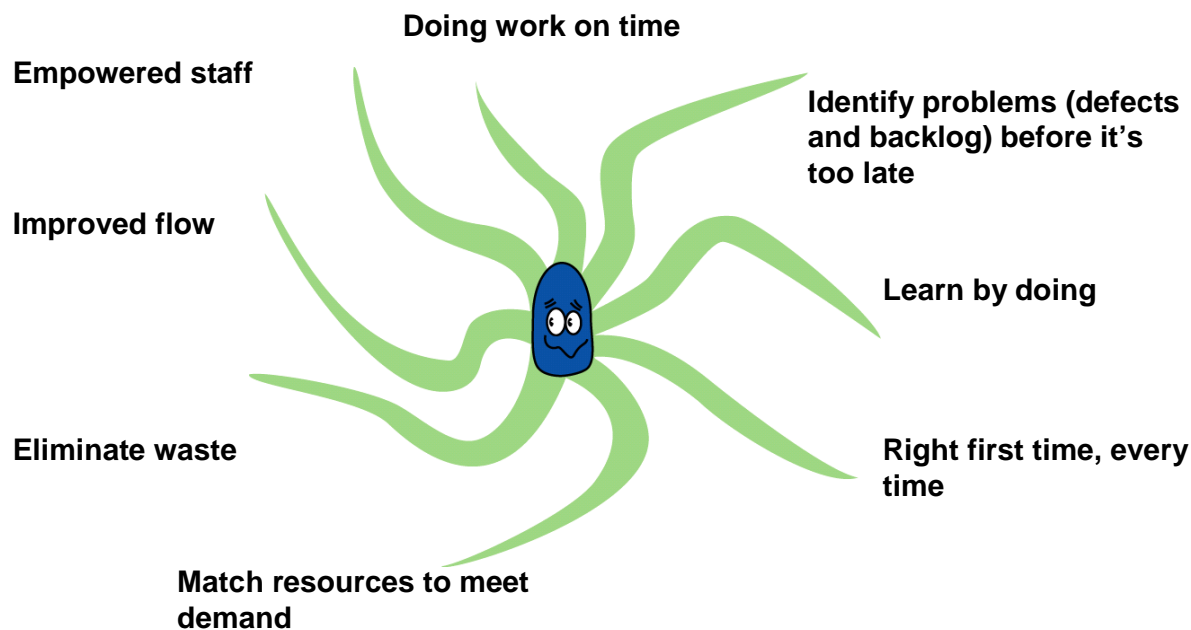


# Lean Thinking – Improving flow and eliminating waste



**Neil Westwood – Service Transformation**

**Neil Westwood**

**Service Transformation and  
Hereford Hospitals NHS Trust**  
[neil.westwood@institute.nhs.uk](mailto:neil.westwood@institute.nhs.uk)



**Photos courtesy of Hereford  
Hospitals NHS Trust and Bolton  
Hospitals NHS Trust**

# Must read books for Lean thinkers

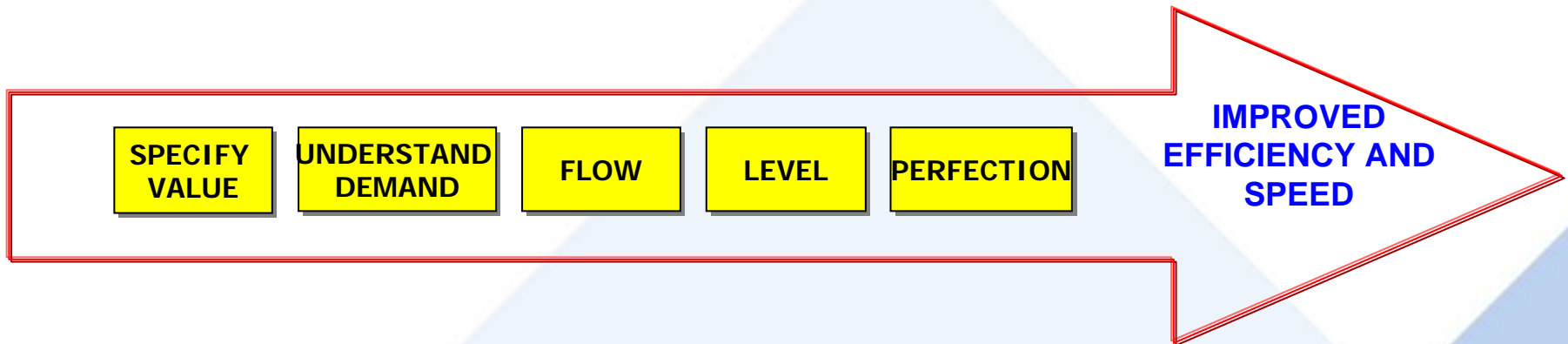


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[www.leanuk.org](http://www.leanuk.org) and [www.institute.nhs.uk](http://www.institute.nhs.uk)

**Lean – focuses on dramatically improving flow in the value stream and eliminating waste**



## Benefits of using Lean

**Increased productivity, reduced waiting times, lower costs, better safety and improved experiences of patients and staff – everyone wins**

# Lean goals include

Doing work on time

Empowered staff

Improved flow

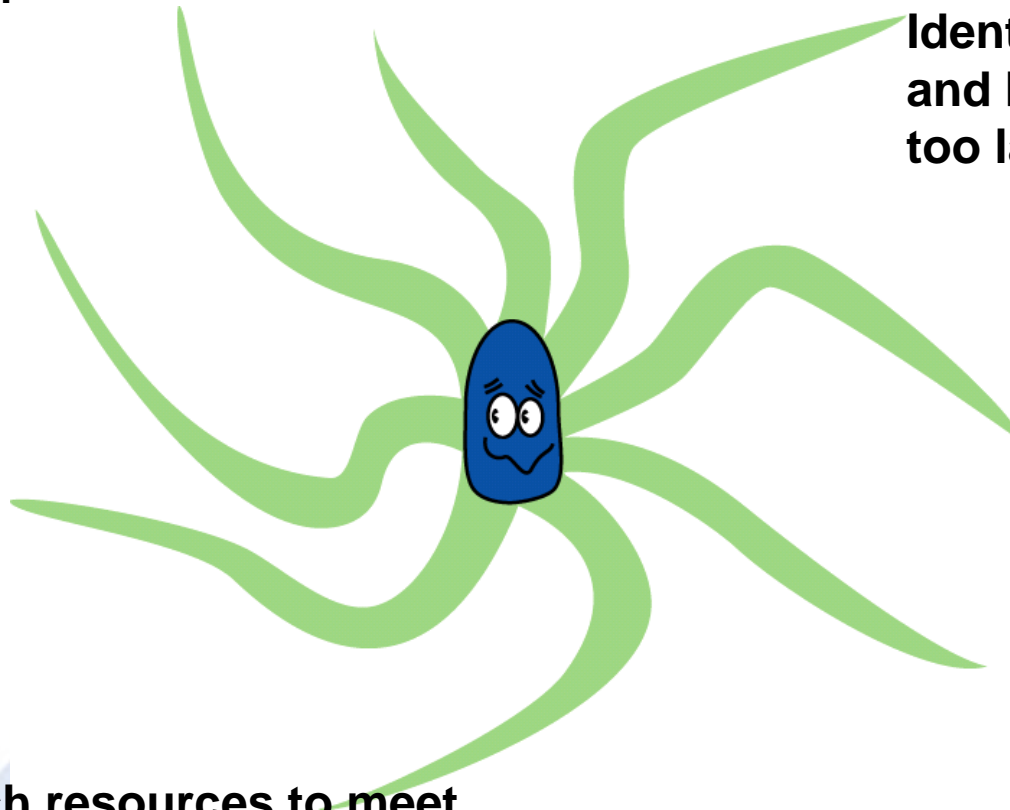
Eliminate waste

Match resources to meet  
demand

Identify problems (defects  
and backlog) before it's  
too late

Learn by doing

Right first time, every  
time



# World Class Lean Principles



# World class companies use Lean



1 in queue policy – get customers to ask for another checkout to be opened (a Kanban signal)

