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Lean Principles in Hospital Pharmacy

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Blackpool Victoria Hospital

&

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The Manufacturing Institute



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REDHAWKES & SHINGO

Introduction

- Blackpool, Fylde & Wyre Hospitals NHS Foundation Trust
- Approx 800 beds on acute site & 200 beds at peripheral hospitals
- Serves a population of approx 330,000 residents & 12 million holiday makers per year
- Approx 56,000 Day cases & In-patients, 250,000 Out patients & 91,000 A&E patients per year
- One of four tertiary cardiac centres in the NW, providing specialist cardiac services to heart patients from Lancashire and South Cumbria
- Pharmacy department dispensing approx 1100 individual patient items per day & 350 stock transactions per day
- 90 members of staff
- No prior experience of Lean



Agenda

- Introduction
- Project driver
- Engagement with TMI
- Project scope
 - Layout, Work Flows & Working practices
 - Performance Monitoring
- Current State
- Interim Process Management
- Lean Awareness Training
- Lean Tools and Techniques
 - Value Stream Mapping
 - Data Collection and Analysis (Work Flows)
 - Lean Layout & Robot Re-Design
 - 5S
 - Standard Operating Procedures
 - Resource Planning
 - Visual Management
- Future State & Benefits



Project Driver

- Mid July 2007, commenced project to install automated dispensing system (robot)
- Awareness working areas had to change
- Ideas for changes but no firm way forward
- Had need to evaluate how things were done 'now'



Engagement with TMI

- Approached by other hospital department who had worked with TMI before
- With imminent installation of automation, an ideal opportunity to evaluate
- Needed to increase productivity to release staff to take on additional roles
- Seeking to introduce ongoing service improvement



Layout, Workflows & Working Practices

- Needed to review all working layouts and workflows to accommodate automation
- Needed to change many working practices



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Performance Monitoring

- Previously only basic measures of performance recorded
- No formal or specific detailed monitoring
- Staff not aware of 'how busy' just felt busy



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HIGH-ACHIEVING & DIVERSE

Current State

- Busy hospital Pharmacy department, average discharge turnaround time approx 3 hours
- Situation where as time evolved, gave more specific prescriptions priority so more priorities than not
- Different types of prescription dispensing in separate workflows
- No dedicated checking areas
- Separate team leaders managed different sections of work but communication not always good due to environment
- Staff felt segregated by location of stock down centre of work areas



Current State

- Staff able to 'avoid' prescriptions which were perceived to be problem ones
- Problems were unclear to identify within other work
- Work frequently dispensed out of sequence
- Difficult to identify progress of that day's work
- Fast moving stock was placed in working area but under benches so difficult to access
- Some staff negative to change as, 'we've always done it like that!'





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Interim Process Management

- To allow imminent building, enabling and installation works to commence, large part of department had to temporary relocate for approx 4 months
- New processes had to work in the interim period as well as long term



LEAN Awareness Training

- Initially undertook some basic Lean awareness training with 10 key Pharmacy & 2 Trust Service development staff
- Successful so arranged training to majority of other Pharmacy staff (approx 70 trained)
- Feedback from training very positive and helped to demonstrate to staff what we wanted to achieve



LEAN Tools & Techniques

- Value Stream Mapping

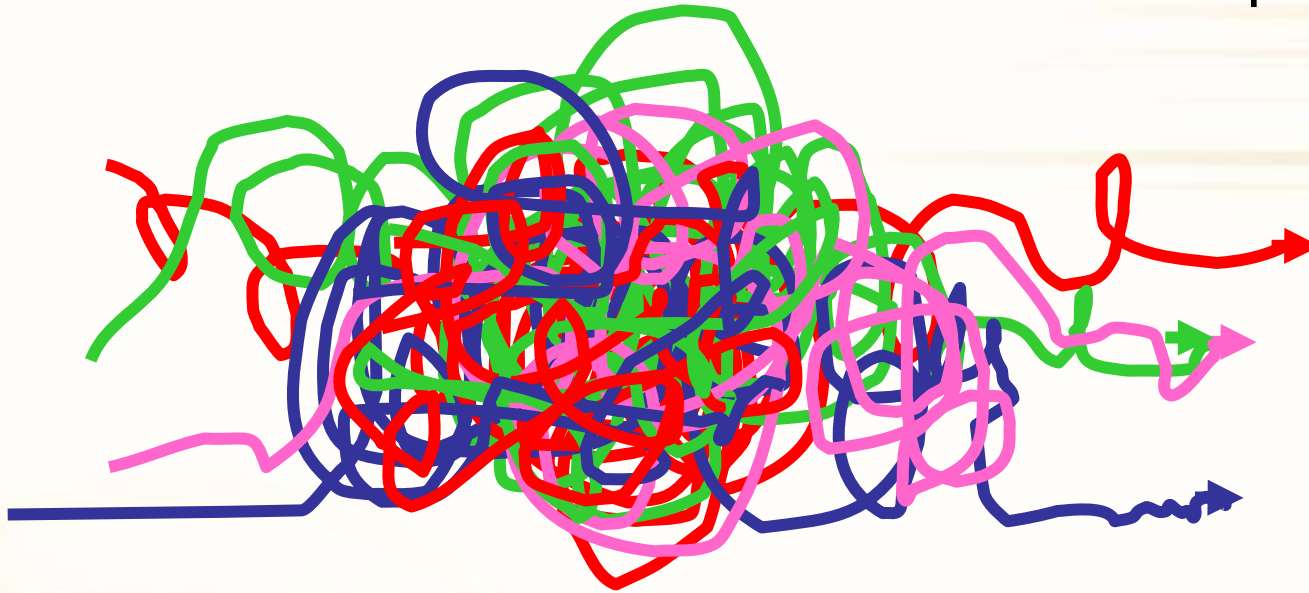


What is value stream mapping?

