Safe & Effective Service Improvement

Delivering the safety and productivity agenda in healthcare using a Lean approach.

An Amnis White Paper

Amnis

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1.0 Overview

This guide is designed to introduce those with a responsibility for safety and productivity working in healthcare organisations to the concept that Lean can, and already is, being used to tackle both of these important agendas. Further than this, we also aim to show that an absence of "Lean Thinking" inside healthcare organisations can lead to increased patient safety risks.

The guide has been written with the minimum amount of Lean jargon and it is assumed that readers will either have a working knowledge of Lean already or will make use of our freely available guide to Lean, called "Uncovering Lean", which can be downloaded from our website (www.amnis.uk.com/library).

The guide uses a mix of commentary and examples from publicly available sources to show the practical benefits of using Lean to tackle safety and productivity, as well as demonstrating that the absence of a Lean approach has contributed to a number of high profile incidents in recent years.

Lean is a concept that has already been used in a large number of NHS organisations to improve safety and productivity. The Institute for Healthcare Improvement (IHI) maintains that whenever there is substantial waste of money,

time and supplies, which unfortunately is common in healthcare, a Lean approach becomes necessary.[1]

This guide builds on work already done in a variety of organisations, both in the UK and overseas, to show both how and where Lean has been applied to successfully improve patient safety and where the absence of the form of systematic thinking that Lean brings to healthcare organisations has led directly to patient safety incidents.

Tackling patient safety incidents in all their many forms, from near misses through to events that cause severe harm or even death, is a priority for healthcare organisations in the developed world. Incidents of harm can cause emotional and financial problems for patients and carers whilst increasing stress and costs for healthcare organisations themselves.

The House of Common's Patient Safety Health Committee published a report stating that of the approximately 850,000 incidents reported annually through the National Reporting and Learning Service (NRLS) in England, over 65% are classified as "no harm" incidents, which include near misses and other prevented incidents. A further 25% are "low harm" incidents, whilst 5% of incidents involve moderate harm and around 1% cause serious

harm to a patient. Finally, 0.5%, about 3,500 cases per year, cause death. However, the National Patient Safety Agency (NPSA) admits that there is significant under-reporting of patient safety incidents; therefore, these figures do not reliably show the amount of incidents that annually occur within the NHS.[2]

The Health Minister, Simon Burns, stated that unsafe care will not be tolerated and that "across the NHS there must be a culture of patient safety above all else".[3] The application of Lean can successfully help avoid these "never events" and can promote patient safety, whilst at the same time helping deliver improved productivity for healthcare organisations.

Lean, when applied across "end-to-end" patient pathways, enables teams to take a critical look at their entire process and to identify high-risk steps. A service improvement mentality that focuses on redesigning pathways coupled with a culture that recognises that any incident or near miss is unacceptable helps to tackle both the systemic and behavioural issues that affect the safety of patients. In addition, Lean can enable organisations to transition smoothly into the utilisation of new practices and technology.[4]

Lean is neither a "new to healthcare" nor a complex process, but organisations can benefit from having knowledgeable support during the implementation of change. We hope you find this guide provides useful input to your service improvement activities.

To find out more about Amnis, the work we are doing in the healthcare sector or if you have questions or suggestions for how we could improve this guide, please use the contact form on our website (www.amnis.uk.com/contact) or call us on +44(0) 870 446 1002.

"If the productivity challenges can be met, then for patients it will mean better services and more of the things they value—fewer hospital infections, more operations, higher quality care. The task for the NHS is not to fixate on the cost side of the equation—saving money or making cuts—these are not improvements in productivity. Rather, it needs focus on the benefits side to find new ways of providing services that increase the value of care to patients."

Professor John Appleby, Chief Economist, The King's Fund[5]

2.0 The Need for Change

Healthcare organisations and providers wish to deliver the highest standard of care possible. However, the combination of complex processes, stress, organisational culture and systems as well as technological problems can lead to mistakes. Patient safety concerns have been brought to the attention of the general public due to a number of high profile mistakes, coupled with raised awareness due to litigation resulting from medical errors.

In the sixth patient safety report of session 2008–2009, the House of Commons Health Committee reported that the NHS Litigation Authority (NHSLA) paid out £633 million in settlement of clinical negligence claims in 2007–2008. This figure only relates to litigation over the NHSLA threshold, and does not take into account many of the costs concerning avoidable errors; in particular, the cost of additional medical care necessary to treat the patient for the harm caused by the error.[6] Duncan Eaton, the Executive Advisor for the Associate Parliamentary Health Group (APHG), maintains that the extremely litigious atmosphere is due to the fact that patients are now more aware of the possibility and frequency of medical errors. This knowledge has been gathered from the publishing of statistical data centring on errors and problems.