**The same principle could be applied to radiologists doing reporting and signing off reports**



Visual workplace - Helpers in visible clothing

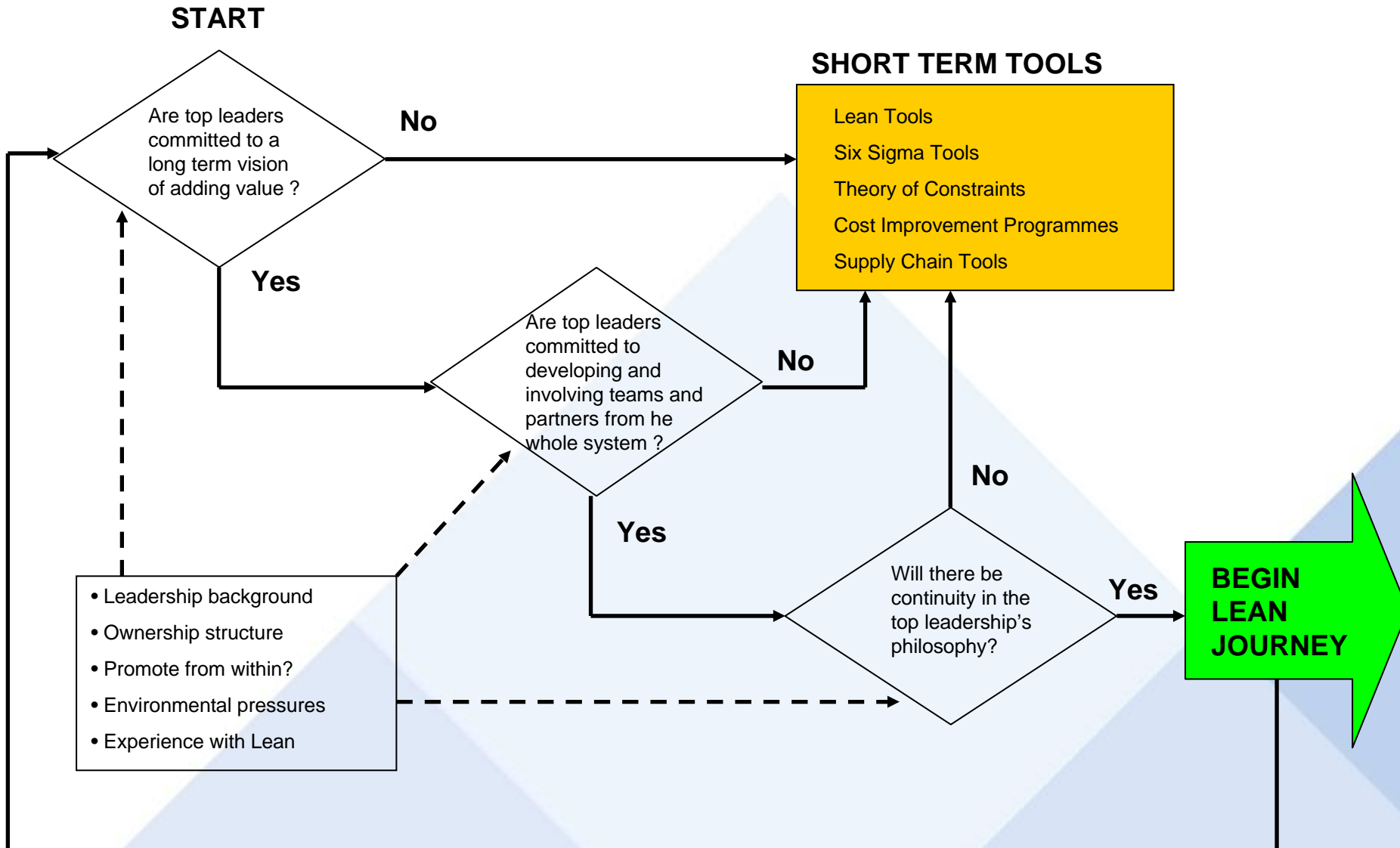
**Staff could wear coloured tops to indicate they are reporting or working in department. This would prevent interruptions**



Open 24 hours a day to meet customer requirements and demand

**Evening and weekend work**

# Does your organisation have the leadership commitment to start a Lean Journey



# 5 S standards



- **Sort**
- **Straighten/Simplify (Set in order)**
- **Shine**
- **Standardise**
- **Sustain**



**Sustain the gains**

# Pharmacy – After a 5s

## Benefits of a Visual System



- # Eliminates non-value-added search time
- # Provides a foundation for process standardization
- # Reduces “space requirements”
- # Communicates “how we are doing” to everyone
- # Can trigger corrective action

## Pharmacy RPI



# BEFORE

# AFTER



# Flow Basics

- **Takt time**

- produce at the customer's rate of demand
- Takt time = Available time per day / Demand per day
- Example 400 mins per day / 100 blood tests
- **Takt time = 1 test complete every 4 mins**

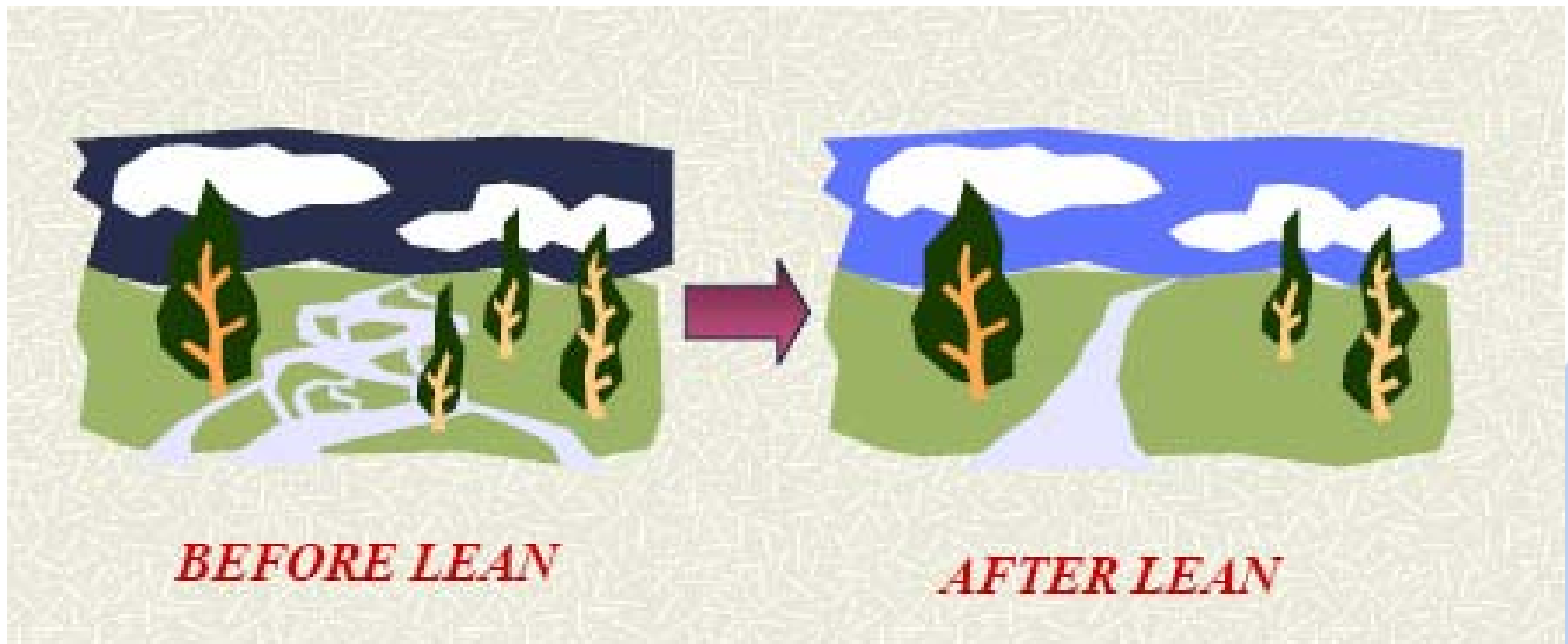
- **One-piece flow - or smaller rational batches**

- eliminate all excess inventory and over production

- **Pull production**

- customers reach upstream to suppliers and pull patients through process

# Keep the process moving, forward (streamlining the flow)



# Typical patient journey

## Batch and Queue of Patients



Patient gets admitted



Patient waits to be seen



Patient gets seen by PreOp RN



Patient waits

Non Value adding – delays and waste



Patient get taken to Holding Area



Patient waits



Patient gets seen by Surgeon



Patient waits

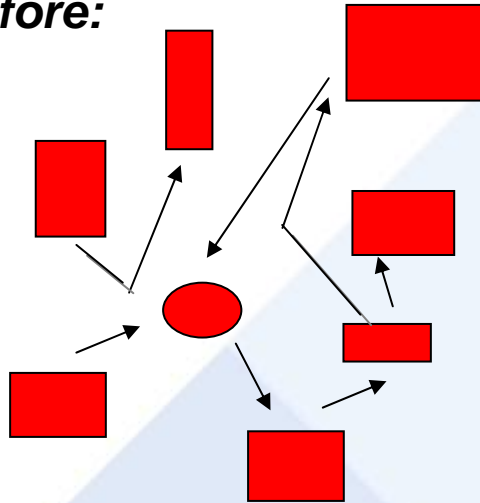


ETC....