Inputs

Your Process

Outputs



The consequences of a “Functional” shop floor, shared resources, long changeovers, MRP and no Flow!

VSM is the way you unravel your companies’ spaghetti!



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Lean is about getting each of your value streams to flow like the original Ford T Line!

Inputs

Your Process

Outputs

Value Stream 1



Value Stream 2



Value Stream 3



Value Stream 4



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Anatomy of a Value Stream Map

Supplier

Information Flow

Customer

Material Flow

LEAN Tools & Techniques

- Value Stream Mapping
- Data Collection & Analysis (workflows)

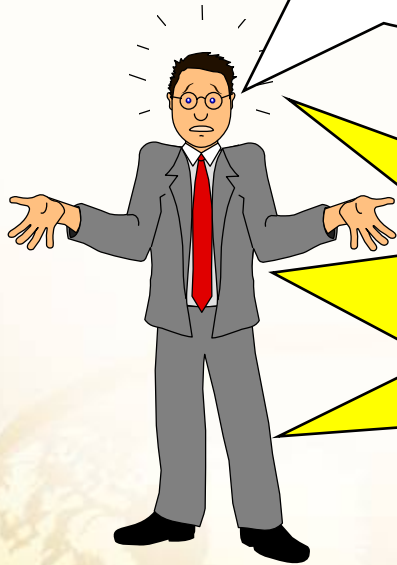


Speak with DATA!!!

These Parts are rubbish
& the Supplier is Useless!

50% of the latest shipment
of Part No 0001234 where
found to be defective. We have
contacted the supplier
and they have set
up containment actions
& they are investigating
the root cause.

Where is the
Data ?



