorm possible options
  - Avoid jumping to solutions
    - Consider multiple options
  - Seek to prevent recurrence of the problem
    - Avoid "workarounds"
- Consider cost and resource constraints
  - PICK charts - simple and intuitive prioritization
  - Pareto charts - data driven prioritization
  - Cost/Benefit analysis - prioritization based upon return on investment

PICK Charts



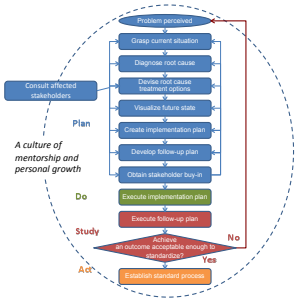
Kill	**C**onsider
Possibly Implement	**I**mplement

Organize Possible Projects

Prioritize Actions

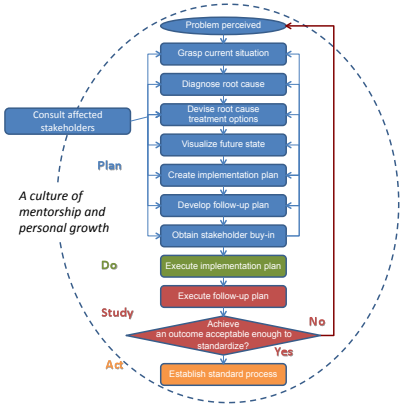
Visualize Future State

- Visualize the new process with a Future State Value Stream
  - New process may have similar value stream but different operations or resources OR
  - A different work flow which can be best visualized with a new value stream
- Future State Value Stream can also be an exploratory tool
  - Extreme is to consider the *Ideal State* Value Stream – what would the best possible process look like?

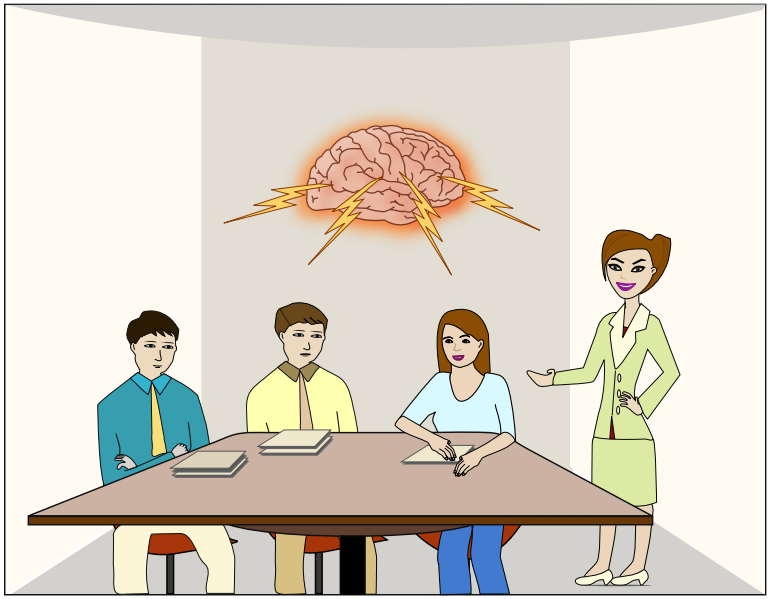


Complete the Plan

- Create an Implementation Plan
  - A road map that outlines our movement from the current state to the future state
  - Identifies who will do what and by when
- Develop a Follow Up Plan
  - How will results be verified?
  - When will the results be verified?
  - What data will be collected?
  - Who will the results be shared with?
- Obtain Stakeholder Buy In
  - For now, you need the approval of your table facilitator for your improvement plan



A3 – A Structured Way to Operationalize CPI



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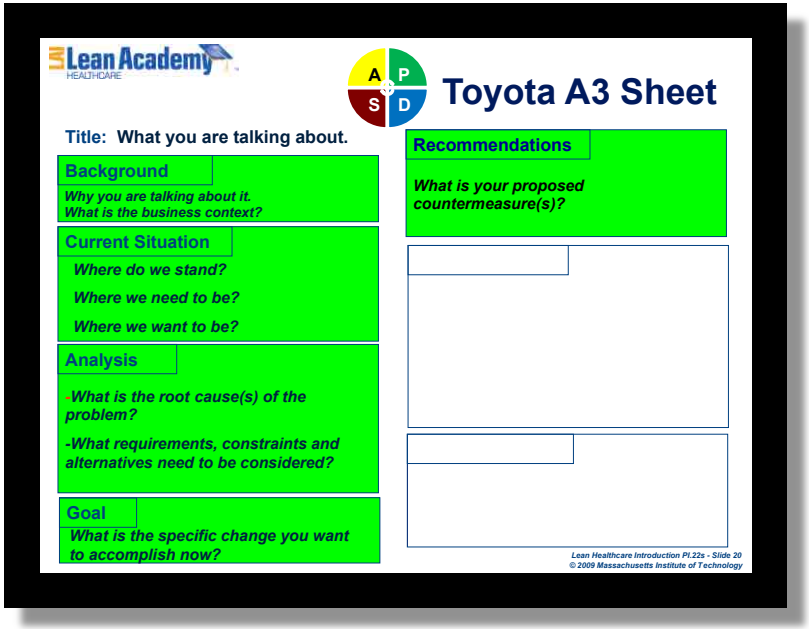

