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Delivering tomorrow's improvement agenda for the NHS

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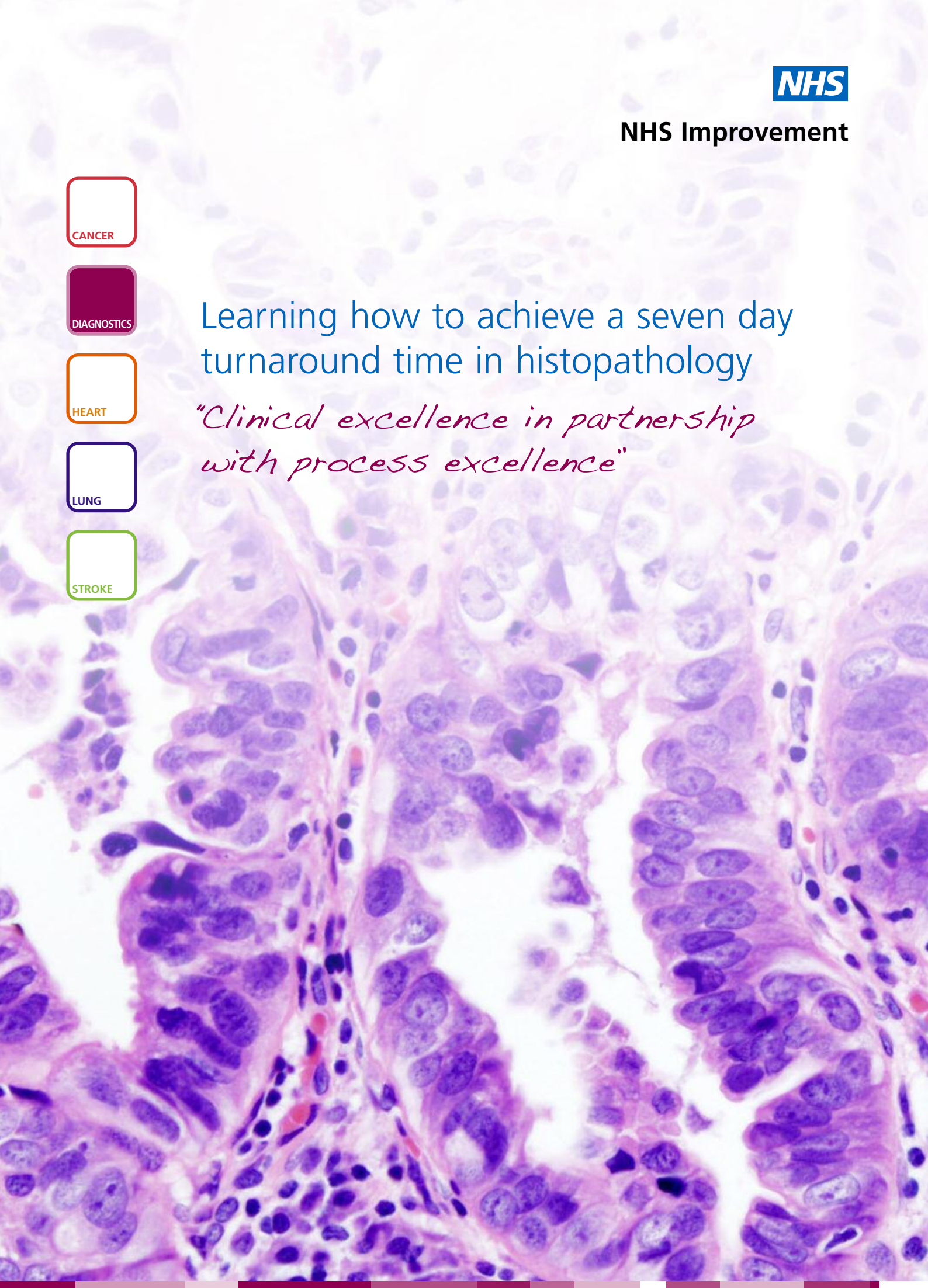
Learning how to achieve a seven day turnaround time in histopathology

"Clinical excellence in partnership with process excellence"



Contents

1. Foreword

Pathology is core to the diagnosis and monitoring of a very wide range of conditions. Amongst the pathology disciplines, histopathology has a particularly important role in the diagnosis of cancer, and in providing information on which treatment decisions are based.

Reducing the intervals between specimens being taken and results being made available will reduce the period of uncertainty for patients and will help to ensure that treatment can be started as soon as clinically appropriate. For inpatients reduced histopathology turnaround times can lead to reductions in lengths of stay.

The aim of the pilots reported here was to test whether it is possible to deliver histopathology results within seven days for 95% of all patients. The results show that this is indeed achievable. However, several factors are critical to success. These include a whole pathway approach (including transport of specimens), user engagement and proactive clinical leadership.

Implementation of the learning from these pilot sites will have benefits for histopathology services themselves and for the multidisciplinary teams of which they are an essential part. Importantly there will be benefits both for patients and for the NHS.

Professor Sir Mike Richards CBE
National Cancer Director

Dr Ian Barnes
National Clinical Director for Pathology

We commend this report to all commissioners and providers of histopathology services.

Dr Ian Barnes
National Clinical Director for Pathology
Department of Health

Professor Sir Mike Richards CBE
National Cancer Director
Department of Health

Key learning has demonstrated success is achieved through:

Strong and proactive clinical and managerial leadership
- to encourage, motivate, and empower staff

Collection and analysis of appropriate data
- to understand the current end to end pathway and to evidence improvement

Walking the pathway
- going to see problems first hand

Executive support
- providing active support and removing barriers

Empowered staff
- who own the problem, find the solutions and 'stop to fix'

Effective transport
- transport is critical to achieving flow and needs to be owned by the laboratory

Optimise technology
- using electronic ordering systems, voice activated and digital technology solutions will improve safety and reduce turnaround times.

2. Executive summary

In 2006 the *Review of Pathology Services in England* by Lord Carter endorsed Lean as the method of choice for improving processes in pathology services. Working in partnership with the Department of Health Pathology Programme, NHS Improvement supported nine pilot sites to test the Lean methodology to demonstrate how to deliver a seven day service and make improvements in quality, safety and productivity.

Multidisciplinary teams worked collaboratively to test and implement changes that deliver improvements for patients, staff and users of the service.

Staff were trained to apply Lean methodology to their work, the intention being to ensure continuous improvement beyond the period of NHS Improvement involvement. In addition, clinical leadership in improvement methodology sessions were facilitated for consultant histopathologists and specialist registrars to highlight the need for leadership in continuous improvement.

Over 157,000 patients will have benefited from the improvements in:

Turnaround times: 95% of test results available for treatment decision within seven days with up to 50% of results available within three days.

Quality and safety: Achieving 'right first time' - addressing errors in specimen labelling and requests

Innovation: Using simple visual management techniques to improve flow, safety and productivity.

Productivity: Eliminating non value added steps, ensuring appropriate utilisation of workforce, demonstrating the capacity required based on the demand, and ensuring technology is used effectively.

This guide provides clinical teams with the basic tools to make changes to their processes, along with insight into how phase one pilot sites have used these tools across the whole patient pathway.

3. Introduction

With timely diagnostics critical to the delivery of the Cancer Reform Strategy, the establishment of a seven day turnaround for histopathology results is key to early diagnosis and improvements in outcomes for patients.

NHS Improvement has worked with pathology teams to test and prove the value of Lean methodology. Clinical teams have been extremely successful and the methodology is being widely adopted in many pathology laboratories and other clinical settings across the country.

The methodology and approach was further endorsed by Lord Carter in the '*Report of the Review of NHS Pathology Services in England*' in 2006/2008.

"No worker, particularly in healthcare, where the well-being and safety of another human comprises the core of the work, appreciates having his or her time wasted" (A3 Problem Solving for Healthcare – Cindy Jimmerson)

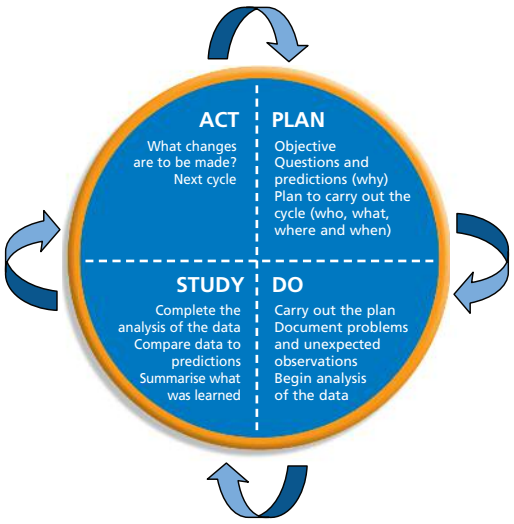
Pilot site teams were trained to:

- Understand and identify waste
- Apply Lean principles to improve flow
- Use PDSA cycles (Plan, Do, Study, Act) to test out ideas to ensure changes make the improvement required before implementation (sometimes known as PDCA - plan, do, check, adjust)
- Use data to demonstrate the impact of improvement
- Use A3 techniques to problem solve
- Understand how people respond to change
- Use statistical process control (SPC) and root cause analysis (RCA)
- Understand communication methods and work as part of a team.

To further support and embed the improvement methodology within the local environment and create local ownership, an overview of Lean methodology was provided for all staff involved in the pathway.

These two factors, combined with clinical lead commitment, are essential to the sustainability of achieved and ongoing improvement.

PDSA cycle for learning and improvement



Spreading and sharing the learning

Networking amongst clinical teams involved in the pilot facilitated a collaborative approach to achieving improvements and to spreading innovation and success.

A buddy system for some sites was set up to support the sharing of best practice along with a series of training and development workshops and shared learning events.

This approach has also been successfully used more widely across other diagnostics areas including endoscopy and radiology with significant results.

This document contains case studies from the phase one pilot sites to help illustrate the changes made. Further case studies can be found on the website at: www.improvement.nhs.uk/diagnostics

4. Phase one pilot sites

The following sites were selected as phase one pilot sites. One of the criteria for joining the programme was to become an exemplar site, prepared to share learning with other teams.

Clinical teams will benefit from visiting phase one exemplar sites, to observe Lean methodology as part of everyday working and understand how the improvements have been achieved.

The criteria for inclusion as an exemplar site are:

- Delivery against seven day (95%) and three day (50%) turnaround times
- Clear evidence of Lean methodology including:
  - Visual management
  - Standard work
  - A3
  - Stop to fix problems via daily meetings
  - 5S
- Evidence of all staff committed to continuous improvement and Lean methodology
- Evidence of sustainability and committed leadership.

Pilot sites and leads:

Birmingham Women's NHS Foundation Trust
Lead: Tervinder Sokhi

Derby Hospitals NHS Foundation Trust
Lead: Andrea Gooding

The Leeds Teaching Hospitals NHS Trust
Clinical Lead: Dr. Pat Harnden

North Middlesex University Hospital NHS Trust
Clinical Lead: Dr. Evangelia Mylona

North Tees and Hartlepool NHS Foundation Trust
Lead: Sharron Williams

North West London Hospitals NHS Trust, Northwick Park Hospital
Clinical Leads: Dr Tanya Levine and Dr Gillian Williams

Taunton and Somerset NHS Foundation Trust, Musgrove Park Hospital
Clinical Lead: Dr. Fred Mayall

University College London Hospital NHS Foundation Trust
Lead: Mrs Ann Hannah

Whipps Cross University Hospital NHS Trust
Clinical Lead: Dr. Saimah Arif

5. Learning for the future

The purpose of this document is to share the learning from phase one pilot sites.
It makes recommendations for change through evidence based case studies and encourages teams to adopt the learning, adapt within their own service, and visit exemplar sites to discuss improvements made, challenges faced and pitfalls to avoid.

The five key changes identified which will bring about substantial reductions in end-to-end waiting times for the histopathology pathway are:

1. Focus on the whole end to end pathway:
- Link all staff across the pathway
- Use whole pathway data to understand where specimens, forms, blocks, slides and reports are waiting.

2. Adopt small batch sizes:
- Throughout the entire pathway, including booking-in, the prep room, lab, reporting, typing and authorisation.

3. Keep samples moving:
- Daily through-the-day deliveries from source
- Continual cut-up sessions through the day
- Pull work through the lab
- Continuous transcription and authorisation of reports.

4. Establish first in, first out:
- No prioritisation of specimens
- Todays work today.

5. Team based organisation of work:
- Work grouped by complexity, specialty, (not by individual)
- Co-location of people, equipment and work.

The key mechanisms required to achieve these changes are:

1. Empowered staff who can:
- See the waste and remove it
- Test changes through PDSA cycles
- Have information to say how we are doing
- Use suggestion boards to have ideas actioned.

2. Daily meetings established to:
- Stop and fix problems
- Encourage a culture of daily problem solving.

3. Visual management techniques to:
- Display performance data
- Promote standard work
- Ensure safe working practices.

4. Information to support the process:
- Turn real time data into information to manage the process
- Ensure visibility of efforts
- Identify problems and establish mechanisms to solve
- Encourage root cause analysis.

To accelerate the pace of change to reduce turnaround times, defects and rework and improve quality, safety and productivity, teams should consider applying:

- **Key enablers to specimen flow** (section 9, page 13)
  Tried and tested, proven to reduce turnaround times across the whole pathway.

Also, consider the:

- **Human dimensions of change** (section 21, page 71)
  The importance of engaging all staff.

An engagement survey tool is available on the NHS Improvement website at:
www.improvement.nhs.uk/diagnostics/lean

Whilst this process will not be easy, the rewards are great!

6. Understanding where you are

Measuring the performance of your histopathology pathway

At the launch of a project, it is important to create an understanding of what is actually happening, as distinct from what 'should be' or is thought to be happening. Identifying the current situation should include the whole journey of the specimens, not just in laboratory processes.

The best way to do this is to 'go see'. This means to physically walk the whole pathway and produce a photographic record of the process. It is recommended that this is done by the whole core team to ensure objectivity.

The pathway should then be graphically represented as a current state value stream map. Measurements taken as part of value stream mapping will provide the baseline against which the impact of any changes to the process can be compared.

Every task undertaken while processing samples will have an impact on achieving the 95% of specimens in seven days turnaround time (TAT) and should therefore be included in baseline measurement. TAT is defined as the time the specimen was taken from the patient to the date the result is available.

Data requirements

To capture a clear and accurate TAT measure, data should be collected for all three key stages of the histopathology pathway:

1. Date specimen taken to date it is received in the laboratory specimen reception.
2. Date specimen received to date QC'd in the laboratory and available for reporting.
3. Date available for reporting to date report is authorised and available to the referrer.

To determine the impact of changes made in the laboratory or other specific parts of the pathway, additional timings should be captured and statistical process control charts (SPC) produced to evidence achieved improvements.

Recommendations include:

- Date/time booked in
- Date/time cut-up
- Date/time completed on processor
- Date QC'd
- Date reported
- Date typed
- Date of authorisation (available).

A sample data collection spreadsheet can be found on the NHS Improvement website.

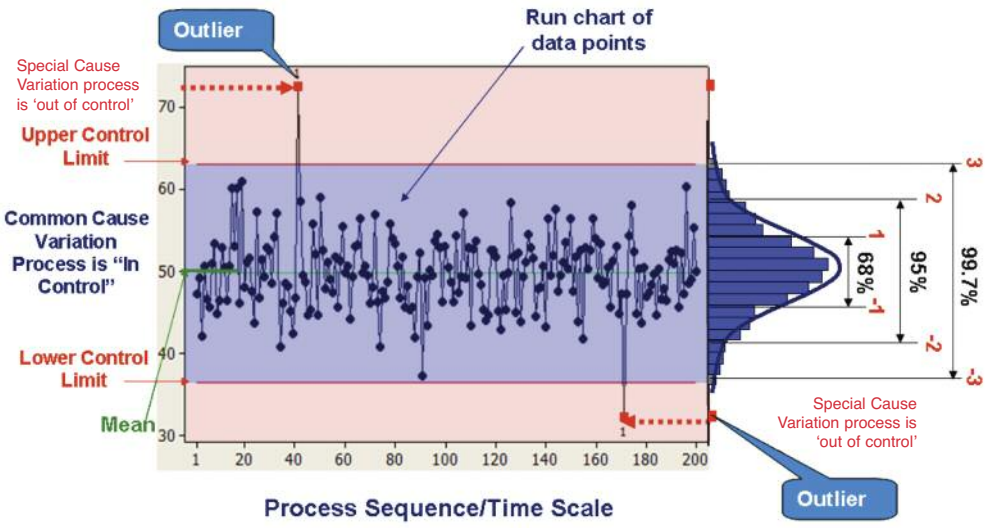
What type and how much data?

We recommend you collect data on at least one week of consecutively numbered specimens to provide a statistically valid baseline TAT.

Calculating and monitoring TAT – Using statistical process control (SPC)

By collecting data from specimens at the three key stages within the pathway, variations in delay/wait times and other sources of waste can be detected, corrected and tracked to assess how/if these are reduced over time as a result of improvement changes.

SPC charts provide a graphical representation of the time it takes to process a particular specimen and an overall view of the variation in the process.



Statistical control limits are calculated from the data input and are displayed on the chart along with process average (mean) and its variation about that mean. If there is evidence of unusual variation or 'special cause' (outlier) detected, then this 'special cause' should be investigated by using a root cause analysis technique (see section 12).

SPC tools can be accessed via the NHS Improvement Reporting System or NHS Improvement excel data template. To find out more about SPC and the types of 'run rules' that are used to indicate out-of-statistical control situations please refer to the website or NHS Improvement publication '*Bringing Lean to Life: Making Processes Flow in Healthcare*'.

Your individual project can be set up on the NHS Improvement Reporting System and this will enable you to track the project, add project documentation and upload improvement stories. Further information on how to use the Improvement System can be obtained via: support@improvement.nhs.uk

Other important data for your baseline	
Turnaround times	% achieved in seven days % achieved in three days % of reports available for next MDT
Quality and safety (defects)	% specimen pots/forms with inaccurate/illegible/ incomplete information % referrals returned to requester % of laboratory defects at QC (non-conformities) % of cases requiring extra processing/fixation
Engagement	Overall team engagement/morale scores at start of project and various additional points throughout the change process Number of ideas generated and % implemented on time

7. How to begin

Team guidance
Begin by identifying a credible and respected project lead to head up the team. This could be a clinician or manager with the drive and enthusiasm to steer changes across the patient pathway.

Project team members should be drawn from across the entire pathway:
- Clinical /managerial lead who must provide active support and leadership to the core team
- Specimen reception/cut-up – (eg MLA) should be able to contribute to discussions such as organisation of transport and cut-up for same day sample delivery and cut-up
- Laboratory – (eg MLA, BMS) must represent and understand all processes from block processing to QC sign-out (you must utilise laboratory managers and histopathologists as part of the core team/wider team or steering group)
- User involvement – member of an existing patient group or suitable equivalent, likely to be a wider team member.

Core team members must:
- Understand the process within their stage of the pathway
- Be able to contribute ideas/information on the process
- Be able to influence the decision making process
- Be prepared to test and implement changes across the pathway
- Be committed to attend all team meetings, and work required between meetings.

Wider team membership/steering group
A wider team of key stakeholders from across the pathway should provide regular input and support but may not be a member of the day-to-day core team.

Executive support
An executive team sponsor should be identified to provide proactive support and access to relevant support services such as estates and transport, HR, Finance and IT teams. They may be called upon to escalate key issues.

Protected time out
This is essential to allow thinking time for the core team and any members of staff planning a Plan, Do, Study, Act (PDSA) cycle and may have to be facilitated by the departmental manger or executive lead

Communication plan
It has been widely recognised from the phase one pilot sites that the establishment of a communication plan is essential and a central information board should be positioned to inform all staff of project activity and progress.

Training location/work room
Space will be required for the core team to work. An area should be identified where the team will have space to work on projects and display information work sheets and maps.

8. Establish the measures

The purpose of measurement is to:
- Understand the baseline position and how much improvement is made
- Set goals and ensure progress
- Prevent problems and errors
- Work with facts and not opinions
- Set standards
- Recognise success

Quality, Innovation, Productivity and Prevention (QIPP)
With the introduction of the QIPP Quality, Innovation, Productivity and Prevention agenda measures should be aligned to quality outcomes:

Patient safety
Reducing avoidable harm with confidence that the result is accurate, e.g. % errors in specimen taking, request cards, data input and results letters.

Patient experience
Providing a timely accurate result with relevant information, e.g. information at time of test and with result.

Clinical effectiveness
e.g. % of patient results available within seven working days and the % of results available for first MDT meeting.

Delivery
End to end turnaround times

Costs

People and staff

Environment
There will be other local measures and quality indicators which can be used to assess the impact of local improvement work.

Some examples of additional measures:

- % of referrals with insufficient request information
- Patient satisfaction rating
- % processor/system utilisation
- % staff availability
- % machine/system re-runs
- % staff absence
- % staff trained in task
- Stock level replenishment
- Department productivity v. target.

9. Key enablers to specimen flow

This section is designed to help teams make changes that have been tested and proven to make a significant difference to turnaround times across end-to-end specimen pathway

All parts of the process are covered. Changes should be implemented in a planned and structured way, guided by the core project team and project lead. Measures should be in place to track improvements and evidence the impact of improvement.

To support these recommendations, case studies demonstrate how sites have implemented these.

Specimen Taken Source	Action	Why?
1	Send specimens to laboratory at least once a day, even if there is only one.	To ensure timely testing.
2	Utilise laboratory vacuum pod systems for delivery of small specimens to lab.	To support the daily levelling out of specimen deliveries to specimen reception.
3	Ensure appropriate staff are trained in the use of relevant patient administration and lab systems and are able to use its full capability.	To enable the correct information to be entered onto the request form.
4	Simplify and standardise request forms Where available, use electronic requesting for every specimen.	To ensure correct demographics are recorded. Specimens are not returned for correction or because hand writing is illegible - get it right first time!

Lab book-in and cut-up	Action	Why?
1	Perform continuous cut-up processes daily for main specialties.	To enable more predictable flow of blocks for processing whilst saving up to one day at cut-up stage.
2	Reduce batch sizes to a minimum.	Instinct tells us batch processing 'feels' quicker and is more efficient. Small batches will immediately reduce your TAT - use SPC to prove it.
3	Implement a non-acceptance policy for incorrect forms and specimen containers.	To improve quality and safety whilst eliminating time spent by staff dealing with omissions and mistakes, logging returns, telephoning surgeries etc.
4	Use pre-filled disposable pots rather than re-cycling.	Time savings.
5	Stamp the expected date of report at booking-in.	This visual management enables reporting capacity to be predicted and planned for and assists communication throughout all main laboratory processes to ensure the reporting schedule is maintained.

Lab (processing QC signout)	Action	Why?
1	Treat all specimens with equal importance - remove 'urgent' streams.	Time is saved by not sorting/classifying at booking-in/cut-up stages.
2	Utilise minimum batch sizes across embedding, sectioning, trimming.	Instinct tells us batch processing 'feels' quicker, but this will immediately reduce your TAT - use SPC to prove it.
3	Stop the microscope QC stage for small and resection material.	Time is saved by not performing 100% checks where errors rates are low (overprocessing).
4	Perform microscopic quality checks on 25% of slides from any one case of biopsy material with multiple slides.	Waiting time is reduced for cases leaving the laboratory resulting from a lower defect rate - focus on right first time.
5	Quality checks are performed on control slides for special stains rather than all slides.	Time can be re-allocated to cover BMS advanced cut-up.

Reporting (typing and authorisation)	Action	Why?
1	Implement typing area 'quiet time' and/or pooled typing resource reporting time-slots during agreed periods each day (no answering e-mails, remove the fax machine, phones set to silent).	This will allow dedicated points of contact to be nominated daily whilst improving the quality of concentration and productivity of typists.
2	Where available, utilise the same system of voice recognition / digital dictation consistently.	This will increase secretarial efficiencies and reduce time waiting to validate / authorise.
3	Use of standardised typing check templates that identify and address issues relating to errors in specimen coding, assigned pathologists and unrequested specimens e.g. • Specimen list - code • Specimen codes linked to free text • Tabulated by anatomical system for ease of use • Guidance notes regarding the formatting of text • RCP cancer data coding.	This will minimise unnecessary time spent checking and duplicated checking.
4	During planned reporting time, consultants complete the reporting and authorisation of a planned number of cases. To ensure results are made available continually throughout each day, consultants should work with minimum batch sizes, adopting a 'first in, first out' approach.	This will alleviate the build-up of cases delivered to consultants who are not available to complete reporting activities at time of allocation.

Office activities	Action	Why?
1	Type and issue reports in chronological order. Prevent the occurrence of older reports taking longer to despatch than those more recently requested.	A true 'first in, first out' system will ensure that no patient or referrer waits excessively for results other than for reasons of a genuine clinical nature.
2	Ensure correct Snomed codes are included when typing is received from reporting staff. Make use of minimum dataset reporting software where possible. Agree departmental standard work (or standard operating procedures) for codes to be dictated/written at reporting.	Reporting software automatically records the correct code right first time, everytime. This can be used with confidence to search for diagnoses of new cancers quickly and when calculating workloads.

All areas	Action	Why?
1	Initiate weekly / monthly performance review meetings with representation from all laboratory areas, Consultant teams, Clinicians, MDT / Cancer Manager and Commissioners etc.	To review weekly / monthly performance reporting and lateral cancer pathway impacts. This improves communication across pathway boundaries and allows for issues / escalations to be resolved quickly.
2	Send out monthly reports and newsletters communicating current TAT, achievements, issues etc.	To improve communication, promote your improvement work, and delivery against guaranteed and predictable TAT's for users.
3	Introduce area-by-area visual management showing volumes of specimens, blocks, slides, cases received (demand), processed and work left to do.	Improves productivity. Progress is visible and motivating.
4	Initiate five minute daily meetings (huddles) with all staff around the information board.	Enables staff to review progress against expectation and encourages 'stop to fix it' culture and improves engagement.
5	Introduce a staff ideas and information board.	Important to engage staff in identifying issues and solutions. Essential to provide a feedback loop explaining what is happening with suggestions made.

10. The nine wastes

The key to adding value is to remove waste.
So, what is waste?

There are nine forms of waste and these can be easily remembered with the mnemonic:

TIM A WOODS

Transport
Material or information that is moved unnecessarily or repeatedly e.g. unnecessary movement of samples.