Previously, patients did not have access to this data, and thus did not have the resources to seek compensation if problems arose.

The NHS has responded to the increasingly litigious and retributive atmosphere by formally recognising patient safety as a serious issue and placing it on their policy agenda.[7] This undertaking began seriously in 2000 with the publication of a patient safety policy and the formation of a number of organisations and committees designed to formulate protocols.

One of these organisations, The Chief Medical Officer's Expert Group, stated in their report *An Organisation with a Memory* that the NHS needed to develop:

- Unified mechanisms for reporting and analysis when things go wrong;
- A more open culture, in which errors or service failures can be reported and discussed;
- Mechanisms for ensuring that, where lessons are identified, the necessary changes are put into practice; and
- A much wider appreciation of the value of the system approach in preventing, analysing and learning from errors.

One of the most significant actions taken by the Expert Body to address these issues was the

formation of the National Patient Safety Agency (NPSA) in July 2001,[8] and whilst the coalition government has taken the decision to disband the NPSA we should not forget the excellent work the organisation has done raising the awareness of issues that drive poor patient safety. The NPSA was established to achieve improved and safer patient care by "informing, supporting, and influencing organisations and people working in the health sector", and is an Arm's Length Body of the Department of Health.[9]

In 2005–2006, there was a series of reports assessing the progress of the various safety initiatives that had arisen, and then in 2008 Lord Darzi wrote a report titled, *High Quality Care for All: NHS Next Stage Review Final Report*. Darzi's report outlined a long-term vision for the NHS that underscored the fact that the provision of quality services and patient safety needed to be the NHS's main priority.[10] Lord Darzi states that to patients, the quality of care they receive from the NHS is all that truly matters. He goes on to state that "People want to know they will receive effective treatment. They want care that is personal to them, and to be shown compassion, dignity and respect by those caring for them. People want to be reassured that they will be safe in the care of the NHS." Lord Darzi maintained that in order for the NHS to pursue its goal of improving

quality it needs to focus on helping people to stay healthy, empower patients, provide the most effective treatments and to keep the patients as safe as possible. The NHS needs to emphasise the importance of having a healthy lifestyle, and should also work to ensure accessibility to prevention services.

Patients also need to feel empowered and that they have a say in the care they receive. It is also important that people have access to the necessary treatment and care, and that patients are kept as safe as possible. In order to fulfil this last goal, the NHS needs focus on reducing any sources of potential harm and to keep patients in clean environments. The NHS will be able to provide high quality care when these four areas mentioned by Darzi are addressed. He states that "there is much more to be done to place quality right at the heart of the NHS".[11]

> **Amnis Commentary**
> A strategy with a combined focus on safety and productivity, with joint actions to improve both concurrently, needs to be developed for every healthcare organisation.

3.0 Lean Concepts Underpinning the CQC Framework

The Care Quality Commission (CQC) is the health and social care regulator for England. There are equivalent bodies for Wales and Scotland, The Social Services Inspectorate Wales (CSSIW) and the Scottish Commission for the Regulation of Care (SCRC), respectively.

The CQC's goal is to ensure better quality care for all patients receiving medical care despite the setting they receive it in.[12]

In order to maintain a high standard of care, the CQC outlines the essential standards of quality and safety that a patient can expect to receive when they undergo medical treatment. From the 1st October 2010 it was affirmed in law that every health and adult social care service in England is legally responsible for ensuring that it meets new essential standards of quality and safety. The CQC registers and licenses care services that meet these essential standards, and monitors these organisations' activities to ensure that that their performance remains up to the required standard.

The CQC also monitors foundation trusts to certify that they comply with the quality and safety standards. This extra layer of scrutiny does overlap with the agency "monitors" who ensure that the foundation trusts are providing high quality care; however, the CQC and the "monitors" have different focuses and outcomes.

The CQC has set out five essential standards to address patient safety covering clinical outcomes, clinical care, the neutralisation of errors and patient experience.

We aim to briefly show on the following pages that each CQC Goal can be clearly seen to link to one or more Lean concepts.

"The current financial climate presents a real challenge to commissioners and providers, who need to ensure they maintain a quality in services while achieving greater efficiencies."