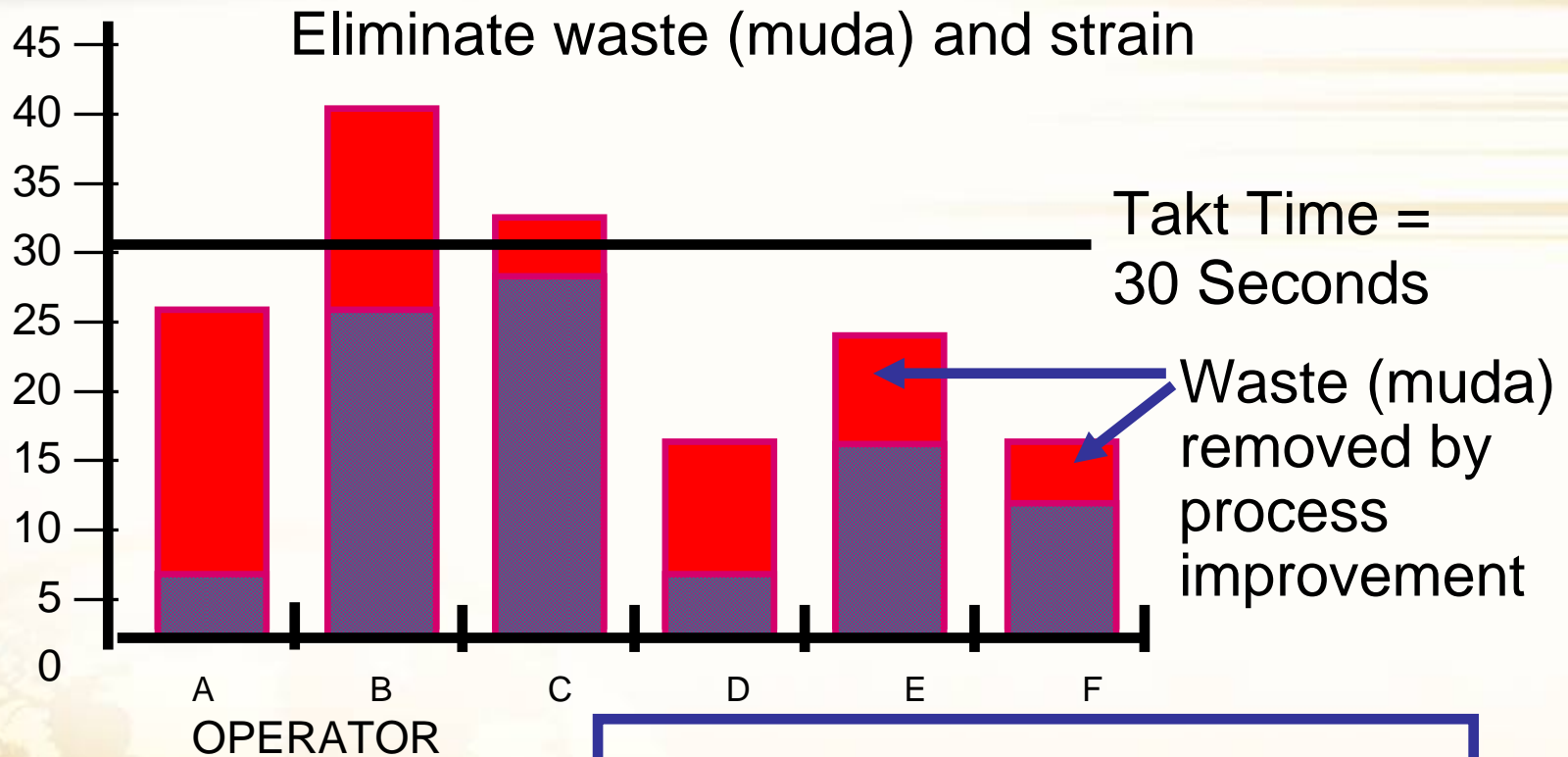
Vague



Specific



Takt Time vs. Cycle Time

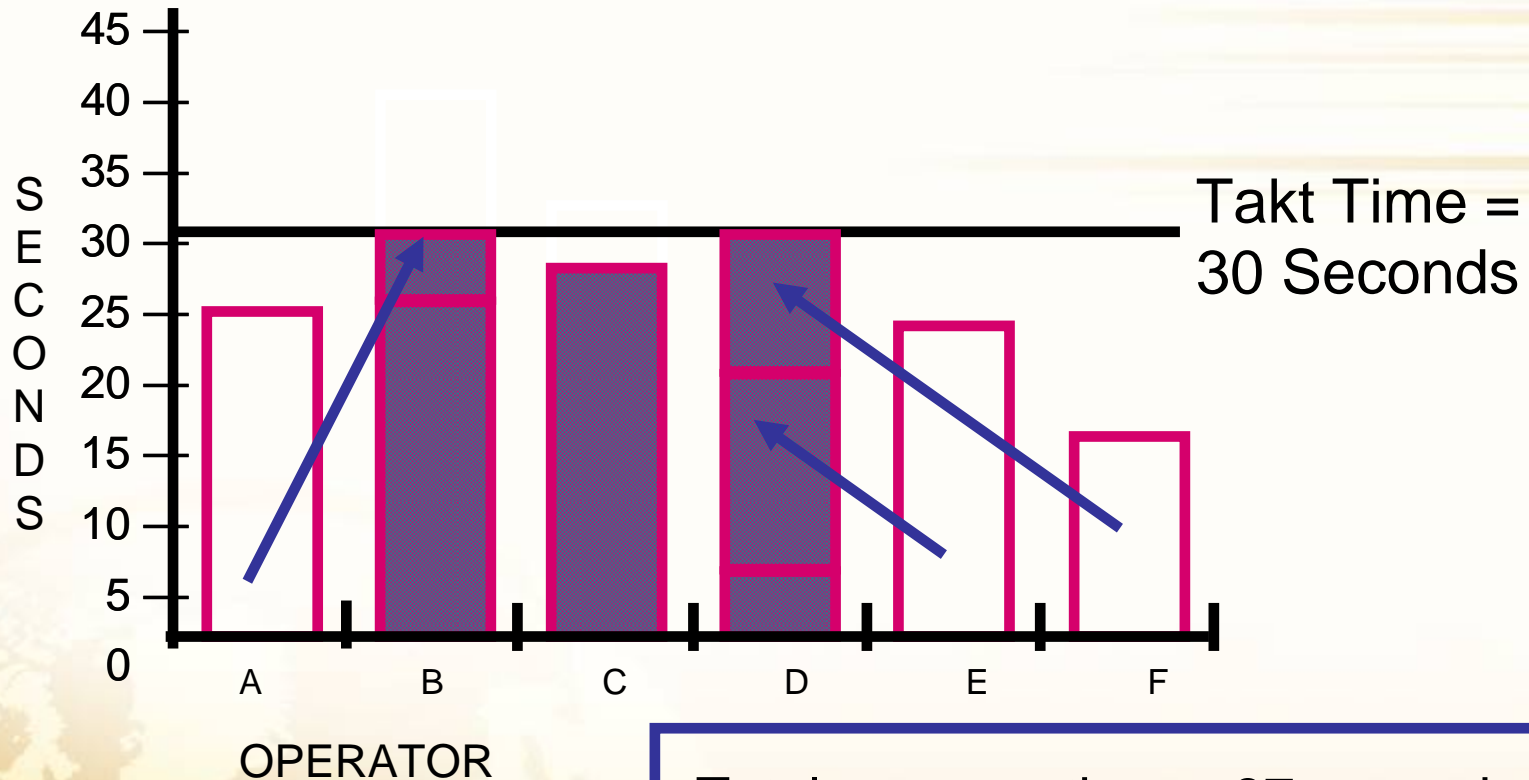


Total process time = 87 seconds



Takt Time vs. Cycle Time

Rebalance workload and eliminate strain



LEAN Tools & Techniques

- Value Stream Mapping
