

Nick Tandy,
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Abstract:
Creating a lean and productive processing department.

BACKGROUND

A key factor in the NHSBT modernisation strategy for Manufacturing has been to develop the Filton site and increase its productivity and efficiency by consolidation of 7 processing sites to one.

Filton now processes 830,000 whole blood donations which is approximately 45% of the total national blood collection and supply.

In Manufacturing this has been sized to process typically between 2900-3300 donations per day over a normal routine period (5 days per week). Some further flexibility has been allowed for up to 3600 donations and on a 'rare event' basis, to handle exceptional collection days above this level.

The key enabler to achieve gains in productivity and reduction in cost has been the progressive implementation of Lean Approaches across the whole NHSBT organisation as part of a formal training and individual performance improvement plan, at all levels. The most significant improvement has been in its Manufacturing (Processing) efficiency, where 50% improvement over 12 months have been achieved, by better sizing its operating capacity and staff resources.

A further key change in the working culture has been the development of Value Stream Thinking or Analysis, to identify Customer Demand and clarify process activities that 'add value' and 'non-value'. The focus has been to remove 'non-value' steps and re-align activity to improve flow, using a Team of operators and a facilitator to run Rapid Improvement Events (RIE's). The outputs of these have been to define Standard Work profiles for each of its key processes, i.e. Top/Bottom and Top Buffy coat removal, Platelet pooling, Cryoprecipitate preparation,

FFP Preparation. For each process a specifically designed 'U configured Pod or Cell' has been arranged with the following benefits:-

- Reduction in equipment (centrifuges, presses)
- Reduced footprint (up to 25%)
- Improved Productivity typically by 25%-40%
- Set up Lean Cell Activity – Continuous Improvement
 - defined Standard Work and max. number of operatives per Pod
 - Visual management of hourly/daily output
 - Improved Flow (Can see all parts of the process)
 - Create Pull (load work slightly to front end)
 - Use 6S approach (set, scrub,sort, safety, standardise, sustain)

Figure 1

DEVELOPING A BALANCED MANUFACTURING SCHEDULE

The Filton Manufacturing area has 6 routine, primary Pods (TAT) which are set up on a daily basis to deliver the required component mix plus 2 further Pods (BAT) for platelet (buffy coat) production. (Note: - Only 20% of platelet production is sourced this way, with 80% achieved from apheresis.)

Primary Pods are set to produce either:-

- 'Top and Top' (waste buffy coat and plasma); 2 operators (50/hr)
- 'Top and Top' (waste buffy coat plus useable FFP/CRYO); 3 operators (43/hr)

The production of FFP/CRYO takes twice the operator time, compared to the 'waste' (IP) plasma TAT model (approx. FTE ratio FFP2: 1IP). The picture below shows the typical daily intake set-up for primary Pods of 2900-3300 donations.

Figure 2

When predicted activity exceeds 3300 intake, then FFP/CRYO processing is reduced in favour of the more productive IP Pod configuration. Correspondingly on intake days where intake falls below 2900, then processing is switched into the 'more labour intensive' FFP/CRYO processing Pod configuration (see below).

DONATION INTAKE:

<2900 / day – Make 600FFP
2900 – 3300 / day – Make 500 FFP
3301 – 3600 / day – Make 330 FFP
>3600 – Make 'Zero FFP'

This approach has proven to work well and maintains the most robust approach to managing and scheduling, Manufacturing daily activity.

The other main factors that are needed to support and delivery of a balanced Manufacturing Schedule on a regular 'daily/weekly/monthly basis are:-

- **Predicting donation forecast of the next 4-6 wks** identifying 'high' and 'low' intake events to schedule production and staffing schedules.
- **Daily monitoring of 'Actual' donation intake (see below)** and comparing this to 'Predicted', shows a 5% reduction on 'Predicted'.
- **Discussion/feedback with National Blood Stocks Management Team** to confirm quantities & blood group type for FFP and Cryoppt to confirm production supply to target requirements.
- **Communication** – Ensure that all key Manufacturing managers have sight of Manufacturing schedule to arrange correct activity on each shift.
- **Plan contingency arrangements around 'very**

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high periods/days of intake' – These are currently associated with bank holidays.

Figure 3

Over the last two years the Filton Centre has embedded the Lean Manufacture culture routinely using the tools and techniques to ensure continuous improvement. Staff at all levels are involved in the process and training programmes are in place to ensure that staff have the required skills to embrace the process.

In November 2012 a Value Stream Analysis was held at the Filton site involving all key site managers, an external facilitator and external participants from the Finnish Red Cross and the Royal National Lifeboat Institute.

The team performed a detailed analysis of the current state identifying areas where improvements were required. From this a challenging target state was agreed against the four key dimensions, Human, Quality, Cost or Productivity, and Delivery or Timeliness.

