

MINIMISING VARIATION, MAXIMISING THEATRE EFFICIENCY

THEATRE EFFICIENCY PROGRAMME, CASE STUDY: WRIGHTINGTON WIGAN & LEIGH NHS TRUST, UK

JOHNSON & JOHNSON MEDICAL LIMITED UK TEAM

Executive Summary

- In reports published in 2015, both *Monitor* and GIRFT highlight extensive variation in theatre throughput between NHS providers for routine surgical procedures. In an environment where high quality service delivery with constrained budgets is required, there is increasing necessity for reduced variation and improved efficiency.
- In response to this demand, Johnson & Johnson Medical Limited has developed a structured programme of systematic solutions that work in partnership with NHS Hospitals to reduce variation and improve theatre efficiency.
- Implementation of JJML *Theatre Efficiency* programme at the Wrightington, Wigan and Leigh NHS Trust has improved efficiency by reducing variation in start and finish time and increasing surgical utilisation by 9%.

Introduction

The NHS today faces a paradox of increased need for high quality service provision, delivered with constrained budgets. With capacity, efficiency, productivity and throughput all areas of focus for hospitals, a number of key reports were undertaken and presented in 2015 to identify suggested areas for improvement. Amongst these, *Monitor*, a health services regulator in England, and *Getting It Right First Time* (GIRFT) both report on the wide scale variation between hospital providers included in their studies.

Monitor highlights significant variation between NHS providers “at every stage of each care pathway”.ⁱ However, this variation is viewed with optimism, as an indication of the scale of achievable productivity gains if the variation is reduced. The report concludes that the adoption of good practices that include “increasing throughput in theatres by explicitly measuring, communicating and managing the number of procedures per theatre session” has the potential to offer significant efficiency savings to the NHS.

The GIRFT report also highlights considerable variation in theatre throughput for routine surgical procedures across the country. The reasons for these variations are multifactorial, but with 50% of Trusts visited by the GIRFT Team currently failing to meet a target of 18 weeks from referral to completion of careⁱⁱ, and orthopaedic referrals to secondary care increasing by up to 8% per annum, the capacity gap is widening. The GIRFT initiative calls for an “urgent resolution to maintain maximum theatre productivity and throughput”.ⁱⁱ Furthermore, as the running costs for an

average operating theatre are approximately £1,200 per hourⁱⁱⁱ, the importance of running an efficient theatre is paramount.

In response, Johnson & Johnson Medical Limited has developed a programme of supporting solutions to reduce variation in UK hospitals. These hospitals are embarking on enhanced recovery and theatre efficiency programmes to deliver high quality services to patients, whilst at the same time increasing efficiency and cost-effectiveness.

This paper explores one particular theatre efficiency programme supported by Johnson & Johnson Medical Limited at the Wrightington, Wigan and Leigh (WWL) NHS Trust. It explains how it was set up, who was involved, and what has been achieved to date.

The challenge of variation in theatre efficiency

Theatre Efficiency is a multifactorial problem, but can be categorised into the following causal metrics (excluding surgical time and technique), namely, start and finish time variation from plan, delay between cases, and patient changeover. With these multiple drivers in mind, it is clear that there are areas for efficiency improvements that will exist within most operating environments.

To effectively understand, manage and communicate these opportunities, it is necessary to employ a utilisation measure that illustrates the previously mentioned causal metrics. Theatre utilisation (TU) is the preferred metric for theatre efficiency in many hospitals

(the percentage of the planned session during which a patient is present in the operating room and/or anaesthetic room). By definition, the TU measurement can include patients waiting in the anaesthetic room, and, therefore, may not provide a true representation of where opportunities for improvement exist.

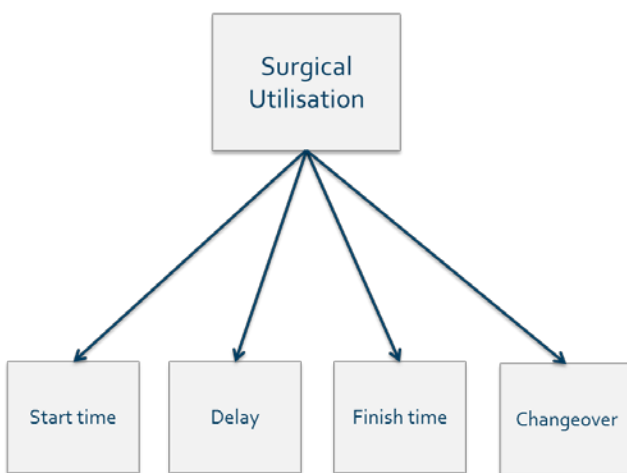
In response, Johnson & Johnson Medical Limited suggest the use of Surgical Utilisation (SU) as a metric (the percentage of the planned session during which the surgeon is operating). We believe SU has greater sensitivity than TU, which highlights opportunities that can be influenced by process standardisation (internal variation) and problem solving (external variation).

