Using A3 methodology to improve immunosuppressant sample turnaround times

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A3 thinking is a problem-solving approach that is built around the PDSA (Plan Do Study Act) cycle. The idea is that an A3 sheet of paper is used to record a clear summary of the problem. The A3 template starts with identifying the problem, recording the current state and determining the goal of the improvement process. This encourages a structured way of thinking to provide a long-term sustainable solution.

Putting the 'C' in continuous quality improvement: An A3 four years on

Biochemical sciences is one of the Viapath laboratories at Guys & St Thomas' Hospital. Guys & St Thomas' is a regional centre for kidney transplantation and a supra-regional centre for kidney and pancreas transplantation and for blood group and HLA incompatible transplantation. It has the largest and most active living kidney donation programme in the UK. The laboratory provides the immunosuppressant drug monitoring service to the Renal Transplant team at Guys Hospital, 365 days a year, seven days a week. Monitoring immunosuppressant drug levels in a timely manner is vital to minimise rejection of scarce organs and reduce patient harm caused by toxicity.

Responsibility for the immunosuppressant drug monitoring service was transferred to the laboratory in 2012 and initial discussions with the renal team alerted us to the need to improve the service. Delays in receiving results was identified as the most significant issue and so this was where we focused our initial efforts.

The problem statement was defined as "Immunosuppressant sample turnaround times do not match the need of the renal transplant team to have results available on the same day". A project team was established with a representative from each stage of the sample pathway: renal sister, phlebotomist, biomedical scientist, clinical scientist, medical laboratory assistant and a patient. The team undertook a pathway walk, which started in Renal OutPatients at Guys Hospital and ended with the renal sister telephoning the patient and advising on a change in immunosuppressant therapy.

Data was collected to enable the current state to be clearly defined and significant amounts of waste were identified: transport, waiting and over-processing. A 'fishbone' diagram was used to help determine the root cause(s) and identify suitable counter measures. The agreed goal was that 90% of immunosuppressant drug samples that were received in the laboratory by 2pm were reported by 5.30pm the same day. The current state data supported this as an achievable yet challenging target; a retrospective review of performance showed that the laboratory only met this goal for 65% of samples.

The team began to implement the changes in 2013. Progress was initially slow and it is a testament to the determination of the team that they continued their efforts to improve the service. Re-audits in October 2013 and February 2014 demonstrated incremental improvements but the goal of 90% remained elusive until January 2015. Since then, the goal has been consistently met and often exceeded, highlighting the long-term success of the A3 approach.

This A3 illustrates the importance of the 'C' in CQI (continuous quality improvement). Success is not always achieved overnight and perseverance and continued review of the PDSA cycle are important. There are different ways in which success can be measured and performance statistics often only provide a snapshot of the status quo.

Another equally successful aspect of this A3 has been the improved relationship between laboratory and renal team. They communicate in real time and have a better understanding of each other's roles and commitment to improving the service. A user survey conducted by the lab in June 2014 indicated that the renal team were generally satisfied with most aspects of the service and acknowledged that the service had greatly improved. This was seven months before the goal was met.

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[A3 OVER LEAF]

Putting the 'C' in Continuous Quality Improvement: 4 years post A3

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Define the problem / Opportunity

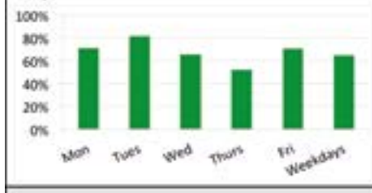
Monitoring immunosuppressant drug levels in a timely manner is vital to mimimise rejection of scarce organs and reduce patient harm caused by toxicity. The laboratory has a significant impact on this patient pathway and we believe there is room for improvement.

Problem statement: Immunosuppressant sample turnaround times do not match the need of the renal transplant team to have results available on the same day.

Current State

Renal clinic	Transit	CSR	Immunosuppressant lab	EPR	Renal clinic

Only 65 % of samples received by 2pm are reported by 5:30 pm on the same day

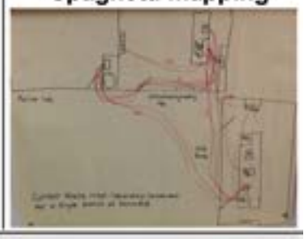


Efficiency

Value added = 15 minutes
ENVA and waste best case = 387 minutes
Total best case = 402 minutes
Efficiency best case = 4%

ENVA and waste worst case = 497 minutes
Total worst case = 512 minutes
Efficiency worst case = 3%

Spaghetti mapping



Goal

To improve the patient care pathway by enabling the renal transplant team to contact the patient and advise on any dose change prior to them taking their next immunosuppressant dose. To facilitate this we aim to report immunosuppressant drug results that arrive in the laboratory before 2pm, by 5:30pm the same day. Our goal is to achieve this for > 90% samples.

