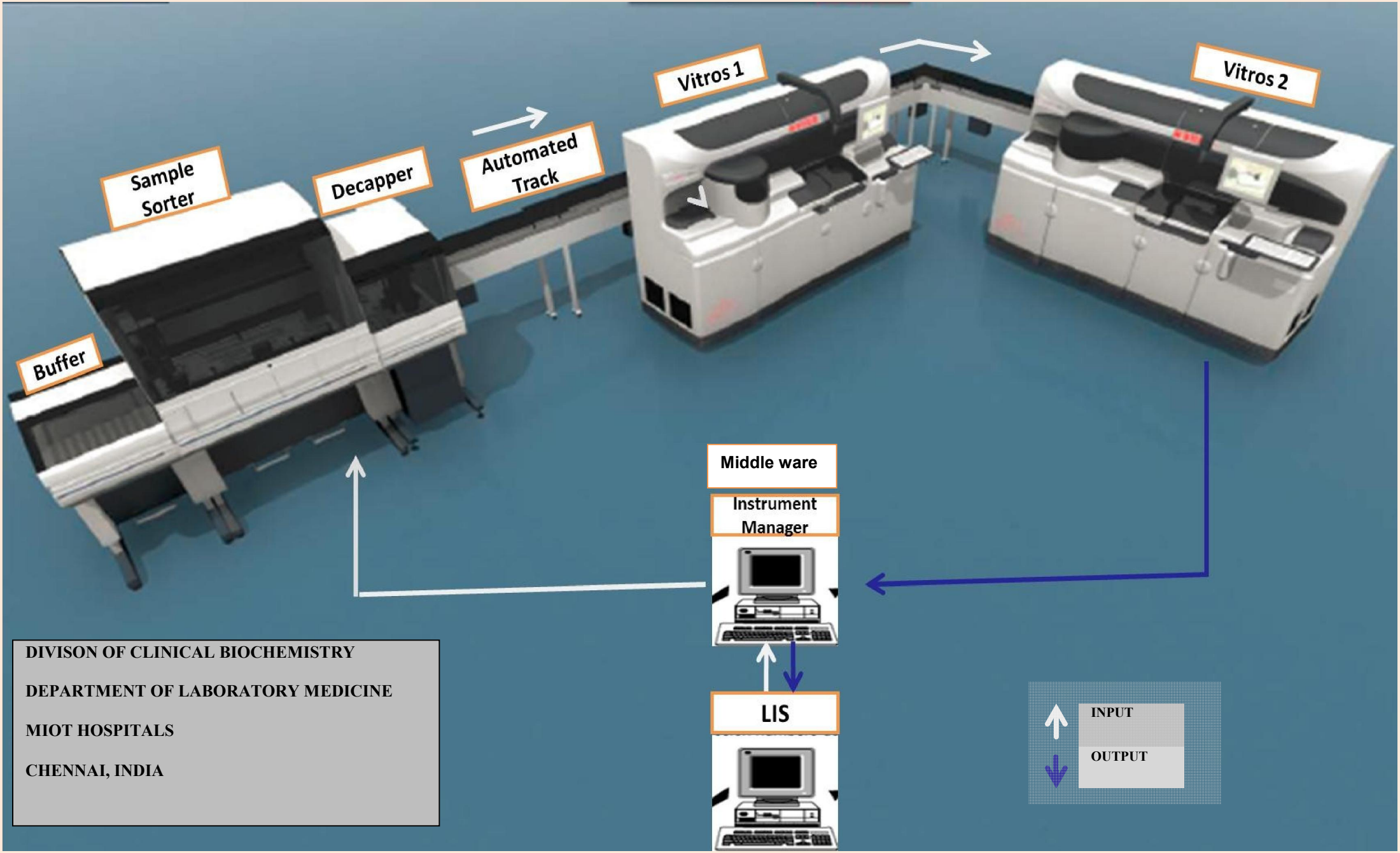
QUALITY IMPROVEMENT PROJECT – PROJECT SYMPHONY



DIVISON OF CLINICAL BIOCHEMISTRY

DEPARTMENT OF LABORATORY MEDICINE

MIOT HOSPITALS

CHENNAI, INDIA

PROJECT SYMPHONY OVERVIEW

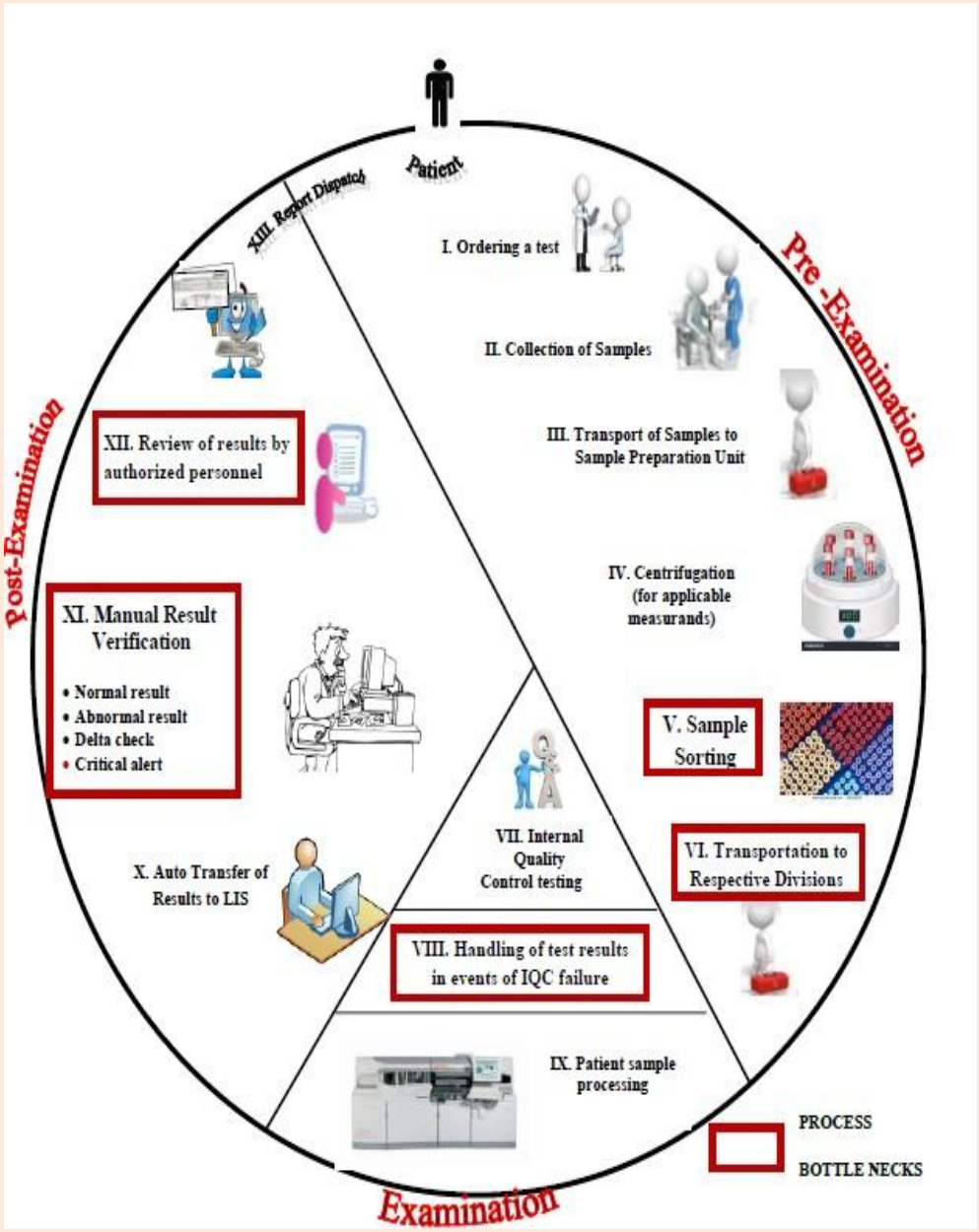
I. Need for a change

Technical advent over the past decade has placed the clinical laboratory Medicine in the frontline of health care. Clinicians take 70 % of their decisions based on clinical laboratory results. Hence Laboratories have gained a prime focus in deciding the clinical outcomes. With **'power comes the responsibility'**. It has become the need of the hour for the clinical laboratories to channelize the technological advent towards patient safety. For realization of this quality goal, Laboratories need to evolve into and adopt a patient outcome based process approach. This provides an opportunity towards designing the quality requirements targeted towards patient outcome. Our quality improvement project – PROJECT SYMPHONY has been built around the outcome-process model, wherein we have tried to explore and understand the gaps (bottle necks) in our process, prioritize the risks involved and duly act upon to bridge the process gaps with the optimal utilization of technological advancements available with us.

MIOT OVERVIEW (PRE TOTAL LAB AUTOMATION (TLA) ERA)

- MIOT International is a 1,000-bed hospital offering healthcare to patients across 63 specialties.
- Department of Laboratory Medicine (DLM) at MIOT is one of the largest branches of the Hospital, with the core laboratory occupying a space of 6,000 square foot, operating round-the-clock 24/7, 365 days an year.
- 70 % of DLM's workload is managed in the Division of Clinical Chemistry.
- Over the past five years, the testing workload for Clinical Chemistry and serology has steadily increased from 150-200 tubes per day to around 1000 tubes per day. The workload surge was managed by a lean group of 8 technical staff with a average TAT of 4 hours.