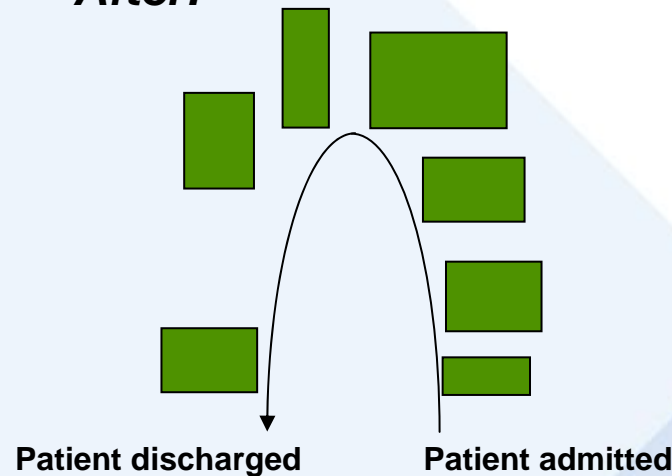
# Improve flow in the value stream

- Geographically concentrate equipment to perform tasks into a “Cell” or “Line”

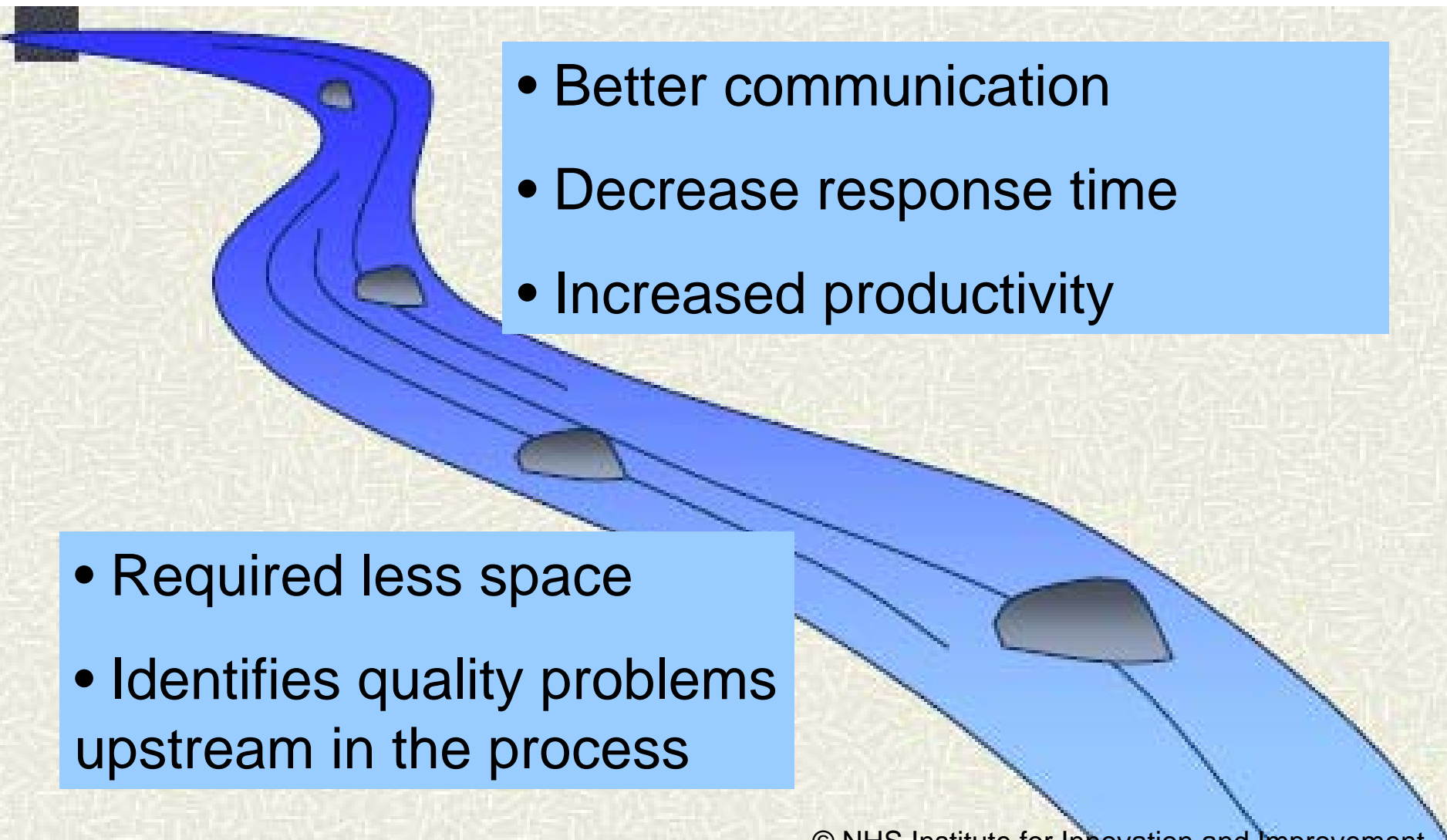
*Before:*



*After:*

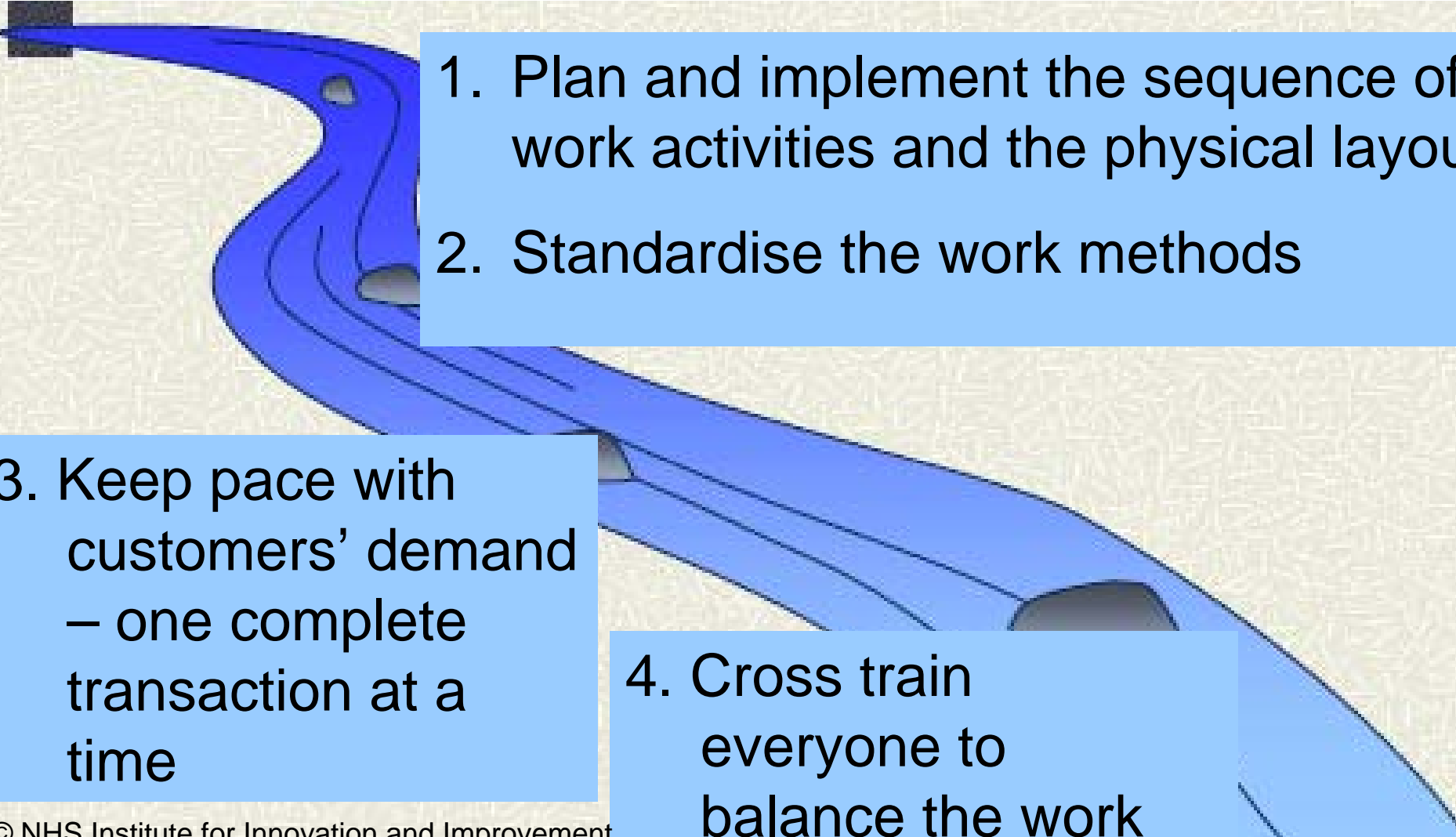


# Benefits of steady flow processing

- 
- Better communication
  - Decrease response time
  - Increased productivity

- Required less space
- Identifies quality problems upstream in the process

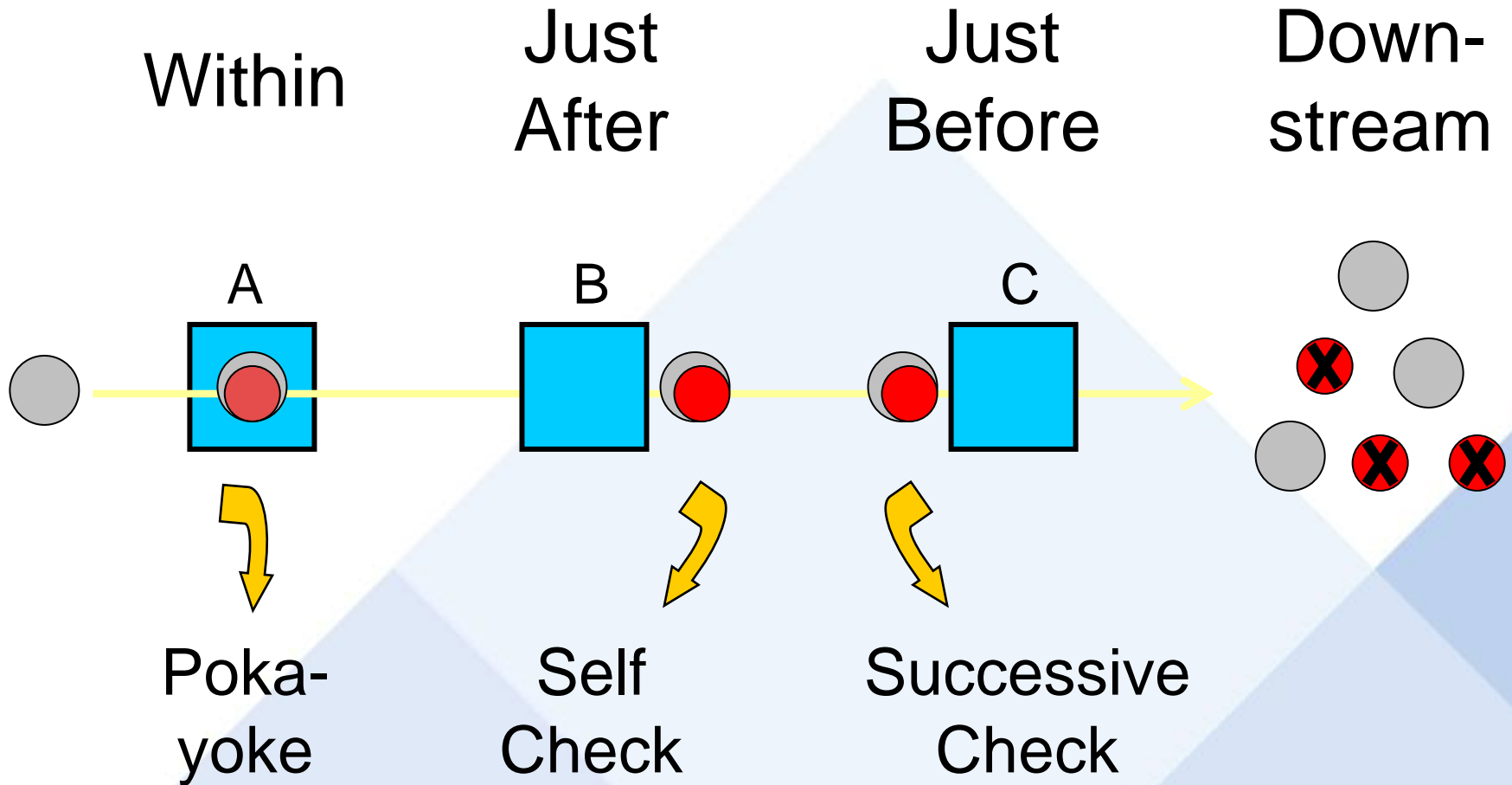
# The steps to steady flow processing

- 
1. Plan and implement the sequence of work activities and the physical layout
  2. Standardise the work methods

3. Keep pace with customers' demand – one complete transaction at a time

4. Cross train everyone to balance the work

# Mistakes are fixed at the source



# Mistakes vs. Defects

- **Mistakes** are inevitable...but reversible.
- **Defects** are mistakes that were not fixed soon enough...and are now relatively permanent.
- If you fix mistakes soon enough, your work will have **zero defects - what the customer wants!**
- Mistakes are least harmful and easiest to fix the closer you get to the time and place they arise (the reverse is also true).