Inventory
Excess levels of stock in cupboards, store rooms, backlogs and waiting lists e.g. specimens waiting to move to next step in process, or people waiting for tests and results.

Motion
Unnecessary walking, moving, bending or stretching e.g. equipment placed in wrong location, unnecessary key strokes.

Automating
Where technology is substituted to compensate for a poor inefficient process/processes.

Waiting
Waiting for samples, equipment, staff, appointments or results e.g. patients waiting for test and results, staff waiting for other staff, equipment or information.

Overproduction
Producing something before it is required, or more than is required e.g. unnecessary / inappropriate tests, batching samples, tests and information.

Over-processing
Duplication of data or repeat testing due to defects e.g. dual data entry, additional steps and checks.

Defects
Errors, omissions, anything not right first time e.g. poorly labelled specimens and requests, insufficient or illegible information.

Skills utilisation
Unused employee skills e.g. highly qualified staff performing inappropriate tasks.

WASTE COSTS MONEY AND ADDS TIME

The following case studies illustrate how the sites have removed waste from their systems to improve turnaround times.

Case study 1

Improving transportation of specimens

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary

Working with high volume, on-site Trust users has improved delivery times with associated improved flow, which has led to increased numbers of cases being processed the same day with subsequent downstream benefits for turnaround times.

Understanding the problem

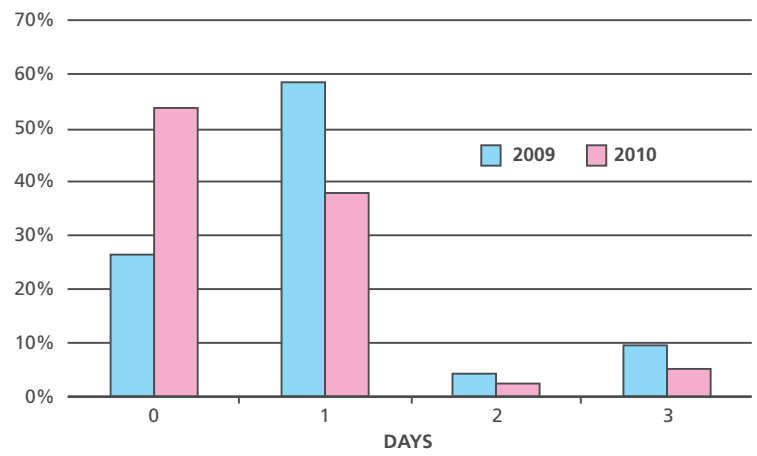
Data collected for 2009 indicated that 66% of hospital site requests were taking more than a working day to reach the histology laboratory.

- A go and see activity took place with the porter attached to the pathology department
- Particular problems were noted in high user specialties/areas such as outpatients, endoscopy and day surgery where clinic sessions often continued to 6:30pm
- Outpatients was visited only twice per day with dermatology being the most productive
- Endoscopy was reliant on their own staff to deliver specimens when they could which led to batching and often only at the end of a session
- Day surgery was reliant on theatre support workers to deliver at the end of a session causing late delivery
- Triage at pathology main specimen reception added to the delay and created some additional batching.

How the changes were implemented

- Go and see activity with the laboratory porter which identified clinical areas covered within the trust
- Meetings with high volume users to discuss the specimen delivery data
- Trial of temporary dedicated histology porter for one month to collect four times per day from high volume users
- Specimen volume data collected throughout each day and analysed
- MLAs now carry out two retrievals per day at 08.30 and 14.30 from the high user areas and deliver directly to histology, ie no general pathology triage/wait/batching

High volume users delivery time - July/August 2009 vs July/August 2010



- The acquisition of a new xylene free processor has aided the implementation of automated rapid processing.

Measurable outcomes and impact

- Improved delivery has enabled processing of smaller batches and improved flow of specimens within the laboratory. As a consequence more cases are processed the same day and others are brought forward by up to **12 hours in the cycle**
- Overall the number of cases from the high volume users arriving the same day has **improved by 100%**
- The number of cases rapidly processed the same day as receipt has **improved by 100%**.

Ideas tested which were successful

- Go and see activities
- Engaging with the high volume service users to communicate the aims of the project and to present current state data
- Use of the PDSA testing concept to manage the change – trial of porter followed by in house MLAs and modification of collection times.

Ideas tested which were unsuccessful

- Difficulties identifying those who had any real influence in a given area/specialty
- Agreements with two users to modify their delivery times failed or were not sustainable
- Use of the air tube system for delivery from certain areas failed on health and safety and risk after a rigorous independent assessment
- High volume users stopped their current in house delivery practice which they were asked not to do.

How this improvement benefits patients

- An **additional 20 cases rapid processed** the same day as receipt
- An **additional 12 cases** per day brought forward into the system by at least 12 hours
- The use of an automated xylene free processor for rapid processing has reduced the risks associated with a manual rapid process instrument.

How will this be sustained and what is the potential for the future /additional learning?

- Further improvements to be identified to smooth specimen flow from source and allow more same day delivery. We need to better understand specimen delivery issues from off site users such as GPs and treatment centres
- Further testing of rapid process programmes to allow more same day processing
- The benefits from this study have been highlighted to the Trust executive management, who have instigated a portering service improvement initiative across the Trust
- Potential to increase MLA collection frequency and extend to other service users subject to staffing levels/investment
- Service user engagement will be maintained and extended.

Contact

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Case study 2

Reducing the waste in the further work process

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary

Introduction of an Excel database to allow multiple pathologists to simultaneously request extra work from the laboratory.

Understanding the problem

The previous system of requesting extra work required pathologists to fill in paper slips and place them in a request box in the laboratory. They were then transcribed by lab staff into an extra work book. Problems included:·

- Wasted movement - average of 38 metres covered on a daily basis
- Illegible writing - 5% not processed right first time
- Duplication by transcription of paper slips in to request book
- Difficulties in tracking progress of request
- Forgotten requests - approximately 2%
- Duplicate requests - approximately 1%.

How the changes were implemented

- The problem was discussed at a daily huddle and an Excel database was developed in house, with conditional formatting that used colour to flag the status of requests
- The Excel database could be shared across the network to allow multiple pathologists to simultaneously view the progress of requests and add new requests. Commonly used requests could be chosen from a drop down menu
- This was tested for six weeks and its usage was reviewed (using the PDSA cycle). Due to the benefits of the system, it was fully implemented and confirmed as the new standard way of working.

Measurable outcomes and impact

- The database has eliminated wasted movement of **208 kilometres per annum; approximately 60 hours of walking by pathologists**
- It has eliminated illegible requests and transcription duplication of requests
- The progress of requests can be easily tracked by pathologists and lab staff
- Later copies of the database were given to the other labs participating in the national pilot project and many of these labs are now using the database.

Ideas tested which were successful

The database was accepted by staff as an improvement. One pathologist described it as "the best thing to come out of the project".

Ideas tested which were unsuccessful

The database required some software 'tweaks' to allow it to be used by large departments with more than 10 pathologists. Some pathologists do not like using computers.

How this improvement benefits patients

It allows extra work requests to be correctly processed, first time every time, and improves turnaround times.

How will this be sustained and what is the potential for the future /additional learning?

In-house development of software is an under-exploited solution to work flow problems. Labs are often constrained by immutable commercial software. Labs should be encouraged to pursue their own software solutions.

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Case study 3

Reducing defects at slide labelling

University Hospital of North Tees, North Tees & Hartlepool NHS Foundation Trust

Summary

Labeling slides at section cutting has reduced transcription errors **by 60%.** Ensuring cases are kept together from blocks to slides facilitates faster QC with **2 hours** of wait time and **1.5 hours** of MLA time saved daily. The latter has addressed a CPA non compliance through the introduction of block checking.

Understanding the problem

Value stream mapping highlighted 'work in progress' backlogs accumulating at QC due to incomplete cases moving along laboratory processes between section cutting, staining and QC. A department audit revealed that 74% of laboratory non-conformities were transcription errors at section cutting / slide labelling. From observed practice and presentations at other pathology departments and conferences, it was decided to adopt slide labeling as sections were cut as whole cases at a time. Additionally, slide labelling was time consuming which delayed cases and duplicated effort of Bio-Medical Scientists (BMS) and Medical Laboratory Assistants (MLA).

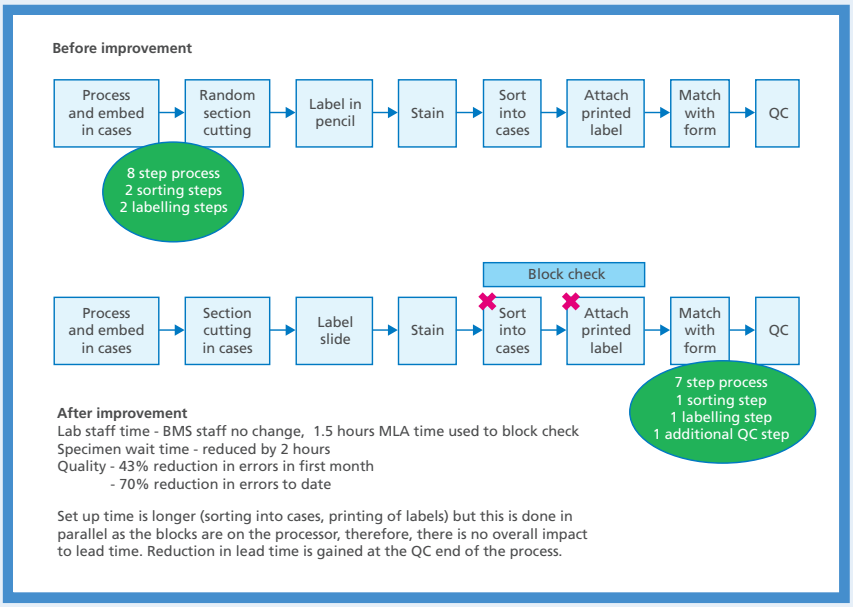
How the changes were implemented

- Labels are printed at data entry and attached to request form
- Blocks and associated request forms / labels kept together throughout section cutting, staining and collation
- Sections are cut and labelled with slide label before staining·
  PDCA cycles undertaken to ensure correct placement of the label on the slide

Measurable outcomes and impact

Wastes removed

- **Motion** - there is significant reduction in matching up forms and slides
- **Waiting** - cases now move to the reporting stage **2 hours earlier**



- **Defects** - has been reduction in non-conformities arising from transcription errors from **74% to 20%**
- **Over Processing** - cases were being split at section cutting and sorted back into cases at QC stage - duplication in effort was removed saving **1.5 hours** of MLA time daily.

Ideas tested which were successful

Adopting the slide labeling approach used across other Histology labs proved to be relevant.

Ideas tested which were unsuccessful

Labelling the slide with the printed label only. Governance concerns raised by Pathologist staff (both internally and at referral centres), and the possibility of labels lifting from slides, resulted in the department returning to labelling the slide in pencil before adding the printed label. Although slightly more time consuming, the overall impact is minimal and does not detract from the benefits of this change.

How this improvement benefits patients

- Overall quality has improved from reduction in laboratory generated errors
- Delivery is quicker as slides are available sooner for reporting
- Time has been released to allow an additional QC step as required by CPA

How will this be sustained and what is the potential for the future /additional learning?

All staff now recognize the direct benefit of removing laboratory non-conformities and improving safety by keeping whole cases of slides together; all of which can be achieved without additional resource. An ongoing audit will ensure measurement against a zero tolerance goal.

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Case study 4

Stopping the overproduction of spare unstained slides

The Leeds Teaching Hospitals NHS Trust

Summary

50 days of staff time have been released annually by addressing overproduction of spare unstained slides from small biopsy specimens. Projected annual cost savings of **£1,229** in consumables have been identified.

Understanding the problem

- Waste of unstained slides was identified when 'walking the lab pathway'
- Spare unstained sections had automatically always been taken from small biopsies at initial microtomy
- Affected approximately 250 blocks per day
- For some specimen types, spare sections were used on very rare occasions
- Valuable staff time was involved in boxing the spares and disposing of them· Spares were stored for at least two months in several large heavy boxes
- Large quantities of slides were being disposed of with cost implications.

How the changes were implemented

- Pathologists identified that spare unstained sections were not required for gastric, cervical and small / large bowel biopsies
- Sectioning protocols were changed accordingly
- Pathologists provided feedback if lack of spare sections caused problems.

Measurable outcomes and impact

- No recorded clinical incidents due to lack of spare sections. Lack of spare sections necessitated further sectioning for only 0.6% of cases (for further work or if original H&E slide was irreparably broken).· By reducing the number of spare unstained sections
- **279 hours** of sectioning time released, equating to **37 working days annually**
- **103 hours** of time spent producing labelled slides released, equating to **13 working days annually**· Estimated **£1,229** saved annually from consumables budget.

How this improvement benefits patients

By freeing up the equivalent of an extra staff member one day a week, the capacity for sectioning has increased. This alongside other measures has seen the lab block backlog (peaked at c.5,000) being reduced to nil (August 2010).

How will this be sustained and what is the potential for the future /additional learning?

By reducing one of the seven wastes identified during the original waste walk, staff have been able to appreciate the positive effect of tackling wastes. It has been a surprise to see how one small change has released so much time and saved so much money.

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Case study 5

Reducing wasted skills

Birmingham Women's NHS Foundation Trust

Summary
Implementation of a digital dictation system has reduced the waste of skills and contributed to a reduction in turnaround time.

Understanding the problem

- Secretaries typed reports for the pathologists from handwritten documents or analogue dictated tapes
- No system to drop off or pick up the reports and the Pathologists had to physically deliver the work to the office (some worked in a different building creating further transport problems and delays)
- Batching caused backlogs and periods of time when there were no tapes to process
- Several reports would be dictated onto one tape. As only one secretary could type from the tape remaining reports queued and were delayed further
- There were times in the office when no work had arrived and times of great pressure. The pressure to get out the reports and keep the backlog down also resulted in more errors
- Each day work had to be carried over and this led to delays in reports going out.

Manual data capture was used to record when reports were delivered to the office, how long each report took to type, and how long it had been waiting in the office to be typed. A defect log was also recorded.

- Baseline performance of three day turnaround times was 41%
- Delays from 'specimen available to report sent' for a significant number of cases was as long as a month and typically four days
- A lost or damaged tape could take one hour of pathologist time to be reworked which equates to £1900 per annum
- All reports were checked twice by the pathologists and 30% required amendments before the second check when they would be authorised to send out
- Secretarial time spent on amendments took approximately one day per week equating to £4,000 per annum secretarial time
- The double checks by pathologists added a further day per week of wasted Pathologist time which equates to £15,000 per annum. Delay at this step when reports needed amendments could add two to five days to turnaround times
- Difficulty deciphering handwriting or difficulty hearing the report due to poor quality tapes would slow down the process for the secretaries and contribute to the rework at the first check.

Wastes addressed by this improvement activity - Transport, motion, defects, waiting, human potential.

How the changes were implemented

- A digital dictation system was purchased from an office supplier at very low cost
- Two pathologists conducted a trial and once the initial problems had been addressed all but one of the remaining Pathologists adopted the new system
- Initially the team continued to work with existing processes e.g. matching dictation to request forms. They then started to identify improvements and make changes.

Measurable outcomes and impact

The introduction of digital dictation resulted in the following benefits:

- Reports arrive electronically as soon as the pathologist has dictated them, removing pathologist time spent transporting tapes and the subsequent delay before typing starts
- The reports can flow one at a time instead of being batched which means secretaries can manage the workflow more easily and turnaround the reports as soon as they are dictated
- The administration team have re-organised the work and are now available to provide more support to pathologist staff and the laboratory team
- The majority of reports are typed and sent the same day as the specimen was made available to report. This is having a positive impact on morale within the department and is evident in the daily staff meetings and the staff survey
- Length of dictation can be easily seen allowing admin team to more effectively manage the work
- Very urgent reports are highlighted in red so that they can be prioritised
- There is no lost dictation
- There is now clear, audible dictation leading to fewer errors
- Pathologists dictate name and date of birth so that secretaries can immediately type with no need for a card check
- Typed reports can be checked by pathologists immediately in their own office and sent to print
- The three day turnaround time has improved **from 41% to 77%**
- Most of the time one secretary can manage the workload in the office . Three staff are then re-deployed in other parts of the department until required to type reports. This equates to **£60,000 of resource.**

Ideas tested which were successful

- Removing excessive checks in the process
- Removing the need for the copy referral card to be used to identify the patient by ensuring Pathologists dictate a standard identifier for each patient.

Ideas tested which were unsuccessful

- Six of the pathologists adopted the system immediately. One pathologist took longer to be convinced and adopt the change
- The system does not easily allow pathologists to dictate at cut-up and a solution to this problem is being worked on
- The current IT is an obstacle preventing the electronic authorisation of the report.

How this improvement benefits patients

- This has resulted in speedier results to referring clinicians allowing patient treatment to be commenced earlier.

How will this be sustained and what is the potential for the future /additional learning?

- The improvements have already proven to be sustainable· Further refinements to the process and technology are being planned.

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Case study 6

Reducing the QC of slides leaving the laboratory

University College London Hospital NHS Foundation Trust

Summary

Microscopic checking of every slide leaving the laboratory has ceased. **360 hours of BMS time** saved annually.
Contributed to reduction in laboratory turnaround time from **1.5 days to 0.8 days**.

Understanding the problem

- A microscopic check of every stained slide before leaving the laboratory covered the quality of staining, orientation, quality of section, tissue type correlation and patient's details
- A visual check for the same quality issues was also being completed in the collating area before the microscopic check
- Checks caused delays to slide availability for pathologists to screen
- Quality checks were not applied in standard way (despite SOP).

How the changes were implemented

- Quality check process and specimen types assessed to check if all or some of the wastes of duplication/overprocessing could be removed. Decided initially to microscopically check only biopsy/skin lesion and special stains
- Moved on to reduce the % of biopsy/skin lesions checked, checking only control slides for special stains
- TAT data was collated to evidence the process before and after changes
- Minor error log for microscope and collating area was compared and list of minor errors tabulated to identify only those areas relevant to both. Errors included patient demographics, specimen type and number of pieces and quality of staining and section
- Percentages of work sent back for repeat work against this list was collected
- Statistical process control (SPC) charts generated to confirm if process was speeded up by changes
- Error type and percentages also monitored to evidence impact of changes
- Number of slides returned by pathologists with errors associated with the error log list collected before and after the removal microscopic QC stage
- Collating and microscope checking staff used error tracking book (inc. tick boxes)
- One senior was nominated daily to be in charge of work through the lab. This enabled closer association with staff in the collating area
- Daily case list generated and ticked off by the collating staff to enable continual verification on the LIMS of cases leaving the laboratory
- Isolation of one QC step for small and resection material decreased the batch sizes of cases leaving the laboratory
- Microscope QC stage for small and resection material was stopped
- Only 25% of slides of any one case of biopsy material with multiple slides microscope checked
- Only control slides for special stains microscope QC'd for each case
- All control slides kept and dated until the appropriate audit is carried out
- Random sample of special stained slides/cases audited every three months as part of an audit for false negatives.

Measurable outcomes and impact

- Quality defect rate has dropped from **2% to 1%** and any mismatches or other issues now identified at the collating bench where they are corrected
- SPC charts showed the decrease in process and batch sizes had decreased TATs from the laboratory (booking in to release from lab) from **60% in 1.5 days to 90% in 0.8 days**
- Audit of special stained slides/cases showed no false negative results
- Total annual time saved from removing duplicated quality checking amounted to **360 hours**. This was re-assigned to cover AP cut-up short fall in specialist registrar numbers.

Ideas tested which were successful

- Removing duplicated quality checks did not result in increased errors escaping to the next process.

Ideas tested which were unsuccessful

Initially ran the QC checking stage at collation bench with same staff (MLA's). Senior BMS of the day interacted in more proactive way with collating staff.

How this improvement benefits patients

- Work now moving through analytical laboratory stage to consultants faster
- Marked improvement in the level of right, first time work
- Used change in conjunction with others to cut total end to end turn around time for laboratory phase for 90% of our work in one working day.

How will this be sustained and what is the potential for the future /additional learning?

- Continue using the patient pathway analyser to highlight areas of waste
- Variation from new standard operating procedures will be monitored
- Ensure all staff understand standard operating procedures are key to good process and any suggested changes need to be discussed by all of the staff
- Staff have clear instructions and an understanding of the task through the competency procedure that.

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11. A3 thinking for problem solving

An A3 is literally a one-page, A3 size document that records the agreed problem statement, it's analysis, potential counter measures and the action plan to resolve.

The report template itself serves as a guide for understanding a problem, identifying the point of cause and eventual true root cause in a systematic way. It serves as a collaborative problem solving tool.

Beginning with a consensus on the problem or issue you are trying to solve, the left hand side of the page is completed to document the current state. The right hand page is the innovative or experimental approach to solving the issue towards the future state.

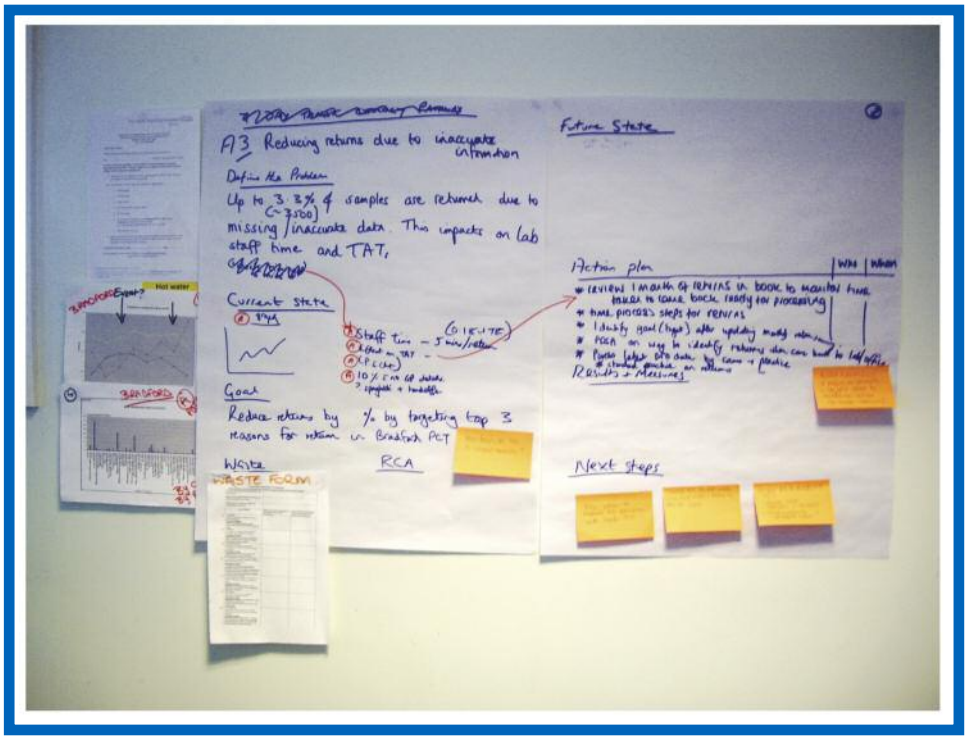
Since Lean is primarily the description of a methodology to routinely solve problems everyday so that the daily work is delivered to specification, A3 thinking is the rigorous application of the Plan, Do, Study, Act (PDSA) approach.

It is the structured 'thinking' that is of most importance, the A3 report is of no significance in the absence of structured, agreed understanding and thought processes.

Describing the entire process - from current state, through analysis to future state on a single sheet of paper requires concise information. Creation of an A3 necessitates logical discussion and thinking - with ultimate agreement on experimentation to seek a better way forward. Distilling the information to only the most relevant details for communication to the rest of the team ensures that a thorough understanding of the issue has been attained.

A precise A3 report prevents massive amounts of information being misinterpreted and inappropriate conclusions being reached by a multitude of staff. The best A3s convey the understanding of the problem and analysis without any explanation. Often, a graphical or pictorial representation of the issue at hand is better than a text summary.

The A3 report itself represents a shared understanding of the consensus of opinion on solving the problem. As a document, it encourages reflection on the learning that has taken place and ensures that a consistent message is able to be discussed and scrutinized. Ultimately, it allows the team to ensure that an agreed action plan is followed.



Case study 7

Using A3 thinking

Derby Hospitals NHS Foundation Trust

Summary
A3 thinking provides a structured approach to identifying and resolving problems and issues within the histology process.

Understanding the problem

Value stream mapping by the core team visualised the value steps in the service from the users perspective and highlighted areas for improvement.

After evaluating the value stream map and considering staff feedback and suggestions, the core team identified the 'big problems' that appeared to be having the greatest impact on turnaround times.

These gut instincts and hunches needed to be investigated and supported by data but the team ended up with lots of data with little agreed way forward.

How the changes were implemented

The core team was facilitated through their first A3 document which focused on the current push system used to distribute work to consultants. Rather than using A3 paper, the team used flipchart paper to create something that would be easier for all to see and contribute to.

First the problem was defined as best as the team was able given their limited investigation so far. The current state was partially represented by the data already collected and the team agreed what else they needed to collect and validate.

The current state was further evidenced using photographs, graphs and diagrams.

When identifying wastes the team found that some headings didn't apply to the problem in hand but others had a long list.

Having fully understood the problem, evidenced the current state and identified the wastes the team moved on to root cause analysis using the fish-bone technique, deciding on the specific problem and attributing the causation factors to the appropriate arms of the fish-bone. As with all the preceding steps this required great thought and discussion and, finally, agreement.

Some team members found the time it took to complete the left hand side of the A3 frustrating and wanted to go straight to Future State and the Action plan. Having invested the time however it was clear that all of this work ensures the team knows exactly what the problem is (having started with a vague statement), what is happening in the current state and what the root causes are. All this preparation ensures that the future state and countermeasures are designed to address the right problem.

