Reducing laboratory sample rejections due to pre-analytical error: *improving patient experience, quality and efficiency*

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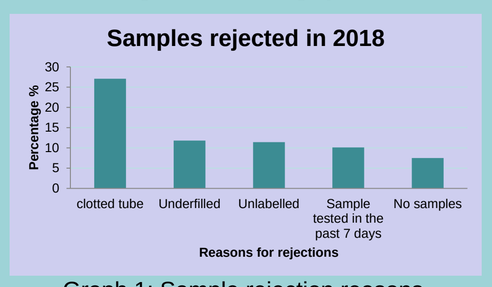
Fig 1: Total testing cycle



Graph 1: Sample rejection reasons

1. Introduction

- Studies have shown n estimated 70% of diagnostic clinical decisions are based upon information derived from laboratory test results.
- Evidence suggests that 46-68% of laboratory errors happen during the pre-analytical stages, e.g. during sample collection and transport.
- GOSH laboratories receive over 400 000 patient samples a year. The sample include bloods, urines, stools, swabs, biopsies and body fluids.
- An audit revealed that over 5000 patient samples were rejected due to pre-analytical errors in 2017 - 2018.
- The main reasons for the rejections were insufficient, clotted and unlabelled samples.
- Sample re-collection and re-testing not only cause delayed diagnosis and treatment, but also results in wastage of staff time and hospital resources.
- Most important of all, patients are subject to unnecessary collection procedures (e.g. needle prick) that are often associated with negative feelings.

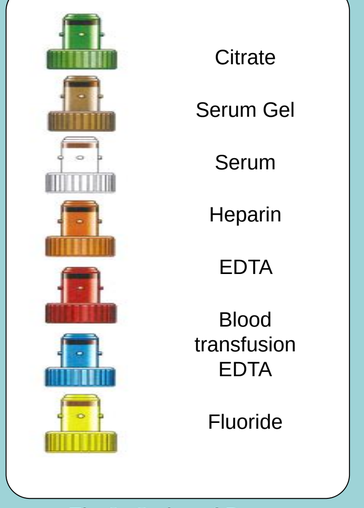


Fig 2: Order of Draw

2. Aim

The aim of the project was to develop the organization's pre-analytical capabilities to reduce the number of rejected samples and to significantly improve patients' overall experience and the quality of their care. The objectives were to investigate the reasons for sample rejection, to understand the causes and identify ways to avoid them.

3. Method

- Using the IHI Model for Improvement and quality improvement tools such as driver diagrams and stakeholder mapping, the main drivers were identified.
- A steering committee with representation of clinical and non-clinical stakeholders from across the organization was formed.
- Internal and external stakeholders were engaged to understand the problem and explore improvement ideas.
- Several interventions were proposed, implemented and monitored through the steering committee and working groups to measure improvement.
- Data collected was published on Organization's QI dashboard on the intranet.

4. Results

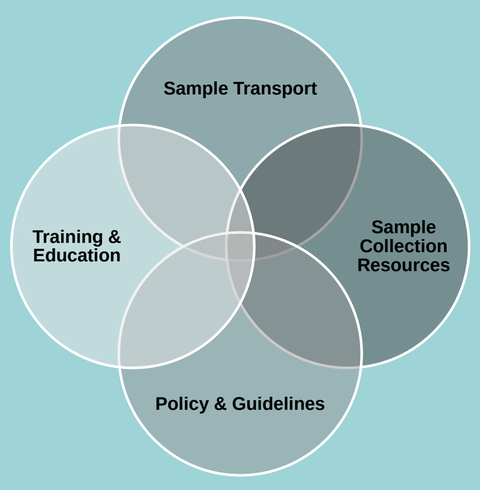
Internal stakeholders Steering Group

Executive Sponsor	Operational lead	QI	Medical
Nursing	Labs	EPR	PMO
Portering	Risk/Patient Safety	Procurement	Infection Prevention & Control
	Practice Education	IPP	

External stakeholders

- Sarstedt
- Quirepace
- Patients and Families

Working Groups



The main reasons for sample rejections in 2018 were identified (Graph 1). Common type of errors include: clotted or insufficient; incorrect sample types and delayed delivery