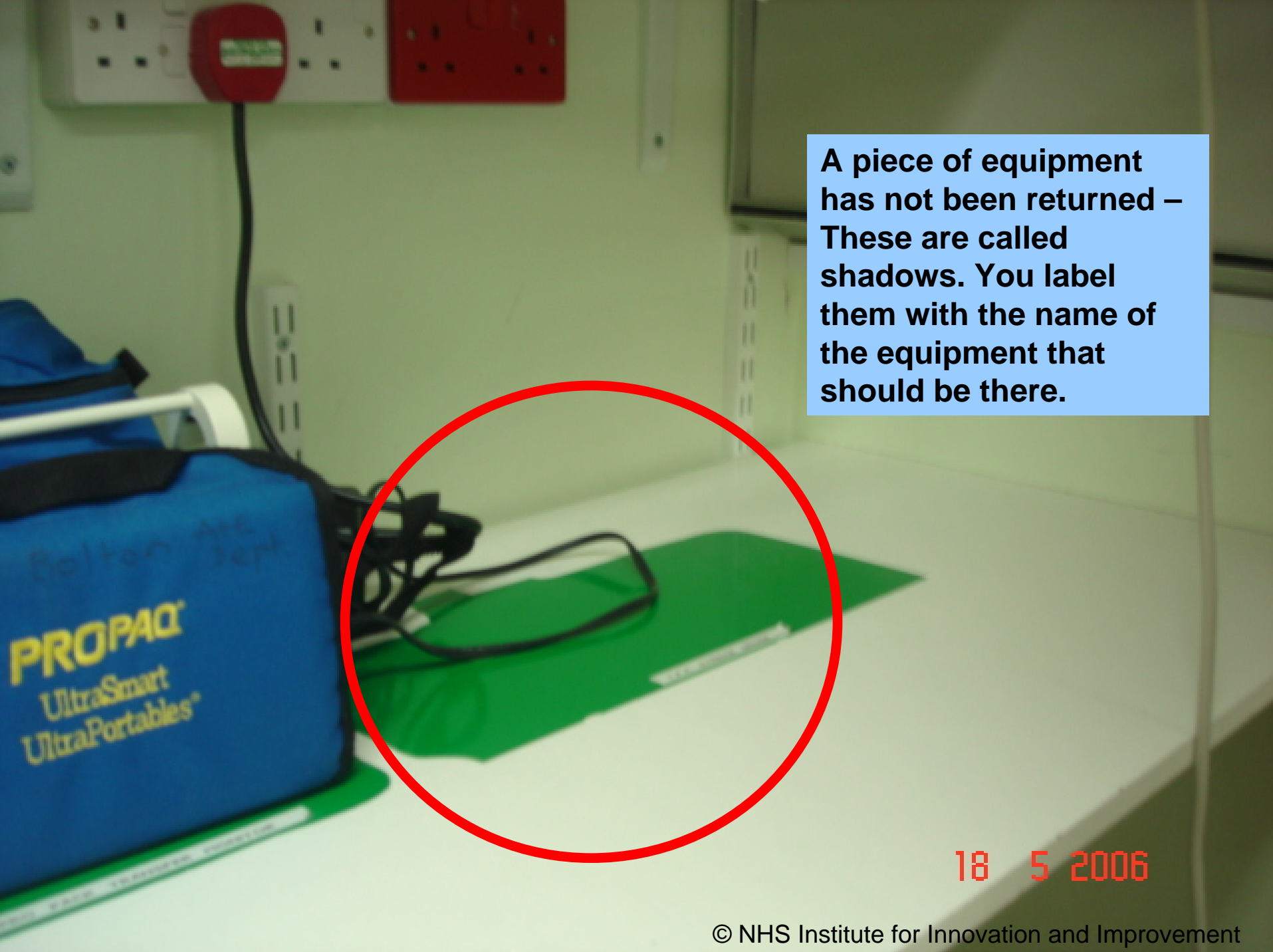
Visual management - helps you to see if equipment is out of place



**Colour coded beds - Other equipment that belongs to that bed is also colour coded. This helps staff to know where it belongs. See the green tubes and the green stand.**



**A piece of equipment has not been returned – These are called shadows. You label them with the name of the equipment that should be there.**



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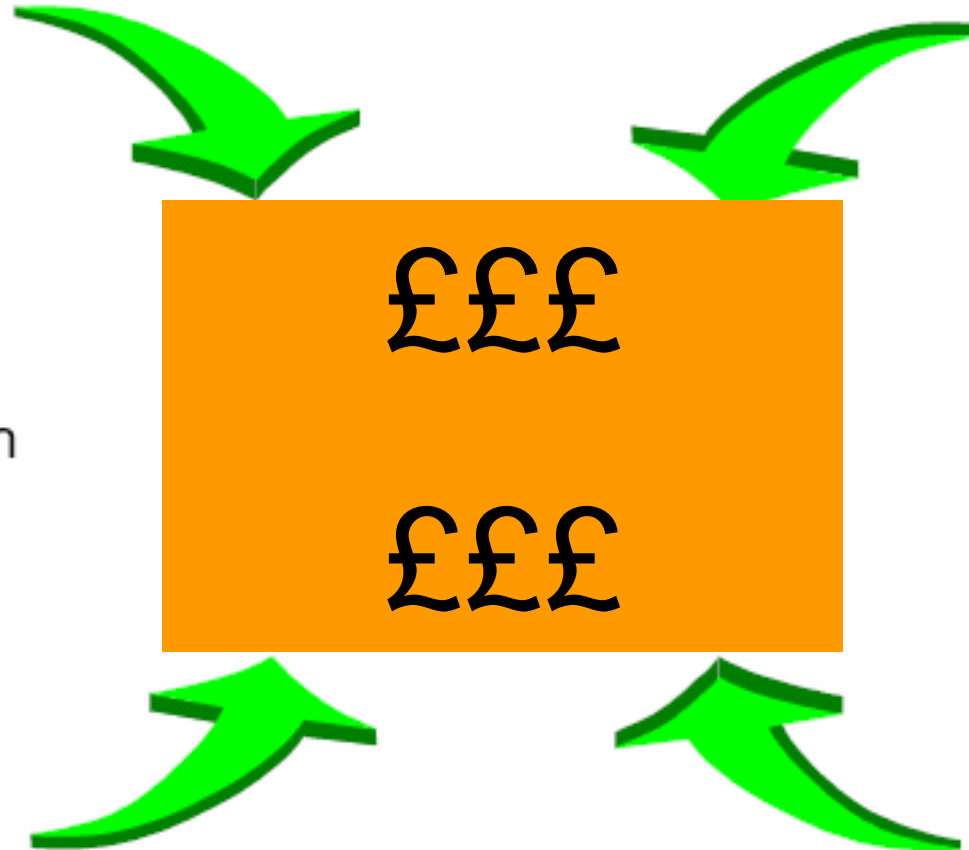


# No doors on cupboards – so that staff can see what's in them – saves time opening the doors

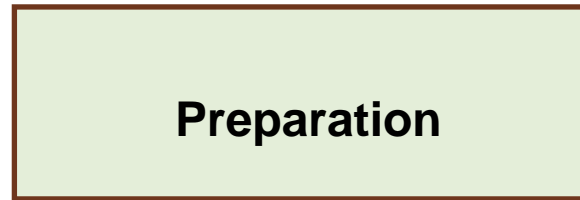


# Value Adding Activities

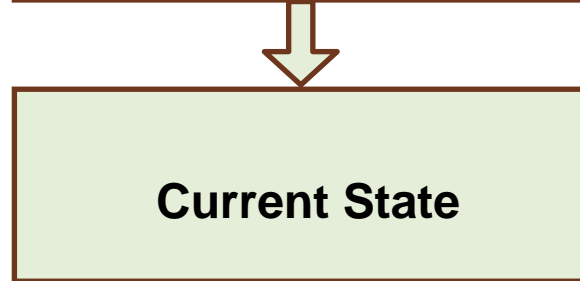
- Something the customer is willing to pay for!
- Transform raw material or information to meet customer requirements.
- Is done right the first time.



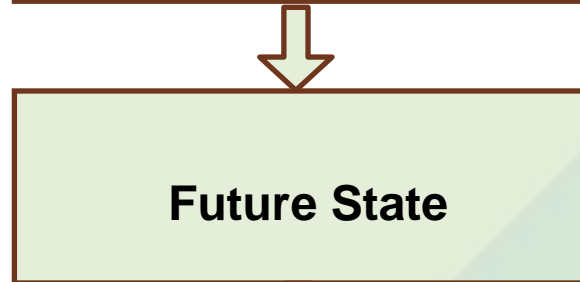
# Value Stream Mapping Phases



Agreeing on what process to study, how to map it and who will participate.



Agreeing on a well understood map of the current situation.



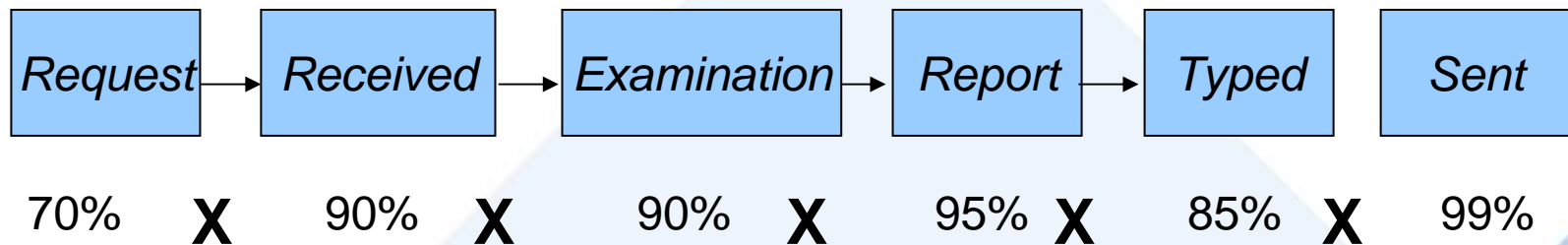
Agreeing on a shared vision of a lean future state.