Dame Jo Williams, Chair, Care Quality Commission[13]

CQC 1st Standard

The first standard is the right of the patient to take an active role in their care, and to be well informed of what is happening at every stage in their care. Patients will have the right to consent or reject any type of care, treatment or examination before it takes place.

This standard addresses several of the patient safety areas. When patients are actively involved in their care they can be effective at identifying errors. Therefore, patients should be encouraged to ask questions and to voice any concerns they might have.[14]

Furthermore, this can improve clinical outcomes and the neutralisation of errors by performing an extra check on the course of treatment, plus, the patient experience will be improved because the patients will feel like they were in control of and comfortable with the care they received.

This need for increased patient involvement is supported by Jeremy Taylor, Chief Executive of National Voices, which "is the coalition of national voluntary organisations promoting stronger patient and citizen influence". Taylor states that the way healthcare is delivered needs to change. It is no longer effective for highly paid experts to take complete responsibility for treating a passive patient. Taylor affirms that it "is wasteful, paternalist, not always effective, and no longer affordable".[15]

Lean and the 1st Standard

Lean is a collaborative approach to improvement that involves patients/carers, clinicians and managers in the redesign of pathways and services and the introduction of standardised processes.

CQC 2nd Standard

The CQC's second standard states that patients can expect the care, treatment and support that adequately meet their needs. This includes planning a patient's course of treatment, which will ensure that the treatment is safe and is in keeping with the patient's rights.

Furthermore, patients will receive the food and drink that meets their dietary needs. Extra measures will be taken to ensure the patient's safety when more than one care provider is involved on a case. Also, when patients feel that their healthcare providers are listening to and addressing their concerns they are more likely to be cooperative and comply with the medical advice they are given.

By meticulously planning out a course of treatment, the clinicians are mitigating risks, which will improve their clinical outcomes.

Lean and the 2nd Standard

In a similar fashion to the 1st standard, the 2nd standard is based upon having effective standardised pathways and information that enables professionals to work collaboratively to deal with patients and that informs patients effectively about all aspects of their treatment.

CQC 3rd Standard

The CQC's third standard is that the patient can expect to be safe. They will be protected from abuse and staff will respect their human rights. Patients have the right to care in a clean environment where precautions are taken to protect them from infections. Medication will be delivered when the patient requires them and in a safe manner, and patients will not be harmed by unsafe equipment.

Lean and the 3rd Standard

Mistake Proofing processes to prevent error, introducing the concept of the Visual Workplace and having effective standard working practices that are regularly checked and, most importantly, followed are the key to delivering the 3rd standard.

CQC 4th Standard

The CQC's fourth standard is that patients will receive treatment by qualified staff. By ensuring that healthcare providers are properly trained, organisations are ensuring that they provide a high level of care, with best possible clinical outcomes, and that the patient experience will be as pleasant as possible.

Lean and the 4th Standard

Understanding the capacity and demand for services, along with calculating the optimum staff numbers required to manage services is the key to the 4th standard.

CQC 5th Standard

The CQC's fifth and final standard is that patients can expect their care provider to constantly check the quality level of its services. This entails the clinicians continuously monitoring the care they provide to ensure the patient's safety, and to take seriously any patient concerns or complaints. Also, that all personal records will be kept up to date and secure.[16]

By constantly monitoring clinical outcomes and the patient's status, organisations can avoid a variety of adverse events, which will allow for better clinical outcomes and result in happier patients.

"We have found that we can do 15–20% more work, offer a safer service, on the same budget, using the same infrastructure, staff, and technology—and with improved staff morale and we have only just begun. I really do believe that Lean can save healthcare."

Alan Mitchell, Flinders Medical Centre in Adelaide, South Australia.[17]

Lean and the 5th Standard

Standardised working practices, a culture of continuous improvement, clear and visual measures of success, mistake proofing and the introduction of consistency in end-to-end patient pathways are key to delivering the 5th standard.

Amnis Commentary

Lean should be at the heart of the drive to raise standards and improve the quality and safety of care given. It is not only a tool for improving productivity but for driving organisation-wide change.

4.0 Case Examples Supporting the Need for Change

Patient safety incidents involve real people and cause real harm. In this section we go beyond the statistics to introduce some high profile patient safety incidents involving real people. At the heart of the problems that arose was the absence of systematic and consistent working practices, an organisational culture and management style that accepts that working practices can be ignored or differences in working practices between professionals. These case studies clearly demonstrate that the absence of "Lean Thinking" and a Lean Culture led directly to harm.