Waste Identified

1) Patient **waiting** in clinic to see Renal sister and Phlebotomist
2) Samples **waiting** to be collected by the 10 am or 12 pm courier
3) Samples from Renal Clinic at Guys' Hospital **transported** to laboratory at St Thomas' Hospital
4) Samples **waiting** to be booked in by Central Specimen Reception
5) Samples **waiting** to be collected by Biomedical Scientist analysing immunosuppressant drugs
6) Manual transcription of results
7) Results **waiting** to be second checked of prior to authorisation
8) Results **waiting** on EPR for Renal Sister to review

Root Cause Analysis

Problem	5 Whys
Samples waiting in fifth floor central specimen reception (CSR)	1.CSR very busy especially in afternoon with lots of different sorts of urgent samples; 2. Other urgent samples prioritised over immunosuppressants; 3.No telephone call to immunosuppressant staff to collect samples from CSR; 4. Immunosuppressant staff miss telephone call to collect samples; 5.Telephone left in prep lab and staff in mass spec room setting up mass spec
Sample preparation is time-consuming with multiple mixing and pipetting steps	1.Blood, zinc sulphate, water and internal standard are added in separate pipetting steps; 2.A 200 ul pipette is used to add a volume of 400 ul doubling the number of steps; 3.The mixer and centrifuge are in a different lab adding time to walk to them; 4.The centrifuge and mixer are shared with the staff from other labs

Future State

Renal clinic	Transit	Immunosuppressant lab	EPR	Renal clinic

1) Samples delivered directly to immunosuppressant lab by courier with bar coded tracking, removing delays in CSR
2) New and simplified analytical method. Incorporating addition of all reagents in one step reduces analysis time by 20 minutes per batch. Running single calibration curve daily saves 35 minutes analysis time. Over one year, these changes will save approximately 360 BMS hours, equivalent to 0.2wte BMS.
3) Lab liaison role identified to improve communication between the lab and Renal Clinic and ensure any service changes are discussed e.g. workload, clinic times etc.

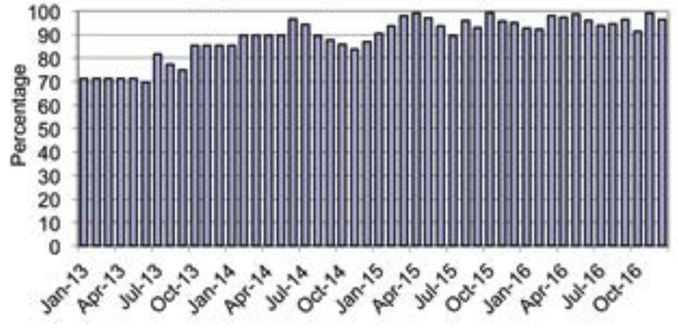
Action Plan

Action – What, Why, How	Who?	When?	Progress Status
Presentation of the current state value map to lab to recruit volunteers to help drive the change	RCu	9/11/2012	3 volunteers recruited
Introduce a laboratory liaison to the renal clinic to improve communication between the clinic and laboratory	RC	31/12/2012	Completed
Validate analytical method. Produce associated documentation (validation report, SOP, competency etc) and train staff	RC	28/1/2013	Completed
Implement changes to courier service - collect from Renal Clinic, deliver to immunosuppressant lab, barcode tracking in place	SW	21/1/2013	Completed
5 S's for the immunosuppressant work space	BM RG	31/10/13	Completed
Review and re-audit, discussion with Renal Team	LB EM, ZO,	Oct 13, Feb 14 and June 15	Completed
KPI established with GSTT NHSFT. Monitor monthly	RC		On going

Results and Measures

Time period	% samples reported by 5:30pm	Goal met?
Pre A3	65.0	
2013	71.3	
2014	85.4	
2015	95.1	
2016	95.6	

Percentage of immunosuppressant samples received in lab by 2pm and reported by 5:30pm



"The immunosuppressant lab are shining stars"
Liz George, Renal Sister, User Survey 2015