Agreeing on how to implement the future state vision.



# Right first time every time?



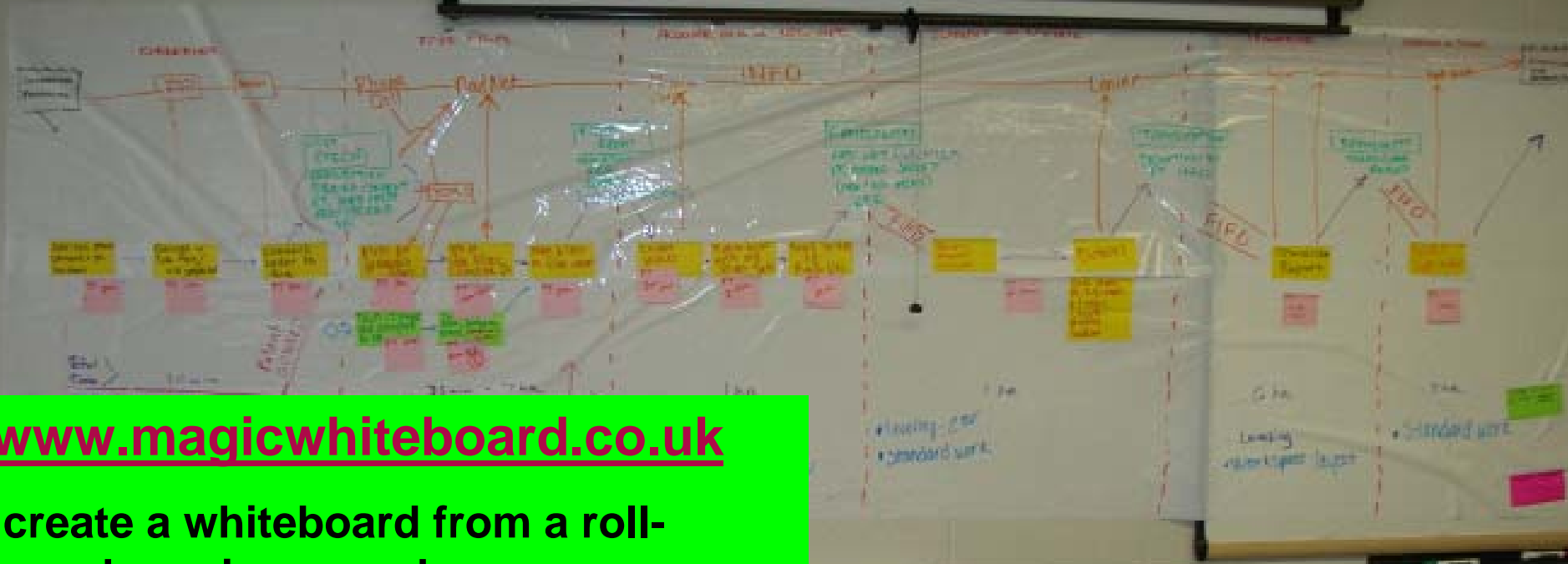
**Complete and accurate = 45%**

# Information to collect at each step in the value stream – you need patient flow and information flow

Trigger – What causes people to start this step?	
Done – How do we know when an item has been completed?	
Flow Time– Total time, including waiting + work time	
Touch Time – Time taken to complete one	
People – How many people carry out this step?	
Work in Process – How many are waiting/being worked on?	
Number of interruptions	
% Complete and accurate – What proportion of activities go through right first time?	

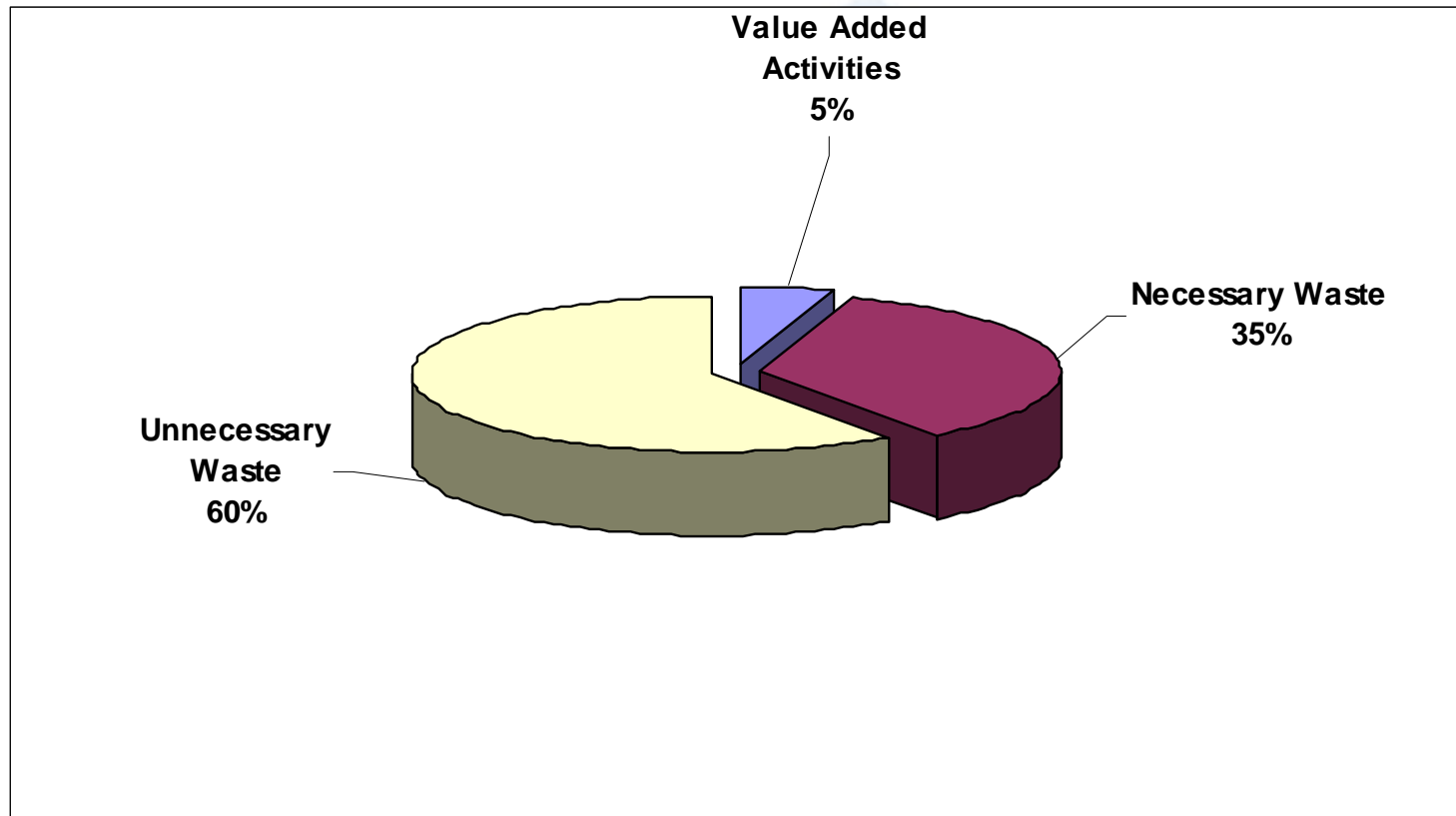
# Future State Value Stream Map – non value adding steps and unnecessary delays removed

## Future State Value Stream Map



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anywhere, in seconds

# Maximise value adding steps, minimise necessary waste and eliminate unnecessary waste



# Waste is

Anything other than the *minimum* amount of equipment, materials, space, and worker's time which are *essential* to add value to the product or service.

A symptom, not a cause, of a problem.