Jamie Merrett

In this incident, an agency nurse, Violetta Aylward, was caring for Jamie Merrett, a 37-year-old tetraplegic patient. While providing care, Aylward accidently turned off Merrett's ventilator. Merrett attempted to get Aylward's attention by clicking his tongue as she turned off his device, but he was unsuccessful. Merrett was without oxygen for 21 minutes.

After realising what she had done, Aylward attempted to revive her patient using a resuscitation bag, but she applied it incorrectly. Previously, Merrett was able to talk, use a computer and a wheel chair; however, he was without oxygen for so long his mental age regressed to that of a young child.

Aylward's employer, Ambition 24hours, was aware that Merrett required care by a nurse who knew how to properly use a ventilator, but the company did not have adequate systems in place to ensure that their staff's training was up to the required standard.[18]

> **Where could Lean have helped?**
> Whilst the issues here could have been prevented through the redesign of the ventilator to make it harder for the mistake to arise (the Lean concept of Mistake Proofing), it was the absence of a rigorously applied standard working process as well as the absence of effective local leadership that led to this incident arising. These are issues that a rigorously applied Lean approach would have tackled.

Laura Nash

Many incidents with serious repercussions occur during the delivery of infants. Julie-Ann Nash suffered from gestational diabetes and as a result her baby, Laura, was larger than average. In order to deliver Laura the hospital staff used the "corkscrew" method, which was inappropriate for Laura's situation. This method broke Laura's collar-bone and dislocated her right arm, which as a result she is now unable to use.

The hospital apologised to the Nash family for the error, and states that the quality of training for their doctors has improved since the incident. After taking the trust to court, the Nash family won a £100,000 compensation settlement to be paid to Laura on her eighteenth birthday.[19]

Where could Lean have helped?
Again, it is the absence of a standardised work process that was capable of recognising and responding effectively to a known abnormal birth situation and the failure to communicate instructions between the various professionals who dealt with Laura's mother that effectively led directly to this serious event occurring.

Michael Bradford

Michael Bradford was a 38-year-old man who called for an ambulance after experiencing chest pain. When the ambulance staff arrived they told Bradford that he probably had a chest infection and to call his doctor the following day.

Within half an hour of the first ambulance staff leaving, Bradford felt ill again and called for a second ambulance. He suffered cardiac arrest and was unable to be revived. The two ambulance technicians who originally saw Mr Bradford had only brought the basic emergency equipment into his home. The heavy 12-lead electrocardiogram (ECG) that records the rhythm and electrical activity of the heart was left in the ambulance despite the fact that this violated ambulance service protocol.

The inquest headed by Ms Hamilton-Deeley stated that "had the correct diagnosis been recognised he would have been treated at once with a potentially different outcome".[20]

Where could Lean have helped?
A lack of consistently applied standard work, coupled with a culture that allowed protocols to be ignored without being challenged, contributed directly to the death of Michael Bradford.

A Catalogue of Errors

The BBC obtained documents that revealed a string of mistakes that were made at hospitals in the north-east of England. These mistakes ranged from Serious Untoward Incidents (SUI) to infringements on patient privacy and included issues such as swabs being left inside patients, an incident where a patient had the wrong finger operated on and the incorrect insertion of a naso-gastric tube that caused the death of a patient.[21]

Where could Lean have helped?

Inconsistent processes, poor communication, poor team-work and a lack of clarity about roles lie at the heart of all of these issues, and many of them could have been fixed through the rigorous application of Lean principles.

Amnis Commentary

Lean is more than just the application of tools and concepts. It is the adoption of a new way of thinking about your organisation, the way it works and how it is led. Lean concepts will directly affect safety and productivity only if the right leadership environment exists to support their implementation.

5.0 The Case for Lean

Data collected by the NPSA suggests that one in ten patients is unintentionally harmed by their healthcare providers. These errors occur because the procedures are often vague and there are no clear directions on how they should be carried out, and thus practitioners develop their own methods in order to carry out the task.

Pathways are particularly at risk at the interfaces between departments and organisations, these being the points at which information has to pass effectively between different groups efficiently and with the minimum loss of accuracy. The various methods and solutions developed by different individuals and groups in response to poorly defined and vague procedures can often be harmful and dangerous, and there is a clear need to apply some systematic approach to these problems to create consistent and well-understood processes to manage day-to-day activities and deal with exceptions and errors effectively when they do arise.