Johnson & Johnson Medical Limited Theatre Efficiency Programme, Wrightington case study

This programme was undertaken at the Wrightington site part of the WWL NHS Foundation Trust, famous for its strong heritage in orthopaedic surgery, and home of Professor Sir John Charnley, one of the founding fathers of total hip replacement surgery.^{iv}

An alignment process was conducted with key stakeholders within the WWL Trust in order to define measures of success: maximising SU through reduction in variation of causal factors; theatre start and finish times, delays, and changeover time (Figure 1).

Figure 1: Surgical Utilisation Metrics and link to Causal Metrics



Method

Assessment: Diagnostic Healthcheck

A Johnson & Johnson Medical Limited *Diagnostic Healthcheck* of current theatre processes was performed, and used to focus the Johnson & Johnson team's initial recommendations for improvement.

The *Diagnostic Healthcheck* comprises real time observations over nine days that were captured using a data tracker application (DATA™), a DePuy Synthes iPad enabled tool for the collection of real time operating theatre data to support measurement, analysis and improvement of theatre efficiency. These data were ratified using Trust theatre management system data over a period of 330 days. Process observations were analysed against the Johnson & Johnson Medical Limited Lean maturity assessment tool.

Following the *Diagnostic Healthcheck*, a tailored theatre efficiency programme consisting of three distinct, but integrated change management modules (*Visual Theatre*, *Rapid Changeover* and *Scheduling*) were developed by Johnson & Johnson Medical Limited Process Excellence Manager and delivered in partnership with the Hospital via a series of interactive workshops.

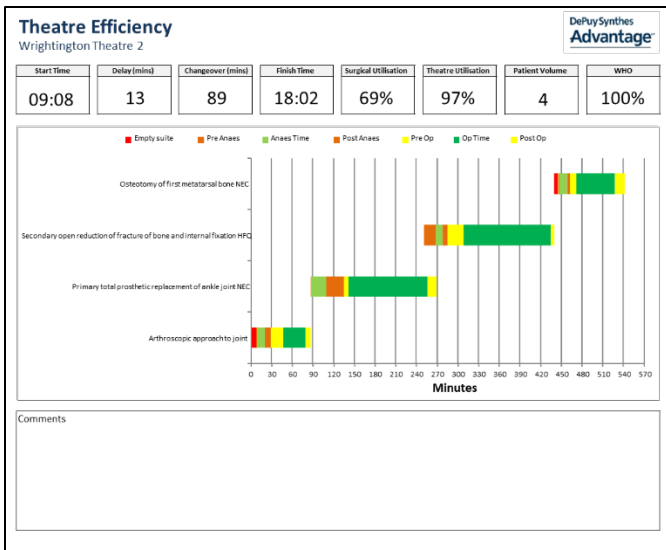
Each module is based upon lean management philosophy, adapted to function in an operating theatre environment. The modules are designed to empower staff, through the transfer of knowledge, to problem solve and address system level issues to support theatre efficiency.

Visual Theatre Module

The *Visual Theatre Module* provides a systematic approach to measuring, communicating and managing the theatre list. The module works to ensure that all members of the theatre team are accountable for planning and managing the theatre list, continuously reviewing their performance against plan, and problem solving to ensure the efficient running of the theatre.

The *Visual Theatre Module* provided management with data insight, aligned to the *Diagnostic Healthcheck* baseline measures. This graphical representation (Figure 2) helped identify opportunities to support the reduction of variation in start and finish times, and to reduce delay.

Figure 2: Example of daily graphical data output



focuses on developing a process by which procedural times can be reviewed, building on the principles outlined in the 2015 *Monitor* report which states that increased throughput in theatres can be achieved “by measuring, communicating, and managing the number of procedures per hour per surgeon and theatre team” and by ensuring surgeons review data and plan accordingly.ⁱ

The outcomes derived from the *Scheduling Module* were particularly well received by the surgeons involved, and highlighted the benefits throughout the team and through to patients themselves.

Results

Baseline Surgical Utilisation

The Diagnostic Healthcheck showed the SU to be 46%^v but, through process modelling, it is believed that an SU of 80% is possible and should be used as a ‘stretch’ goal. The following assumptions are used in the model: start on time, finish on time, no delays, and 10 minute changeovers.

Start & Finish time, variation from plan

Analysis of a 16 month data extract from one theatre which began to implement the change management process from January 2015, reveals improvements in several of the measured processes.