**We need to find and correct causes of waste.**

**CURRENT THINKING**

**REQUIRED THINKING**

Making more than is necessary or making things faster than is necessary, working ahead

Desired outcome (customer requirements) cannot be achieved within the existing process

Rework, work done because of errors in a previous process

Unreasonable -ness

Redundant or unnecessary processing, work that is giving the customer more than he/she is willing to pay for

Processing  
Correction  
Inventory  
Over Production

**WASTE**

Information or material waiting in queue

**FORMS OF WASTE**  
P  
C  
I  
O  
W  
M  
M

People waiting for machines or information.  
Information waiting on people or machines

Waiting  
Material Movement  
Motion

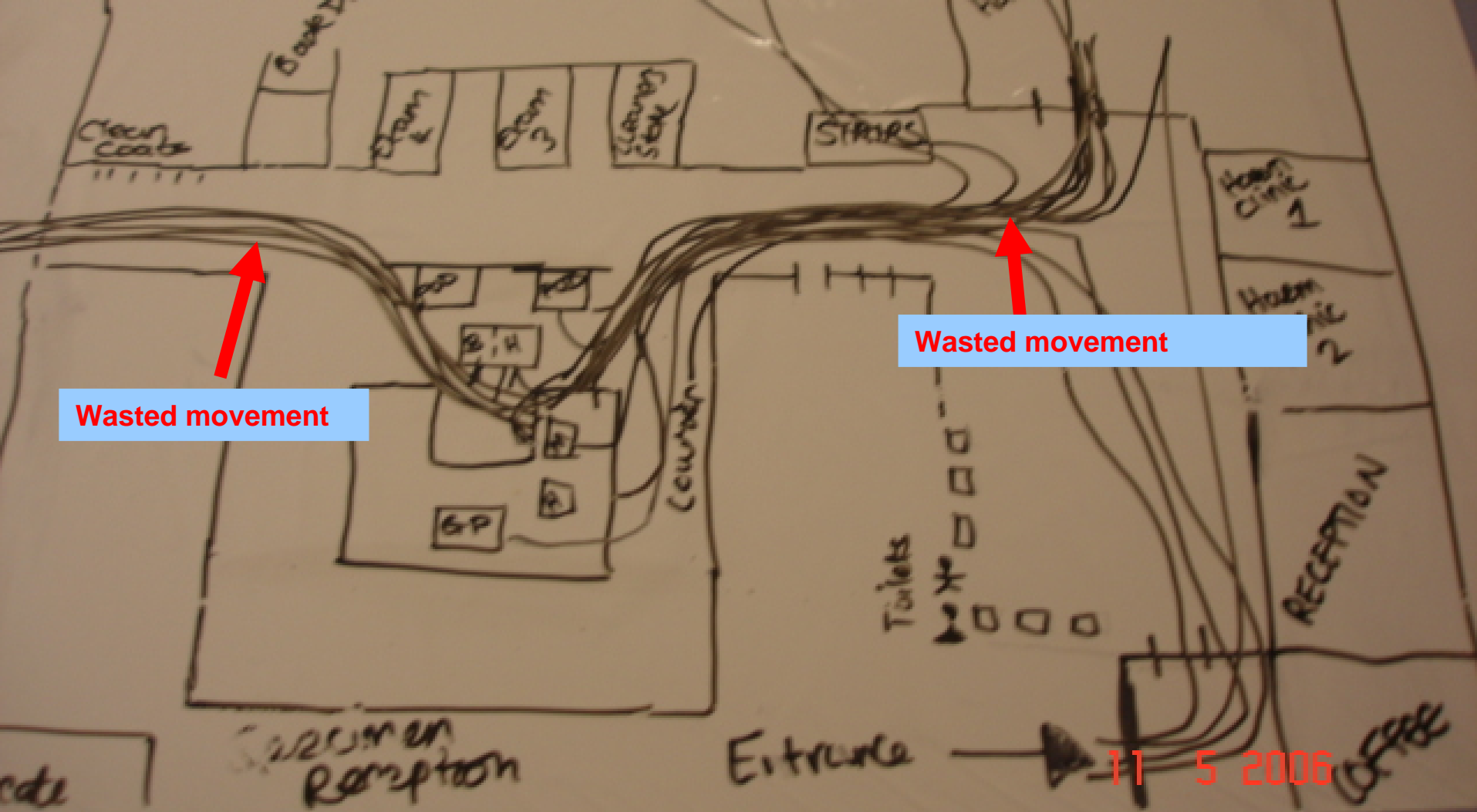
Unevenness

Unnecessary people motions, travel, walking, searching

Unnecessary handoffs, transfers, distances of material & information

Fluctuation and variation in customer demand

**Spaghetti diagram -  
Movement of staff in  
Pathology Department –  
helps you to see the  
waste of movement**



# Causes of Waste

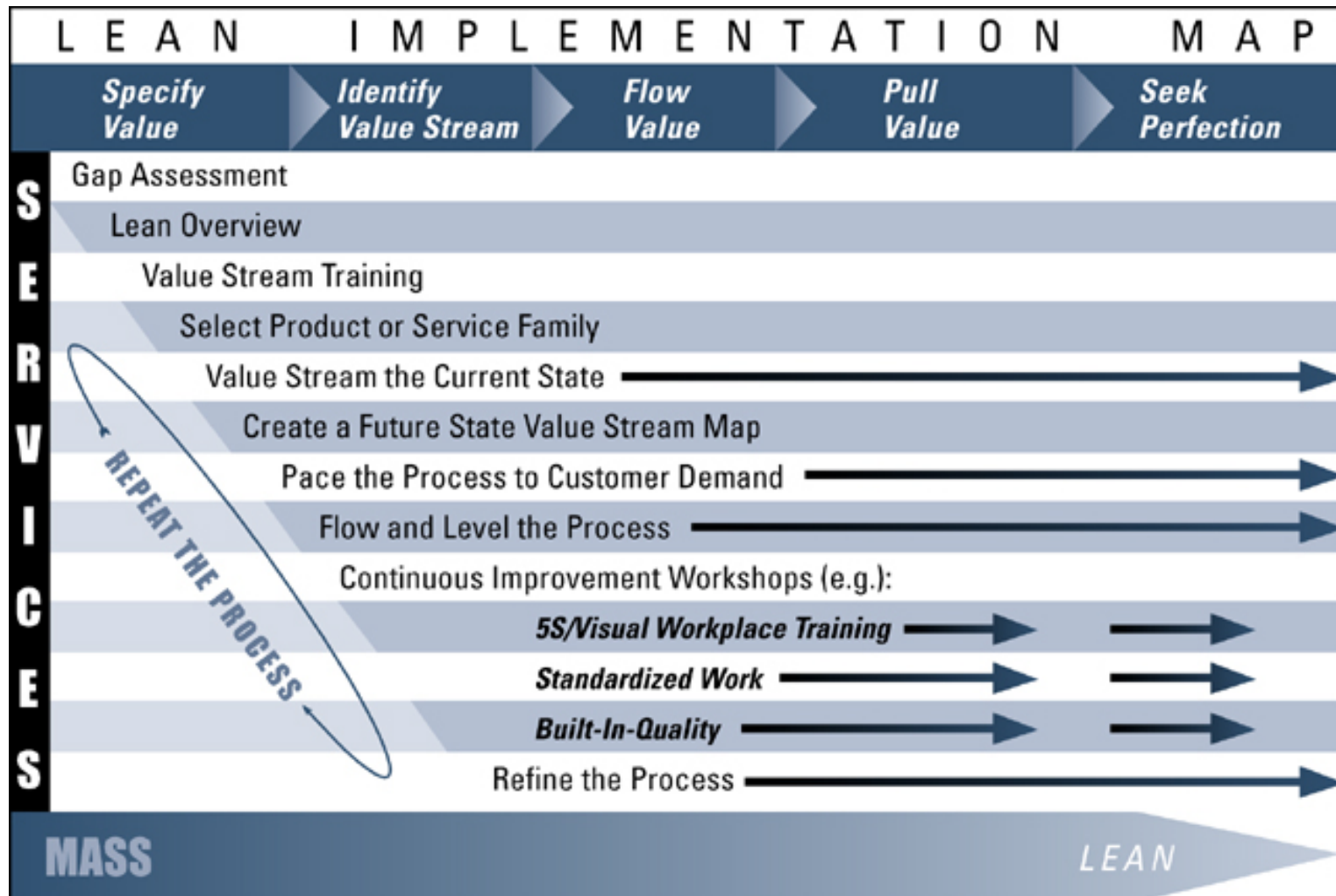
- Poor Layout
- Set-up time
- Poor maintenance
- Poor communication
- Machine capability
- Work Methods
- Deficient training
- Poor adherence to procedures
- Ineffective scheduling
- Lack of material
- Dis-organisation
- Supplier reliability/quality problems
- Not knowing requirements