This is not easy because the current systems that departments have developed may have been built up over months and years, and the scattered and isolated way in which departments tend to work to improve processes means that problems can easily be transferred simply up or downstream of the area leading the changes. This then impacts the patient flow between departments within an organisation,[22] reduces productivity and significantly increases the risk of errors occurring.

The application of Lean within healthcare organisations introduces consistency in processes and creates a safer environment when done well. Lean helps you avoid "designing in" problems and forces organisations to take a critical look at end-to-end pathways and consider the whole patient journey. This allows for the identification and remedy of any errors or potentially dangerous issues.[23]

Lean can specifically help healthcare organisations in a variety of ways, an example of this being the standardisation of working practices. However, Dr Yogini Jani, the lead pharmacist for medication safety at University College London Hospital NHS Foundation Trust, warns that it is important to find the balance between a doctor making the right clinical decision because they are relying on previous knowledge, and a doctor making the right decision because they followed a set process.[24]

Lean has mostly found a use in healthcare in helping to deliver the productivity agenda.

However, safety and productivity go hand in hand, and a pure productivity improvement focus may actually introduce additional risks and sources of error. The tools and concepts of Lean naturally have a clear fit with the safety agenda in healthcare, from creating a visual workplace that helps to reduce both management time and the risk of errors occurring, to the redesign of pathways that eliminate wasteful activities and barriers between organisations that introduce risk. The successful application of Lean helps to free up staff time so they can focus on giving care, reduces the risk to both staff and patients and can even contribute to improved patient outcomes.

Amnis Commentary
The simplicity of a Lean approach is both one of its key assets and one of its weaknesses. It makes it easy to introduce and make quick wins but this simplicity can also make people underestimate what it is capable of helping you achieve.

6.0 Lean Case Examples – Delivering the Patient Safety Agenda

The following case studies have been drawn from a variety of publicly available sources and have been selected to show how a variety of organisations have successfully applied Lean concepts and tools to help them reduce risk, improve safety and, in many cases, deliver efficiencies at the same time.

Improving Information Flow

NHS Lothian wanted to improve the flow of information within their organisation. They realised that many patients had several sets of case notes on file and there was a problem with duplicate registrations on the patient administration system. These issues led to a shortage of relevant clinical information in outpatient clinics, which was causing patient safety concerns.

The NHS Lothian team utilised various Lean techniques to analyse and identify the issues with the system, including process analysis and problem solving tools.

The team agreed upon a core set of data necessary for each patient and then began eliminating any duplicates. They also created a protocol to monitor the administration system

to ensure that duplication was kept to a minimum. This project also tackled the information flow from hospital day staff to the night staff. After the implementation of the new protocol, registration errors have dropped significantly. Before the process began, correct registrations were at 74% and two years later have risen to a consistent 95%.[25]

Reducing Prescription Errors

The Hereford Hospitals NHS Trust team underwent a Lean implementation programme in order to reduce the amount of medication errors the organisation was experiencing. The focus was on developing a safer and more consistent prescribing system. Hereford's recent research upon the subject had revealed that there was a 15% error rate in all the medication orders screened by pharmacists at the hospital. The research found that approximately 19% of all these errors would have resulted in serious harm to the patient if they were not identified and corrected. The Hereford team then identified defects within their prescribing system such as a lack of standardised procedures, the incomplete collection of drug history, interruptions occurring during prescribing and a lack of education in prescribing for medical staff, which were causing prescription errors.

By working with the technical support team, Hereford built a more resilient system and created a new risk management tool that was more proactive. The system was then monitored continuously and educational programmes kept up the level of awareness among the practitioners. This helped enhance the safety culture within Hereford.

As a result of the Lean process, the number of prescription errors has dropped. The number of prescription orders that no longer require intervention to fix errors has risen from 79% in 2008 to 87% in 2010.[26]

Reducing Clinical Decision Making Times

The Service Improvement team at Hereford Hospital decided to utilise Lean principles to improve their pathology department. Pathology plays an important role in diagnosing patients; 70% of all clinical decisions in hospitals depend upon the information gleaned from tests performed by this department.

Hereford Hospitals' objectives were to improve the turnaround times for all specimens, to use staff more effectively and thus improve morale, to improve quality which would lower waste and costs, to space out the arrival of specimens in order to reduce the bottleneck effect that

occurs during the late afternoon and to more effectively use the available resources.