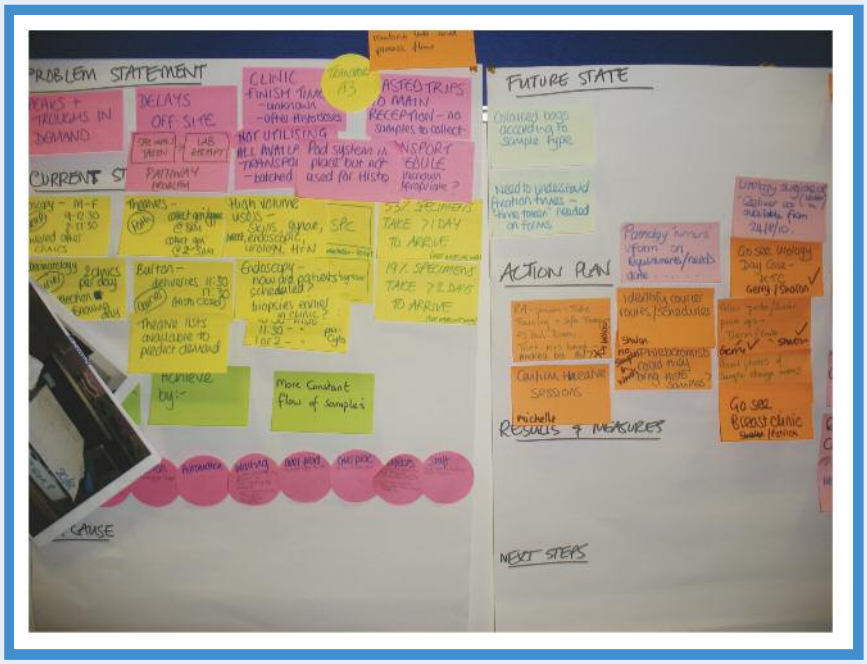
The action plan was used and updated throughout the process to remind the team to go see, collect data, to ask what often felt like obvious questions and most of all to communicate to the wider team/department what was happening.

As the future state and counter measures were agreed, PDSA cycles were also added to the action plan with time-frames and measures.

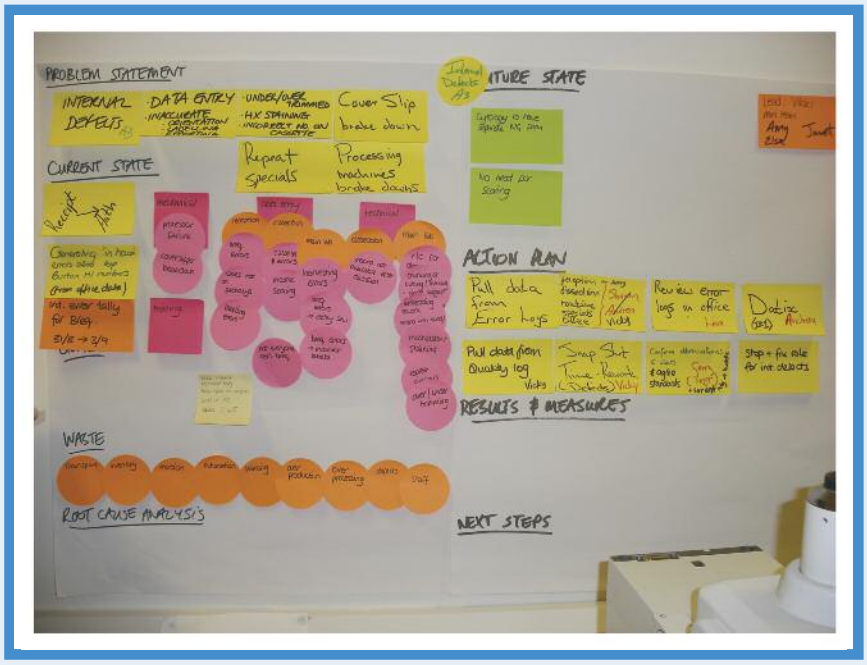
The team went on to use A3 thinking to steer their work on

- Small batch working
- Pull system
- Externally created errors
- Internally created errors
- Transport
- Immunohistochemistry.

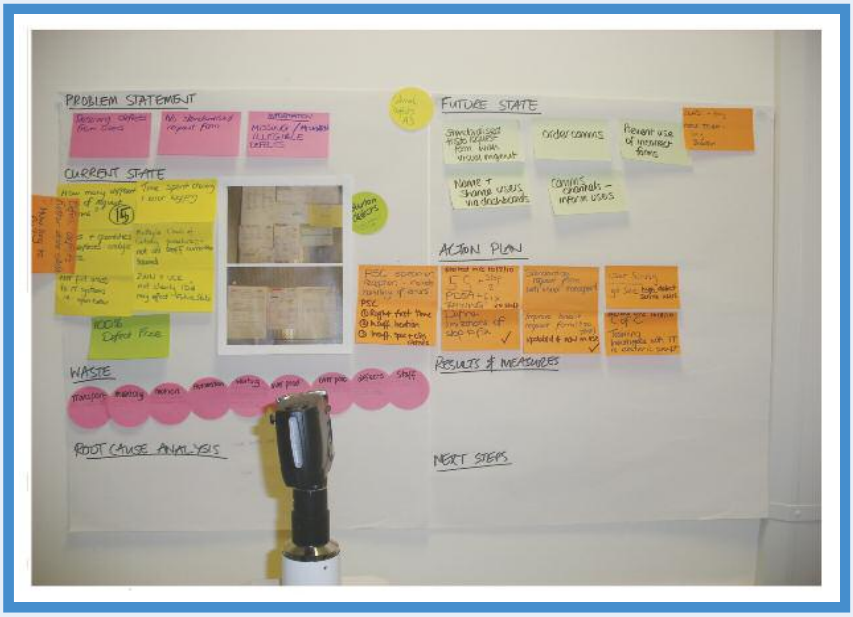
The first and biggest A3 - push system for distributing work to consultants. It now takes up a whole wall



Transport A3



Internal defects A3



External defects A3 - Includes a photograph of the 14 different request forms being received

Ideas tested which were successful

- A3 thinking has provided an excellent framework for the team projects
- Having multiple A3s on the go at the same time with attributed leads and mini teams including staff not on the core team has helped share responsibility
- Links between the A3's were identified by having cross over of mini team membership
- Dedicated time out for team members to work on A3 problems.

Ideas tested which were unsuccessful

The core team learned of the pitfalls of implementing countermeasures to achieve an ideal future state the hard way when the A3 working group took the decision to implement some changes part way through the A3.

Whilst some staff engaged with the change immediately a number did not. Work was not agreed and standardised and confusion and dissatisfaction amongst staff developed.

The team reacted immediately with focused and detailed communication and made sure channels for feedback were made available whilst the working group continued their work on the A3.

IHC A3

How will this be sustained and what is the potential for the future /additional learning?

A3 problem solving will now be used across histology having been communicated to all staff. It provides a discipline for thinking through and resolving problems and it's visual nature has encouraged involvement from the wider team.

Further development work needed on root cause analysis by senior staff is required.

Reflective learning on the use of A3's to solve problems by all staff involved has highlighted the need to ensure the planning and data collection stages are fully complete before implementation and counter measures are put in place.

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12. Root cause analysis

The most obvious contributor to any problem is rarely the root cause.

An effective problem solver uses A3 thinking to investigate an issue until they identify the one cause that, if dealt with, would eliminate all future occurrences of the problem in hand.

All process problems result from either:

1. **a poorly specified activity**
2. **an unclear connection**
3. **a complicated or undefined pathway**

It is imperative that countermeasures are designed to prevent repeat episodes of the same problem without the necessity to perform a 'workaround' solution. Effective countermeasures should always become the new standard way of working.

Finding the root cause may require some experimentation and will need a thorough understanding of the problem. A useful method for identifying the root cause of a problem is the 5 Whys deductive technique - literally asking 'Why?' five times until the final causality is established. The root cause can be found by digging deeper, questioning why a problem occurred and hence truly understanding the problem.

5 Why Analysis Example

Labelling problem

Why were the samples labelled incorrectly?
Because of the unreliable database

Why is the database unreliable?
Because the database has incorrect information

Why does the database have incorrect information?
Because the database is not maintained

Why is the database not maintained?
Because no one is responsible for maintaining the database

Why is no one responsible for maintaining the database?
Because there is no maintenance standard in place

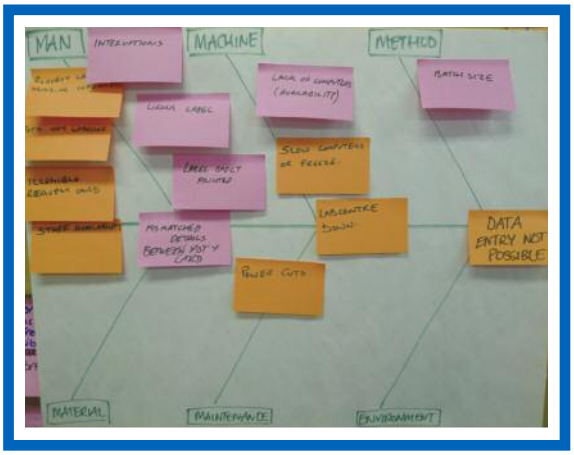
Once the root cause is established, a sense check can be performed by working backwards from the root cause to the problem statement saying 'therefore' between each 'why' statement. The root cause is rarely obvious and often the countermeasure can not be implemented immediately as it must be tested and evaluated. Therefore, in the short term, you may need to consider putting containment work in place to prevent the problem from reoccurring until the countermeasure has been implemented.

Alternatively, an Ishikawa or fishbone diagram might be useful. The fishbone diagram is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects. It may also be referred to as a cause-effect diagram.

Used in conjunction with the 5 whys tool, it forces critical thinking in order to challenge each cause-effect relationship.

The goal of the 'root cause analysis' section of the A3 report is to show that either experimentation or logical deduction has established the true 'cause-effect' relationship in the current state. Reasoned agreement within the team should separate symptoms and opinions from the true cause-effect and a summary of the main findings should be populated in the relevant A3 report section.

Analysis should be fact and data based, not based on assumptions. Accurate data/measures should be used as an objective means to identify occurring problems which give rise to deviation from specification requirements. Determining the root cause of these deviations should provide a clear understanding of the necessary solutions.



There are a number of principles to bear in mind:

- Do not assume you know the cause - preconceived ideas will prohibit a useful analysis
- Always go to the location of the problem, observe it first hand and speak to the people involved with the process
- Continue your analysis until the true cause of the issue is identified
- The goal is always to identify problems that can be corrected by the problem solver
- A thorough analysis with factual data will indicate the corrective action required
- Determining the result when the causes are detected is as important as examining the problem itself

Case study 8

Using A3s and root cause analysis to improve the use of the specimen dissecting room

University College London Hospital NHS Foundation Trust

Summary

The goal was to generate a flexible and effective use of the available space, staff and cut-up slots. The pathway from specimen receipt to preparation has been reduced to **less than 24 hours for 84% of specimens** by using A3 thinking to identify waste, perform root cause analysis and collect appropriate data, as well to generate an action plan to follow, engaging all staff in the structured thinking process.

Understanding the problem

Work on our current and future state maps revealed considerable gains to be made addressing issues in the provision of specimen cut-up.

- Inconsistent and inefficient use of the facilities in the cut-up room
- Too much phoning around to fill cut-up slots leading to late over running and leaving no time to set-up for the following morning
- Junior medical staff had other work to do so could not start cut-up until 11:00 am
- Inconsistent start times for cut-up slots
- Cut-up was running ad hoc all day
- Lack of space and cut-up stations (three) with juniors and Pathologist staff wanting to use them at the same times causing issues
- BMS and junior medical staff hunted for slots instead of pre booking slots the day before
- Problems created where three junior pathologists could be cutting up but only one MLA and one BMS assisting between 10:00 am and 3:00 p.m. which was stressful.

The core team used A3 problem solving with a user group and produced the following:

Root cause analysis

- Showed lack of communication between all grades of staff
- Instigated capacity planning for space and people
- Looked to link junior pathologists and BMS staff rotas
- Showed need for standardisation of work flow.

Waste identification

- Over processing of diagnostic material - high block count per specimen
- Non uniformity of pots and lids - time taken to keep resorting
- Waiting in the mornings to start cut-up - made afternoons very busy and crowded
- Waiting to start work as benches not set up the night before.

The overall goal was for 95% of all work to have the cut-up stage completed within 24 hours (excluding head and neck cases) with the remaining 5% to be completed within 48 hours.

How the changes were implemented

- Block book cut-up times for perinatal pathology
- Actively manage juniors work plan
- Generate demand analysis for afternoon slots
- Generate visual management schematic for booking cut-up slots
- Instigate 10:00 a.m. cut-up start
- Senior BMS to actively supervise the cut-up suite
- Generate SPC data to correlate before and after for turn around times for the specimens.

Measurable outcomes and impact

The following was achieved:

- Initial turnaround times for January 2009:
  - 5% of specimens cut-up on day of receipt
  - 60% of specimens cut-up within 24 hours
  - 35% of specimens cut-up 48 hours or longer after receipt
- Turnaround times after changes January 2010:
  - 54% of specimens cut-up on day of receipt
  - 84% of specimens cut-up within 24 hours
  - Only 16% cut-up 48 hours or longer after receipt (e.g. head and neck cases)
- Implementation of a work cell for booking in to processing now to include two MLA's and two BMS staff in the morning who cross cover at high points of demand
- There are also two AP cut-up BMS staff in addition to the junior pathologists processing for cut-up
- Morale of staff now very high- as measured by decrease in sickness rate.

Ideas tested which were successful

- Engaging a whole group of staff in use of PDSA (PDCA) methodology to problem solve
- Uncover true root cause of the problem
- Identification of multiple wastes in the system
- Generation of ideas to solve the issues.

How this improvement benefits patients

The decrease in turnaround from receipt to cut-up has contributed to a decrease in the overall laboratory TAT to 0.8 days. Slides are delivered to pathologists earlier enabling them to schedule their time to report on the slides so patients are given their results more quickly.

How will this be sustained and what is the potential for the future /additional learning?

A3 problem solving is currently in use across the department when a problem is identified. The methodology is easily communicated to staff and being such a visual tool staff are able to use the approach in a group setting.

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Case study 9

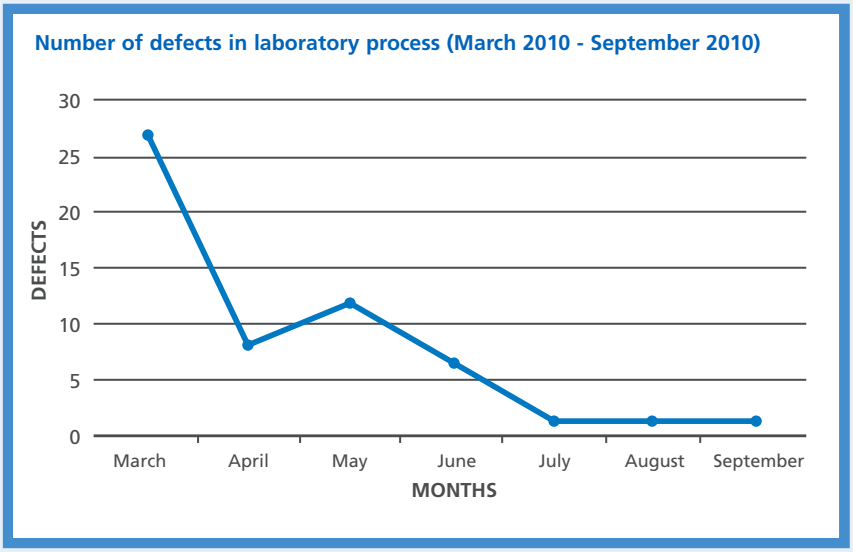
Root cause analysis to reduce defects

Birmingham Women's NHS Foundation Trust

Summary
Reducing defects and quality audit.

Understanding the problem

- The laboratory team had a checking process in place but there was no active data collection or proactive management of defects in the process
- Specimens inadequately labelled or with missing information would be dealt with by BMS staff who had to find the clinician who had taken the specimen. On average there would be 10 of these defects per month
- Every case was checked at the end of the process for section quality. With an average of 1,000 slide checks per day taking 4 hrs of staff time the cost was £22,500 per annum
- The team needed to prove whether the slide checks represented over processing and further understand how defects could be eliminated or reduced
- Understanding whether defects could be detected earlier in the process was key. An equipment fault which caused the blocks to be under - processed, was only detected at the end stage check, requiring all specimens to be reprocessed overnight, involving re-work and staff time
- Data collection helped the team understand the nature of the defects that were occurring
- Measures were taken to show the time wasted when defects occurred. Eg. the melting down of blocks wasted 25 minutes of staff time per block equating to £10 of staff cost per defect
- The most common defect occurred because blocks were not cut to the right level. As the defect was not being detected early enough (at the trimming stage) further waste was occurring between cutting and final slide check. This caused a delay of an hour which equated to £21 staff cost per defect.



How the changes were implemented

- Firstly, data was gathered to evidence defects and process performance
- Following training in 'problem solving' and 'cost of poor quality' the team held an initial meeting to review defects and decide on a future management plan
- Defect data was analysed using the Pareto principle i.e. 80% of the problem is linked to 20% of the defects
- The commonest defect had a root cause analysis and a solution identified which was communicated at the daily meetings or through specific training
- The defect management process was shared in the visual control centre
- With the support of the clinical governance department, all inadequately labelled specimens or request card discrepancies would be returned to the sender and an incident form completed.

Measurable outcomes and impact

- After four months the common defects in the laboratory process had reduced and now only one defect per month is detected
- No labelling and request card errors occur, On the extremely rare occasion this happens they are returned to the requester
- Defects are prevented from occurring and the team follow the principle of not passing on poor quality
- The team work well together at solving problems as soon as they occur and ensure the right solutions are put in place as soon as possible.

Ideas tested which were successful

- Daily review of defect management at the visual control centre
- Communication and training to prevent defects
- Returning labeling and request form defects to the referrer.

How this improvement benefits patients

- Assurance that patient test results are safe.

How will this be sustained and what is the potential for the future /additional learning?

- Problem solving and prevention of defects has now become part of the daily disciplines within the team and defects occur only infrequently
- The slide check at the end of the process is now in question as the defect rate is too low to justify the £21,000 per annum of resource required to conduct the check. However, this needs to be agreed at the next CPA inspection visit.

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13. Visual management

Visual management is everywhere, from traffic lights, to the numbers on the front of buses, petrol indicator lights in cars, a water level on a kettle, or a cricket scoreboard.

These visual indicators allow us to easily understand the situation and take action where necessary.

Visual management is a simple, yet highly effective way of indicating what should happen (by setting a standard) and what is actually happening in the work environment. At a glance, colleagues, supervisors, managers and visitors to the area should be able to understand the process and see what is under control and what isn't without asking a single question.

Visual management allows teams to:

- **See the work in progress**
- **Recognise flow stoppers**
- **Assess inventory levels**
- **Identify defects**
- **See deviations from the standard**
- **Enable interventions.**

There are two types of visual management:

- **'Visual display' is the provision of information**
- **'Visual control' is associated with action.**

Both provide the maximum amount of information without having to leave the work environment or interrogate an information system such as a spreadsheet or database.

Visual management provides knowledge, certainty and makes our life, and those of our patients, safer.

You can use visual management to answer, amongst others, the following questions

1) Are we up to date with the work?
2) How much work is in the system today?
   a. How many specimens/blocks/slides/forms are in the laboratory?
   b. How many results have we made available today?
3) What are our three biggest problems in the area and what is being done to resolve these problems?

Examples of visual management in everyday life

4) How do staff know that their ideas have been listened to?
5) Who is trained to perform each task?
6) Is there daily responsibility for supervision? Who is it today?
7) How do you know where staff are - break, annual leave, study leave?
8) How do you know if the stock has been ordered?

Further examples of visual management in use across pathology are available in a Visual Management Catalogue on our website:
www.improvement.nhs.uk/diagnostics

Case study 10

Daily visual management used to plan, monitor and act on pathway performance

The Leeds Teaching Hospital NHS Trust

Summary
A workstream was set up called '*Protecting the Customer*' to identify the key stakeholder groups of the histology pathway and understand their priorities so that they could be translated into measurable requirements.

From this process, a series of communication/information boards have been located across the department, and have shown to be working successfully in communicating the right performance information to the relevant audiences as they are updated on a regular basis. This has resulted in staff engagement with the programme to improve lab workflow.

Understanding the problem

- No visual means of presenting daily information to the laboratory, pathologists or remainder of department on number of blocks processed, embedded and sectioned. This was being recorded on an excel spreadsheet
- Staff would manually search department data systems to establish volumes of cases/specimens received and where work was held across the pathway
- Similarly, pathologists had limited information about TAT times and delays within the laboratory and therefore could not inform clinicians.

How the changes were implemented

Information boards introduced to display information relevant to all groups of the department under the criteria of delivery, quality/defects and cost.

Lean principles, 5S information, pilot workstreams, core team members, baseline SPC, specimen journey throughout lab, master A3 storyboard including current / future state value stream maps, identified wastes and action plans from workstreams.

Lean communications board

Consolidates pathway indicators relating to overall result TAT e.g. daily workflow, improvement events, staff training / availability, unplanned equipment downtime, 5S scores etc. If this is the case, it is clear where the problem(s) occurred and contributes to root cause analysis.

Histology department dashboard

Boards used to present daily work received, work completed and left to do figures against plan. Anyone can view this and identify current workloads and any problems. Daily section five minute meetings are held at the board to review the previous day's performance and instigate actions where problems occurred whilst also agreeing daily work-plans including required staffing capacity through the day.

Lab daily performance board

Measurable outcomes and impact

Daily workflow information is collated, displayed and updated throughout each working day - produced quickly, at no cost and in such a way that all staff members both understand and use it. This assists decision making for staff allocation and scheduling planned downtime for activities such as 5S and working on training plans.

Ideas tested which were successful

- **Daily performance boards** - timely performance updates are available to all staff
- **Histology dashboard** - allows Pathologists to know daily what work volumes and oldest date of anything outstanding in the lab and plan their workloads effectively, with minimal inquiries to laboratory
- **Daily workload calculations** - daily knowledge of volumes of work received, work completed and what work was left to do in each area helped to plan and allocate staffing time more accurately across the whole lab.

Ideas tested which were unsuccessful

Limited board space / information layout - required alternate information formats.

How this improvement benefits patients

Staff members understand, plan and monitor daily workflow allowing for responsive staff management enabling allocated time for both training and compliance work.

How will this be sustained and what is the potential for the future /additional learning?

- Visual management is in place and regularly assessed for stakeholder needs
- Electronic reporting / specimen tracking is being set-up using Excel and bar-coding to allow real-time information to be shared with all service users.

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Case study 11

Visual management

North West London Hospitals NHS Trust

Summary
Visual management is supporting the standardisation of processes within the laboratory.

Understanding the problem

As changes were introduced to lab processes, staff became unsure of how to do things and core team members were frequently interrupted with questions or the need for reassurance.

In both the lab and the mounting room each staff member had developed a different way of working and people didn't always remember the new process. Picking up a task from a colleague became difficult as it wasn't clear how they were operating or where they had got to.

Not everyone was comfortable with small batches of slides for staining and still felt they had to fill racks with 40 slides.

How the changes were implemented

Visual management was created to support the new standard work to help all staff to see step-by-step what was required.

Measurable outcomes and impact

Visual management is supporting the process and helping to standardise work.

Visual management to aid preparation of cut-up bench

Visual management to support scraping and creation of small batches

Ideas tested which were unsuccessful

The team started with lists of the steps required to complete each task which were posted on the wall near each work area. These had limited success because not everyone was clear on exactly what the process should be. There were still individual interpretations of what was required.

The next step was to create photos to show what is required. People found it easier to follow the photos which are less open to interpretation than the written instructions

How will this be sustained and what is the potential for the future /additional learning?

The visual management in the main lab will need to be updated and improved when new slide label printing equipment is installed to ensure everyone follows the new standard work.

Photographs to aid set up of cut-up stations and visual management for reception is to be developed further. Once specimen reception and booking in are combined as a work cell, visual management will be used to aid standardisation of the process.

Visual management for the filing room will make it easier to identify where slides are and how to remove and replace them.

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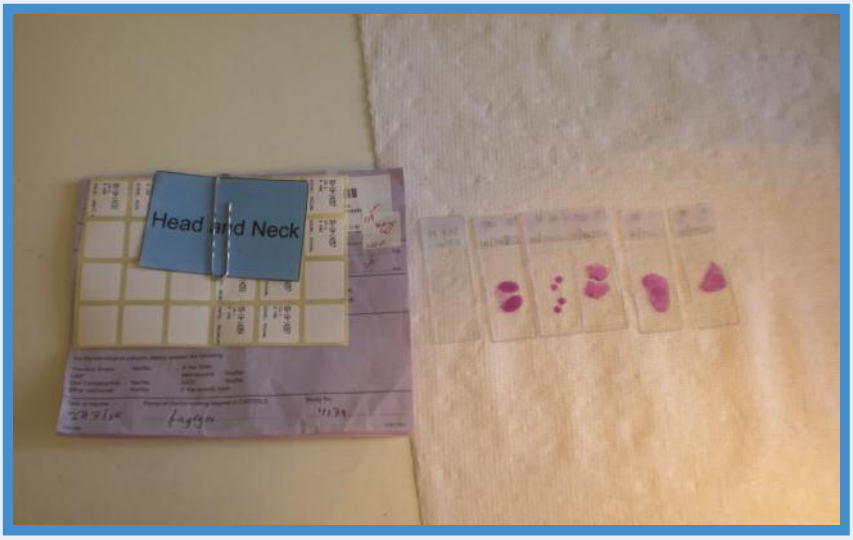
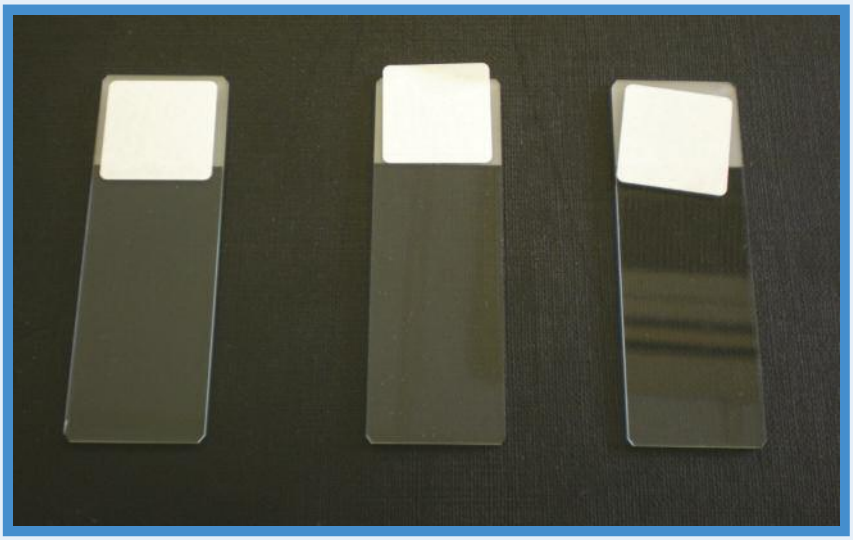


Visual management to aid matching forms, labels and slides



Visual management for labeling slides

14. Value, value stream mapping, flow and pull

- Lean starts and ends with the customer. In our case, the patient or another department involved in that patient's journey
- A value stream map is used to describe all activities performed and information required to produce and deliver the product or service
- Whether a step is 'value add' is determined by the patient
- To ensure value in a process, focus on improving flow, creating pull and striving for perfection.