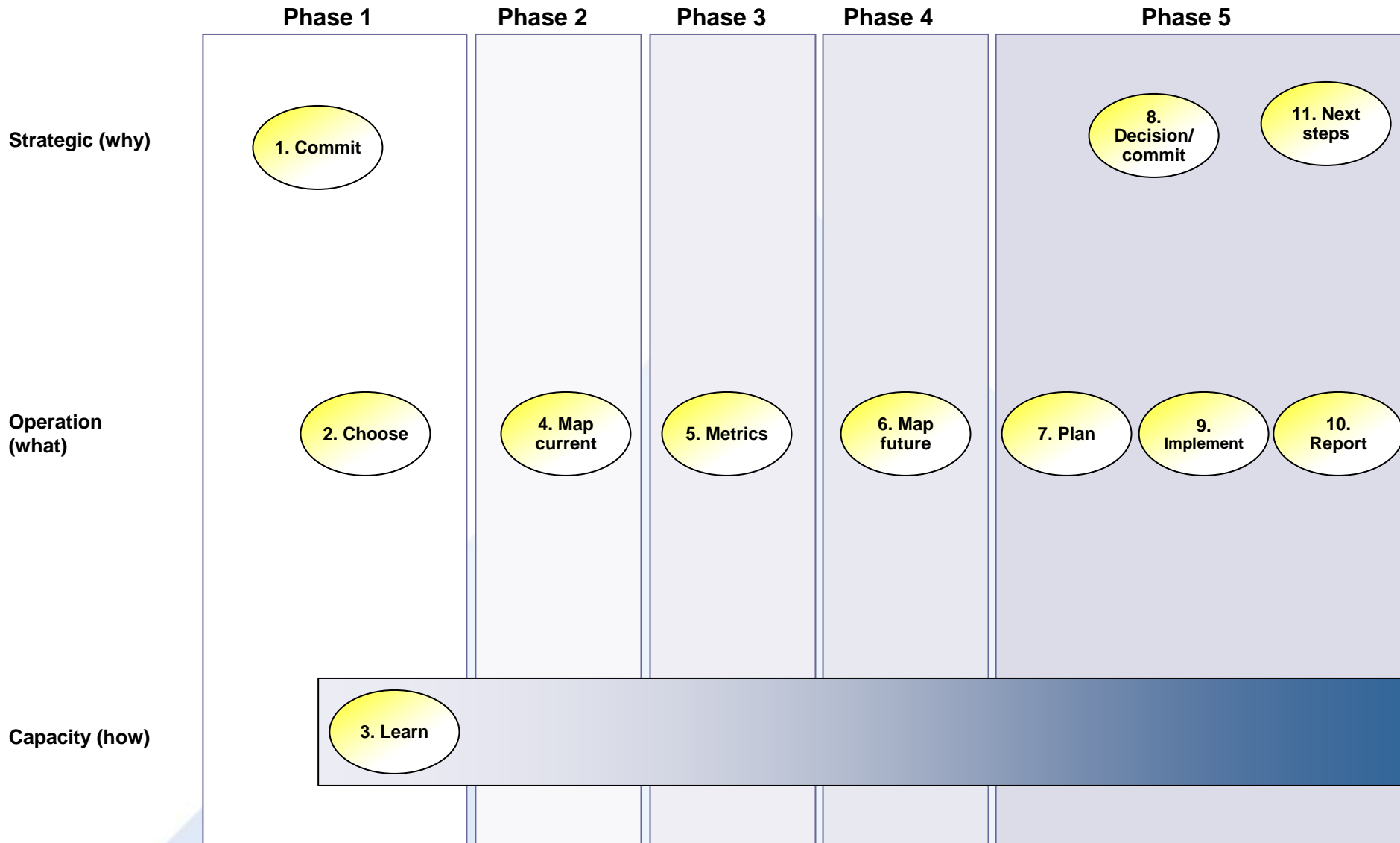
# Examples of waste

Lean Waste	Examples in radiology
1. Defects	Running unnecessary scans Forms not being signed Faxes sent that are illegible
2. Overproduction	Undertaking multiple scans
3. Excess inventory	Extra supplies
4. Excess processing	The process for ringing porters in the evening is to ring the Help Desk and then to be routed to the porters Entering duplicate information Printing paper reports to send in post
5. Unnecessary motion	Time spent looking for staff, entering duplicate information, Looking for parts and forms Interruptions from other staff
6. Unnecessary transportation	Transportation of scan results in post
7. Waiting	Waiting for referrals, scans Waiting for reports, signatures Waiting for patients, doctors, porters
8. Underutilised staff	Helpers waiting in rooms Secretaries waiting for reports to be signed

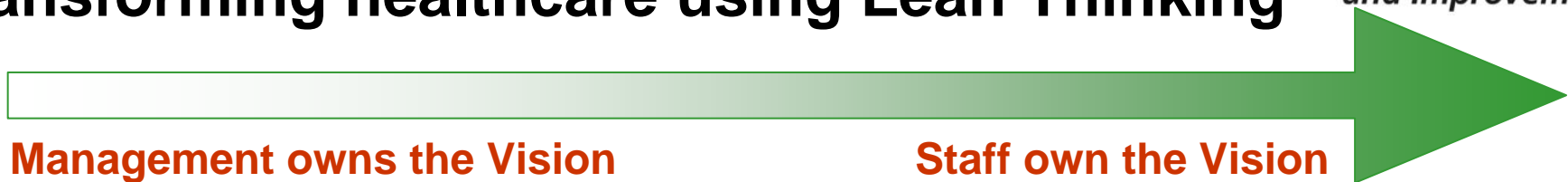
# Lean implementation map



# Planning your Lean journey

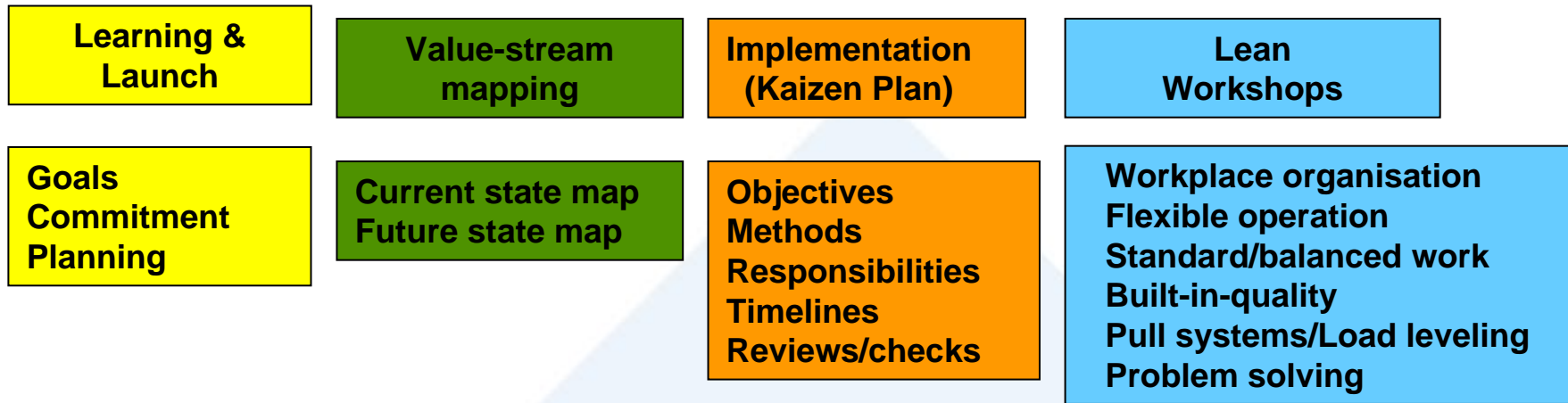


# Transforming healthcare using Lean Thinking



**Management owns the Vision**

**Staff own the Vision**



## Value stream supports clinical care:

- Focus on patient journey as service model.
- Create the most value while consuming the fewest resources.
- Distinguish process steps that create value from those that do not.
- Improve and track performance to reduce lead time and build-in quality.

# Must read books for Lean thinkers



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