- Data Collection & Analysis (workflows)
- Lean layout & robot re-design



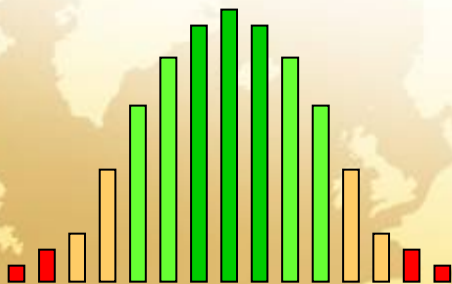
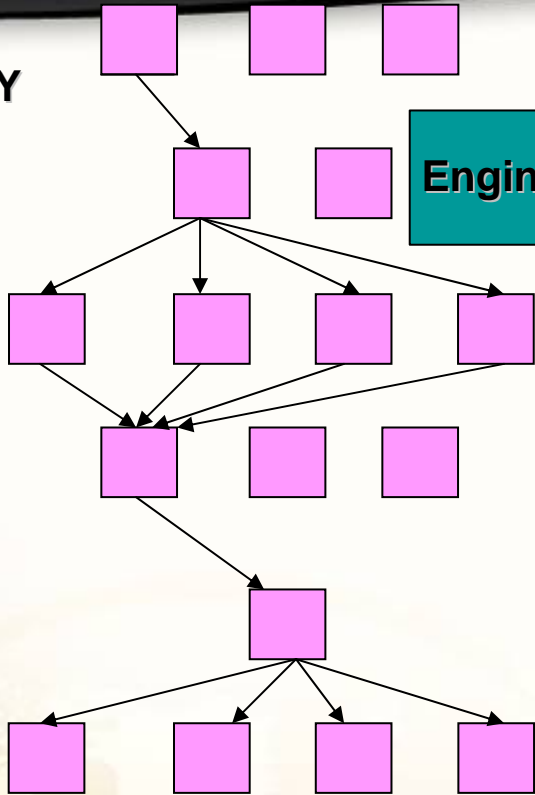
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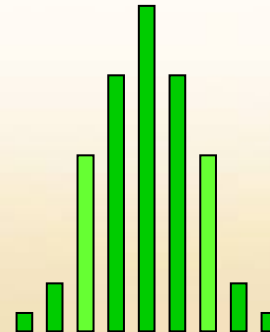
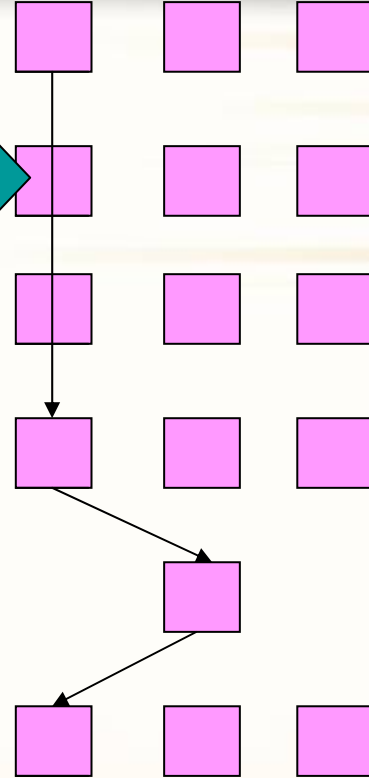
VARIATION