What is a Value Stream Map (VSM)?

This tool captures and specifies the activities, information and timing in the process. It differs from a process map in that it includes waiting times and inventory (backlogs) between steps and the number of people involved at each stage in the process.

It should ideally be a hand drawn representation of how all the steps in a process line up to deliver a service. As well as the flow of information that triggers each step of the process into action, it includes the flow of materials and the flow of information.

The steps in the process are timed and categorised as value-added and non-value-added.

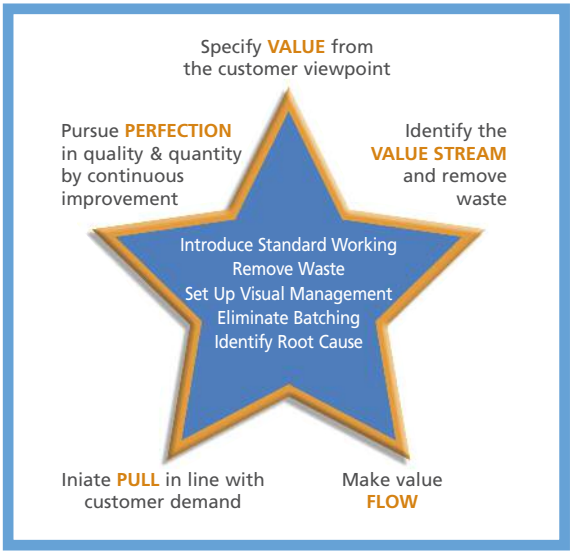
Teams will create more than one VSM. The first should show the current state (the way things are now). A subsequent VSM should be created to identify the 'Ideal' or 'Future' state; the idealised notions of the process in a perfect world, where all the steps are only value added steps.

As improvements to current processes are made the current state VSM should be updated.

Why do we need a VSM?

The purpose of a VSM is to:

- provide the customer (patient) perspective and keep focus on delivering to their expectations
- provide a complete, fact-based, timed representation of the activities required to deliver a service
- provide a common language and common view to analyse the value stream
- show how information flows to trigger and support the activities
- show where activities add value and where they don't



How is a VSM created?

A VSM should be created to represent what is actually happening rather than what should be happening. The best way to capture the steps that a specimen or patient goes through is to "go see"; do a "Gemba walk" meaning to go to where the process happens and observe what actually happens and how long each step takes.

In order to understand and analyse the process you will need to capture certain information including cycle time, changeover time, inventory (backlog) levels and the number of staff carrying out the task.

Every step in the value stream needs to be understood by asking:

- What is the actual time required to perform the task in the process step?
- What is the waiting time before each step?
- What is the transport time?

A VSM should also include a representation of information flow. This is critical to the timely and effective execution of the process. Location, quantity and frequency of information flow should be shown.

To identify this detail, ask these questions:
- **What information is being transmitted?**
- **When is the information being sent?**
- **Who receives the information?**
- **Where within the value stream is the information transmitted?**
- **Is the information sent manually or electronically?**

Lead time
This is the amount of time it takes for one piece (specimen) to move through the whole process from start to finish. It includes transport, process time, waiting, etc. It should be from the time the patient has had the procedure (specimen taken) to the time the result is available to their clinician. Lead time includes value added (VA) and non value added (NVA) activities.

A VSM includes a continuous line along the bottom representing the lead time for each step. The line looks like the turrets of a castle with each turret being the time it takes for each step to be performed and the gaps between turrets being the waiting time.

Quantifying and qualifying value added (VA)
Steps in the process should be described as value added (VA) and non value added (NVA).

Non value added steps can be further subdivided into:
- Non Value Added but necessary
- Non Value Added and not necessary.

Value added processes or activities must meet three key criteria:
- The customer (patient) must be willing to 'pay' for it. Payment is generally thought of in monetary terms but could include time or other resources
- The activity must transform the product or service in some way
- The activity must be performed correctly the first time.

Anything that does not meet the above criteria is Non Value Added (NVA) and is, therefore, a waste of some type.

Flow
Flow refers to the creation of a steady stream of products or services to the customer.

The ideal state is that, from the time the process starts, the specimen never stops until the result is available to the clinician. To achieve this ideal state, specimens would have to flow through the process one at a time with no excess inventory, no defects, no rework and no equipment break downs.

The only way that we can get close to this ideal is to apply standard methods of working with minimal variation and to reorganise work environments.

Flow is difficult because it doesn't fit with the natural way humans think. We tend to organise things into batches because we think it is more efficient.

In single piece flow documents and specimens are handled less, use less space and are completed more quickly. Single piece flow is not entirely achievable in a laboratory environment but batch size reduction has achieved proven time savings.

Pull
Pull and flow work in harmony with one another to keep the entire value stream moving at the rate that is required by the patient.

Lean uses level scheduling practices to keep the system operating at a steady achievable pace. One of the most common examples of a pull system is a supermarket where only the specified amount of a product is placed on a shelf. When the product level runs low, the empty space acts as a signal for the stockperson to replenish the product.

In a laboratory the pull system should be driven by the customer (patient) demand which signals all the activities upstream to build or replenish what has been used. Upstream activities are not initiated until a signal from the steps downstream is received.

Instead of building up an excess of specimens at any step in the process, work should be performed only when the specimen is required downstream - a ‘take one, make one’ system.

When successfully implemented in conjunction with flow and perfection, pull systems result in less inventory (backlog), reduced floor space and faster processing of specimens.

Case study 12

Reducing turnaround times by automating semen analysis

North Tees and Hartlepool NHS Foundation Trust

Summary

Introduction of automated semen infertility analysis to reduce turn around time for semen infertility specimens and increase senior BMS capacity. The automated system has ensured this process is standardised and can be performed (without variation) by junior grade staff releasing senior BMS staff time.

Understanding the problem

Semen infertility analysis was shown to be labour intensive and required evaluation by higher grade BMS staff. A value stream map (VSM) of the process showed a lead time of 1275 minutes of which 94.11% was non value added waiting time. In reality, specimens were delayed longer due to the small number of staff trained to perform the morphological examination.

How the changes were implemented

- **Current and future state processes mapped**
  Whole system of semen analysis could be simplified through using a machine which could be operated by a more junior grade staff member. Current process delays would be significantly reduced by eliminating and combining a number of existing process steps
- **Analysis of cost benefits performed**
  Staff time, reagents, equipment and consumables costs were calculated for both manual and automated methods. This proved to be cost neutral as the cost of consumables for the automated method offset any potential financial savings from the releasing of staffing time
- **Business case was secured**
  Decision to lease a SQA-V Gold analyser (Medical Electronics Systems Ltd) to automate the process
- **SOPs produced**
  One day training session for all staff Band 4 and above.

Measurable outcomes and impact

Overall process lead time was reduced from **1,275 minutes to 9 minutes**, achieved by focusing on waste reduction:

- Waiting - reduced 1200 minutes of waiting time (94.11% reduction)
- Automating an inefficient process - completing and analysing a current state value stream map proved the plan to automate semen analysis was worthwhile
- Skills appropriate to task - **104 hours senior BMS** time saved annually (important to cover the out of hours service)
- No direct cost savings as extra cost of consumables cancelled out senior staff capacity released.

Ideas tested which were successful

The only option available was to consider automation. Comparative study was performed by a senior BMS within the department.

Ideas tested which were unsuccessful

Automated semen vasectomy analysis proved too expensive (e.g. equipment consumable costs proved more expensive than staff time to perform analysis.

How this improvement benefits patients

The analyser is easy to operate, producing accurate and consistently reproducible results in a relatively short space of time. This benefits patient care whilst freeing up BMS time which contributes to reduction in the pathway turnaround time.

How will this be sustained and what is the potential for the future /additional learning?

Quality has improved by adopting a standardised process which removes operator variation. Performance is assured with self calibration and regular QC.

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Case study 13

Introduction of pooled medical reporting to improve workflow

The Leeds Teaching Hospitals NHS Trust

Summary

Lean principles have been used to amend the system of medical reporting of skin and lung cases to ensure work leaving the main laboratory continues to flow until reporting, typing and authorization of reports is completed. The mean medical reporting turnaround times for skin biopsies and lung resections have been **reduced by 68.7% and 60.3% respectively**. For bronchial biopsies that had previously been treated as urgent 'fast track' cases it has been **reduced by 42.9%**.

Understanding the problem

Average time taken from slides released from the laboratory to sign out of reports by pathologists (including result server access) was 5.20, 7.17 and 2.38 days respectively for skin, lung and bronchial cases. This contributed to prolonged end to end pathway turnaround times raising concerns from the Cancer Network and PCT service users.

In May 2010, Pathologist and trainee medical staff, laboratory staff and administrative staff addressed this problem in a three day Rapid Improvement Event (RIE). In preparation, a specimen caseload was determined to establish baseline measures with process time-gates extracted from the departmental specimen database. This enabled SPC charts to be produced for work flow monitoring, identifying special cause 'outliers'.

Similarly, a number of pathologists recorded their daily activities in terms of what they did, for how long and at what stages during the day to identify allocation of time spent on key activities according to their job-plans.

At the outset of the RIE, an A3 storyboard was set-up to document the current state and plan / monitor progress implementing the agreed future state. A process map was also constructed that helped identify and quantify various wastes. It became apparent that there was considerable short term and long term variation in both demand and capacity of the medical reporting system.

Variation in demand

- **Between cases** - examination and reporting time of small specimens (e.g. skin / bronchial biopsy) can take as little as five minutes compared with reporting of large specimens (e.g. lung resections) which can take up to four hours over several days
- **Case volumes** - average of 230 skin / lung specimens were received weekly between January and July 2010 (minimum of 192 / maximum of 263) impacted by batching and lack of predictable workflow out of the main lab
- **Impact of report availability for MDTs** - cases received on the day prior to MDTs need to exit the lab and reporting stages in less than one day whilst those cases received on the MDT day itself have up to sixdays to complete all pathway stages. This resulted in a fast-tracking of cases to meet patient needs, rather than reporting within a first in-first out system.

Variation in reporting capacity

- Pathologist availability impacted by non-reporting job-plan tasks and part-time working patterns.

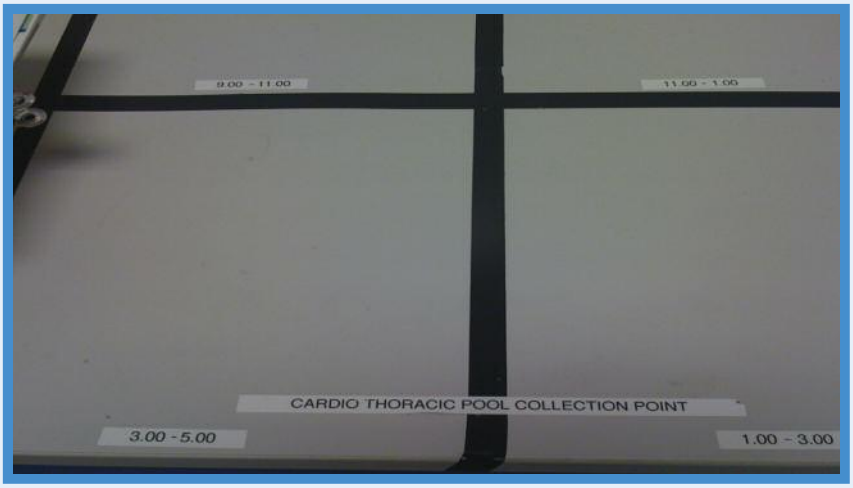
Wastes within pre-improvement medical workload management

- Delay - cases were assigned to specific pathologists on daily rota basis who then dissect or supervise specimen dissection
- Once prepared, microscope slides where placed in pathologists' pigeon holes for collection and reporting which resulted in batching of slides and uneven work flow to individual pathologists
- Unreported cases were concealed in pathologists' offices until searching the outstanding report database or when clinicians followed-up
- Similar delays existed in the office where dictated reports waited to be typed and subsequently typed reports waited to be edited
- Transportation - cases delivered to an absent pathologist required resorting and reallocation to their colleagues providing absence cover
- Reworking was also needed when slides had to be re-examined if authorisation was required for a report prepared by an absent Pathologist
- Failure demand - additional work was needed when report enquires were received about delays due to failure of the system to achieve expected TATs
- Inappropriate use of skills - inappropriate use of secretarial skills occurred when identical reports were typed for cases with similar diagnoses.

How the changes were implemented

The RIE introduced changes which initially ran for a five day period but then extended to 30 days to allow further experimentation of changes before being made standard:

- Work was pooled - upon receipt, specimens would be assigned to 'skin pool' or 'lung pool' not batched to specific pathologists
- Standard work protocols adopted by the pathologist assigned to specimen dissection for that day. Complex specimens would be photographed and sites marked on the photographs from which blocks were taken
- Main lab QC slide supermarket - slides placed on skin pool and lung pool tables for reporting (lung cases placed in pool when available)
- Pull system of work distribution was born as pathologists, (not necessarily who performed dissection) would collect and log cases taken in batches of five (estimated as one x hour of pathologist work time) or after one hour, if five cases were not available
- Lung pathologists worked to a rota covering pool reporting in two hour periods
- Single piece work flow introduced for microscopy, report typing and report authorisation
- Slides would be examined with reports dictated and individually sent immediately for typing or in batches of less than five. Upon receipt, these would be typed by one of a skin / lung pool of Secretaries working on a two hour rota
- Where possible, synoptic reports and standard report texts were pasted into reports with the completed report authorised immediately by the reporting pathologist.



Thoracic workpool where cases for reporting are obtained (pulled) by pathologists at specific times of the day

Any further work required would be immediately requested with the case assigned to the reporting Pathologist in the departmental specimen database.

- Visual management - if unreported cases accumulated in the pools beyond agreed limits, their "visible presence" on the pool table would provide a management trigger to investigate with action(s) taken to adjust capacity before failure demand develops.

Measurable outcomes and impact

Mean reporting TATs for skin biopsies and lung resections were reduced by 68.7% and 60.3% respectively. For bronchial biopsies that had previously been treated as urgent 'fast track' cases it was reduced by 42.9%. Data from January to July 2010.

Ideas tested which were successful

- Pooled reporting / team working was encouraged by visits to Calderdale Royal Hospital Histopathology Department and Pathlinks, Lincoln
- Lean principles training provided a language to review work flow management and techniques to improve it
- Pooled lung typing for reports shared by secretaries of the three lung pathologists.

Ideas tested which were unsuccessful

Skin typing pool failed when departmental secretaries opposed the use of a typing rota. Instead, one secretary now performs the required one hour of typing on a daily basis.

How this improvement benefits patients

The reduction in medical TAT combined with the reduction in laboratory TAT has reduced the mean end to end turnaround times for skin and lung specimens from **15.2 days** in January 2010 to **8.1 days** in July 2010.As a result of this:

- Skin reports available within seven days up **from 9.9% to 62.6%** (Jan-Jul 2010)
- Lung cancer reports ready for MDT meetings two weeks after surgery (requested by Cancer Network service users) up **from 59% to 92%** (May-Jul 2010).

How will this be sustained and what is the potential for the future /additional learning?

The work pool system will continue to be monitored, and if report quality is maintained whilst TAT is minimized, other specialties will be encouraged to adopt it to establish level workloads that enable reports to become available throughout each day.

In support of this, two activities will follow:

- medical reporting time will be measured so that evidence-based planning of capacity will be possible
- establish appropriate calculations so that as cases are 'pulled' from the work-pool, the main lab can adjust their pace of replenishing them.

Skin and lung turnaround times

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Case study 14

Increasing workflow through scheduled cut-ups

The Leeds Teaching Hospitals NHS Trust

Summary

50% of cases took longer than two days to progress through specimen reception and cut-up (11% of cases taking > 5 days) impacting on overall pathway TAT.

By changing the way cut-up activities are organised and by addressing waiting time delays, 96% of cases are now cut-up by the end of the following working day.

Understanding the problem

- Department is a specialised Pathology service with multiple specialty groups operating their own rota systems for cut-up
- Average TAT from date received to cut-up was 2.94 days (98.5% of TAT attributed to waiting time)
- Large proportions of received cases were automatically allocated to the specialty pathologist on cut-up for the following day
- **297 minutes were wasted** each week sorting and transferring specimens onto different trolleys in specimen reception for transfer to cut-up benches
- There were multiple booking systems for cut-ups and pathologist or technical staff often did not know when to expect a cut-up
- Cut-up bench utilization was 27%
- 13% of planned daily cut-ups were missed with 46% done on time (no free staff)
- Work areas cluttered, time lost finding equipment/consumables (24 mins daily).

How the changes were implemented

- Three day rapid improvement event (RIE) identified changes to ensure >90% of cases would be cut-up by end of next working day from receipt in specimen reception
- Identified when two benches should be used for BMS cut-up ((1) deal with pre-cassetted biopsies and (2) remaining small specimens because the majority of specimens were in this category)
- Each specialty was allocated a colour code for dissection of larger specimens
- Specialties were allocated individual colour coded benches
- Same colour code used to label specialty trolleys in Specimen Reception. After booking in, specimens wheeled to specific bench on coded trolleys
- Charts for booking cut-ups were also colour coded. The charts had hourly start slots for each bench and were used to allocate technical staff to booked cut-ups. All staff can now see scheduled cut-up times and where they will be working
- At booking in, an increasing number of cases were allocated to a specialty group instead of an individual pathologist
- Consequently, if a specialty cut-up session is ongoing, relevant booked-in cases could now be fed straight in
- Fixed cut-up times were trialled for the breast and gastrointestinal teams including fixed sessions for the opening and pinning out of fresh specimens.

Measurable outcomes and impact

- **96% of cases** are now cut-up by the end of the following working day. Average TAT through Specimen Reception and Cut-up has **reduced by 1.74 to 1.20 days (59.2% improvement)**
- The specimen pathway through specimen reception and cut-up is now defined
- Larger proportions of specimens are Cut-up on same day they are received by allocating specimens to specialty groups as opposed to an individual
- All staff can see where/when/for how long they are working during each day
- **93% of cut-ups** are now on-time
- Post RIE satisfaction questionnaire indicated that Pathologist staff morale had improved with **82% of respondents satisfied** with new bench allocation system
- Time to place specimens **reduced by 50%** providing annual saving of **132 hours**

Ideas tested which were successful

- Rapid improvement event provided opportunity for team representing all pathway staff to brainstorm ideas and trial them before putting them into practice
- Colour coding enabled everyone to track specimens, no longer relying on prior knowledge. It also makes the day more colourful!

Ideas tested which were unsuccessful

Pre-booking all cut-ups resulted in several pathologists choosing the same start time which couldn't be accommodated as insufficient technical staff to cover all cut-ups.

How this improvement benefits patients

A decrease in cut-up TAT has contributed to overall decrease in departmental TAT - **66% of cases** turned around in seven days (July 2010). This has led to more predictable reporting time enabling clinicians to better plan their patient clinics.

How will this be sustained and what is the potential for the future /additional learning?

- Optimise specialty groups that cut-up specimens on day of arrival by altering how specimens are allocated in that group
- Develop booking in charts to include all other cut-up tasks, using them to move staff according to workflow demand. Staff will know where they will be needed throughout the day and provide extra variety of allocated work tasks.

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Case study 15

Introducing a consultant 'pull' system to smooth reporting flow

North Middlesex University Hospital NHS Trust

Summary

The introduction of a common reporting pool for the majority of specimens has created flexibility and allows consultants to 'pull' work according to their availability to report it, thus eliminating the discrepancy between demand (unreported work) and supply (reporting capacity of the consultant body).

Turnaround times (TATs) have **improved by 21% for three days and by 55% for seven days** and there has been a reduction in the time taken to report cases by consultants from an average of **4.5 days to 1.8 days**.

Understanding the problem

Despite improvements being made by the laboratory, turnaround times were not approaching the targets set.

There was a perception amongst the pathologists that the work allocation could be improved as five of the six pathologists worked part time:

- The steps from specimen receipt to authorisation were analysed using the patient pathway analyser tool on the NHS Improvement System. This confirmed that fluctuations in overall TATs were primarily due to the organisation of the consultant reporting rota
- All the slides processed from a single day's cut-up were allocated to that specific pathologist (average 10-15 slide trays)
- Slides were booked out to the pathologist within the laboratory (a time consuming, wasteful task that generated errors, leading to slides being allocated to the wrong pathologist). Big batches of slides would remain in the pathologist's office until they were reported
- An analysis of work allocation versus actual time available for reporting showed that cases were sitting in offices awaiting reporting, despite pathologists being committed to other duties e.g. multidisciplinary meetings, cut-up etc.
- Piles of unreported slides in offices created waste and led to a feeling of constant pressure with no time for other activities e.g. continuous professional development, service development etc, making it harder to search for a specific urgent case (assuming it was in the right consultant's pile of slides!).

How the changes were implemented

The problem was addressed by discussing the data amongst the pathologisys at one of the regular morning huddles, after which it was agreed that:

- Majority of the cases were pooled into a common area in the laboratory called 'The Blue Box' all allocated on the computer to a generic default setting
- Agreement that larger cases, cut-up by individual consultants (mainly cancer cases or complex resections) were given directly to them
- Pathologists would 'pull' a reduced batch size tray of work (containing approximately 10 slides) only if they were ready to report it directly
- Pathologists were asked to replace any unreported work at the end of the day back into the pool
- The laboratory ensured work was placed to flow 'first in, first out', with no priority streaming.

Measurable outcomes and impact

- The pooled, pull system resulted in improvement in TATs from baseline figures.
  - Cases reported within three days increased from **19% to 39.6%**
  - Cases reported within seven days increased from **56 % to 95%**
- A dramatic reduction in time taken from ready to report to final report authorisation from 4.5 days (pre changes) to 1.8 days (post changes) was achieved
- Morale amongst the pathologists improved as workload can be adjusted in line with other duties within the working day. Waiting of stacks of trays in offices has been eliminated
- Improved account taken of consultants working part time
- Wasted time reduced within the laboratory and office
- No allocation of work to individual pathologist
- Unforeseen 'urgent' cases can be retrieved and reported quickly. They are easily located and dealt with by an available pathologist
- A common pool is a clear visual measure of demand (work awaiting reporting) with no trays hidden in rooms
- An empty pool is rewarding, whilst a full pool allows consultants to work together to prioritise reporting duties whilst still taking other duties into account.

Ideas tested which were successful

Pooling of work had been suggested previously on several occasions and had been tried in various combinations, without success.

- Initial objections were noted as:
  - loss of control
  - the view that traditionally one's cut-up remained one's responsibility
  - the fear that the number of cases reported per pathologist would be used comparatively within the department for monitoring of an individual's performance and productivity
  - an individual may feel a lack of contribution if their figures happened to be lower
- This system requires mutual cooperation and trust
- The idea of reducing batch sizes by reducing the number of cases per tray was successful in moving the work quicker and had a psychological impact.

Ideas tested which were unsuccessful

- An initial trial of four to six weeks where the work was pooled, divided daily by a nominated consultant was unsuccessful. It was time consuming and resulted in batches of work being handed to individuals who may have other commitments, with piles of unreported work in the offices. No allowances for those consultants with several big cases as a result of recent cut ups, allowing little capacity for further work. On occasion, work was also handed out to pathologists on their days off
- An idea for the BMS to distribute the daily work based on number and complexity of cases (Warwick points), availability of the pathologist, and other commitments. Once an agreed maximum number of points had been reached for an individual pathologist, the remaining specimens were allocated to another pathologist. This was time consuming, confusing and laborious for the BMS and reduced morale within the laboratory.

How this improvement benefits patients

- Improved and predictable TATs allows prompt discussion at multidisciplinary meetings, ensures results are available when the patient returns to clinic
- As cases are assessed as soon as they are taken from the pool, any further investigations required e.g. special stains, levels are requested promptly thus reducing further delay
- Cases can be easily retrieved when requested and reported promptly by an available pathologist.

How will this be sustained and what is the potential for the future /additional learning?

- Laboratory staff and consultants feel less pressurised and happy to continue indefinitely. The system works well due to mutual cooperation
- A similar system has been adopted for gynaecological cytology resulting in dramatic improvements in consultant reporting times
- The challenge for the future is in trying to adapt specialist reporting into the current model.

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Case study 16

Improving flow of specimens through the lab

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary

Improving the work flow throughout the laboratory has been achieved by identifying and removing waste in the pathway from processing to QC.

Understanding the problem

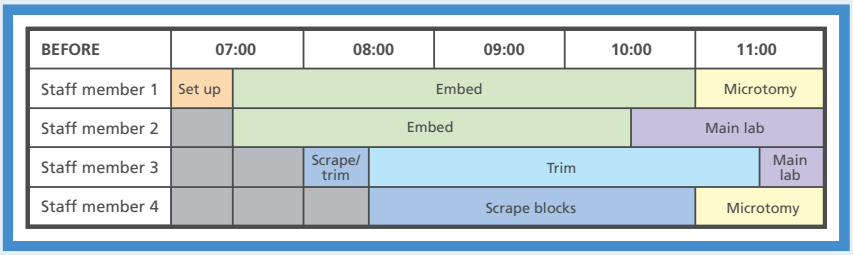
At the start of the project, although the current day's work flowed through the laboratory and was available for reporting the same day, it was apparent that there was waste within the pathway. This was evidenced through completion of the current state value stream map, spaghetti mapping and process sequence charts.