- Both a *way of thinking* and a *tool*
- A management process evolved at Toyota
- Named for the A3 sheet of paper (~ 11 x 17 in)
- Will be covered in "A3 Thinking" module

Team Exercise

You will devise a change plan for the simulated clinic, following the CPI framework

- Devise “treatment” (improvement) options
- Create implementation plan
- Present it to your table facilitator to obtain “stakeholder buy-in”

Simulation Progression

- Segment I: Baseline performance
  - Learn and practice the rules
  - Use simple lean tools to improve legacy process
- **Segment II: Applying Lean locally**
  - Create a process map and add data for a simple VSM
  - Find waste and bottlenecks
  - **Devise clinic process improvement plan** 

  - **Execute and stabilize the improved process**
- Segment III: Applying Lean across clinics
  - Face external disruptions and enterprise issues
  - Improve enterprise performance with Rapid Process Improvement and Daily Management System

Notes on Value in the Simulation

- Value is created by admitting and discharging patients with correct treatment
- Correct Treatment is defined as having all dots in the right order on the chart
  - Dots = testing or treatments
- Patients are happiest if this happens in minimum time
- Other stakeholders (insurers, clinic, other caregivers) require all paperwork to be done correctly

Notes on Process Changes in the Simulation

- Sorry, can't change the hourglass speed (or skip them)
  - This is the details of the Value Added tasks, which we NOT addressing
- Correct treatment is defined as having all dots in the right order on the chart - *can't change this*
  - Dots = testing or treatments
  - CANNOT change who administers which dots
- Steps, *including routing decisions*, must be made by qualified personnel
- Paperwork must be completed
  - May change its *form* (in a later round), but information must be captured for records and billing

What goes where

- Patients need to be in a waiting room or process location (treatment, exam, etc.)
  - Can't queue in the hall
  - You can make more waiting rooms…
- Paperwork needs to be in a file room or process location (same capacity as patients)
  - Can't be left "out" or in the waiting room due to confidentiality

Process Change

- Almost always involves *routing*
  - Can't omit hourglasses or operations involving dots
  - Personnel must be qualified to make decision
- Not free (fee noted on chart)
- New process must be written on index card and retained for audit

Cross-Training

- Cross-training allows personnel to get outside of their usual roles
- For now, cross-training allows
  - Admins to do *either* admit or discharge work
  - RNs to do Admin work, and/or make certain routing calls currently done by MDs *(but only if no red dots are involved)*
  - MDs to do Triage work
- We will consider *Teamwork* (which also requires cross-training) later

Hiring

- **Can hire more of the same type of people, plus some special ones**
  - **Patient Advocate helps Admin's and Triage with difficult cases**
  - **Extern - helps MD**

Purchasing

- Can buy more equipment
  - Resource cards (same, or improved models)
  - Bins, Timers - 10 each
  - Biometric ID tags - 50

Super Gizmotron

Purchase: 950
With trade-in: 500
Does NOT fail on a "6"

$950 each

$10 each

$50 set of 60

Team Exercise: Details

Take 30 minutes to

- Select changes that might impact your identified root causes
  - Estimate cost, impact, and possible implementation issues
  - Check with your facilitator to assure the changes work the way you think they do
- Create Change Plan
  - List options
  - Select preferred action(s)
  - Budget $200
- Present to class
  - Obtain “stakeholder” (facilitator) approval

Suggested Planning Template

On an Easel

- **Systematic change planning is key to lean transformations**
- **We will be learning more formal methods for planning in the A3 module**

Improvement Goal			
Option	Effect	Cost	∆metrics
Recommendation			
Implementation Plan			

Wrap Up

- PDSA anchors a continuous improvement – and continuously learning - culture
- Use a structure problem solving process like the Continuous Process Improvement Framework
- Lean Thinking concepts and tools can improve process flow when thoughtfully applied
- Change plans should be carefully selected and documented

Reading List

Graban, Mark, *Lean Hospitals*, 2nd Ed, CRC Press, New York, 2012

Jimmerson, Cindy. *A3 Problem Solving for Healthcare: A Practical Method for Eliminating Waste*. Productivity Press, Boca Raton, FL. 2007

Shook, John, *Managing to Learn: Using the A3 management process to solve problems, gain agreement, mentor, and lead*, Lean Enterprise Institute, Cambridge, MA 2008

Sobek, D. K., Smalley, A. *Understanding A3 Thinking: A Critical Component of Toyota's PDCA Management System*, Productivity Press,. Boca Raton, FL. 2008

Acknowledgements

Contributors

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