TODAY



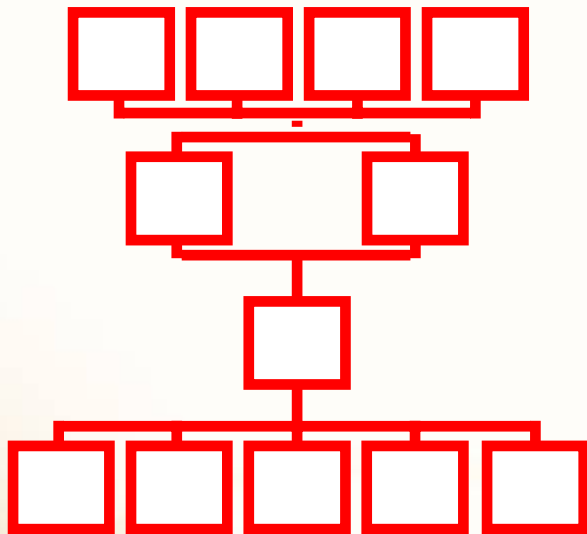
TOMORROW

Engineering know how



Turbulent Stream & Straight Stream

TURBULENT STREAM



Large scale
General purpose
High cost
Lot production
Difficult to prevent recurrences

STRAIGHT STREAM

First Process



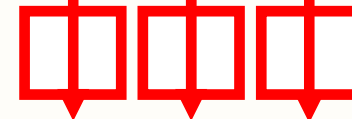
Second Process



Third Process

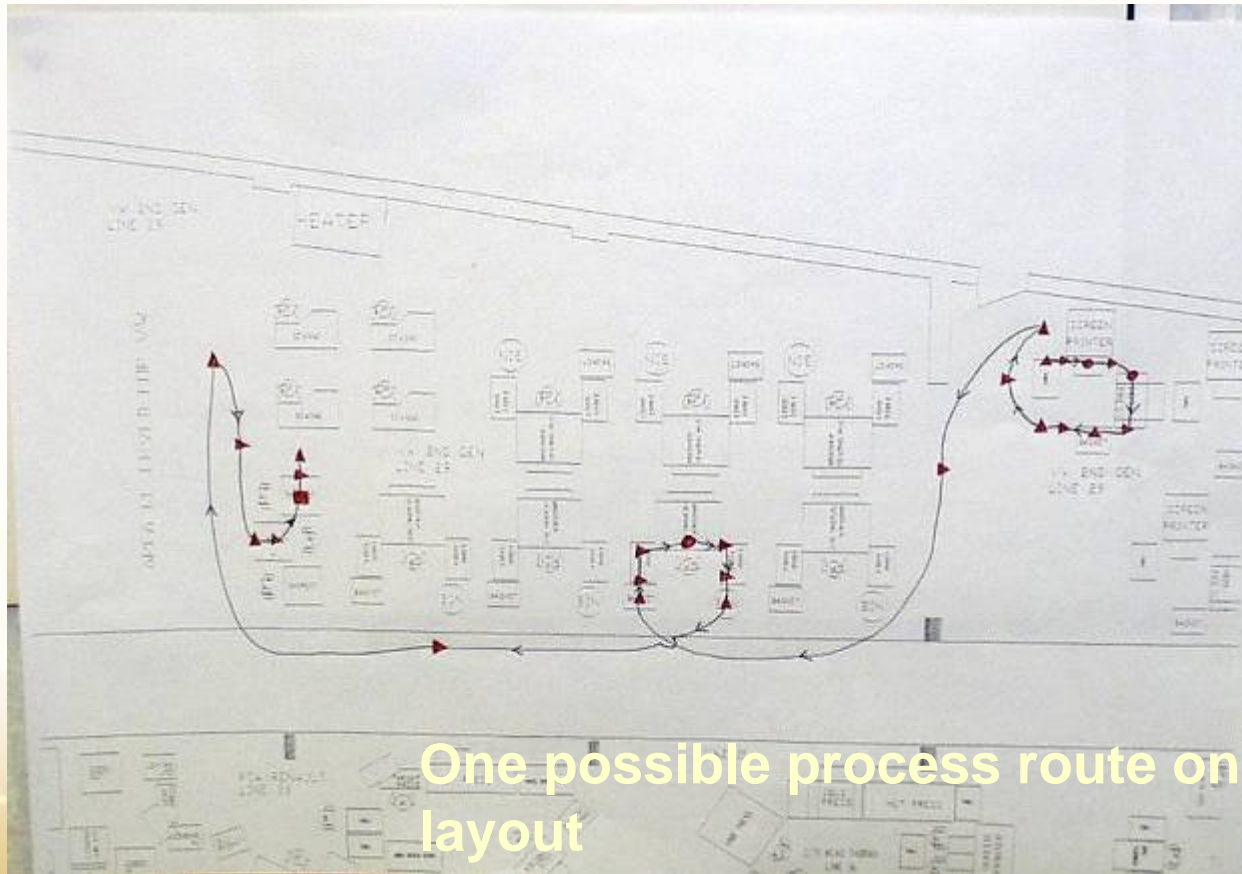


Fourth Process

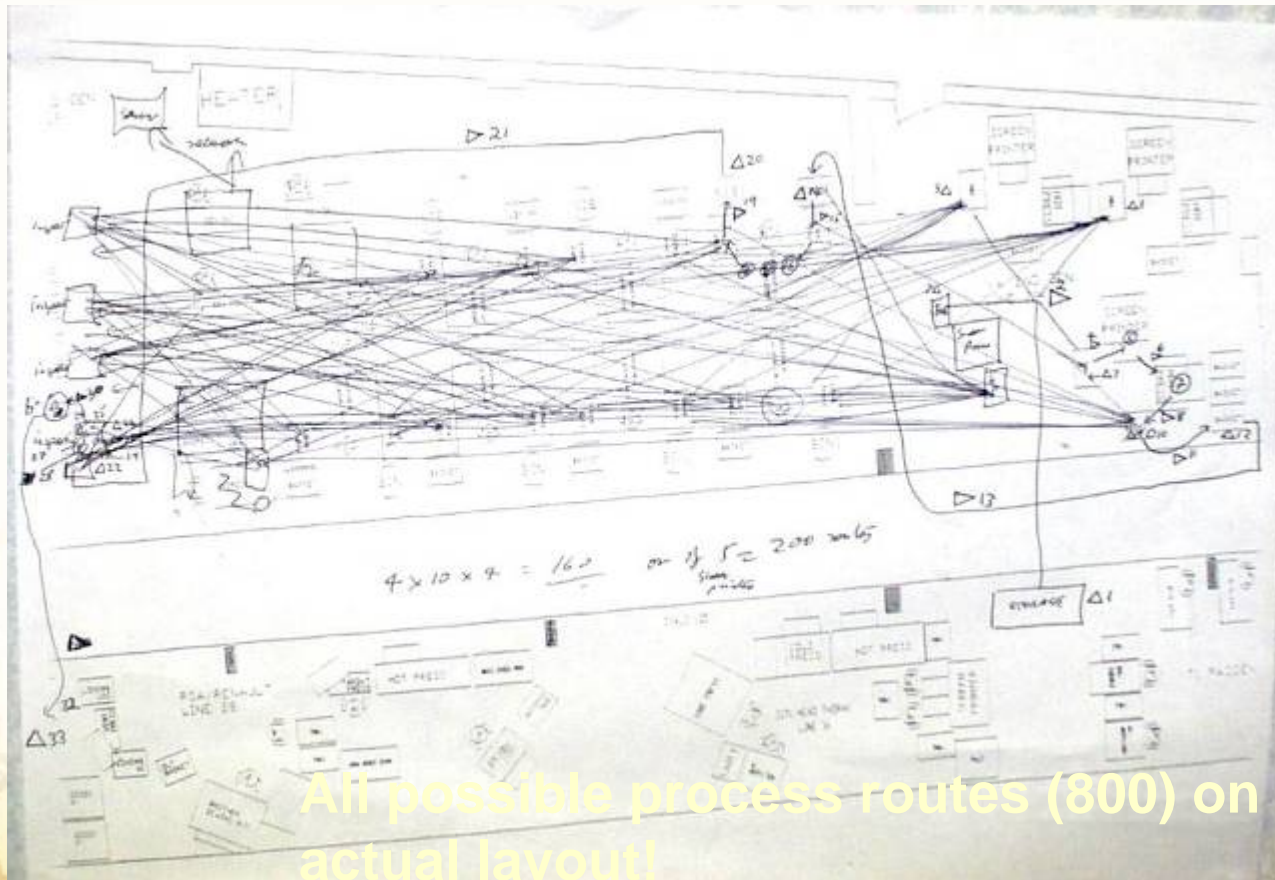


Small scale
Dedicated & general purpose
Low cost
Piece-by-piece flow
Easy to prevent recurrences

Turbulent Stream Example – Sewing Industry



Turbulent Stream Example – Sewing Industry



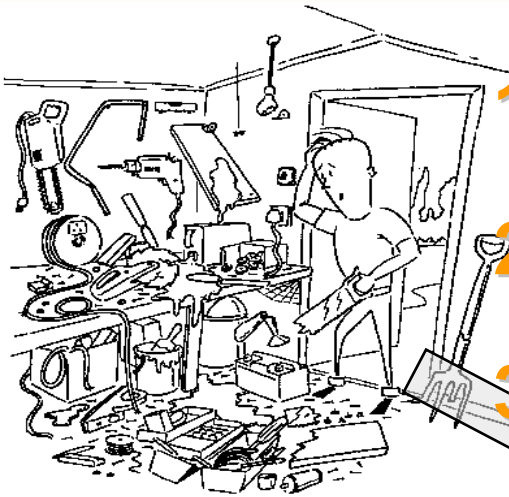
All possible process routes (800) on the actual layout!

LEAN Tools & Techniques

- Value Stream Mapping
- Data Collection & Analysis (workflows)
- Lean layout & robot re-design
- 5S



Workplace organisation – 5S



From this!

1st S - Sort

2nd S - Straighten

3rd S - Sweep

4th S - Standardise

5th S - Sustain

To this!



Standards ensure the change is maintained!!