Processing

- Same day processing was achieved by the use of a manual microwave processor for approximately 10-20 blocks. All other specimens were processed overnight.

Embedding and trimming

The following rota was in operation



- The first job of the day was to set up the laboratory for the working day. There was no standard work to support this and resulted in variation in the way this was performed and in the time taken to complete this
- The next job was to start embedding by two members of staff
- Scraping and trimming would not be started until sufficient blocks had cooled
- A single trimming station was situated in the main lab. There were difficulties with monitoring the flow of embedded and trimmed blocks for cutting
- There was no continuous flow of trimmed work as the staff member would be covering other lab duties
- An additional microtome was available but stored under the workbench as there was no space to use this.

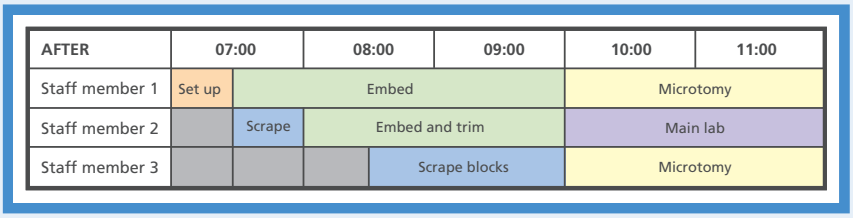
Microtomy and staining

- Staff would collect a batch of between 12-15 trimmed blocks for cutting
- At unspecified times, a microtomist would fill a rack of cut slides for staining.

During this period there was a radio playing in the background and general lab chatter which was interrupting the flow of specimens.

How the changes were implemented

- A new xylene free processor has been introduced, which has enabled an improved same day processing service with less operator interaction for 40-50 blocks
- Standard work for morning set up has been developed and implemented
- The trimming microtome has been relocated to the embedding room to create an embed/trim work cell.



Measurable outcomes and impact

- The number of staff required for embedding and trimming has reduced from four to three. This fourth staff member can now complete other value-adding tasks
- An extra microtomy work station in the main lab has been created
- There is an increase in efficiency in the embed/trim workcell of 40%, with the average time for embedding, scraping and trimming reducing from 1.56mins to 0.61mins
- Through reducing the batch size to 10 for cutting, the work is more evenly distributed amongst staff
- Loading the staining rack every 15mins ensures a continual flow of specimens (stainer has 15mins cycle time)
- Batch sizes at QC checkout have reduced from 40 to 20
- Although not very popular initially, there is an improvement in the rate the work flows with the quiet/microtomy time. Data shows that it took an average of 1.63mins/block with radio and talking, whereas with quiet time it takes an average of 0.65 mins/block
- Batch size of 10 trimmed blocks for cutting has been introduced
- Cut sections are pulled onto the H&E stainer every 15 minutes
- Quiet/microtomy time has been introduced following a PDSA cycle to determine the best solution. There is no radio and minimal chatting between 9am and 12pm.

Ideas tested which were successful

- Use of Plan Do Study Act (PDSA) cycle to test different ways of working
- Daily communication with all lab staff, pathologists and office staff throughout PDSA cycles
- Collection and analysis of data before and after changes to evidence improvement
- Creation of standard work through discussion with all staff involved with the process of morning set up
- Reviewing equipment usage and location
- Reducing batching throughout the lab
- Automated same day processing.

Ideas tested which were unsuccessful

- Quiet/microtomy time was unsuccessful at first as some staff felt demoralised. However by evidencing the improvement with data, the majority of staff now appreciate the benefits.

How this improvement benefits patients

Improvement in turnaround time of all diagnostic histopathology reporting.

How will this be sustained and what is the potential for the future /additional learning?

Further development of processing schedules to support further same day processing service.

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Case study 17

Improving consultant reporting

Whipps Cross University Hospital NHS Trust

Summary

Work was being issued by the laboratory in batches at unpredictable times to each of the six consultant pathologists in the department. A 'push' system was in operation and there was a mismatch of reporting capacity and demand resulting in a backlog situation and lengthy reporting times (mean of six days, could be up to 30 days).

Once microscopy reports had been dictated by pathologists, there were significant delays before electronic validation due to an inefficient secretarial typing step. Traditional methods of work allocation were abolished, allowing introduction of a pull system. Matching of reporting capacity and demand was optimised. The reliance on secretarial staff for typing reports was eliminated by using a new approach to constructing microscopy reports. These actions resulted in a reduction of consultant reporting times to a mean of 1.5 days.

Understanding the problem

A 'push' system of work

The allocation of work was undertaken in specimen reception by laboratory staff who kept a daily tally record of cases assigned to each of the six pathologist staff. A complex set of rules governed the division of work, designed to take into account:

- Pathologisy leave
- Specimen type (for example, only certain pathologists reported bowel screening specimens, only one pathologist reported alopecia cases etc…)
- Pathologists' other duties (for example, an allowance was made for those pathologists undertaking gynaecological cytology and management roles).

There was poor understanding of the system and mistakes were frequently made, resulting in frustration for both pathologists and laboratory staff. Laboratory staff were delivering work to pathologists in batches at times when they were unable to complete it, for example whilst preparing for an multidisciplinary meeting (MDM) or just before going on leave. Reporting capacity was not matched with demand. Trays of slides were building up in pathologist offices and could remain unreported for up to 30 days.

Delays in typing of microscopy reports

- Three pathologists would dictate microscopy reports in batches of 10 onto analogue tapes which were then left in the office for secretarial typing (other three pathologists typed their own reports)
- Time taken to type reports was highly variable and unpredictable, ranging from immediate (one 'urgent' case if prioritised by the pathologist) to two working days. In addition, the typing of analogue tapes was frequently batched
- Typing delays and batching resulted from poor organisation and variable staffing in the office, with tasks performed without effective prioritisation
- Reports were further delayed when returned to the pathologist for electronic validation often when the pathologist was working on other tasks or absent from the department and unable to validate the reports
- At time of validation, any errors would be corrected. If minor, this would be undertaken by the pathologist. Occasional cases would have to be returned to the secretaries for correction (e.g. proportion of report missing, typographical errors).

How the changes were implemented

Workload allocation

- Extensive discussion between pathologists led to a unanimous decision to trial a 'pull' system, in conjunction with the introduction of specialist reporting
- In specimen reception, all specimens were marked according to specialty. A visual chart, detailing the nine categories, was attached to the wall. Laboratory staff adapted to this easily as they were already familiar with assigning specimen codes and were able to accurately designate cases to specialty groups
- Once cases were checked out, they were placed on shelves labelled by specialty which were located in the laboratory. The most recent cases were placed at the bottom of each pile
- When able to report, each pathologist picked up one tray of cases (from the top of the pile, i.e. oldest cases) from the laboratory. The next tray would only be collected once the first was complete
- Pathologists therefore 'pulled' the work from the laboratory rather than having it 'pushed' upon them. As soon as work was taken, it was completed.
- Any work outstanding was clearly visible to all as it was located in the laboratory. There was no reporting backlog in the pathologists' offices
- Matching of reporting capacity and demand was therefore optimised.

Eliminating a hand-off to simplify the reporting process
Individual statistical process control charts for microscopy reporting were generated and openly discussed, with root cause analysis performed on any outliers. A process sequence chart was also constructed.

- Sources of waste included
  - dictated reports waiting to be typed
  - typed reports waiting to be validated
- Three pathologists who were already typing their own reports shared their experience of using standardised microscopy reports (templates) which they had created and saved within the laboratory software. These could be inserted into the specimen report and modified if necessary
- Existing templates were accessible to all pathologists and new ones could easily be created and saved in individual pathologist folders
- Of those who were dictating reports, two pathologists started creating and using templates. As the repertoire of templates has increased, dictation of reports onto tapes was discontinued.

Measurable outcomes and impact

With the introduction of these changes, there was marked improvement in the pathologist reporting process. Mean reporting time **reduced from six to 1.5 days**.

The pull system

- Pathologist staff feel far less pressured and more in control of their work. They work together as an effective team to tackle the daily work and any backlogs that may build up, maintaining a first-in-first-out approach
- Lab staff feel they can see work literally 'flowing' through the final part of the pathway as it is taken from the shelves. It increases their motivation to check the cases out as soon as possible.

Microscopy reporting

- Five out of six pathologists using templates are making a microscopic assessment, inserting the appropriate report template and electronically validating a case in one go
- No delays between reporting and validation steps - the waste of waiting up to **three days had been eliminated**
- Cases are completed one by one, with elimination of batching.

Ideas tested which were successful

The pull system

- Use of coloured paper to separate work according to the date issued by the laboratory (kanban system). This allowed a rapid visual assessment of how long the work had been waiting in the laboratory, prompting consultants to take the oldest work first
- Discussion at morning huddle about any outstanding work left on shelves from previous day
- Regular communication between the pathologists, in particular during periods of leave when reporting capacity is reduced in the face of constant demand
- Monitoring of individual workload so that the system is deemed to be fair.

Microscopy reporting

- Fundamental changes in pathologist behaviour became possible because decisions were based on universal engagement and consensus decisions. There was genuine willingness to try new ways of working and be open about practices and outcomes with colleagues.

How this improvement benefits patients

- Reduction in reporting turnaround time is the greatest contributor to reduction in overall turnaround time
- Earlier communication of results to patients, earlier formulations of management plans and prompt discussion at the MDM where appropriate.

How will this be sustained and what is the potential for the future /additional learning?

- Application of the pull system to gynaecological cytology specimens
- Implementation of voice recognition - anticipated that using this in conjunction with templates will increase the efficiency of microscopy reporting further, eliminating the need for pathologists to type any reports at all
- Incorporation of the Royal College of Pathologists' minimum datasets into reports - identified as feature that clinicians want included in reports, but so far hampered by IT issues.

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Case study 18

Eliminating the urgent work stream

North Middlesex University Hospital NHS Trust

Summary

For many years routine work was separated into 'A' and 'B' workflows. The 'A' flow consisted of small biopsies and urgent cases. The 'B' flow consisted of large routine cases and non-urgent biopsies.

Workflow has improved by treating all samples on a first in first out basis.

Wastes have been removed resulting in TATs of 91% in seven days despite a 20% increase in requests and 49% increase in work units.

Understanding the problem

- Blocks remained uncut into the next working day
- The embedder was required to stop embedding blocks and para trim 'A' flow blocks, placing them on the cold plate for cutting to commence. This delayed embedding of routine blocks
- Staff were required to stop cutting blocks in order to stain, mount and check out the 'A' flow
- Work was QC'd and signed out of the lab towards the end of each day
- Staff felt pressured to prioritise embedding, cutting and staining of 'A' flows before 'B' flows, occasionally resulting in missed urgent cancer cases.

How the changes were implemented

- Removal of the 'A' and 'B' flows procedure from cut-up by introducing first in first out principles
- Staff now embed and cut all biopsies first eliminating time wasting as they go straight onto staining machine
- Batches of blocks taken by each BMS to cut have been reduced by equally dividing the workload between each person - from about 30+ blocks each to approx 15 blocks per cutter
- Staff morale is discussed at daily 'huddles' and weekly lab meetings
- Lab staff saved between 30 and 60 minutes in cut-up by not prioritising and organising the work into 'A' and 'B' flows
- Office staff are less pressurised to type the 'A' run forms first
- Special stains are cut and stained earlier for the biopsies.

Measurable outcomes and impact

Data was collected for the times that the first and last tray had QC performed and were released from the laboratory to pathologists.

This showed an a**verage 25% reduction in time taken to release work to consultants**.

Ideas tested which were successful

- Elimination of "A" and "B" flows contributed to the TAT reduction of biopsies
- Staff morale improved as staff are under less pressure.

How this improvement benefits patients

- Reduced turnaround times without reduction in quality
- Approved reports available on pathology computer system sooner benefiting clinicians and other service users
- Reports are sent out quicker to clinics via the pathologist. The urology department was full of praise at speed and efficiency of report availability
- As slides are available earlier, pathologists have more time to request special stains, immunocytochemistry or any other further investigations e.g. sending blocks and slides to specialist centres.

How will this be sustained and what is the potential for the future /additional learning?

The elimination of 'A' and 'B' flows has become routine department practice.

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15. Future state mapping

Approaches to future state mapping

There are at least three ways to draw future state value stream maps.

1. 'Begin with the end' - envision the ideal state where you assume anything is possible in terms of resource, equipment and IT utilisation and work your way back to an interim implementation time line such as 6 or 12 months.

2. 'Incremental approach' - analysis of the current state value stream map will identify non value add steps that can be eliminated along with value add steps that can be either combined, simplified or re-sequenced to achieve the future state whilst bringing equipment closer together, reducing error rates or backlogs.

3. 'Recipe approach' - are a set of pre-agreed questions, examples of which follow:

- What is the Takt time of your current state versus future state?
- Will the process be built to a supermarket?
- How can we flow work with fewer interruptions?
- Where will supermarket pull systems be utilised?
- At what single point in the pathway does production get triggered?
- How often will we check our performance against customer needs?
- Which steps create value and which steps are waste?
- How do we control work between interruptions, and how will work be triggered and prioritised?
- How will we level the workload and/or different activities?
- What process improvements will be necessary (i.e. uptime, changeover, training)?

Implementing the future state

Begin the implementation process as soon as possible by tying in implementation to a business objective. Ensure your future state is split into 'loops' of process flow, normally the main stages of your value stream. Produce a value stream plan of what to do, by when, always evaluating progress against targets.
Using the PDSA methodology and measuring before and during improvement activity, ideas can be tested to ensure they make a positive difference to the process.

Regular value stream reviews (by walking the pathway) should be made with corrective actions implemented if improvements are not sustained.
As soon as the 'future state' is achieved it becomes the 'current state' and a 'next' future state map should be drawn. This is part of the Lean culture of continuous improvement and the principle of striving for perfection.

Case study 19

The link between future state mapping, A3's and root cause analysis

University College London Hospital NHS Foundation Trust

Summary

By using A3 thinking and linking it to changes required to implement the Future State Map, multiple checking and handover steps have been eliminated to generate a flexible and effective use of the available space, staff and cut-up slots.

Defined urgent reporting category with standard set of 'rules' for all and cut off time for cases required by the next day has been successfully implemented.

Understanding the problem

Wastes identified:

- Over-processing - at most process stages, over complexity, high block counts
- Little or no communication - double booked cut-up slots
- No standard practices - may be different each week / specialty, leading to high numbers of defects and repeating of work - re-cuts/ re-stains on 'lost' work
- Poor skills utilization - high complexity of decision making at booking in
- Waiting - time lost re-prioritising, giving information, hunting for slides, chasing queries, re-sorting
- IT issues - two booking in systems.

Root Cause Analysis

- Lack of communication between the BMS, junior and consultancy staff with regards to cut-up. No link between the lab/doctor's rota
- Users unclear what information they need to supply
- Work was categorised at booking in which was different to how it is distributed. Poorly understood system of allocation of work
- High level of variable practices - different rules for allocation of neoplastic and non neoplastic cases depending on month/week etc.

How the changes were implemented

- After completing the current state Value Stream Map (VSM) the core team attempted some 'blue- sky thinking' to draft a future state map (FSM)
- Generation of the FSM led the team to use A3 thinking to generate ideas and make changes to close the gap between the current VSM and the FSM
- Four A3's were generated tackling the problems of:
  - Poorly coordinated use of cut-up time and space, resulting in only 5% of sample dissected on the same day and only 60% within 24hrs
  - % of slides assigned to wrong consultant/specialty causing reporting delays
  - Constant interruptions disrupt/delay the work flow through the laboratory
  - Lack of standards for referrals creates delay, errors and risk at booking in
- Action plan developed using PDSA (plan, do, study act) methodology to implement changes
- Process Sequence charts used to understand and document process flows, identifying waste in the system.

Measurable outcomes and impact

- Data collected to measure interruptions, demand for cut -up slots, problems/defects, and time taken to sort out pot/lids
- Visual management (VM) proforma designed to simplify referrals and booking in
- VM board used to show daily case load, staffing numbers, lead BMS by area
- VM message board implemented
- Generated FAQ's sheet to disseminate to all staff work in the main lab and use of LIMS for queries - trained all junior and consultant pathologists to use the specimen view audit report (SVAR) function in CoPath.
- Generated schematic (VM) to 'book' cut-up slots
- Manage monthly Juniors work plan - created rota for BMS 7 responsible for cut-up.

Ideas tested which were successful

- All ideas and changes were generated as part of the A3 thinking process by the whole team and discussed at morning 'huddles' and wider lab team meetings
- Action plans with named task owners and date/times for completion
- PDSA cycle log was produced to track changes and produce next steps.

Ideas tested which were unsuccessful

There were some issues when dealing with staff and teams outside the department, but work continues to address these by constant communication.

How this improvement benefits patients

Patients are now assured of a safer more streamlined service for the 37,940 samples processed each year (of which c.4,000 reports are external referrals).

How will this be sustained and what is the potential for the future /additional learning?

The department is now using A3 thinking routinely to address problems and issues as they arise and to achieve the goals of the Future State Map.

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16. 5S

- 5S means the workplace is clean and safe - a place for everything and everything is in its place
- 5S is the starting point for implementing improvements to a process
- To ensure your gains are sustainable, you must start with a firm foundation
- It's strength is contingent upon the employees and organisation being committed to maintaining it.

Note: Unless you are working in a small area don't undertake 5S for the whole department at once. You will overwhelm everyone and you will risk shuffling unnecessary items around, rather than eliminating them. Before you start the 5S process determine the boundary of the area you are addressing. Do not 5S another individual's workspace.

5S is one of the foundations for Lean as it:

- Reduces waste
- Means less searching and decreases walking and motion
- Reduces downtime, accidents and mistakes
- Improves flow
- Makes better use of space.

It is also a precursor to other tools such as:

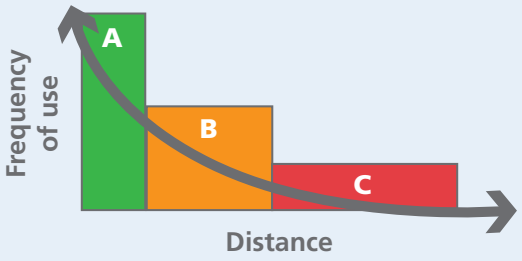
- Pull systems/inventory replenishment
- Standardised work
- Setup reduction
- Mistake-proofing.

5S Stands for:

SORT - Separate and remove clutter and items not needed in the workspace. Remember that extraneous items impede the flow of work.

SET IN ORDER/ STRAIGHTEN - Arrange and organise all items to minimize movement, make things clear.

SHINE (AND INSPECT) - Clean the area, workspace, storage, equipment, etc. and inspect for warning signs of breakdowns.



Use this graph as a general guide for deciding where to store items

STANDARDISE - Create consistency. Identify an area to store 5S supplies (cleaning supplies, labels, coloured tape, boxes and other necessary items) and schedule time and responsibility for restoring work area to proper condition regularly.

SUSTAIN - Maintaining 5S. Audit the area regularly and expand 5S activity to other areas. To maintain discipline, practice and repeat until it becomes a way of life.

Why use 5S at all

- A clean workplace indicates a quality product and process. Dust and dirt cause product contamination and potential health hazards
- Creates a safer work area
- Gains space, removes waste and shortens travel distances
- Visually shows what is required or is out of place and so saves time not searching for items
- More efficient to find items and documents (silhouettes/labels/shadow marking).

Case study 20

Visual SOP facilitates 5S in the cut-up room

Leeds Teaching Hospital NHS Trust

Summary

As part of introducing 5S workplace organization within cut-up, a visual SOP for cleaning cut-up benches has been introduced that standardises the cleaning process ensuring all bench areas are clean after each cut-up.

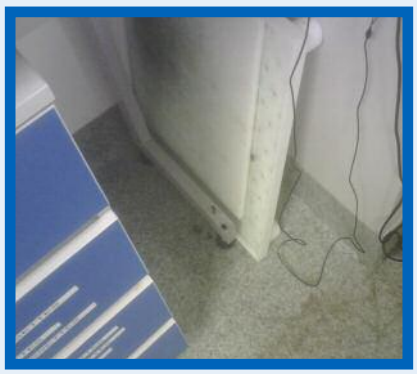
The use of shadow boards for instrument layout has promoted an organised presentation of instruments and saved time searching for lost equipment.

Understanding the problem

The cut-up room is a busy place; fresh specimens are often received with the area quickly becoming dirty. Organised time was not allocated to cleaning thoroughly. In their enthusiasm to continue with daily work, staff would often clean quickly missing areas such as bins, lamps and under benches. At the start of daily cut-up, equipment was frequently missing having been borrowed by other benches. Consequently, pathologists and technical staff wasted an average of two minutes before each cut-up which equated to 24 minutes each day (usually 12 cut ups per day). As a result, an initial 5S audit was done which scored 37 %.

How the changes were implemented

- During the 5S audit, these problems were discussed and it was decided to produce a visual SOP to clarify the cleaning procedure
- A pictorial aid describing the expected cleaning process was produced. Particular attention was paid to areas that had previously been overlooked
- The visual SOP was displayed on the wall above each bench
- Pathologists were consulted on a standard set of equipment for each bench
- A3 laminated shadow boards were produced which depicted the layout of these instruments and blades. Placed on each bench with intention to lay-out instruments on the board
- These changes discussed with the Visual SOP introduced at the morning huddle



Measurable outcomes and impact

- Each bench is much cleaner and better organized with staff no longer searching (**saving 104 hours per annum**)
- Subsequent 5S audit done which improved the 5S score from 37% to 63.8%.

Ideas tested which were unsuccessful

Staff were reluctant to lay the instruments on the shadow board as they felt that it obstructed the working area. The shadow boards were displayed on the wall and used as a guide to lay the instruments out.

How this improvement benefits patients

Time not spent searching for equipment has enabled increased bench utilisation.

How this improvement benefits the organisation

- Working in a professional, tidy environment has a positive effect on staff morale
- Clean benches provide a safer working environment for staff.

How will this be sustained and what is the potential for the future /additional learning?

- Bench checker appointed to perform daily 5S checks on the cleanliness and tidiness of the benches each evening on a rotational basis
- Laminated daily check -sheet to be displayed which is signed once checks completed.

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Case study 21

Using 5S principles to improve

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary
Implementation of 5S improved the organisation of the laboratory.

Understanding the problem

- Time was being wasted looking for consumables and equipment
- Obsolete equipment was being stored
- Equipment used regularly was not easily reachable
- Equipment cleaning was not taking place or to a satisfactory standard
- Consumables were being stored in multiple locations
- Occasions when consumables had run out because stock control was difficult
- There was no standard area for leaving extra fixing or decal specimens.

How the changes were implemented

- All staff received training in the principles of 5S: Sort, Set in order, Shine, Standardise, Sustain
- Using the first three principles, 5S events were held where the whole team spent time reorganising the laboratory
- This involved cleaning out all the cupboards and drawers, disposing of obsolete equipment, producing labels for drawers and cupboards and rearranging the equipment for a better work flow
- Following the events, standard checklists were devised and implemented
- Photographs were taken of what the ideal standard should be for each area at the end of the working day
- Visual management in the laboratory increased with the use of kanbans to specify where items should be placed and which processes should be completed.

Measurable outcomes and impact

- Workstations are ready for use straight away with cleaning standards and stock control
- Eliminated the time spent searching for items - **motion saved approximately 1.1km annually**
- Eliminated over-ordering of stock - **space saved c. 3 sq m (approx £2000 per sq m = £6000)**
- Reduced time to do stock check
- Staff morale increased as it is easier to find clean and ready-to-use equipment. Reduced frustration caused by having to look for consumables as there is always a supply in its rightful place.

Ideas tested which were successful

- Training all staff in the principles of 5S
- The idea came from the lean project and was wholeheartedly supported by all the laboratory staff. The lean project gave us the motivation to do something about the state of the laboratory
- Kanbans for extra fix and decal specimens
- Kanban principal is used in the stock management system.

Ideas tested which were unsuccessful

- Initial cleaning logs for microtomes were complex, but have now been made clearer and simpler.

How this improvement benefits patients

- Time is not wasted looking for consumables as everything is now in its rightful place. More time is therefore available to spend on value-adding activities to improve the journey of the patient's specimen through the laboratory

How will this be sustained and what is the potential for the future /additional learning?

- After the laboratory 5S event was carried out, the office staff also had a 5S event. In addition it was noted that several of the consultants had tidied up their offices
- Sustaining the clean and tidy laboratory was problematic until a 5S team leader was allocated
- As new equipment is purchased then existing equipment may need re-positioning with new cleaning logs devised to allow a smooth flow of work through the laboratory.

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17. Standard work

What is standard work?

Standard work refers to the most efficient work combination that can be put together. A work combination is the mix of people, processes, information, materials and systems/machines that come together to enable completion of a work process.

Outside manufacturing it is common to hear comments like 'we're not robots' and 'we don't make cars', but standard work happens in all walks of life:

- A chef uses standardised work - a recipe
- A football manager used standard work - a game plan.

It is worth noting that standard work does not mean work standards. You will already have work standards e.g. standard operating procedures, but they do not ensure standard work. Standard work creates a reliable and repeatable process, which ensures that safety, quality and productivity are maintained at high levels.

It is only when you have mastered standard work that variation in what and when work is done can be minimised. Variation and wasteful activities are restricted by standard work to avoid compromising the final outcome whether it is a delivered speech, restaurant meal for two, winning a football game or issuing the patient's test result within seven days. There are three components of standardised work:

1. Takt time

This is the rate at which units of work (e.g. specimen results) must be produced to meet customer demand (e.g. the patient/clinician receiving the test result). Please refer to the next section on takt time for further information.

2. Working sequence

This is the series of steps that is the best way of completing a process. This should be a logical sequence and be as simple and concise as possible.

3. Standard 'work in process' inventory

This is the minimum amount of work-in-progress (WIP) (e.g. request forms, specimens to be processed, blocks to be cut) that must be held at or between your work processes for smooth completion of a work sequence (i.e. test result). If this quantity of completed work does not happen at each step, it is impossible to synchronise work operations.

These three components can be documented on a standardised work chart and all members of staff involved with the process should be trained in how to apply the elements of the standard work.

By following standard work, consistent results can be achieved and problems can be identified and resolved quickly.