A high level future state map was produced and a gap analysis performed. From this a programme of activity was produced. The key themes set for 2013 were:-

- Measurement of standard work across departments with use of data to inform resource requirements.
- A structured programme of 6's improvements across departments.
- A targeted introduction of visual management to support processes and better monitor issues and adherence to throughput each hour.

- Reduction in product waiting time through better alignment of resources to match demand.
- Further targeted RIE's to consolidate process improvements and remove further waste from the process.
- Work towards greater staff flexibility between departments to better match resources and demand.
- Support project sustainment through audit of 6's and standard work adherence
- Further OIP training for Filton staff (Bronze, Silver, Gold, Platinum)
- Green (basic) training integrated into new staff Induction
- Target 100% staff green trained by 2013 year end
- Greater Staff involvement - 'create a bottom up approach'
- Continuous Improvement - Business as Usual
- National Standardisation

CHRONOLOGY OF IMPROVEMENTS IN MANUFACTURING

Figure 4

THE CHALLENGES AND BENEFITS OF SUSTAINING A LEAN CULTURE

The main challenge for any organisation is how to invest in its key staff resource, during a period when fewer staff will be required. The Lean approach shows not only how through continuous improvement and waste reduction this can be achieved, but engage all staff in the decision making process.

The key is to develop Leadership skills in those staff who will have to take forward a clear Value Supply Chain strategy which has the interest of

the Customer as its 'goal'

Figure 5

There needs to be a coordinated approach to organisational change in the Transition to lean culture, which has its focus on training and development of its staff. Support and facilitator resources are now available across industry and within blood services, which could be more widely utilised by EBA members.

ORGANISATIONAL PERFORMANCE IMPROVEMENT TIMESCALE

Figure 6

SUMMARY OF KEY POINTS

- Coordinating the overall Supply Chain is key to realising improvements within the Manufacturing area, particularly with Logistics and Donation Collection.
- Value stream mapping has proved essential in defining what 'adds' and 'does not add' value from a Customer perspective. By identifying a plan of Rapid Improvement Events, removal of waste and improved efficiencies can be achieved.
- Educating and sustaining Lean Approaches in Manufacturing at Filton has been an effective way of delivering continuous improvements, while reducing costs and significantly improving productivity.
- Consolidation of activity to fewer sites, although helps improve efficiencies of scale, still requires a change in culture. This necessitates the investment in a formal, facilitated, training programme to generate the leadership and facilitation skills required to sustain future (long term) development of its staff.

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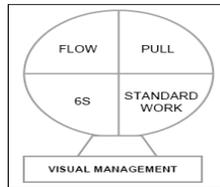
- Pod or Cellular design has been shown to give operators an effective mechanism to target and measure hourly activity, based on Standard Work measurements.
- Rapid Improvement events are a useful mechanism for engaging staff in the ownership of improved processes.
- Further collaboration through benchmarking activity is a key aspect of sharing and skills transfer of Lean Approaches.
- Top level investment is essential in formalising a Transformational Plan of Care (TPOC) which needs ongoing sustainment.

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Lean Cell Bringing People and Process Together