STATION HOUSEKEEPING STANDARD

22-Apr-03

Issue 1

Carl Tomlinson

Area: Mainline Stage 1



Activity	No	Location	Method	Criteria	Action	When	Resp.	Time
Check	1	Tool Board	Visual	All tools in place	Check, find, reorder	End of shift	SD	
	2	Louvre Pannel	Visual	Bins nearly empty	Check, top up	End of shift	SD	
	3	Shelving	Visual	Empty bins	Place on "Need refill" pannel	As required	SD	
	4	"Need refill" pannel	Visual	Empty bins	Refil to correct level, advise Keith Prior if stock not available, note on shortage sheet, place bin on "Shortage" pannel	End of shift	SD	
Clean	5	Floor	Manual	Litter free	Clean	End of shift	ROTA	
	6	Bin	Manual	Empty	Remove wate to skip and replace liner bag	End of shift	SD	
	7	Bench Surface	Manual	Dirt free	Clean	End of shift	SD	



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LEAN Tools & Techniques

- Value Stream Mapping
- Data Collection & Analysis (workflows)
- Lean layout & robot re-design
- 5S
- Standard Operating Procedures



Definition:

“A Standard Operation describes the most efficient known method of doing a job, whilst maintaining quality and safety standards”



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HIGHWAY DESIGN & CONSTRUCTION

Process Variation

WHAT

HOW

WHAT

PEOPLE

QUALITY

MATERIAL

METHOD

COST

MACHINE

DELIVERY

STANDARD
INPUTS

STANDARD
PROCESS

STANDARD
RESULTS



Single Point Lesson

No 001

AREA: _____ Cell A _____

TASK: To define tool locations _____
_____ on shadowboards _____

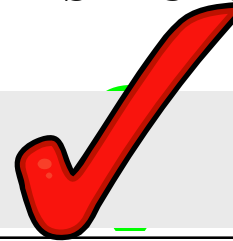


This situation is
UNSATISFACTORY

X



This situation is
SATISFACTORY



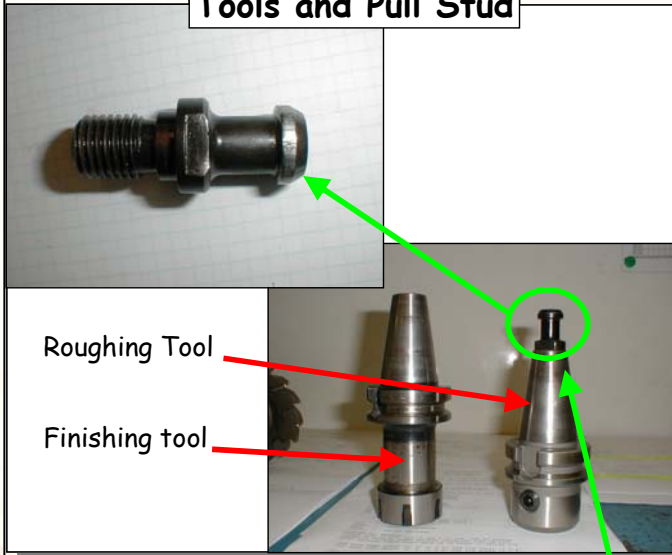


Matsuura MAM 600 - Tooling

Pull Stud

Ref: TPM01

Tools and Pull Stud



Roughing Tool

Finishing tool

Description

This is the correct pull stud for the machine. Damage will occur to the drawbar mechanism and drawbar claws if any other pull stud is used.

Method

1. Place tool in bench tool holder.
2. Clean thread of tool holder and pull stud.
3. Screw in pull stud.
4. Tighten with 19mm spanner.
5. Put tool in machine carousel

Tools

Airline, Cloths, 19mm Spanner.

Safety

1. Wear safety glasses.

LEAN Tools & Techniques

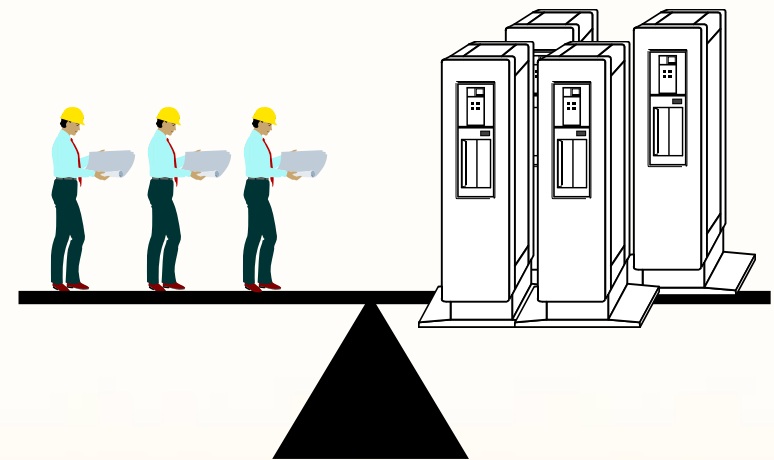
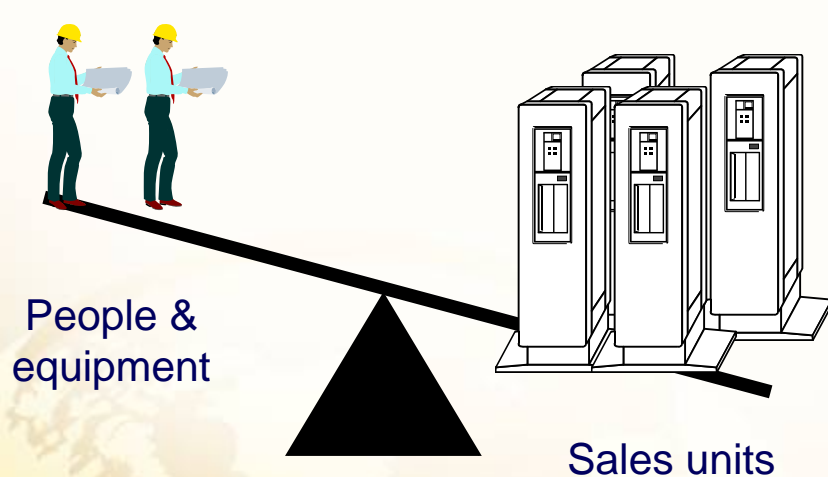
- Value Stream Mapping
- Data Collection & Analysis (workflows)
- Lean layout & robot re-design
- 5S
- Standard Operating Procedures
- Resource / Capacity Planning



Importance of planning - Demand

Resource vs.