The Service Improvement team applied Lean using a structured approach that focused on solving problems that the patients and staff were experiencing. They focused on achieving their goals and used data to measure improvements and to actively engage staff.

Forty pathology staff members from various disciplines participated in a short training session on the Lean method and improvement principles. At this training session staff filled out waste identification forms, where they could highlight issues such as redundancy and other non-value-adding activities.

Nine days were dedicated to improving Hereford Hospitals' pathology unit. Staff walked through the entire process, identifying each step as they went and discussing the problems that arose at each part of the process.

The findings were that all test results were being delayed. This was caused by several contributing factors. These were the fact that the department was not laid out according to the sequential flow of the work. The demand for specimen testing varied throughout the day; however, there was a sharp spike in delivery during the late afternoon. Specimens often

waited at the reception desk for about 30 minutes before they were picked up by a staff member. Another factor was that upon arrival specimens were put into buckets, and it was very difficult to ascertain which had arrived first; this caused turnaround times to be unpredictable. It was also difficult for staff to enter all the patient information into the computer system; this resulted in specimens having to wait for extended periods of time before they could be tested. A large factor in the delaying of results was the unnecessary duplication of activities and time wasted looking for equipment and staff members.

Once these problems were identified and fixed, Hereford Hospitals' pathology department experienced significant improvement. For example, the time from when the specimens were received until the time that the results were made available dropped from 62 minutes to two hours down to 38 minutes. This translated into tangible savings valued at £365,000 at "ward level", with reduced bed usage and shorter Length of Stays.

The time needed for specimens to be picked up from pathology dropped from 13 to 50 minutes down to 1 to 4 minutes. This resulted in reduced overtime and staffing costs in pathology valued at £10,000. Once double handling of specimens was eliminated, a further

40 minutes daily were freed up resulting in further savings valued at £3,000. The centrifuge productivity underwent a 252% increase, which resulted in less waste and a savings of £5,000. All these improvements meant that clinical decisions could be made more swiftly and that ultimately the risk to patients was reduced.[27]

Shortening Scanning Times for Stroke Patients

The Central Manchester Foundation NHS Trust wanted to create a new care pathway for patients suffering from a stroke and/or a transient ischaemic attack. Using a Lean approach they implemented protocols that were in line with the National Institute for Health and Clinical Excellence (NICE) stroke guidelines. The programme delivered a variety of changes including a new phone referral system, patients consenting before arriving on the ward, transportation by a specialist stroke team and faster scans.

Further streamlining was undertaken in scanning and in arranging consultations with neurologists. These changes reduced the total scan time to 3 minutes, and an audit of the fast scan protocol showed that during February 2008–2009, 225 patients received scans within two hours, while 256 patients received scans within six hours, improving the speed with which clinicians could make decisions and

therefore ultimately improving outcomes for patients overall.[28]

Shortening Histology Reporting Times in Cancer Care

The Calderdale & Huddersfield NHS Trust was under pressure to deliver the new 31/62 cancer targets, which emphasised the long waiting times for histology results across every clinical pathway.

A team made up of hospital staff from various departments that use the histology department underwent a Lean Rapid Improvement Event and they identified a number of issues including the inconsistent manner in which samples were labelled and the fact that samples were delivered in large batches. By recognising that samples were labelled haphazardly, the hospital was able to implement a standardised method of labelling which would reduce any potential errors, and minimise any waste and rework.

During the Lean process, hospital staff used process analysis tools, such as spaghetti maps, to illustrate wasteful transport and motion that resulted from the poor layout of the lab.

The Lean programme reduced end-to-end turnaround times in the histology department by 43%. The histology department also experienced financial benefits as a result of the

Lean process valued at several thousand pounds by reducing duplicate stocks held and introducing a Lean "pull system" (kanban).[29]

And lastly, one from the other side of the world.....

Improving Care in A&E

The Flinders Medical Centre in Adelaide, South Australia, is a medium-sized teaching hospital. They were experiencing issues with their emergency department, which at times was so congested that it was unsafe. Patients also had to wait long periods before receiving care, and the hospital was experiencing a troublesome increase in the amount of serious untoward events.

In order to address these worrisome problems, Flinders Medical Centre underwent a Lean programme. Before the Lean process, patients who entered the A&E were put into one of five urgency categories at triage. Each category has a set window of time in which the patient needs to receive care: 1 minute, 10 minutes, half an hour, etc. However, patients who fell into the less urgent categories often had to wait for hours to be seen by a doctor, and were constantly being superseded in the queue by patients with more urgent conditions.