Making standard work flexible - using a pull system

Standard work allows the practice of just-in-time processing. This means maintaining little or no WIP by using a 'pull' system.

In a pull system, each department supplies the downstream department / process with the right forms / specimens, at the right time, in the right quantity. In essence, the patient/clinician makes a request for their result ('pulls' the authorised report), which 'pulls' from the volume of authorised, reported specimens from the consultants. The consultants 'pull' dissected, processed and stained specimens from the laboratory. The laboratory 'pulls' request forms and specimens from the specimen reception and so on up stream.

These planned re-order (kanban) points should be set to fit with daily capacity. Small buffers of work should be used to balance workload requirements of the next department where volumes of forms / specimens 'requested' cannot be met.

Case study 22

Standardising preparation for MDT

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary

Cancer Services have improved systems and two way communications after being made aware of the impact of the team's actions on Pathology and other teams within the Trust.

Understanding the problem

Multidisciplinary teams (MDTs) had developed over a period of time in a very organic manner. Each team developed to meet the needs of their particular clinical requirements and schedules. During the last 12 months cancer referrals in the Trust have increased by 28%, while cancer conversion rates have stayed at a consistent percentage.As a result of Trust restructuring, MDT Co-ordinators were realigned with a new divisional structure and this highlighted differences in ways of working. This is set against a background of national interest in effective MDT working (The Characteristics of an Effective Multidisciplinary Team, National Cancer Action Team, February 2010).The need for change was evidenced by working practice, numbers of cancelled MDTs (due to lack of core staff or missing reports) and the impact on the 62 day target (evidence which was taken from the Somerset Cancer Register). Waste was identified in a number of areas including:

Time

- Delays in patient pathways / care plans when meetings were cancelled or when patients had to be added to the following weeks meeting (for various reasons)
- Lengthy preparation time for MDT Co-ordinators, Pathology and Imaging staff.

Resources

- High numbers of staff attending MDTs, particularly when held at lunch time.

How the changes were implemented

- MDT preparation standardisation by optimising use of the Somerset Cancer register for the production of the MDT list
- Cut off times were negotiated to prevent late additions. This allows Pathology and Imaging to schedule time to prepare for the meeting and helps control list size (exceptions made for clinically urgent patients)
- MDT meetings were reviewed resulting in reduced staff numbers and therefore the time and cost of running the meetings. This impacted on peer review as it allowed for improved tracking of staff attendance
- Alternate arrangements were made in advance for bank holidays to limit cancellations
- Agreement from Imaging that there would be a designated MDT core member plus a deputy. Current focus is on establishing this framework for pathology.

Measurable outcomes and impact

- Increase in the number of meetings covered
- Fewer meetings are cancelled which has meant the Trust is consistently achieving the 62-day targets (August 2010 - 97.5% versus a target of 85%)
- In one team, admin staff no longer go to the MDT as the Office Manager is already in attendance, allowing this staff member to continue with other work outside the MDT
- Standard preparation time for MDT staff has lead to savings of approximately 210 hours annually for one team alone. There is now more time to prepare for meetings with staff morale boosted by not having to use weekend and evening time.
- There is less clinical risk as patients are not postponed to later meetings.

Ideas tested which were successful

The most significant change was the standardisation of the MDT list by Co-ordinators.

Ideas tested which were unsuccessful

Reduction in numbers of staff attending MDTs has had limited success so far because everyone wishes to participate.

How this improvement benefits patients

Patients' pathways are not delayed and therefore there is less anxiety for them, their treatment is not delayed and they have more confidence in the service.

How will this be sustained and what is the potential for the future /additional learning?

This is the beginning of improved benefits to the organisation. Both time and costs have been saved together with improving the quality / safety of the MDT process and significantly improving admin staff morale.Lean methodology will continue to drive future change which so far has provided a better understanding of Pathology processes and a greater appreciation of the team and the work they perform.

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Case study 23

Using technology to enable standard work - introduction of 'LYSIS' templates in specimen processing

North Middlesex University Hospital NHS Trust

Summary

ΛΥΣΗΣ/LYSIS (Greek word for solution) is the project lead's invention of an electronic database that incorporates macroscopic and microscopic templates allowing simultaneous uploading of typed macroscopic description whilst the specimens are dissected.

The use of this technology enables precision and reproducibility and ensures a more cost-effective, standardised service.

LYSIS eliminates the need for transcription of cut-up tapes by the medical secretaries and has resulted in **improved efficiency to 93.2%** (reducing TAT's), the reduction of defects to zero, time savings for the medical secretary of **20 days p.a**. and reduced movement of **39,240m (23.5 miles) per annum**.

Understanding the problem

The secretarial workload comprises more than 10,000 requests per annum which accounts for approximately 1,120 dictation tapes from the cut-up area plus the pathologist's dictation (Pre-LYSIS figures) covered by one full time equivalent (FTE) medical secretary.

Value stream mapping of the specimen pathway highlighted several complex, non-value adding steps that were occurring during the cut-up process.

Conventionally the macroscopic descriptions of dissected samples were dictated on tapes that required transcription by the medical secretaries (9.8% process cycle efficiency).

How the changes were implemented

- The aim was to create a single work flow stream from the office to the laboratory by ceasing unnecessary feeding 'roundabouts'
- In March 2010 the LYSIS macro system for the BMS cut-up was introduced. This accounts for 80% of the daily departmental workload
- The system is an electronic database that incorporates the use of macroscopic and microscopic templates with a multiscreen computer system adaptable to different cut-up areas. LYSIS uses bar code readers and a list of specified control keys for quick on screen access to the database (transferable method easily modified for other labs)
- LYSIS macro-system is used in the histology office while booking in the cases in the specimen reception. Administrative staff use bar codes to call on screen the suitable macroscopic template for each case. The templates are incorporated and the request form is ready to go back to the lab. Samples and request forms are matched up and the cut-up is ready to start
- LYSIS set up for the cut-up area: Two well defined separate areas have been created: The clean hands area (CHA) and the dissection unit (DU)
- The clean hands area (CHA) is the workstation of the assisting BMS with the main computer unit and screen. A transparent divider separates this area from the cut-up area (DU)
- CHA and DU areas each have a computer screen placed at eye level in front of the operator. The screens are linked to the PC in the CHA area
- Specimen and cassettes are placed in front of the pathologist
- The BMS uses bar code reader to call the patient's case on screen
- Both BMS and medics check the registration details of the request form with the screen

Cut-up room before and after LYSIS

- Pathologist measures and weighs the sample and the measurements are placed in the appropriate gaps within the selected template from their personal file. The templates have been created based on the preferences of the cellular pathology staff
- Checking of blocks is finalized and the case is completed with the macroscopic description typed and available on screen.

Measurable outcomes and impact

The initial idea to standardise the cut-up process and create linear workflow without delays was achieved:

- **Reducing TATs:** The current TAT is 39.6% in three days and 95% in seven days against the targets of 50% and 95% respectively.
- **Time savings:** Currently the medical secretaries are receiving two tapes per day from the cut-up room (one tape from the extended BMS cut-up and one tape from the pathologists cut-up). This generates an annual typing workload of 400 tapes/annum which represents approximately 11 days of secretarial typing time
- **Reducing defects** - The rate of 6% daily defects related to missing data or faulty tapes has been completely eliminated. LYSIS macro-system ensures the Lean principle: right first time every time
- **Improving efficiency**- Process sequence charts have proven that the process cycle efficiency of the cut-up process with utilization of tapes (conventional method) is only 9.8%. The process cycle efficiency using LYSIS is an impressive 93.2%
- **Eliminating unnecessary movement** - When tapes were used there was a total of 82.2 metres traveled for every cut-up (or 49320 meters traveled/annum). A LYSIS cut-up generates a total of 16.8 meters traveled (or 10080 meters traveled/annum). This represents a significant reduction of 39240 meters traveled/annum.

Ideas tested which were successful

At the end of February 2010 the LYSIS layout was implemented in the cut-up area with an initial cost of £25 for purchasing a cable that connected the two computer screens. Everything else, from the bar code readers to the benches and the computer screens, were existing property of NMUH Histopathology Department and therefore there was no additional cost.

LYSIS was easy to implement and the training period was short. There were no major problems with the use of the system, mainly because the database is user friendly. The staff engagement and dedication to the concept was such that it created a supportive environment for the project.

Ideas tested which were unsuccessful

Before implementing LYSIS, the NMUH Histopathology department considered purchasing digital dictation/voice recognition software. There have been subsequent demo presentations that have highlighted certain issues:· The issue of lost dictation and/or inaccurate data transcription that has occurred during the trial period with all relevant users.· Multiple user licenses would be required at a significant cost per license.· Time allocation for training/educating the equipment according to individual user's voice/speech patterns.

How this improvement benefits patients

LYSIS has provided an efficient linear workflow and benefits the patient pathway because it is designed to be used as a standardisation tool, while maintaining personal dictation preferences.

How will this be sustained and what is the potential for the future /additional learning?

By implementing LYSIS the whole lab team is involved in a modernised user friendly process. Since LYSIS has been used routinely for 80% of daily work load, a further reduction in end to end TATs from 83.6% of cases reported within 7 days in May to 95% of cases reported within 7 days in August has resulted. LYSIS has improved the secretarial workload and has assisted in absorbing an increase in workload (measured by number of blocks and slides reported) of 17%. LYSIS use for the majority of cut-ups will be implemented by the end of September 2010.

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18. Takt Time

Takt time is the rate at which units of work (e.g. Histology report) must be produced to meet customer demand (e.g. patient receiving their result within seven days of the specimen being taken).

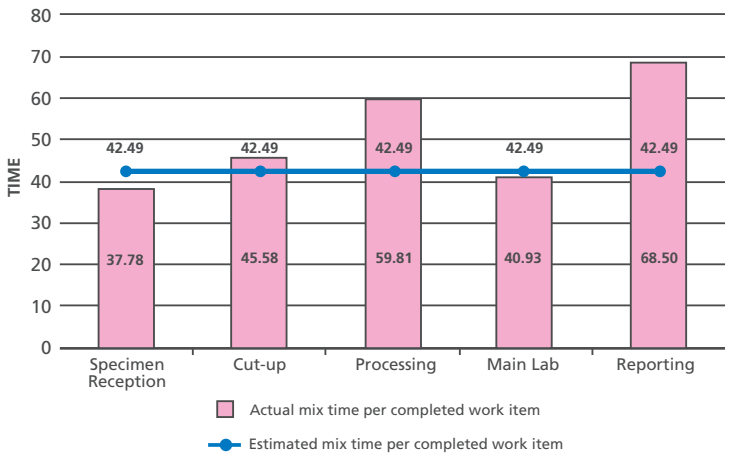
It is calculated as the total available work time per day / shift (e.g. total number of minutes within the shift minus breaks/lunches) divided by required daily output quantity (e.g. number of reports issued).

Cycle time is the time taken to finish tasks required for a work process and is typically measured from the point of completing the previous task to completion of the next task. To get an accurate reading of cycle time, it's recommended that at least two team members record the time taken to perform each department task 20 times. This can be done using a time observation sheet.

Work sequence is the order of tasks performed to make the work process within takt time.

A number of forms are typically used here; for example process sequence charts. Standard work combination sheets are helpful for collecting information about the sequence of tasks, who completes them and the time / distance needed for each task.

Capacity vs. demand based on current daily work volume - Takt time



It is not uncommon to find department cycle times are higher than the takt time, meaning that staff members could not complete all work in a normal shift on the same day it was received or process higher volumes of work than received to reduce any backlog. Where this happens, potentially avoidable department agency and overtime costs are incurred.

Case study 24

Takt time used to match specimen reception capacity to demand

The Leeds Teaching Hospitals NHS Trust

Summary
As part of reviewing workflow at cut-up it was identified that further efficiencies existed at booking-in to balance staffing capacity in line with expected specimen delivery volumes.

Understanding the problem

- There was a daily backlog of 60 cases waiting to be checked, labelled and booked in. A proportion of these cases waited longer than a day before they were dealt with
- Work was not processed on a first in first out basis. All deliveries were sorted with urgent cases pulled out and dealt with first, the remainder waiting until there was time to deal with them. Up to 12 minutes per delivery was wasted sorting, equating to 96 minutes daily
- Cases would take up to 72 hours to move through specimen reception and cut-up.

How the changes were implemented

- Three day rapid improvement event implemented changes that ensured >90% of cases would be cut-up by end of next working day from receipt
- Each process step was timed plus times of day and volumes of samples received at each delivery were logged to provide a baseline against which changes could be compared
- Specimen arrival times were measured with data broken down into two hourly slots which showed 63% of specimens were received either before 10.00am or later than 4.00pm. This illustrated an imbalance between demand and the capacity that had been allocated. Takt time was calculated to determine the required staffing capacity which would enable one piece-flow booking-in of specimens as they arrived
- Urgent cases no longer separated out, thereby ensuring all cases booked in, in first in-first out order. In effect all cases were now treated as urgent!

Measurable outcomes and impact

- One additional staff member was allocated to work in specimen reception for one hour to book in cases left over from the previous day. This enabled existing staff time to deal with new deliveries immediately
- All cases now booked in, in first in-first out order showing **annual time released of 416 hours.**

Spare capacity in specimen reception was released between 10.00am and 4.00pm ensuring staff transferred into cut-up to balance demand in there.

Ideas tested which were successful

- Rapid improvement event was an 'at ease' environment for suggesting, agreeing and trialling the implementation of required changes
- Scheduling extra staff time to deal with any booking in work left over from previous day
- Stopped sorting deliveries into urgent and non-urgent categories.

Ideas tested which were unsuccessful

Anything and everything was tried as PDSA experiments which ensured the most appropriate changes were implemented fully.

How this improvement benefits patients

Average TAT from date received in specimen reception to date cut-up has reduced from **2.94 to 1.20 days** which has subsequently reduced end-to-end pathway TAT by the same margin."It's the waiting that hurts the most" is a common statement from patients.

How will this be sustained and what is the potential for the future /additional learning?

Specimen delivery methods (including. lab vacuum pod system) and transportation schedules will continue to be reviewed to ensure all specimens are delivered sooner and at a more consistent rate throughout each day. More suppliers' are beginning to use the internal pod system thereby eliminating the need for a porter. Similarly, work is underway with the transport department to establish direct laboratory deliveries from outlying hospital sites as opposed to using the central Pathology Specimen Reception which is in another building on the same site.

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19. Capacity and demand

Definitions and measurement

In order to provide an effective service we must first understand the capacity required to meet the demand placed upon it. To do this, we must ensure the measurement of capacity and demand is done in the same units - the unit of time.

Demand is all requests for a service (what we should do).

Number of specimens / blocks / slides x time taken to process them.

Capacity is the amount of staff / skills / kit we have available (what we could do).

Number of pieces of kit x staff time available to run/process/embed/cut.

Backlog/queue is the number of patients 'waiting' (what we should have done).

Number of specimens / blocks / slides in the queue (waiting) x time to process.

Activity is the work we got through in reality (what we actually did).

Number of specimens / blocks / slides processed x time taken.

When the demand (requests) and the total capacity are converted to time, excel tables and charts can be used to demonstrate the gaps between the two or potential for change.

Understanding variation

Monitoring demand over time will demonstrate natural and predictable variations in demand, including seasonal and bank holidays. Capacity can be planned to reflect this variation. However, there are specific actions that cause additional variation, including transportation, batch processing of specimens / blocks / slides, information transcription and IT applications, all of which are under our control and can be changed.

Reducing variation

- Regular specimen transportation throughout the day (use of a pneumatic tube system)
- Reducing batching at all parts of the process (embedding / cutting / data entry / reporting)
- Eliminate the urgent workstream (adopting first-in-first-out system - FIFO)
- Pooling reporting amongst pathologists
- Pulling work through the process - initiating a 'pull' system for pathologist reporting
- Levelling the work schedule and synchronising processes to ensure optimal staff usage
- Balance staff shifts and holidays to ensure demand can be met
- Ensure staff skill sets meet the process requirements.

Staff can work more effectively when variation is eliminated!

What do you need to do?

- Understand the demand on your service, measure it and look for patterns in variation
- Ensure correct skills / people are available to deal with peaks and troughs in demand
- Monitor capacity and demand weekly using SPC charts
- Increase capacity by removing waste by process redesign: it is common to find as little as 5% of activities adding value in a system
- Plan capacity at 95% of expected "maximum" workload (taken as your upper control limit from your SPC chart) which will serve as a buffer in preventing queues or backlogs from building up
- Use visual management techniques such as a clinical dashboard to display:
  - demand (i.e. numbers of blocks / cases that day)
  - cutting and embedding target times based on daily demand
  - the total number of blocks/ slides waiting at the end of each day
  - daily QC check out times (first and last slides)
  - root cause analysis (RCA) of issues/problems
- Deal with the backlog
  - measure and monitor backlog
  - use temporary short term increase in capacity (overtime etc).

If a backlog exists and is constant, it is unlikely there is a problem with capacity!

And some important don'ts
- Carve out (prioritisation) for specialties and 'urgents' will cause a backlog
- Use activity as a proxy for demand
- Use averages
- Go for 100% utilisation of your skill / assets.

Business cases for additional capacity will be more robust if clear evidence of capacity and demand can be provided.

Further information on capacity and demand is available at the NHS Improvement website by accessing the Improvement System capacity and demand analysis tools.
www.improvement.nhs.uk/improvementsystem

QIPP agenda and measures
The QIPP agenda focuses on increasing efficiency by enhancing value through improvement.
- Quality
- Innovation
- Productivity
- Prevention.

The intention behind the establishment of productivity / efficiency measures is to focus attention on particular outputs or outcomes and to align the behaviour of individuals with overall organisational goals. This means that utilisation is a poor measure of efficiency.

Throughout the implementation of a process improvement initiative, which may span many months or years, there is a need to constantly focus on the critical goals that can bring visible progress. If not, the tendency is for busy staff to lose sight of the ultimate objective of improving outcomes for patients.

Staff may also see data collection as an exercise for management to 'blame' them for poor performance. Teams need measures that support their mission or they will not fully exploit their ability to perform the process faster, more cost effectively or more responsively to customer needs.

Some appropriate measures of performance may be effective throughput and cost.

For example (based on complexity):
- Hours taken for embedding /cutting per person
- Numbers embedded/ cut per person
- Numbers typed/ data entered per person
- Numbers reported per person
- Costs per test.

The following case studies demonstrate how capacity and demand analysis has been used to redesign the service.

Case study 25

Managing the consultant workload with a points system

North Tees and Hartlepool NHS Foundation Trust

Summary

Adoption of Warwick Scoring developed at Warwick District General Hospital to manage consultant workload, releasing BMS and office time.

- Based on specimen type and suggested clinical diagnosis
- Enables specimens to be allocated prospectively by the laboratory technical staff to even out workload and can further be utilised to support sub specialisation
- Not affected by final diagnosis or individual pathologist variation in numbers of blocks, sections and special stains examined
- Allows department to maximise reporting capacity every day - cases allocated dependant on consultant availability and allows for other commitments e.g. multidisciplinary team (MDT), supporting professional activities (SPA) activities etc.

Understanding the problem

The consultant body felt there was an inequitable workload across their team. Additionally, competing and often conflicting demands on pathologists' time were exacerbated by the unpredictable reporting case load and mix arriving at their in-trays daily. Timely reporting of cases suffered and juggling commitments outside reporting was becoming impossible. The Warwick points allocation was introduced into the department in 2008. It has been reviewed a number of times during the program to maximise the benefit and simplify the process. The points allocation system allowed fairly for MDT cover:

- At the start of program specimens triaged on receipt into 3 categories - Urgent, Routine and Waitlist (cases not assigned to anyone as the rota indicated no identifiable capacity for reporting)
- Urgent and routine cases were allocated first
- There was an increased pressure on the department to achieve 100% attendance at MDT
- Unallocated waitlist cases - list produced and stored in lab to be 'pulled' when capacity allowed. Generally, these were reported as overtime. At start of the project, these were being stored for three weeks after which time any unreported cases were referred offsite for reporting.

Wastes:

- Overproduction - the lab producing more work than could be reported
- Over processing - lab producing lists of cases being stored, lab changing computer records to track cases in and out of waitlist
- Wait - cases waiting up to 3 weeks before being referred for reporting
- Transporting - from QC to cupboard for storage
- Poor utilisation of workforce - lab staff producing lists to track cases and amending patient records to track cases, office staff searching for cases to be expedited and dealing with phone calls associated with delayed cases, Head BMS dealing with complaints relating to delayed reports.

How the changes were implemented

The full cooperation of the laboratory manager, consultant histopathologists, medical director and executive director have ensured iterations of this system have resulted in a fair workload commensurate with agreed job plans.Numerous reviews of the process have:

- Identified additional reporting capacity
- Allowed a simplification of the consultant rota which in turn has enabled more lab staff to be trained in points allocation. Better utilisation of BMS staff
- Enabled the 'wait list' category to be removed. Cases that cannot be allocated are stored for a maximum of two days 'buffer' before being referred offsite for reporting eliminated the requirement to produce 'wait list' sheets and removed the need to amend patient record to track cases through this step of the process.

Measurable outcomes and impact

As a result of above changes, annual staff time released is:

- **Office time: 79.2 hours**
- **BMS time saved = 99.6 hours.**

Ideas tested which were successful

- Idea gained from nationally available publication
- Visited a local hospital already using the system.

Ideas tested which were unsuccessful

None - although numerous iterations to the system have been achieved through negotiation since its inception.

How this improvement benefits patients

- Safety - workload allocation reflects available capacity. Pathologists are therefore not over burdened
- Delivery - reduction in TATs achieved as cases and points are not allocated to unavailable pathologists
- Quality to patients and referrers has increased as improved attendance at MDT is now possible and cases are ready in time for MDT discussions
- Data collected has allowed the department to demonstrate the need for an additional pathologist - 75% MDT attendance minimum (project measure).

How will this be sustained and what is the potential for the future /additional learning?

Close collaboration between the clinical lead and managerial team has ensured robust buy in. The principles can be applied to manage emerging service demand and staff changes.

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20. Communication

The importance of two-way communication

Answering a telephone call, attending a meeting, receiving an email, having a face-to-face conversation with a colleague, reading a newsletter or watching a news article; these are all communication activities that we frequently experience at some point during our day.

Establishing the framework for and maintaining good two-way communication is critical to the success and sustainability of any improvement activity.

- **Go and see** the process you are trying to improve. Speak to patients, users and people involved with the process. See and hear what is happening and ask questions to deepen your understanding. Communicate with and involve key people as early as possible, during the planning stage of any improvement activity.

- **Share information regularly.** Use monthly project meetings and daily five-minute meetings to confirm progress, to allow ideas to be raised and questions answered. Always allow sufficient time for feedback on actions.

- **Communicate visually** - "A picture is worth a thousand words".
  - Use A3's to support problem solving, to set out improvement proposals and to confirm the status of an improvement project.
  - Create a communication board to support two way communication, to review progress and to support problem solving.

- **Listen** to the opinions of colleagues, including those that differ with your own. Seek to create an environment where discussion can take place in an open and fair way.

It is everyone's responsibility to ensure good two-way communication takes place. With a well informed, well engaged team, your improvement activity will have the solid foundation it needs to make it a success.

Case study 26

Maintaining staff awareness - Communicating to all stakeholders

The Leeds Teaching Hospitals NHS Trust

Summary

In any programme of change, communication is key to ensure that all stakeholders are informed and engaged in a timely manner with up to date and relevant data.Service Improvement was established as a standard agenda item on the monthly departmental briefing and partner hospital clinical governance meeting. To compliment this, a monthly newsletter outlining ongoing initiatives, progress against targets and current turnaround times is circulated to all staff and stakeholder groups.

Understanding the problem

- Clinicians and other users of the service never knew there were backlogs in the laboratory until their cases were delayed
- Cases were being withdrawn from multidisciplinary team (MDT) meetings with follow up appointments delayed and rescheduled
- Leeds PCT who commissioned direct access services had lost confidence in the ability of the department to provide a consistent standard of service as there was no direct communication informing them about TATs and action plans to reduce them
- Department staff were unaware of how both their own area and all pathway areas were performing in terms of accuracy and timeliness of work processed, or what output was expected of them personally.

How the changes were implemented

- Communication work-stream established with approved work stream leads
- All relevant stakeholders were identified by the core project team Communication format/frequency was established for all stakeholder groups
- Communication plan was documented to outline the type and frequency of communication to be used throughout the project. Associated risks were identified and escalations to address if the communication did not happen
- Monthly executive group meetings were held with the key stakeholder groups (including clinicians, PCT commissioning manager, Trust lead cancer manager) to provide updates against actions on the project master A3 storyboard and wider project plan. This meeting also allowed all representatives to give feedback on the project
- Monthly service improvement newsletter was created and emailed to all identified stakeholders with printed copies made available in staff break rooms and in main laboratory. The newsletter included information on recent Rapid Improvement Events, descriptions of each of the workstreams and their progress plus monthly reporting of pathway turnaround times
- Monthly laboratory briefing includes service improvement information across the whole department
- Project progress reported back to all Lab Managers at the weekly management meeting
- Daily huddles performed in specific laboratory work areas to review the previous day's performance in terms of planned work completion v. actual and where variance occurred, agreed actions to limit these situations from re-occurring. Similarly, work-plans are agreed for the day ahead taking into account available department capacity
- 'Smiley face board' set up in the laboratory to gauge staff morale and provide them with ability to highlight problems and make project suggestions
- All pathway staff members (both existing and new) take part in lean awareness sessions to learn about the project structure, key documentation such as the master A3, value stream mapping and project progress.

Measurable outcomes and impact

- Leeds PCT informed monthly both in written and verbal form of project progress and predicted pathway targets - now have awareness and confidence in the service provided
- Department staff continually informed of project progress and daily pathway performance.

Ideas tested which were successful

Most forms of communication proved successful, however after stakeholder feedback, the newsletter was adapted to include relevant information for each stakeholder group (e.g. by work stream for lab audience and more detail on TATs/backlog clearance for PCT audience).

Ideas tested which were unsuccessful

The 'smiley face board' was initially successful, however its use reduced once the 'ideas bank' was introduced as method for submitting suggestions.

How this improvement benefits patients

As a result of clinicians and GPs being better informed of specimen turnarounds, workloads can be better planned and there is an assurance that results will be ready when needed at the next MDT.

How will this be sustained and what is the potential for the future /additional learning?