- On Demand
- Lowest Cost
- 1 by 1 Flow
- Visually managed

Figure 1

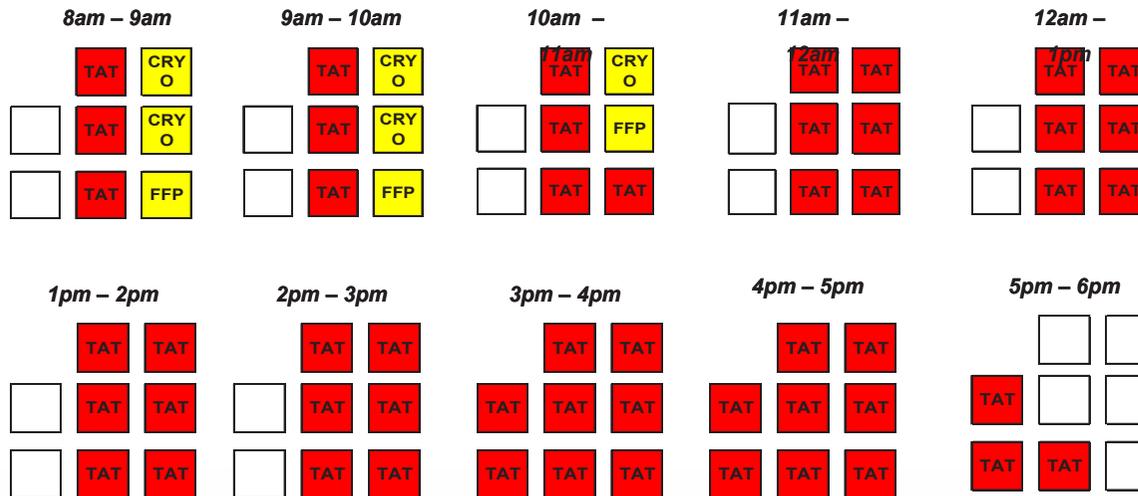


Figure 2

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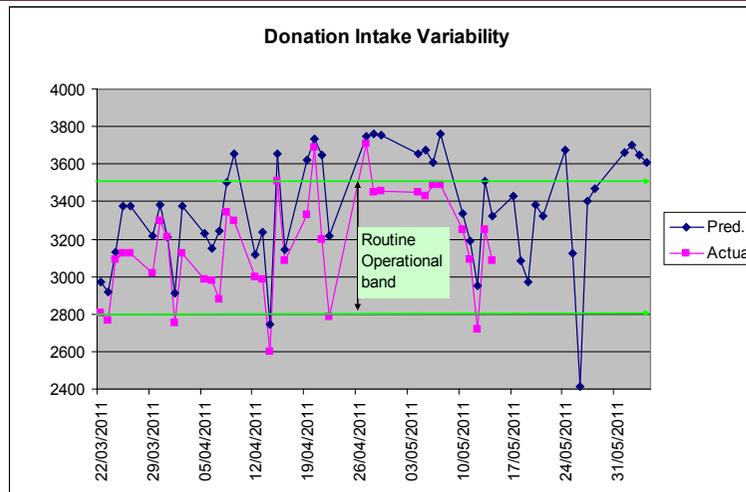


Figure 3

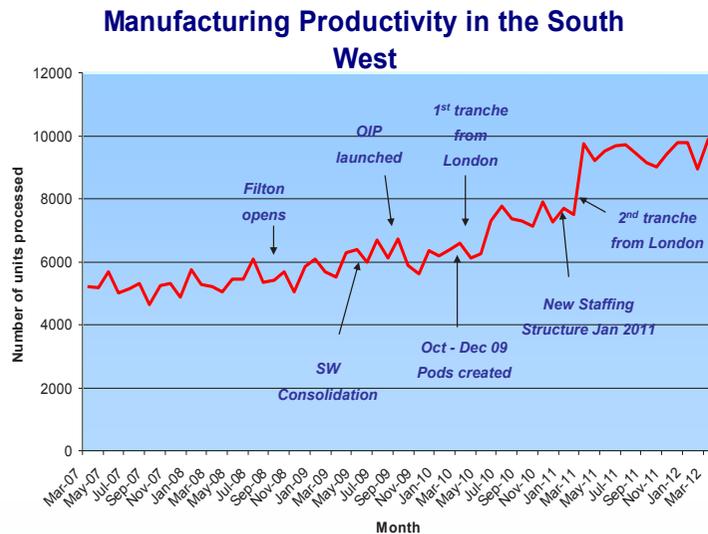


Figure 4

Lean cannot succeed without 'Leaders'

- **Define Purpose**
 - Set out clear vision & strategy
 - Define value at highest level
- **Drive process improvement**
 - Clear future state map
 - Champion flow, pull, waste elimination, zero defects
 - Support RIE's
- **Align the people & organisation**
 - Organise by value stream
 - Trained and educated

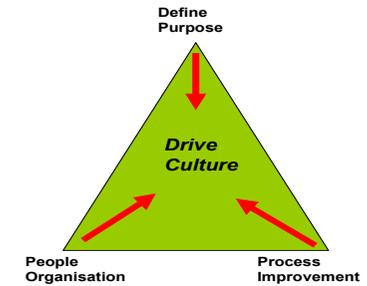


Figure 5

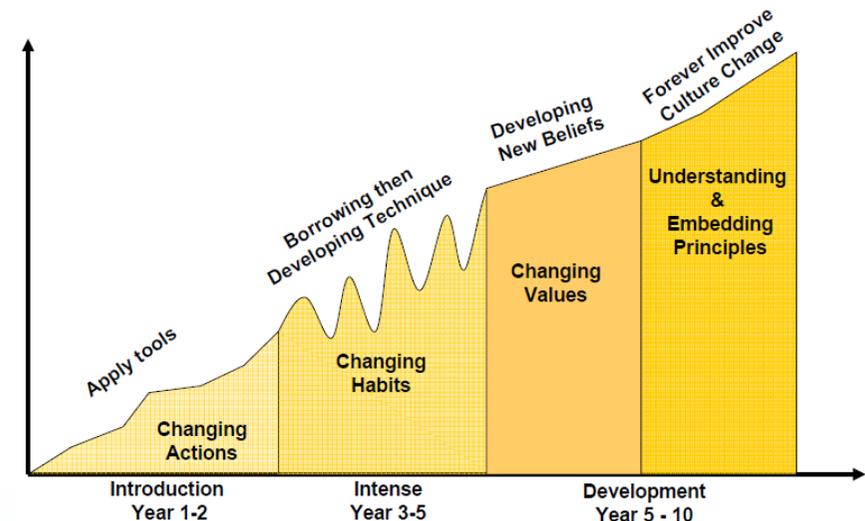


Figure 6