The Flinders Medical Centre team decided to divide all of the patients in the A&E into two

groups: those who only needed care from the emergency department, and those that would need to be admitted into the hospital. The patients who would be able to go home after receiving care from the A&E could be treated on a first come first served basis as long as there was no "threat to life or limb".

This change eliminated much of the complicated decision making as to which patient needed to be seen first. Patients were also happier because they could be informed as to where they stood in the queue. The Lean process went smoothly because the whole staff at Flinders Medical Centre was involved in the implementation process. Also, since the patients' best interests were being focused upon, staff members were willing to cooperate and work together.

The hospital noticed a positive change in their emergency department the day they enacted their new procedures. Two years later the Lean process has been applied to other departments within the hospital and they were coming in under the budget.

The hospital was able to invest the money they saved into new equipment. The speed of patient flow through the hospital has increased, and the staff's workload has decreased. As a result, the number of notifications (which occur

when the hospital gets involved in litigation concerning errors that cause death or disability) has dropped from 87 to 32.[30]

> **Amnis Commentary**
> Our experience shows that you can successfully deliver improvements in a single department, a single organisation or a whole health economy.

7.0 The Keys to Lean Success

Executing a successful Lean programme in a healthcare organisation is a major undertaking. Duncan Eaton, the Executive Advisor for the Associate Parliamentary Health Group (APHG), states that the whole staff of an organisation needs to be involved in order to create new pathways that will be effective across multiple disciplines and departments.

A Joint Safety & Productivity Improvement Strategy

Setting a joint strategy that focuses both on productivity and safety is something that can only be done from the top of an organisation. The key task of senior leaders is to get clinicians and the rest of the staff to recognise and acknowledge issues and to agree that change is necessary.[31]

An Organised Lean Structure

Thus the management of the organisation need to establish themselves as sponsors of their Lean programme. The management will also need to appoint Lean Leaders who will facilitate activities and train others, something traditionally attained through service improvement teams. There is also a need to establish a number of Lean Practitioners, people with a "day job" but who also have the ability to initiate small- and medium-scale Lean activities.[32]

Effective Problem Definition

Delivering improvements is something that can only effectively be delivered by engaging front-line clinicians and other staff, but this only works effectively if problems are properly "scoped" prior to the commencement of activity. The majority of Lean programmes "kickoff" with insufficient clarity about the objectives of the programme, the relevant risks and "fixed points" (things that cannot change) and commitment from staff to enable the project to ultimately be successful.[33]

Effective Implementation

Ideas abound in healthcare but it is only when those ideas are converted into improvements are benefits going to be realised. There are many ways of implementing Lean, such as Continuous Improvement Teams that meet once per month to discuss issues and who then undertake work between meetings through the Rapid Improvement Events, where teams of people are taken out of their day job and tasked with the implementation of changes within the organisation. There are certainly reasons why different approaches might be used, but the most important issue is to do something rather than allow Lean to simply become a process of discussion without action.

Post-Implementation Monitoring

After the Lean implementation process has ended, it is important to continue to closely monitor performance in order to gauge the success of the new processes and systems that have been introduced. This is important because it ensures that the implementation did not inadvertently introduce new risks or remove necessary steps. Evaluation of implementation, weekly at first and then monthly, is undertaken to ensure that the benefits that were required have been achieved and that, more importantly, the changes in processes have actually led to a change in behaviours.

Tackling the Safety "Elephant in the Room"

One of the problems to be aware of in the delivery of a Lean programme focused on improving both efficiency and safety is that, as the NPSA itself maintains, there is considerable under-reporting of patient safety events.[34] Thus, some projects focused on reducing patient safety incidents may in fact result in an increase in reported events to start with as the true reporting rate is brought to light by the management focus on the problem. This can be a major stumbling block for healthcare organisations using Lean to tackle patient safety, but it is vital to the success to encourage an atmosphere of openness that allows staff to feel comfortable reporting incidents that occur within your organisation. The Health Select Committee on Patient Safety maintains that the "blame culture" and the fear of litigation and persecution are major deterrents to reporting incidents and therefore are a major deterrent for people successfully applying Lean to tackle patient safety issues.[35] By creating a culture that accepts that systems are not as robust as they could be and that emphasises the role of each individual in improving safety, it will help to flush out the processes that need the most urgent reconfiguration.[36] It is also apparent from our experience and that of other organisations that inefficient processes and unsafe processes go hand in hand.