- Defined communications workstream with nominated lead staff members to ensure the communication plan is adhered to and updated
- As improvements continue, communication to each key user group will be tailored to ensure relevant information is shared in a timely manner.

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Case study 27

Improving communications with staff and service users

Musgrove Park Hospital, Taunton and Somerset NHS Foundation Trust

Summary

An improved two-way communication framework has been established in the laboratory by implementing daily huddles and revising the structure of communication boards.

Communication with service users has also improved by raising awareness of Histopathology activities, sharing right first time data and completing a service user survey.

Understanding the problem

Poor communication between internal staff and with external service users led to problems:

- Unclear pathologist cut-up times
  Waste of waiting and motion for pathologists and MLAs
- Incomplete and inaccurate specimen request forms and pots. Baseline data showed that 29% specimens had missing, inaccurate or illegible information which prevented it being processed right first time. Some specimens had to be returned to sender for confirmation of missing details.
  Waste of defects, transportation and waiting
- Variation in the way tasks were being completed - no standard working
- Confusion where send away specimens needed to be dispatched
  Waste of defects and waiting
- Unknown location of pathologists (i.e. onsite/offsite)
  Waste of motion searching for pathologists
- Poor reputation due to historical issues.

How the changes were implemented

- Daily huddles at 9:30am implemented
- A communication board set up on the approach to the dissection area which details pathologist and BMS dissection timings
- A communication board has been established in dissection to support send away management
- Project and staff suggestions boards have been established. Staff suggestions are discussed in daily huddles and next steps (e.g. plan, do, study, act (PDSA) cycles are agreed
- Go and see activity with Musgrove Park Cytology Service to understand how communication was improved during and after their national pilot site project
- Visual reminder created to reconfirm key identifiers required on request card and specimen pot in order to process specimens right first time. This has been emailed to all service users, is handed and explained to service visitors to the department and has been added to the pathology website
- A staff engagement survey was conducted to understand thoughts and feelings on department and wider trust operations
- A service user satisfaction survey was developed and issued to relevant trust clinicians and GPs in June 2010
- Use of visual management strengthened.

Measurable outcomes and impact

- Specimen receipt/data entry **defects reduced from 29% (baseline) to 14%** (July 2010)
- Dissection operates more smoothly with fewer gaps in bench usage and reduced double bookings
- Improved team working throughout the service
- Staff are updated daily on Trust and service issues
- Staff feel more confident with bringing problems to the surface and suggesting ways to resolve and improve the situation
- Initial staff engagement survey results showed positive results. This will hopefully be repeated at the end of the project
- 70% (89 / 127) service users completed satisfaction survey. 79% rated the quality of service to be good, 21% rated it excellent. Majority confirmed that access to consultant/scientific advice and general telephone contact with the department was easy or very easy.

Ideas tested which were successful

- Review of all communication boards in use within the laboratory
- Clear explanation of purpose of daily huddles
- Completion of staff survey to evidence levels of engagement
- Review of previous service user survey question set and results (2006) to determine latest survey content.

Ideas tested which were unsuccessful

At first not all staff attended the daily huddles as they did not see the benefit of them. However attendance has gradually improved and now all staff attend unless they need to support multidisciplinary team (MDT) or post mortem commitments.

How this improvement benefits patients

Improvement in turnaround time of all diagnostic histopathology reporting, with a strong focus on getting it right first time throughout the pathway.

How will this be sustained and what is the potential for the future /additional learning?

- Daily huddles sometimes continue for longer than 5-10 minutes. Issues requiring longer than 2-3 minutes to resolve need to be taken outside of the huddle and should only be discussed with those staff members directly involved with the issue.
- Staff and service user surveys will be conducted at agreed intervals in order to understand current operational issues and identify areas for further improvement.

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21. Leadership, engagement and sustainability

Leadership is behaviour - "What we do as leaders is more important than what we say". (Sir Nigel Crisp)

Change preparation of leaders

To understand the process of change, we need to see change as a sequence of events and, at the same time, flows of energies and activities. Often people do not commit to change because they fail to see commitment from those in key leadership positions to the change.

Without leadership there is no change

Those who sponsor a project or 'change' need to exhibit behaviours that demonstrate their full emotional support for that change. In preparation for change, it is vital these leaders of change continually check and act on the following:

- *Purpose & Vision* - understand and agree on project mission and desired outcomes
- *Customer & Needs* - know who project stakeholders are, what they require, and why the project is really needed.
- *Goals & Deliverables* - identify specific, measurable & prioritised project goals and deliverables linked to pathway goals
- *Project Scope Definition* - understand / agree on what is in and out of project scope & tasks
- *Roles & Responsibilities* - define and agree roles, responsibilities, required skills and resources for the project team
- *Authority & Autonomy* - ensure the team is clear on the degree of authority/empowerment given to meet project mission
- *Critical Success Factors* - ensure the team know and are focused on key factors to meet goals and mission
- *Plans & Activities* - have an effective game plan that includes right tasks; clearly defined and assigned
- *Monitoring & Measures* - effectively monitor process and specific metrics linked to progress and goals
- *Schedule/Milestones* - define project schedule with known key phases and milestones
- *Team "Operating Agreement"* - have shared expectations, agree and follow guidelines for how the team works together
- *Interpersonal / Team* - have necessary relationships, trust, openness, participation and behaviours for healthy and productive team.

Engagement through systems thinking

The central guiding principle to lean thinking is creating a flow of value for the customer from the customer order to delivery and support - the whole interconnected pathway.

Failure occurs from isolated and disconnected applications of lean tools. A systems view requires overall pathway improvement as opposed to unique increases in process efficiency, and ensures all improvement actions add to overall performance.

Engagement of your people

What is engagement?

There is no single answer but themes of commitment, involvement, communication and energy are clear.

"Employees who work with passion and feel a profound connection to their organisation. They drive innovation and move the organisation forward"
Meere

"Employee engagement is about translating employee potential into employee performance and business outcomes"
Melcrum

It is well established that change is difficult for most people.

Lean is about a permanent shift to a continuous improvement culture within which everyone feels able to identify problems, solutions and opportunities for improvement.

Leadership is key

Leadership is key to how successfully teams can make this transition.

An Engagement Surveying Tool has been developed and is available at www.improvement.nhs.uk/diagnostics/lean to encourage and support a culture of open and honest feedback and to motivate leaders at all levels to take action on results and improve their own leadership capability.

The 10 questions are based on the work of the Gallup organization, Marcus Buckingham and Curt Coffman published in *First, Break all the Rules*.

Daily huddles

A further mechanism for engaging staff is huddling.

A huddle is a DAILY, short and snappy face to face gathering of a team led by the team's manager. No more than 15 minutes long, it is conducted in a high involvement style.

Three key elements to include in every huddle are:

1. **Focus** - on key goals and responsibilities for the day
2. **Clarity** - clear, relevant and timely information to help staff perform their daily roles
3. **Commitment** - listen to and act on staff views, ideas, concerns and to feed back progress

More supporting information is available at:
www.improvement.nhs.uk/diagnostics/lean

Sustainability

What is the definition of sustainability, and how do we achieve it?

"Holding the gains, evolving as required and definitely not going back to the old way…."
Prof.Jean Penny - Human Dimensions of Change

The presence of certain factors is crucial, not only to ensure sustainability, but also to foster a culture of continuous improvement.

The following were identified by the Pathology Service Improvement Team in 2006 in the document *'Learning from Pathology Service Improvement Pilot Sites and Improvement Examples'*

These elements are similar and consistent with redesign in other clinical services and are not unique to Pathology. The work undertaken by the 'Cancer Services Collaborative Improvement Partnership' around sustainability of service improvement supports these findings and builds on the existing body of knowledge around sustainability.

A sustainability model and toolkit (NHS Institute for Innovation and Improvement - 2003) has been developed for clinical teams covering similar areas to those identified above.

- Leadership focus and executive support
- Engaged, motivated and empowered staff
- Understand user and patient needs
- Investment in continuous quality improvement
- Value adding processes supporting all pathways
- Data to support and evidence service improvement

Spread

The study of the spread of ideas suggests that it is relatively rare for ideas to spread instantly. The process of adoption and adaptation of ideas often occurs through conversation and interaction amongst peers.

Changes may go through a process of re-invention to fit with organisational systems and procedures as they are adopted.

Ideas that spread more rapidly often:

- have qualities that show a clear advantage over the current way of doing things
- are compatible with current systems and values
- are straightforward changes with simple implementation
- have an ease of testing before full implementation
- easily observable impacts

Spread often fails or is limited in its success by the mindsets of 'not invented here' or 'we're different'. The latter may be the case when work and equipment type and volumes are compared however the value stream from the patients' perspective is the same.

Case study 28

Using 'huddles' to improve team communication

Whipps Cross University Hospital NHS Trust

Summary
A long standing lack of organisation in the laboratory with a poor understanding of roles and responsibilities, meant the department had been functioning in a fragmented way, with staff groups working in isolation.

Daily 5 minute meetings or 'huddles' were introduced to help staff focus on their work and improve communication between staff groups. A Lean dashboard was generated to record the discussion and act as a powerful visual tool, and measures reinforced the lean principle of 'today's work today'. As a result, lab turnaround times improved **by 50%** with a reduction in turnaround time from from **4 days to 2 days.**

Understanding the problem

- There was a long standing fundamental lack of direction and organisation across the department. Lack of communication was exacerbated by the geographical layout of the department which physically isolated staff in reception and cut-up
- Historically, technical staff had chosen their own daily tasks - generally those which they liked to do, leading to a lack of structured rotation through the laboratory. Several tasks were unpopular and were either unfinished or not performed at all, in particular, maintenance and cleaning duties. Junior staff were not encouraged to seek help, were poorly supervised and insufficiently trained by the seniors
- It was the norm for any particular day's work to be unfinished, resulting in a technical backlog and large batches of work being issued by the laboratory in an unpredictable fashion, with a knock-on effect on Consultant reporting. The mean laboratory turnaround time was four days
- A culture had arisen where there was no impetus or incentive to finish the day's work and rather than anticipate potential problems and plan in advance to deal with them, the approach was to troubleshoot
- A number of wastes were evident, including poor skill utilisation, overproduction and over-processing. Although staff felt they were working very hard, there was no sense of fulfillment or pride from their work. Individuals were working in a poorly coordinated, unproductive fashion with no sense of teamwork. A global approach to the work was lacking.

How the changes were implemented

- Laboratory tasks were discussed in detail prior to the 'huddles' commencing, ensuring staff knew what was expected of them, aided by implementation of visual management and standard working
- The largest whiteboard in the laboratory was cleared and designated the 'Lean dashboard'. Information recorded on this board provides the focus for the daily huddle. Data collected for the board has gradually increased in response to ideas and requirements of all staff groups
- At 9am, the laboratory manager starts the huddle which lasts 10 minutes. Attendance includes all laboratory staff, the pathologist assigned to cut-up for the day, the trainee pathologist, a cytoscreener, a secretary and the project leads
- Items for daily discussion include:
  - Allocation of tasks for the day. Structured rotation through the tasks is enforced with attention to training needs and skills gaps whilst ensuring appropriate supervision
  - Current day's workload in terms of specimen numbers, block numbers and specimen types (routine, biopsies and megablocks). Target times for embedding and cutting of blocks are calculated based on times measured by laboratory staff undertaking these tasks and the subsequent process sequence charts produced
  - Cut-up start times are agreed with the pathologist
  - Expected frozen sections, sentinel lymph node biopsies, urgent specimens
  - Staffing absences with associated planning to ensure adequate coverage of all tasks
  - Stock issues, maintenance problems, planned services of equipment
  - Current or anticipated problems, with a root cause analysis and action plan
  - Data from the previous day is discussed, including performance against the target times and cut-up times
- Workload and performance data is manually recorded in a 'huddle diary' and some of this has been used to identify daily and monthly trends in workload.

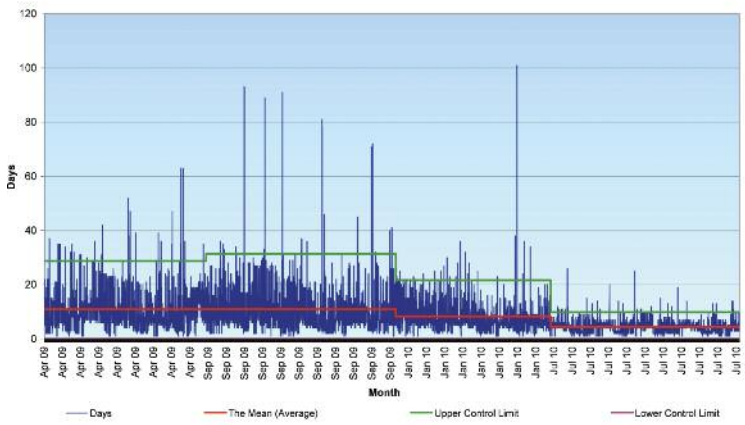
Measurable outcomes and impact

The Lean dashboard and huddle provide an impetus for the laboratory staff to complete their work on a daily basis. Use of target times has helped to focus efforts and provides staff with a sense of pride in their work. It allows staff to predict the time slides will be available for pathologists to report, and plan their day accordingly:

- Staff feel empowered and are taking increasing responsibility for their work. Working as a team, there is now a real understanding of each person's role in the patient pathway, and staff are aware of how their actions impact on others
- Communication throughout the department has improved. The department functions efficiently, even during times of crisis, when unexpectedly short-staffed or during periods of computer failure. Problems and issues are dealt with effectively and promptly, rather than escalating
- All cases are now checked out on the same day they are embedded, with a 'today's work today' culture in place. Extending this to specimen reception and cut-up areas ensures all cases are booked in and cut-up on the day of receipt

- Overall result is a reduction in mean laboratory turnaround time from **4 days to 2 days.** Variation in the system has also reduced (the upper control limit has reduced from 8.5 to 5 days). See graph on the right.

Whipps Cross overall turnaround time



Ideas tested which were successful

- Using a dashboard in association with the huddle (see Lean dashboard on the next page) is a powerful visual tool which at a glance informs any member of staff of the current day's workload, progress and issues
- Empowering staff by encouraging them to develop the dashboard and huddle discussion according to their requirements is facilitated by reserving a section of the dashboard for staff to write down any issue they wish to discuss at the huddle
- Using targets that are based on times that staff have measured themselves rather than had imposed upon them makes the targets realistic from their perspective
- Reporting any cases not booked in or cut-up on the previous day and discussing the reasons why has been instrumental in tackling this issue
- Encouraging active participation from all staff groups has improved communication across the department. Questions and observations can be answered directly by the appropriate staff member with any issues being taken back to their groups immediately.

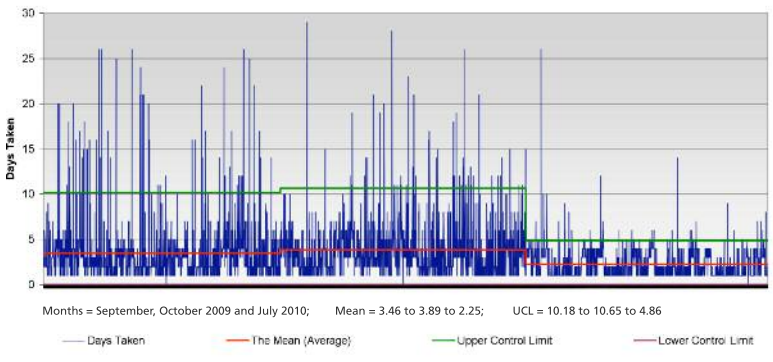
Ideas tested which were unsuccessful

- At the start, use of a poorly placed, small whiteboard with inadequate space to represent the data led to confusion and a lack of clarity. This was rapidly addressed by using the largest whiteboard located in a central area of the laboratory
- Initially, target times for embedding and cutting were never achieved and after considerable discussion amongst the laboratory staff, a number of possible reasons were identified. Timings had been collected by more experienced staff and did not take into account junior staff were slower. A single embedding and cutting time was applied to all blocks initially, however, it soon became apparent that biopsies took longer to embed and cut. Accurate timings were then achieved by repeating the measurements, taking these factors into account
- In the first few weeks, the huddles were poorly attended by laboratory staff due to late arrival in the department and lack of engagement. Open discussion and a few individual conversations over timekeeping have led to universal engagement and gradual expansion of the huddle to encompass more and more issues. This demand has come from the staff themselves who now feel empowered.

How this improvement benefits patients

- Improved laboratory turnaround time has contributed to the overall reduction in turnaround time from **11 days to 4 days** (see graph below). Patients' results are available sooner and management plans can be instituted earlier
- Team working and coordinated working allows intra-operative pathology work such as frozen sections or sentinel lymph node cytology to be dealt with in a more effective fashion.

Days taken from received to cut-up



How will this be sustained and what is the potential for the future /additional learning?

- New members of staff are immediately introduced to our Lean methods of working including the daily huddle
- All protocols across the department are being reviewed to reflect current improved practice
- Electronic recording of the data discussed at the huddle to allow long term monitoring of workload and performance trends
- A skills matrix is being generated to ensure appropriate skill use and allocation of training
- An electronic dashboard is under construction and will be available on all PCs in the department
- Forthcoming refurbishment of the department will be focused on improving the flow of work by eliminating the waste of motion.

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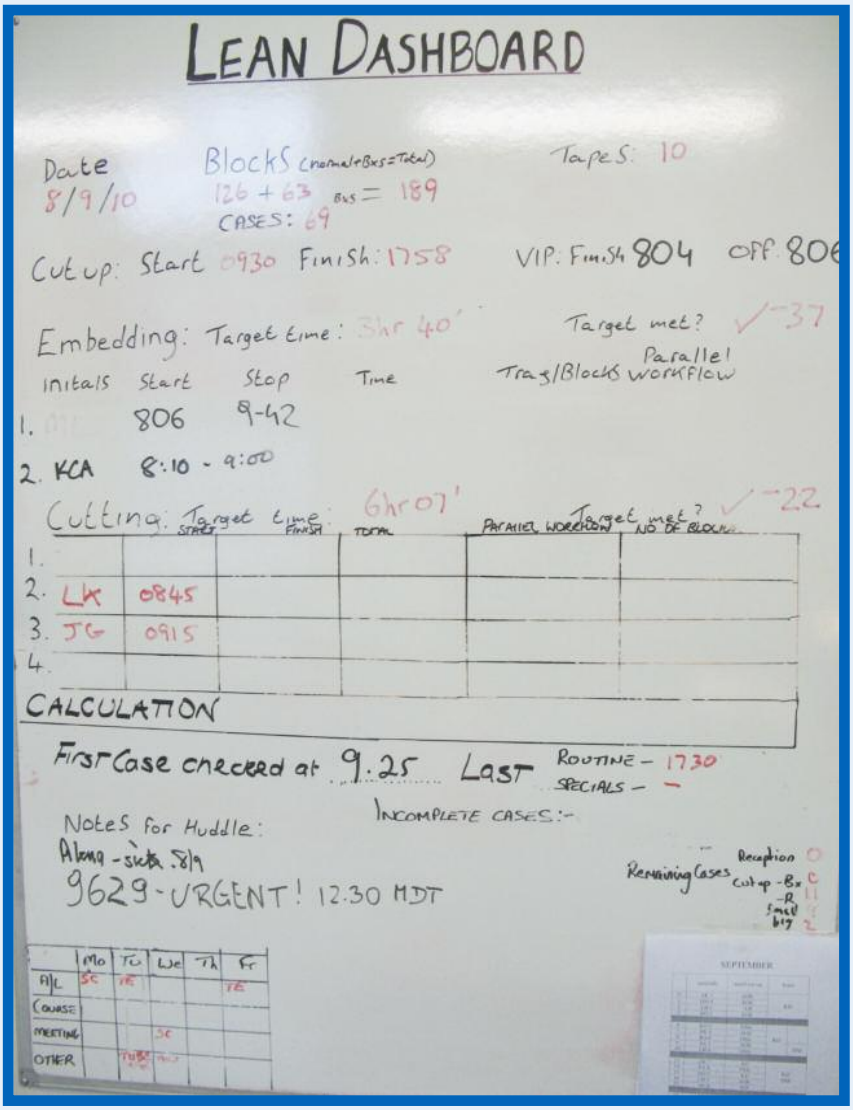

The Lean dashboard

Case study 29

Staff engagement using an 'ideas bank'

The Leeds Teaching Hospitals NHS Trust

Summary

As staff led change and engagement are integral to lean transformation, it was decided to introduce an 'ideas bank' to give an opportunity for all staff to contribute.

Various suggestion options have been trialled with the most successful methods rolled out across the department. The outcome has been positive in terms of improved staff morale and willingness to contribute fresh ideas and suggestions over and above those identified on the pilot master A3 storyboard.

Understanding the problem

The Leeds pilot would require all staff to trial changes to working practices in making the required reductions to pathway turnaround time. The creation of an 'ideas bank' and ideas review team would provide staff with a mechanism for submitting, assessing and trialling ideas, and where successful, fully roll out change across the department. This resulted in a sense of ownership and team development.

Measurable outcomes and impact

- Ideas are screened by the Ideas Review Team in terms of quality, TAT, safety, staff morale, cost and then discussed as to how they can be trialled (with the idea submitter)
- Suggestions are scored on the basis of effort to implement (5-1), envisaged department benefit (1-5) and cost of implementation (1-5)
- Since inception, **47 ideas have been received of which 39 have either been or are in the process of being implemented** (83%)
- Additional suggestion boxes are now available across the department at key locations where different staff groups congregate

Ideas tested which were successful

- **Suggestion boxes** - at convenient locations and allow for anonymous ideas
- **Phone line** - allows for out of hours use and offsite staff participation
- **Ideas bank review team** - enables different staff bandings across each pathway area to screen ideas
- **Use of shared drive** - easy access to ideas status information and overall reporting by any staff member.

Ideas tested which were unsuccessful

- **Huddle comms** - difficult to provide ideas information as not all staff present
- **Suggestion slips** - trialled initially and evolved into the suggestion sheet which allowed for better structuring of an idea and its potential benefits.

How this improvement benefits patients

The 'ideas bank' has increased staff involvement in making changes to working practices and consequently improved staff morale. This has led to improved workflow and quality output with reduced turnaround times.

How will this be sustained and what is the potential for the future /additional learning?

The Ideas Bank will look to evolve methods of idea generation/ communication to reflect the constantly changing environment of the histology department e.g. ideas communication board that provides staff and visitors with status information on all ideas being evaluated and trialled.

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22. Patient and user experience

The white paper - *Liberating the NHS, equity and excellence*, draws attention to the need for the NHS to be more responsive to the patients it serves, where ' too often, patients are expected to fit around services, rather than services around patients' (1.9)

The Pathology Service Improvement Programme has been established to demonstrate a patient focused approach to delivering Histopathology services by achieving improvements in:

- Delivery, by reducing end to end turn around times
- Efficiency across the whole end to end pathway of care
- Effective and appropriate utilisation of workforce across all staff groups
- Quality and safety at all stages of the pathway
- Integration of effective multidisciplinary working, responsive to all users across the pathway of care.

A fundamental principle of lean is to identify 'value from the customers' perspective' and make that value flow. In healthcare the customer is usually the patient.

The patients' clinicians are also customers of the histopathology team and phase 1 sites have conducted user surveys to establish the needs of this customer group. Some have sought input from Patient Advice and Liaison Services (PALS) and other patient groups.

Cancer managers and cancer service improvement leads are a further source of patient and clinician feedback.

The following measures are recommended to track the impact of histopathology services on patient experience.

- percentage of histopathology reports available at the next MDT
- turnaround times - provision of a guaranteed, predictable turnaround enables clinicians to:
  - Provide patients with certainty, reducing anxiety
  - Support effective MDT meetings
  - Manage return appointments
  - Avoiding wasted appointments where results are not available.

Patient opinion
A number of websites have been established to gain feedback from patients about their positive and negative experience. One such site is www.patientopinion.org.ok

Patient and Public Engagement - NHS Improvement website contains tools and examples of how to engage patients and the public www.improvement.nhs.uk

Case study 30

Reducing turnaround times - the impact on users

Whipps Cross University Hospital NHS Trust

Summary

There was concern that delays in histopathology reporting would lead to breach of cancer diagnosis and treatment targets.

By eliminating the bottleneck immediately prior to the consultant reporting stage, the overall turnaround time was reduced from a mean of 11 to four days with results dispatched in a timely and predictable fashion.

As well as allowing earlier management and treatment of patients, time and efficiency savings have been made both within and outside histopathology as evidenced by the feedback from the gynaecology, endoscopy, dermatology and urology teams.

Understanding the problem

- Histopathology results were delayed and issued in batches, particularly for 'routine' cases. The department was receiving numerous telephone and fax requests for results from clinical teams and multidisciplinary team (MDT) coordinators, 10% of which were made whilst the patient was in clinic, being seen by a clinician
- Data collected from the specimen pathway indicated that the mean overall turnaround time was 11 days with some cases taking up to 40 days
- The Colposcopy and Dermatology Units sent lists of 5-10 patients each for whom 'urgent' results were required on a weekly basis
- MDT coordinators sent lists of 'target' patients on a weekly basis requesting results (approximately 10 requests per week)
- Patients would endure waits in clinic of up to 30 minutes whilst their cases were located and reported. Some clinic appointments would have to be re-booked
- Management plans, including treatment and referral to other specialties or the cancer centre were delayed. In particular if a case was not reported by the time of the weekly multidisciplinary meeting (MDM), management decisions could be delayed by a week, until the next MDM
- Maximum eight week delay in diagnosis of 'unexpected malignancies' (routine cases with presumed benign clinical diagnoses which subsequently were found to be malignant). This was due to cases prioritised and reported according to clinical urgency. Although uncommon (up to a maximum of 10 per year), unexpected malignancies caused concern and distress to pathologists, clinicians and patients alike
- Approx six hours of weekly resource was wasted dealing with requests and prioritising cases. In other departments, resource was required to keep track of outstanding cases and chase results.