Ensure that we have the correct amount of **resources** to keep pace with demand. Review monthly/weekly and take an appropriate (6-12 month?) planning horizon



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Resource / Capacity Planning

MONTHLY
Planning

WEEKLY
Scheduling

DAILY
Execution

- **Process**
 - Procedure Summary
 - Demand Management
 - Capacity Management
 - Decision Making & Links
- **People**
 - Values & Behaviours
 - Communication & Teamwork
 - Skills & Competency Requirements
- **Data Integrity**
 - Static Data
 - Dynamic Data
 - Transparency
- **Performance**
 - Adherence to Plan
 - QCD Measures
 - Financials



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LEAN Tools & Techniques

- Value Stream Mapping
- Data Collection & Analysis (workflows)
- Lean layout & robot re-design
- 5S
- Standard Operating Procedures
- Resource Planning
- Visual Management

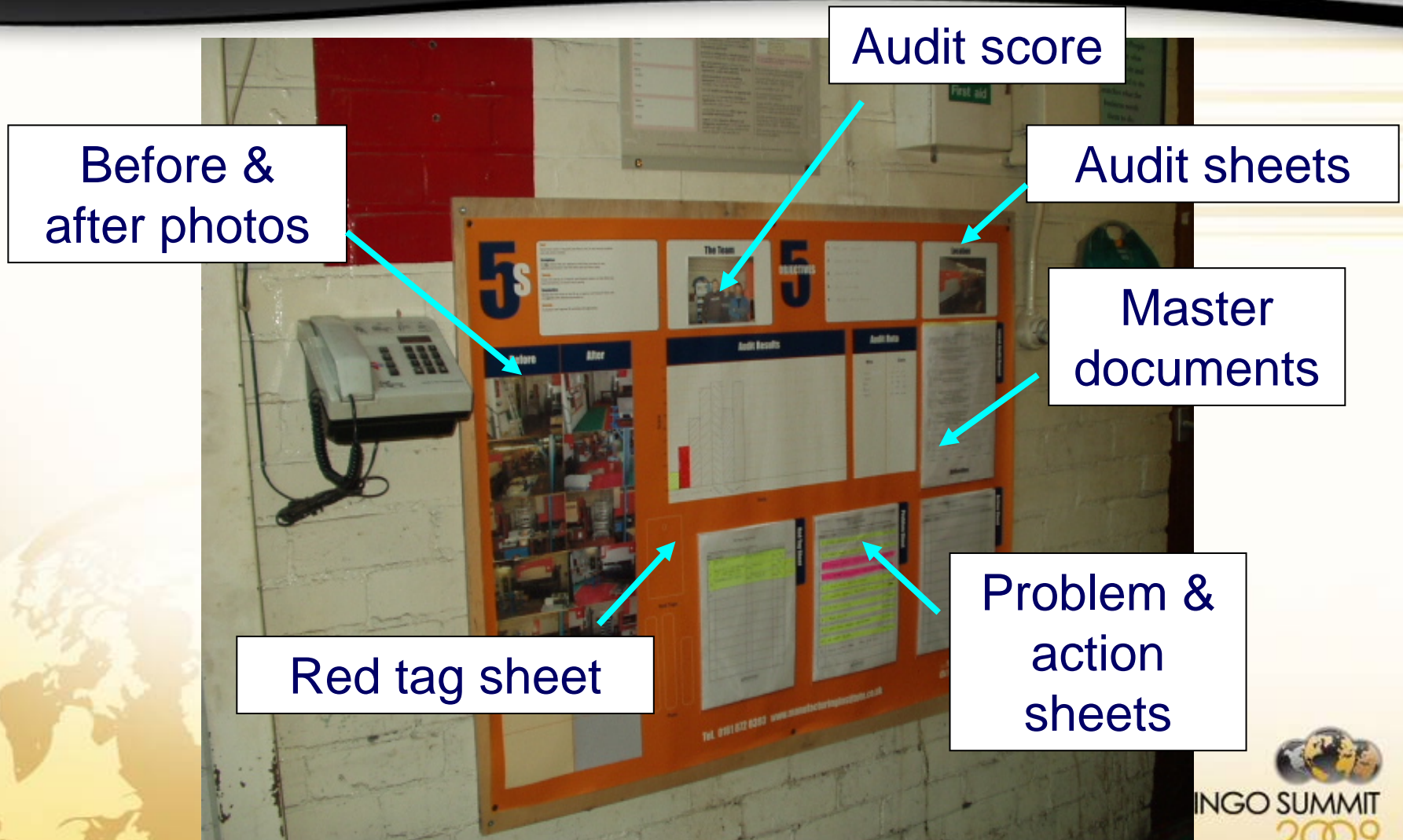


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16th-17th October 2009

Example:- The 5S Visual Management Board



It has to become 'second nature'

- **Awareness** – communicate and check understanding
- **Time** – Must create time for audits & improvement activities
- **Support** – Management must understand that process improvement is more than a 'quick-fix' and it becomes the norm
- **Reward & Recognition** – People make the process, not the other way round, celebrate success



Value Stream Mapping

- Chose all separate 'types' of prescription e.g discharge, in-patient
- Mapped out all stages of each process in detail