Start time has improved against plan from average 3.2 minutes late with a standard deviation of 28 to average 1.7 minutes early with a standard deviation of 14, meaning the theatre is starting closer to plan (Figure 3). Finish time has improved against plan from average 38.8 minutes late with a standard deviation of 84 to average 15.5 minutes late with a standard deviation of 38 minutes meaning that downtime is reduced and suggesting patient scheduling is becoming more effective (Figure 4). One possible benefit from starting and finishing on time is fewer cancellations of surgical procedures scheduled for later in the day. Less tangible benefits may include enhanced staff morale, due to closer adherence to working hours, and an overall improved experience for patients.

Figure 3: Start time variation from plan

The module resulted in implementation of a *Day By The Hour* (DBTH) plan for all team members, to provide a simple visualisation of data, used alongside methodical problem solving to reduce variation. This proved particularly popular with team members, who felt that the introduction of the ‘DBTH Board’ increased focus and improved communication:

Rapid Changeover Module

The *Rapid Changeover Module* helps to engage the whole theatre team in systematically understanding, standardising, and improving the processes associated with changeover between patients.

The *Rapid Changeover* workshop established that the WWL theatre team had more than 200 activities to complete during changeover to ensure the operating room and the patients are ready for the next procedure to start. An analysis provided by the module showed that 80% of the activities were generic from one procedure to the next, and that this presented huge opportunities for standardisation.

The module standardised job roles for the changeover process by implementing simplified solutions and providing a multi-level roadmap for improvement.

Scheduling Module

The *Scheduling Module* provides a systematic approach to ensuring optimal time allocation to perform every technique). The module helps ensure that a theatre list is planned around data, while remaining realistic in order to allow the theatre team adequate time to complete the operation safely. Additionally, this module

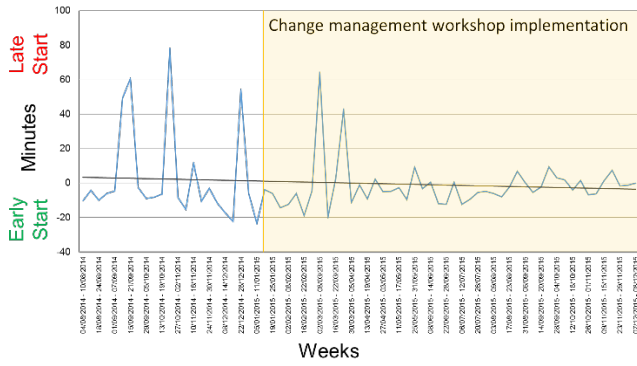
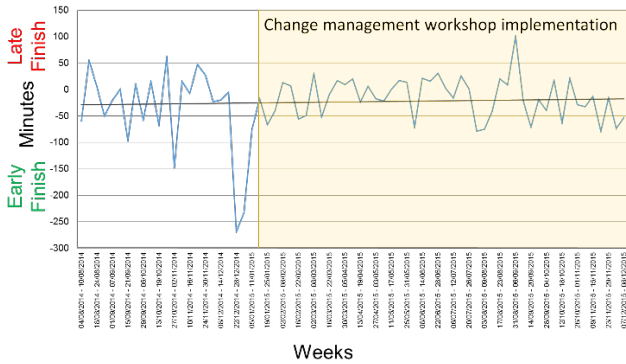


Figure 4: Finish time variation from plan



Reducing changeover

How quickly a theatre is able to changeover from one patient to the next is subject to huge variation and, therefore, is key to reducing overall variation in order to improve efficiency.

Analysis of changeover time across similar primary or revision hip and knee procedures revealed a reduction in average changeover (CO) for primary hip and knee procedures from 46.1 to 45.6 minutes following implementation of the change management workshops (Figure 5). Although fewer revision procedures were carried out, a more dramatic improvement in CO from 72.8 to 42.0 minutes was observed for revision hip and knee procedures (Figure 6).

Figure 5: Average changeover time for primary hip and knee procedures

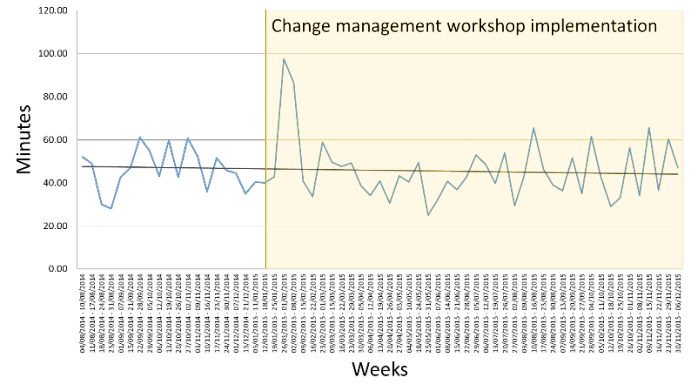
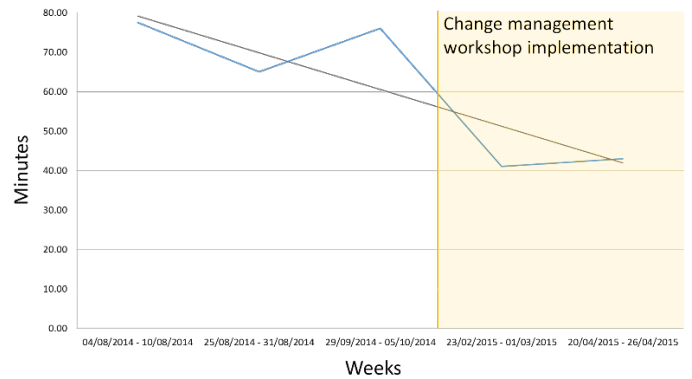