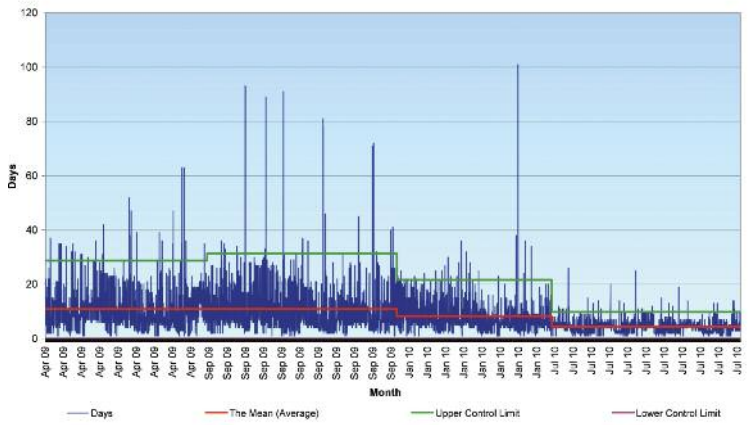
How the changes were implemented

From data used to produce statistical process control (SPC) charts, analysis showed the greatest delay to be at the consultant reporting stage.SPC charts for each of the six individual consultants were constructed with outliers investigated. A process sequence chart was drawn up and A3 thinking used to generate plan, do, study, act problem solving cycles. The outcome was an improvement in reporting times for all consultants which ultimately led to a consistent reduction in overall turnaround time.

Measurable outcomes and impact

The mean end to end turnaround time is now **four days** and the degree of variation in the system has reduced markedly (see graph). 76% of the TAT reduction was achieved from the pathologists' reporting step.

Whipps Cross overall turnaround time



- Dermatology patients are now given their histopathology results and discharged when they return to have their sutures removed a week post-biopsy. This has eliminated the need for a further follow-up appointment, **saving on average 25 appointment slots** every month resulting in **annual cost savings of £30,000**
- Colposcopy have increased the percentage of results letters they have been able to dispatch within two weeks from **44% Q1 2009 to 67% Q1 2010**. They re-organised their administration team to manage faster and more regular reports coming through
- Nurse-led telephone result clinics operate more smoothly as **100% of results** (previously just 75%) are available at the outset, as opposed to being chased during the clinic
- In urology, patients have their biopsies on a Friday, are discussed at the MDT the following Tuesday morning and given their results that afternoon. Previous practice was to defer MDT discussion for a week to allow results to be available
- Patients with gynaecological malignancies are referred to the regional cancer centre earlier, as soon as the histological diagnosis is made. Previously, these cases used to be batched and sent just prior to the regional MDT
- Department no longer receives regular lists for urgent reporting from colposcopy, dermatology or MDT coordinators. This has **saved two hours of weekly admin time**
- Number of telephone calls to histopathology for results has halved (46 in May 2010 vs 94 in May 2009) saving three hours of weekly admin time. Total of **five hours admin time saved** equates to potential annual cost savings of £3,760
- Unexpected malignancies are now reported promptly with a marked reduction in turnaround time and the abolition of prioritisation according to clinical need.

User quotes

'Changes made in histopathology have changed the service beyond recognition. My patients are getting reassurance earlier. Firm management plans are being made much earlier. Time and money are being saved, by potentially reducing the need for follow up clinic slots.'

Consultant Gastroenterologist, July 2010

'Within the Colposcopy Service the marked improvement in the speed of turnaround of cytological and histological samples has facilitated quicker communication of results to patients and faster appointing into treatment appointments when required.'

Nurse Colposcopist and Colposcopy Service Coordinator, June 2010

Ideas tested which were successful

- Understanding the workload and analysing it using the Pareto principle. This helped the consultants to realise the 'green stream' and focus on it
- Discussing SPC charts openly with colleagues and undertaking root cause analysis on why some cases took longer to report
- Minimising errors originating from the booking in procedure which were still present at the microscopy stage. This was addressed resulting in 'right first time' approach, zero tolerance of errors and a reduction in defects at the microscopy stage (see separate case study)
- Adopting a first-in-first-out policy
- Instituting a 'pull' system of working for pathologists rather than the traditional system of work allocation at the point of receipt
- Introducing specialist reporting teams.

Ideas tested which were unsuccessful

- Protected reporting time - 'Do Not Disturb' signs were trialled by pathologists but this proved difficult to enforce and did not reduce the number of interruptions to reporting
- Stamping request cards with the seven day target date, as a visual cue. With the adoption of a first-in-first-out policy, this became redundant.

How this improvement benefits patients

- Earlier, guaranteed communication of results
- Prompt discussion at the MDT
- Earlier management plans, including treatment and referral to other specialties/ regional cancer centre.

How will this be sustained and what is the potential for the future /additional learning?

- Clinicians receiving results faster and in a predictable way improves the efficiency in their areas
- The MDTs are easier to prepare for, both within and outside of the department and specialist reporting means many of the cases have been reported by the consultant pathologist who is presenting at the MDT, reducing the time required for case review
- The impact of the reduced turnaround times has not been fully realised yet. The work is to be presented at Trust level and ways of effectively communicating it to all clinical areas are being evaluated.

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Case study 31

User Engagement

Whipps Cross University Hospital NHS Trust

Summary

Little communication between Histopathology and its users (hospital clinicians, general practitioners, patients) had led to poor understanding of processes, resulting in unrealistic expectations.

Histopathology has always provided a service on the basis of what is **possible** rather than what is **required.**

By engaging users, ascertaining their needs and informing them of the histopathology specimen pathway, productive discussion with useful outcomes has ensued, laying the foundation for future collaboration to improve the overall patient pathway.

Understanding the problem

With the exception of multidisciplinary team (MDT) meetings and isolated case enquiries, there was little interaction between the histopathology department and service users, with the department having a very low profile within the Trust.

Users

- had mistaken impressions of the specimen pathway due to lack of practical exposure to histopathology during undergraduate/postgraduate medical training
- were unaware of what happened between sample being taken and its arrival in pathology
- did not realise the impact of not providing certain pieces of information on request forms (exacerbated as department did not re-inforce their importance.

Histopathology department

- always provided service on basis of what is possible without actually questioning what is required by users, inadvertently leading to misdirected effort and emphasis
- had never asked users what their requirements and expectations were.

How the changes were implemented

High volume user as member of the core team

- Lead consultant in gastroenterology joined the Lean project core team
- He 'walked' the specimen pathway during which he took the core team to endoscopy to demonstrate what happened after a specimen was taken
- He actively participated in construction of pathway value stream map
- He audited delivery of hard copy reports to Endoscopy in conjunction with histopathology office staff.

User surveys

- Lead pathologist for the project worked with the gastroenterologist to design a user survey targeted for hospital consultants and specialist nurses. This collaboration was invaluable for ensuring that relevant questions were posed
- The survey was emailed twice to all the consultants and specialist nurses in the Trust, together with information about the project
- Modified survey accompanied by letter detailing the project was sent to 13 local general practices sending specimens to the department.

Involving patients

- During National Pathology Week 2009, histopathology staff presented a photo board of the specimen pathway to members of the public together with introductory information about the department's adoption of lean methodology.
- Shortly afterwards, details of the project were presented formally to the Trust's patient representative group at their monthly meeting.
- As the project has progressed, regular email updates with the latest three and seven day turnaround figures have been sent to the Chairman of the group.

Increasing the department's profile

- Project presentations, slideshow and photo board were delivered at a number of Trust meetings including
  - Executive team meetings
  - Medical Grand Round
  - Medical division
  - Cancer Strategy Dayo Cancer Board
- Details of the department and project were published in the Trust magazine
- Regular email updates were sent to our executive sponsor.

Measurable outcomes and impact

User surveys

30% hospital user response rate included at least one MDT clinician for each specialty:

- Wanted minimum datasets incorporated into reports
- 33% wanted macroscopic / microscopic pictures of specimens
- Required a mean turnaround time of 3.5 - 20 days depending on the nature of the specimen
- Majority unhappy with idea of electronic requesting and reporting, mainly due to lack of confidence in IT department and equipment
- 50% not willing to receive results electronically only, again due to problems with access to the Trust web-browser/network issues
- Significant concern regarding delays in receipt from off-site generated reports (eg. for cases sent for central review)
- Most were pleased with service provided (pathology representation at MDT)
- All wanted the pathology service to remain on-site.

General Practitioners (90% response rate)

- Were happy with the service provided
- 95% were keen to receive electronic reports only
- Most were willing to move to electronic requesting

Patient involvement
- Patient Representative Group appreciated being involved and through their representation on various clinical governance committees, offered to support the project team in trying to reduce specimen transport delays
- They were keen that reduced turnaround times were translated into changes in clinical practice when results would be communicated to them as soon as possible.

Improved profile
- Trust-wide awareness of the department and project. Details of the project have been published in the Trust's annual report and will be included in the annual review
- Newly attained high profile status of the department, together with strong executive support, has facilitated resolution of many issues and advancement of improvement ideas, especially in specimen transport and IT
- The department has been asked to share the benefits of its experience with others Trust departments embarking on service improvement projects.

Ideas tested which were successful
- Engagement of a high volume user early in the project gave the histopathology department real insight into how it was perceived by users. As the gastroenterologist walked the specimen pathway, he became aware of how processes in his department impacted on the histology process. Both teams have since worked together to implement changes in endoscopy
- Initially the response rate to the hospital user survey was very low, so paper versions of the survey were taken to all of the MDTs and handed out to consultants which increased the response rate considerably
- Conversations with users face-to-face or via telephone about their views and requirements yielded more valuable information than surveys alone. This paved the way for better relations and future communication
- Upon receiving the survey, some General Practitioners telephoned the department to discuss further the service we provided and the project
- Involving the Trust's press and communications department early in the project was vital to ensure that our work was publicised.

Ideas tested which were unsuccessful
- Engaging clinical area staff on specimen transport has proved difficult. Nursing staff from high volume areas were invited to the department to see the project in action. However, there has been poor uptake of this so far.

How this improvement benefits patients
- By engaging clinicians, general practitioners and patients, the department now understands their requirements whilst users have realistic expectations of the specimen pathway.

How will this be sustained and what is the potential for the future /additional learning?
- To maintain a high quality, clinically relevant service for clinicians, we need to engage more regularly and effectively with clinicians
- Ensuring engagement with relevant users when considering potential policy changes for specimen types. Recently, the Maternity Unit Team were engaged when clarifying pathways for 'products of conception' specimens
- Updating teams at departmental operational meeting
- Further changes in clinical practice.
- Continue to share the lean experience with wider Trust teams embarking on similar projects
- Histopathology webpage will launch shortly which will be accessible by the whole Trust. This will include details on the service improvement project
- Public project presentation is planned during 2010 National Pathology Week
- Encourage junior doctors to learn about the specimen pathway in a practical, relevant way by following specimens from patients in their care
- Providing visual material for junior doctors' induction packs, detailing how to adequately fill in a request card.

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Case study 32

Impact of effective histology on MDT meetings

North Middlesex University Hospital NHS Trust

Summary

The introduction of a simple spreadsheet on a common drive has ensured that 100% of histologically diagnosed cancers are captured and discussed by the relevant multidisciplinary team (MDT) even if they were not received via the '2 week wait' route. It has reduced the amount of work that was required in chasing reports for suspected cancer cases and has provided a means by which patients that might fall outside a MDT are picked up and discussed. There has been no cost in its set up and it is now regarded as an essential component of the MDT coordinators role.

Understanding the problem

- All new cancer diagnoses need to be discussed at the relevant multidisciplinary team (MDT) meeting
- Department receives approximately 10,000 requests per annum from over 10 different specialties, local General Practitioners (GPs) and provides histology input for 41 MDTs per month and 12 Super MDTs. In 2009 there were approximately 580 cancer diagnoses made by the department
- These patients had previously been identified by the MDT coordinators, each using a variety of sources e.g. Cancer registry print outs, copies of histology reports, lists provided by clinics etc
- This was an inefficient system with delays in patients being discussed, and in a few cases patients being lost to follow up
- Some patients were not discussed promptly as their diagnoses were unexpected or came from a source that did not have a recognised MDT e.g. GP biopsies, patients admitted via Accident and Emergency or those undergoing emergency surgery. These patients were not on the 31/62 pathway and could potentially be missed
- Even though it was departmental protocol to phone these unexpected results through, it became increasingly time consuming to contact the relevant individual and ensure that they were discussed by the appropriate MDT.

How the changes were implemented

- Simple excel spreadsheet set up on trust wide shared drive (the 'V:Drive')
- Accessed by all histology consultants so cancer cases could be recorded as soon as they were reported
- Spreadsheet modified so that each MDT had its own worksheet
- As soon as cases entered, they were moved to appropriate worksheet by MDT coordinators, forming basis of next MDT list for discussion.

Measurable outcomes and impact

- Since introduction of V:Drive in April 2006, total of 1,852 patients have been registered
- Recent audit by the lead MDT coordinator has shown that 100% of these cases have been discussed by an MDT
- MDT coordinators report a reduction in time spent chasing reports for cases, as there is now a central register of all patients with malignant diagnoses
- Data provided for each patient is accurate, as original request form is used to enter the patient name, date of birth, hospital number and biopsy site
- Relevant histology report number and reporting pathologist are also recorded, allowing the correct histology material to be requested for review
- No need to chase histology reports reducing time spent checking if a case is reported by both MDT coordinators and histology secretaries.

Ideas tested which were successful

- Originally, a pathologist would email the MDT coordinator with list of cancer cases that they had diagnosed that week. Became apparent that using an excel spreadsheet was simpler and was adopted by other pathologists and MDTs
- All pathologists have a shortcut key on their desktop, so that entering required details takes no more than 30 seconds per case
- Several MDTs use it as their primary source for cases; others use it as a failsafe system.

Ideas tested which were unsuccessful

The spreadsheet had to be modified so that data could not be erased and multiple users could access it at any given time.

How this improvement benefits patients

- Spreadsheet has ensured all cases with a malignant histological diagnosis are discussed by a MDT
- As it is a "real time" spreadsheet it allows earlier discussion by MDTs e.g. case diagnosed on Friday afternoon can be picked up and discussed at Monday lunchtime meeting
- Allows decisions on further management or investigations to be made earlier, reducing time that patients need to wait until the start of treatment.

How will this be sustained and what is the potential for the future /additional learning?

This is a simple tool that has not only markedly reduced the amount of work that was required in chasing reports for suspected cancer cases but has provided a means by which patients that might fall outside a MDT are picked up and discussed. There has been no cost in its set up and is now regarded as an essential component of the MDT coordinators role.

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23. Work cell design

What Is a work cell?

An ideal work cell is a self-contained arrangement of equipment, resources and workstations / lab benches that follows the sequence of processes for a given product (e.g. tissue type).

Often, this arrangement takes a U-shaped form with the staff member moving from station to station, until ending the sequence of processes near the beginning step for the next piece or batch. This supports continuous flow and minimises wasteful transportation, motion and delay.

The U-shaped cell is particularly well suited for a variety of activities with communication made easier since every staff member is close to the others. This co-ordination and co-location improves quality, supervision and scheduling and ultimately teamwork.

Implementing continuous flow work cells

1. Decide which work-types (e.g. products / tissue types) will go into your cells.
2. Calculate Takt Time (see section 18) e.g customer demands one unit every 40 seconds.
3. Determine and then document all work elements having calculated the time required for processing one work item.
4. Determine if your equipment is capable of meeting takt time.
5. Create a lean layout based on one staff member being able to perform all work elements to ensure least space is used (less walking, movement of parts, and waste.) U-shaped cells, S-shaped etc.
6. Balance the cell by determining how many staff members are needed to meet takt time.
7. Determine how work elements will be divided among the staff members.

Benefits of work cells

With the right work cell structure and the movements of staff members organised in a logical repeatable motion, processes flow without the need to transport work items and consumables. Ideally, equipment is located close enough that any transportation takes seconds rather than minutes with minimum delay. This style of workplace arrangement also minimises use of valuable space.

Similarly, visual management is greatly improved as the state of work progress is clear with communication and decision-making made easier should unplanned work backlogs / batching appear.

Essentially, an effective work cell does not create additional stress and burden for staff members, but instead allows them to accomplish more while exerting less physical effort. Staff members are provided with a more pleasant work experience with improved staff morale whilst reducing lead times (TAT).

Case study 33

Work cell design in the main laboratory

The Leeds Teaching Hospitals NHS Trust

Summary

As part of the original data collection and value stream mapping exercise, it was noted that there were significant waiting time delays especially where the lab block backlog (5,000 blocks) had built up. This was caused by considerable lab staff time spent walking between the lab equipment required to embed, section and trim blocks. A three day rapid improvement event (RIE) was held to design a work cell (white standard blocks accounting for 75% of workload) which would enable work to flow more effectively through the impacted process stages by ensuring required staff / equipment were co-located. This resulted in work cell output contributing to an 85% reduction in backlog within the first month eventually reducing to nil. Further to this, work cell design has been expanded across the entire main laboratory with five work cells operating daily.

Understanding the problem

- There was a continuous backlog of blocks (to embed and section) of approx 5000 blocks, equivalent to 6.5 days worth of work
- Urgent cases were prioritised - more cases became urgent with non-urgent cases forced to wait even longer with staff time taken up searching for relevant blocks in the backlog
- All process steps were documented in the order in which they were performed to quantify associated wasteful activities - this showed that 95% of main lab time was spent waiting and that standard ways of working were not always followed
- Spaghetti maps highlighted motion as a significant waste as embedding, sectioning, staining and QC were not undertaken in close proximity

How the changes were implemented

- Three day rapid improvement event (RIE) held to design a work cell which would enable work to flow more effectively through impacted process stages. Staff members from all stages of the pathway participated throughout the event
- Team members participated in a 'Lego exercise' which illustrated the principles of Lean and the advantages of cellular working
- A3 storyboard documented the PDSA cycle of developing the work cell
- Team members performed a 'waste walk' through the main laboratory documenting examples of wastes that were observed. These results were collated in a fishbone diagram which, together with information collected prior to the event, helped illustrate the current state
- Time observation forms were completed to time each process from embedding to QC and sign out. From analysing demand at each stage prior to the event, takt time was calculated
- Work cell criteria were then defined, including:
  - **Continuous flow** - cycle time, batch size, handoffs, distance walked, waste
  - **Organised work area** - dedicated work areas, consumables / equipment, visual SOPs
  - **Pulled work** - work triggers, work to takt
  - **Quality in the process** - not passing on defects
  - **Standard team working** - appropriate equipment co-located, skills mix
- Team members split into five groups who each produced a paper kaizen work cell design scored on the above criteria
- Team members split into two groups, each now led by the two team leads from the highest scoring designs
- Two groups prepared to try-out their work cell design in a live 90 minute experiment within the laboratory
- Equipment was co-located, visual SOPs developed, roles and responsibilities defined with team members allocated a target work quantity to process
- Each cell operated by 2.5 WTE ran in parallel using batch sizes of 15· Observers timed each process and recorded workflow through each work cell. Spaghetti diagrams and capacity diaries were produced to show the results
- Teams used results from both experiments to agree the standard work cell design to be further trialed over a one month problem debugging phase
- Four week plan activated including communicating outcomes from the RIE, setting up new work cells, performing 5S, producing visual SOPs, training cell team members, deciding standard responsibilities between cell lead and team members and daily performance tracking
- At end of debugging phase, five modified work cells were introduced across the main laboratory (three work cells handling routine blocks requiring single full face sections with a further two work cells incorporating small biopsy blocks requiring multiple levels).

Measurable outcomes and impact

- Initial work cell **reduced the backlog by 85%** within first month and is now nil. Average daily block throughput has **increased from 800 to 1,080 (by 35%)**
- Defined daily staffing capacity for experimented work cell (and subsequently for the entire main lab)
- By relocating equipment in close proximity **waste of motion reduced by 39% (51 miles!)**
- By establishing work cells, teamwork has been introduced with improvements to staff morale· Improvements in the main laboratory have contributed to a **50% decrease** in laboratory turnaround time from **6.95 to 3.49 days** (January 2010 - July 2010).

Ideas tested which were successful

- Rapid improvement event and structure for work cell design was a great success:
  - Gave everyone a greater understanding of the laboratory processes
  - Generated tremendous enthusiasm and helped progress change
  - Both lab and consultant staff members enjoyed working as one team
  - Work cell concept increased work throughput using fewer staff members.

Ideas tested which were unsuccessful

Adhering to the action plan proved difficult and slippage to both completing actions and in measuring performance meant the trial had to be extended.

How this improvement benefits patients

Work leaving the main lab has become more predictable in terms of volume and frequency which has enabled Pathologist teams to plan their reporting time requirements ensuring a greater proportion of results are available for the next MDT.

How will this be sustained and what is the potential for the future /additional learning?

Co-locating embedding, sectioning, staining and QC in close proximity has had a significant impact on daily throughput. The next stage is to revisit the work cells and completely embed standard work and re-defined staff roles to ensure there is the adequate skills mix to ensure working to takt time is possible.

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24. Accelerated implementation

Two sites joined the programme six months after the rest:

- Derby Hospital NHS Foundation Trust, Royal Derby Hospital
- North West London Hospitals NHS Trust.

Both sites had recently been NHS Improvement Cytology Pilot Sites, and were keen to apply the learning from cytology improvement to the histopathology process.

By applying the same Lean principles, both sites could adopt and adapt the changes made in cytology to demonstrate repeatability and scalability, and were able to quickly implement changes and improve the process in an accelerated manner.

The four key changes identified in cytology that have been repeated in histology:

- **Focus on the whole end to end pathway**
- **Adopt small batch sizes**
- **Keep samples moving**
- **Establish first in first out.**

And the four mechanisms for change apply equally to the histology pathway:

- **Empowered staff**
- **Daily meetings**
- **Visual management techniques**
- **Information to support the process.**

Case study 30

Accelerating the pace of histology change

Derby Hospitals NHS Foundation Trust

Summary

With increasing pressure to deliver cost improvements to the histopathology service, the trust joined the Department of Health Pathology Programme just as the peak summer annual leave period was about to begin.

This left the trust under six months to:

- Learn the principles of Lean
- Obtain and analyse data
- Engage staff and users
- Make improvements.

The team have accelerated the pace of change to deliver improvements to achieve the histology end to end turnaround times at the same time as other sites working to a 12 month deadline.

Understanding the problem

Pathology and diagnostic services generally have been charged with improving to meet patient needs. The cytology team at Derby was a phase 2 NHS Improvement site and their success (along with the dogged determination of the clinical head of service) prompted an agreement for the Histopathology team to join the Department of Health programme six months in.

The team already had a key performance indicator (KPI) to deliver 75% of results in seven working days and was achieving 80-90% each month. They were not however measuring the end to end pathway from the patients' point of view.

On acceptance to the programme a core team was quickly established and Lean training was arranged.

How the changes were implemented

- A core team was selected with representation from every level of staff involved in the histolopathology team
- A wider team of experts that have an input to or an impact on the end to end flow of samples was also developed
- All lab staff were given Lean awareness training by the improvement leads and everyone participated in the simulation exercise to put the principles they had learned into practice
- Time out for learning, action, communication and implementation was agreed although having eight staff members out at the same time has a significant impact on their colleagues and there is still the responsibility to ensure service continues as normal
- The consultants on the core team agreed to have work issued to them even though they may be receiving training or have lean tasks to do
- Training days were agreed. Other lab staff covered the work where possible and a planned backlog system was developed as a fall back should time out effect work flow though the laboratory
- Some use of overtime was agreed but this was minimal and no more than what was being used prior to the lean project starting
- Staff huddles were implemented almost immediately as a forum for communicating to the wider team what was happening. They currently occur three times a week and are embedded in the way the lab now operates
- Notice boards were established to share all the outputs from the core team and to invite feedback, suggestions and concerns.

It was recognised early on that the additional pressure of the pace of the programme at Derby would impact on the wider laboratory team and the decision was taken to invest additional time in operating the Staff Engagement survey. The initial completion rate was low and the team spent some time discussing what may have driven this apparent apathy. A decision was taken to give a more detailed explanation of what the survey entails to all staff prior to the second survey. Despite the low response rate all results were fed back to the team and focus groups were conducted with each staff peer group.

Measurable outcomes and impact

- 158 staff concerns and suggestions were posted to the communications board and formed part of the current state analysis
- Consultants attend huddles on a regular basis and contribute regularly
- Within the first month the main problems had been identified and seven A3 projects were underway, which included base lining the current state with:
  - Value stream map
  - Process sequence charts
  - TAT analysis
  - Demand and capacity
  - Spaghetti maps
  - Go see
  - Staff suggestions
  - Pathway photographs
- 5S champions identified and underway across the department including consultants
- Immediate PDSA:
  - Quiet time in reception
  - designated query handlers
  - Microtomy station to IHC
  - Chemicals moved to immediate work area
  - Direct micro typing by secretarial staff without forms.
  - Her2 FISH results direct to consultants for result entry

How will this be sustained and what is the potential for the future /additional learning?

- Lean is more than a project or a means to an end. It should and has become the way of working for the core team
- It requires a change in philosophy, a change in management style and it becomes a continuous journey rather than a quick fix to a problem not really understood
- The cytology team has been available and supportive to the histology team and has guided them with some of the principles
- Colleagues from other pathology services were invited to and attended the Lean awareness training sessions and new practices are starting to spread to these areas. With the support of the cytology and histology teams this can be encouraged until the whole of pathology has a continuous improvement philosophy.

Derby is in the early stages of A3 thinking, still with further developments ahead. The infrastructure and learning is now in place to ensure a successful outcome to this project.

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DH INFORMATION READER BOX

Policy HR / Workforce **Management** Planning / Performance Clinical	Estates Commissioning IM & T Finance Social Care / Partnership Working
Document Purpose	For information
Gateway Reference	15009
Title	Learning how to achieve a seven day turnaround time in histopathology
Author	NHS Improvement
Publication Date	4 November 2010
Target Audience	PCT CEs, NHS Trust CEs, SHA CEs, Foundation Trust CEs, Medical Directors, Directors of Nursing, Directors of Finance, Allied Health Professionals, Service Improvement Personnel, Pathology Directors and Managers
Circulation List	
Description	This publication demonstrates the learning of how nine histopathology pilot sites have made improvements in quality, safety and productivity. The aim of the pilot was to test if seven day turnaround for all patients could be achieved
Cross Ref	N/A
Superseded Docs	N/A
Action Required	N/A
Timing	
Contact Details	NHS Improvement 3rd Floor, St John's House, East Street, Leicester LE1 6NB Tel: 0116 222 5184 **www.improvement.nhs.uk**
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