Value Stream Mapping

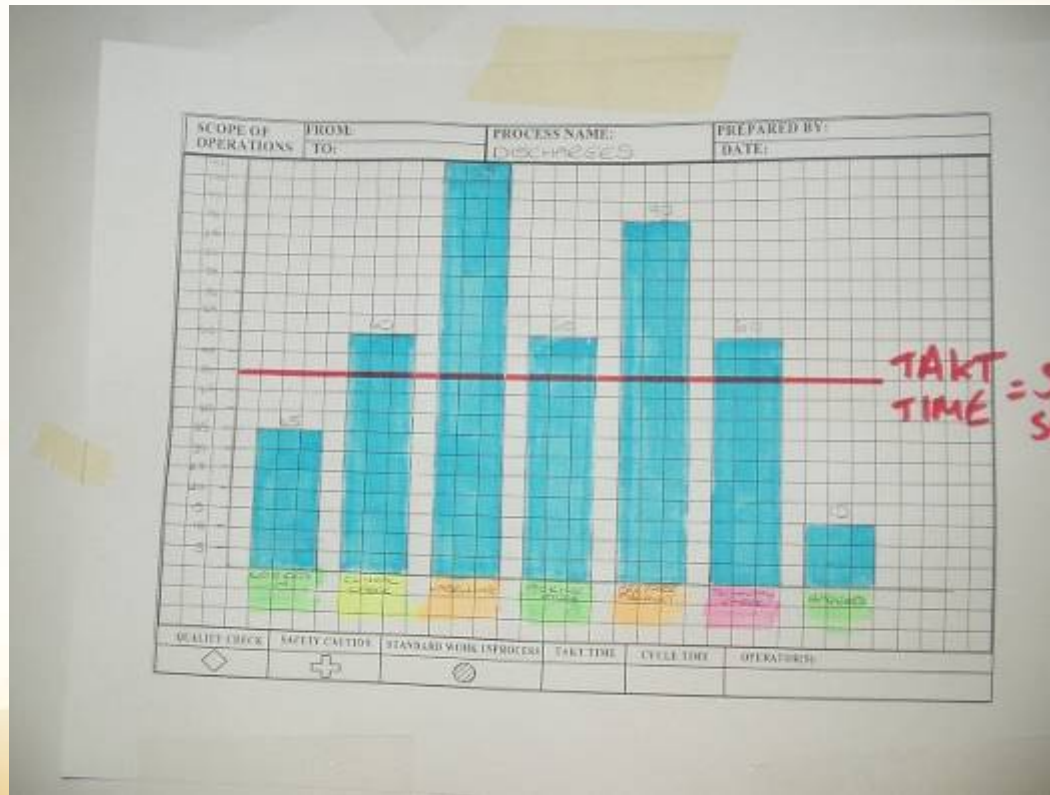


Data collection & Analysis (Workflows)

- Timed all stages of the process after observing various 'sized' prescriptions to then calculate cycle time
- From data calculated work in progress times and value added versus non-value added tasks
- Produced graphs for each stage of every process demonstrating average time for each stage
- Calculated Takt time (average rate at which products are required) for all types of work
- From observations, developed a list of problems/issues & opportunities



Data collection & Analysis (Workflows)



Lean Layout & Robot Re-design

- Work with TMI at the same time as company supplying robot were developing design
- Through work with TMI, able to change the final design of the robot system & save
- Developed final dispensary & stores layout, incorporating robot & changed workflows



5S

- TMI provided basic 5S training to key team members, cascaded to all Pharmacy staff
- Reviewed current work and storage areas
- Arranged in simple to use order, labelled accordingly and standardised



5S in Dispensary



Standard Operating Procedures

- To incorporate changes to workflows, any SOP's updated accordingly
- All changes to SOP's communicated to all staff



Resource Planning

- To be able to identify staff available for various duties, comprehensive weekly resource planner developed
- Incorporated all staff hours available and weekly, Dispensary manager can simply plan & know exact staff hours



Dispensary Resource Planner

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Jane S																						
Julie W	0.25	0.25	0.25	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Simon	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Aime	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Karen L	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Natalie	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Emily	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Jacky P	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Amanda	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Alaina	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Tracey	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Jane T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Julie F	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Atti	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Karen G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackie A	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Angela	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Julie B	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Cathy	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

PRODUCTION UNIT	COLLEGE/COURSE
WINDMILL	ANNUAL LEAVE
COMMUNITY	WARDS
APPOINTMENTS	OTHER DUTIES
OUT PATIENTS	

ACTUAL	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
TARGET	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5



Visual Management

- Performance boards recording:
Turnaround times
Throughput
- Dispensary Manager easily manage daily workload visually



Visual tracker of daily progress each Month



Future State & Benefits

- Automated dispensary & stores area
- Single flow of work for all types of prescription
- No priorities given (unless emergency)
- All work processed as first in first out
- Single checking area where all work moved along in sequence
- All dispensary staff working together as one whole team
- Single team leader manages whole area



Future State & Benefits

- 3 trays for work:
 - 1 in-tray pre Pharmacist check
 - 1 tray for work ready for dispensing
 - 1 problem tray (coloured red)
- All work dispensed in to dispensing trays:
 - Standard work in blue trays
 - Problem prescriptions in red trays
- Single checking area where all work moved along in sequence
- Simple visual management of work on a daily basis as minimal 'in-trays' and areas where work in process
- Average discharge turnaround time 1 hour 35minutes

Future State & Benefits

- Department now feels benefits of Lean
- Staff feel empowered to suggest new ways of working and happy to try any suggested changes
- New design reception area very open plan with all dispensing work processes on view
- Reception staff, customer care focussed
- Previously felt too busy to review anything, now make specific time





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Summary

- A department never heard of Lean
- Within 18 months transformed
- Lean now embedded in any new ideas or suggestions for change in all areas of the department
- Staff frequently comment, 'that's not very Lean!'
- Currently working with TMI on further projects within Pharmacy to develop