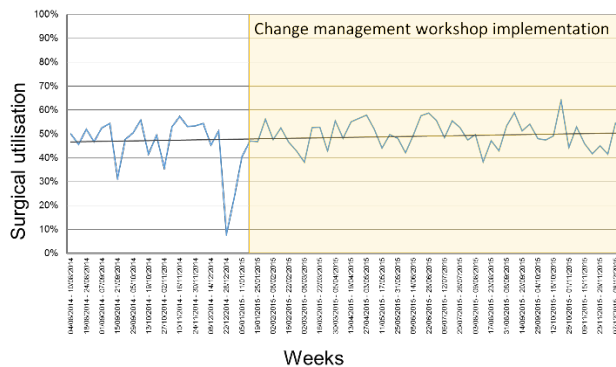
Figure 6: Average changeover time for revision hip and knee procedures



Maximising Theatre Efficiency through SU

Following implementation of the three change management modules, and the associated impact on causal metrics, so far, the results are encouraging. Average SU has increased from 46% to 50% (Figure 7). This 4% rise equates to a 9% increase in utilisation, which translates to an additional 19.6 minutes of time that a surgeon is operating (assuming an 8 hour day). As the finish time has improved by 23.3 minutes, this suggests that these 19.6 minutes are occurring within the surgeon’s working day. Given the £1,200/hour average cost of running an operating theatreⁱⁱⁱ, every minute used more efficiently not only increases theatre capacity but is worth £20, suggesting that improved SU brings both cost and efficiency benefits.

Figure 7: Surgical Utilisation



Conclusion

Whilst changes have been made following the implementation of the *Theatre Efficiency* programme, in order to achieve the ‘stretch’ target of 80% SU and truly embed the principles of best practice efficiency behaviours within the Hospital, there is still much work to be done.

All those involved recognise that the changes made to date are a great start; the team are committed to developing and building on the learning to date, and that this is key to ensuring that efficiency and best practice remain a priority for all.

Embedding best practice efficiency behaviours within the hospital will continue as a result of Johnson & Johnson Medical Limited commitment to the ongoing relationship with WWL.

Discussion

With the significant hourly costs of running a theatre, the benefits of minimising variation and driving theatre efficiency are clear.

Looking to the future, in order to optimise the measurement and communication of efficiency outcomes, we must consider a number of key questions:

- How might improved efficiency translate into clear and tangible financial benefits?
- How do we best ensure there is long-term engagement, that buy-in to new processes is sustained, and that the necessary behaviour changes are maintained?

- Does improved efficiency have other peripheral benefits such as improving staff morale and thereby boosting staff productivity?

Reducing variation and improving theatre efficiency does, however, only tell part of the story. To really improve efficiency and productivity within the NHS, we need to consider theatre efficiency as part of a wider process and, in line with *Monitor 2015* recommendations, reduce the variation in the adoption of best practice in multiple areas including implementation of *Enhanced Recovery Principles*, “If every NHS provider followed the good operational practices adopted by the highest performers at each stage of their elective care pathways, they could save 13-20% of today’s spending on planned care in these two specialities”ⁱ.

Johnson & Johnson Medical Limited realises the importance of efficiency and productivity to our customers, and is committed to helping drive this forward through a systematic, engaging, and proven programme of activity.

Johnson & Johnson Medical Limited would like to extend particular thanks to the team at the Wrightington site for their commitment and contribution towards the implementation of this pilot.

ⁱ *Monitor*. Helping NHS providers improve productivity in elective care, October 2015

ⁱⁱ Briggs T. A national review of adult elective orthopaedic services in England: *Getting It Right First Time*. British Orthopaedic Association, March 2015

ⁱⁱⁱ Briggs T. Improving the quality of orthopaedic care within the National Health Service in England: *Getting It Right First Time*. 2012

^{iv} Wrightington, Wigan and Leigh NHS Foundation Trust https://www.wwl.nhs.uk/hospitals/wrightington/john_chnarley.aspx

^v Double Helix data, held on file at Johnson & Johnson Medical Limited