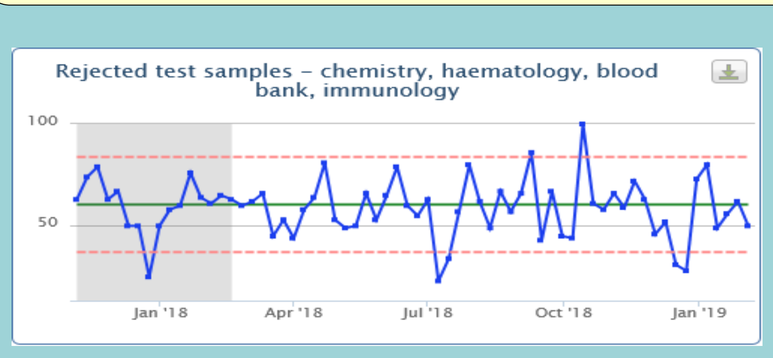
Blood culture transport times showed that in most cases the samples were transported to the laboratory within 24 hours. There were exceptions particularly at night, when it took up to 10 hours.

It was found that use of chute was associated with higher likelihood of leaking NPA.

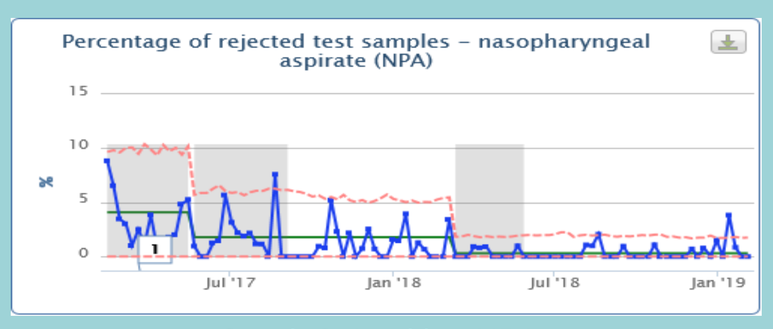
A literature review of the order of draw was conducted resulting in recommendations to update the order of draw.

5. Conclusions / future work

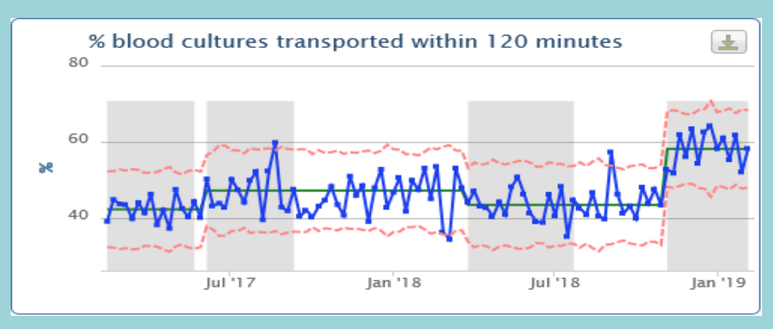
- The project is progressing through the steering committee and working groups.
- An additional porter sample collection round was introduced at 9pm to reduce sample transport time for evening samples
- An organization wide communication was undertaken to raise awareness of leaking NPA samples and a new container that can go on the chute is being investigated
- A real-time report on QI dashboard has been set with Statistical Process Control (SPC) on intranet displaying weekly rate of sample rejection; average sample transport time; and table of reasons for rejection is available to view and accessible by all staff.
- The 'order of draw' has been changed to comply with WHO guidelines and recommendations from Sarstedt Ltd.
- A pilot trial study of replacing neonatal coagulation tubes is in progress.
- The Trust's new EPR – Electronic Patient records will Go-live in April 2018. It is anticipated to improve the sample reception and ordering process.
- A proposal to use medical devices, such as butterfly blood collecting system from the same manufactures is under review.
- The pre-analytical process at GOSH are being benchmarked with other paediatric hospitals in UK.



Graph 2: Rejected test samples



Graph 3: Leaking NPAs



Graph 4: Blood culture transport time

6. Acknowledgements

We would like to thank the staff and management teams who have supported this quality improvement project. We acknowledge the contribution of the clinical staff collecting the patient samples, the porters transporting the samples and all lab staff for checking and recording findings and the QI team for assisting with the data analysis.