Embedding Improvements

Implementation and monitoring are only part of the Lean process. Short-term improvements that last weeks or months are quite common as old processes and systems are gradually reintroduced. The focus has to be on changing systems for good and preventing the previous unsafe and inefficient practices from being reintroduced. This can be achieved through a variety of actions including:

- Processes to deal with problems with the new systems as they arise
- Team meetings to reinforce the changes and to keep up morale

- Sharing success through case studies, encouraging papers to be written, etc
- On-going monitoring
- Visible sponsorship that extends beyond the end of a specific piece of work

Many programmes fail because the momentum is not kept up. By failing to follow through with continual support activities that entrench the new changes and behaviour, organisations will find it increasingly hard to improve as they generate a legacy of poorly implemented projects and badly supported programmes.[37]

The University College London Hospitals (UCLH) NHS Foundation Trust Hospitals have undergone Lean programmes, and one of the ways that they maintained the momentum was to create a Medication Safety Committee in October 2009. It is a multidisciplinary team that consists of all of the professions that have to do with the prescription of medication. They look at ways in which to reduce mediation errors using various sources such as a voluntary reporting system, regular audits of the departments, looking at examples of best practice utilised in other hospitals and using information provided by the NHS network. Before the Medication Safety Committee was created various departments, especially high-risk departments such as cancer, neo-natal and paediatrics, had ad hoc safety committees.

However, they were all brought together in 2009. The unified Medication Safety Committee has raised awareness throughout the whole hospital, identified and tackled developing trends in medication errors and helped to define solutions to problems. On-going involvement is encouraged through written communications and the encouragement of a blame-free culture that has helped to persuade clinicians to report errors. By providing on-going senior support and focus on improving medication errors, UCLH is working to entrench Lean principles.[38]

8.0 Closing Comments

We have attempted to show through this guide that the rigorous application of Lean within healthcare organisations can positively impact patient safety and help to deliver improved productivity. Our aim is to encourage organisations to use Lean to tackle both safety and efficiency and to develop joint improvement strategies to achieve these goals. The systematic approach to improving organisations that Lean brings is ideally suited to tackling both types of issues using an approach that encourages staff to work together and carefully analyse end-to-end pathways. Lean concepts such as Value Stream Mapping, Standard Work and Mistake Proofing allow for the identification of points where patient safety incidents may occur and provide a structure for implementing changes and a structure for turning changes in processes into changes in behaviours.

9.0 About Amnis

Amnis works with a variety of organisations in the healthcare sector helping them to develop internal capability and deliver successful Lean programmes.

Amnis's healthcare experience spans both commissioning and service provision in primary and secondary care.

Relevant to this guide, our experience covers the application of Lean to tackle medication errors, falls, theatre safety (including wrong site surgery), infection control and prevention, clinical decision making and delayed transfers of care.

To find our more about us and our work in healthcare visit our website at www.amnis.uk.com or call us on +44(0) 870 446 1002.

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Definitions

1) **Clinical Adverse Events:** "An adverse event is an untoward medical occurrence in a patient during clinical research involving a pharmaceutical product, clinical intervention or medical device."

2) **Drug Incident:** "An error of administration, loss or unintentional wastage of a drug, or any incident where medical apparatus is involved in the inappropriate administration of a drug."

3) **Incident:** "Includes adverse incidents/events, accidents, near misses complaints and claims."[39]

4) **Never Events:** "Serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented."[40]

5) **Near Miss:** "Any incident that had the potential to cause harm but was prevented, resulting in no harm."[41]

6) **Patient Safety:** "The prevention of harm to patients." As defined by the Institute of Medicine (IOM)[42]

7) **Patient Safety Incidents:** "Any unintended or unexpected incident that could have or did lead to harm for one or more patients receiving NHS-funded healthcare...This is often described in the NHS as a clinical incident."

8) **Serious Untoward Incidents:** "Any incident or near miss on an NHS site, or elsewhere, whilst in NHS-funded or NHS regulated care where a member of staff/patient/member of the public suffers serious injury, major permanent harm or unexpected death or risk of serious injury, major permanent harm or unexpected death or risk of serious injury, either where healthcare services are provided or whilst in receipt of healthcare services, or where actions of health service staff are likely to cause significant public concern."[43]

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