II. WHAT IS THE CURRENT PROCESS OF LAB TESTING?



III. PRIORITY ALIGNMENT.WHAT SHOULD WE WORK ON?

S.NO	BOTTLE NECKS	IMPACT ON PROCESS FLOW	RISK PRIORITY
V.	Manual Sorting of samples	Increased time delay for transport to respective divisions Skilled Manpower requirement for manual sorting Possibilities of manual error in sorting	☐ Very High ■ High ☐ Medium ☐ Low
VI.	Transportation of samples to individual divisions	Manpower required for transportation to examination area Time delay in manual transportation (impact on total TAT)	☐ Very High ☐ High ■ Medium ☐ Low
VIII.	Handling of test results in case of IQC outliers	No procedure in place for preventing patient results from getting released during QC failure Chances of erroneous results released to patients and recall has to be done Increase in reporting time due to repetitions	■ Very High ☐ High ☐ Medium ☐ Low
XI.	Manual Verification of patient results	Skilled, trained manpower required Verification of delta check, critical alerts for results is time consuming (lack of leak proof system) Delay in intimation of critical results (due to manual verification)	■ Very High ☐ High ☐ Medium ☐ Low
XII.	Manual review of test results by authorized personnel	Authorized personnel not available for review round the clock Impact on Turn Around Ttime	■ Very High ☐ High ☐ Medium ☐ Low

IV. HOW ARE WE GOING TO IMPROVE OUR PROCESS?

V. AUTOMATED SAMPLE SORTING

Automation of patient samples sorting with the aid of pre analytical automation (sorter with auto de capper)

Through put for sorting: 600 tubes per hour

Manpower : 01 technician for entire process of auto sorting .Leaning manpower resource from 3 technicians (pre automation) to 1 (post automation) for sorting process per shift.

XII. AUTO VERIFICATION (AV)

We implemented auto verification traceable to CLSI guidelines (**AUTO 10-A**) and based on criteria customized for clinicians and patients. Through auto verification, more than 85% results were auto verified & reviewed without the need for intervention by technical staff or laboratory doctors. This helped us tremendously reduce TAT by 1-1.5 hrs (Average TAT reduced from 4 hours to 2.5 hours after implementation of AV)

VII. AUTOMATED SAMPLE TRANSPORT (RACK TO TRACK)

Automation of patient samples transport through Track system

Equipments connected to track: 02 VITROS 5600 integrated (clinical chemistry-immuno) analysers.

Number of tubes handled per hour: 150 - 200 tubes per hour

USP of tracking system: Equalisation of workload between analysers (avoidance of sample queuing)

Auto dilution mode for samples with results > than AMR.

Bar-coded archiving of processed samples (leaning the sample retrieval procedure)

Manpower :

02 technicians for entire process of examination. Leaning manpower resource from 4 technicians (pre automation) to 2 (post automation) for sorting process per shift.

XI. INTELLICHECK

A significant stride in terms of pre analytical error detection was made through integrating the intellicheck technology available with VITROS with that of IM through which HIT (Hemolysis, Icterus, Turbidity) indices could be customized to each and every analyte based on the manufacturer's claim on HIT interferences on individual analytes. Through this, the laboratory could define the acceptance-rejection criteria for samples with HIT customized to each analyte to be tested, wherein such analytes bound to the interference would not be auto reviewed pertaining to rework by the laboratory. The rejection rate of samples due to HIT expressed in SIGMA scale before IM significantly improved from **4.3** to **5.8** after integration of Intellicheck with IM.

CRITICAL ALERT: Lab has defined critical alerts based on clinician's needs. IM aids us to filter, classify and highlight the critical alerts facilitating the lab technologists to alert the treating clinicians accordingly

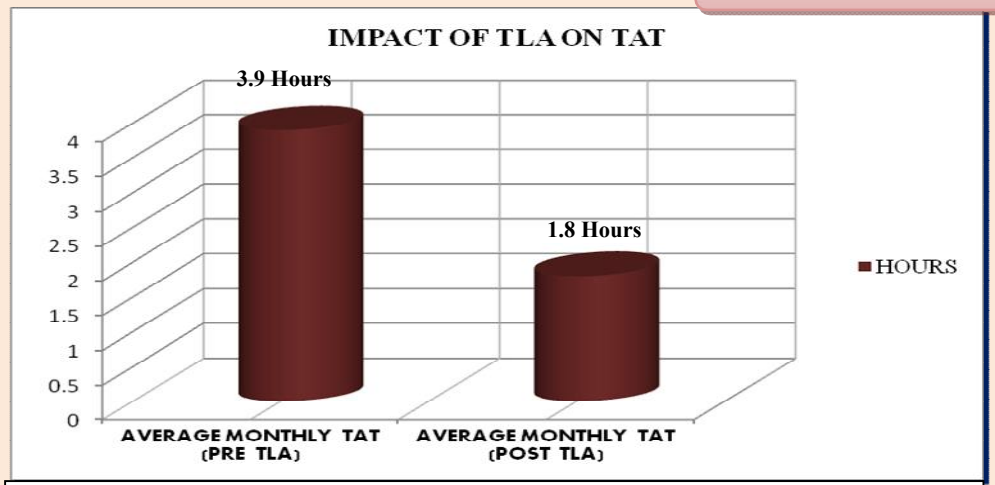
VIII. QC- BRACKETING (IMPROVEMENT OF PATIENT SAFETY)

Bio-Rad IQC used for performance verification of biochemical parameters processed in two equipments (VITROS 5600) could be integrated with the third party software for QC Bio-Rad Unity) through automated transfer of QC results from equipment through IM to the unity interface. All patient results for analytes with failed IQC are programmed to be withheld in IM pending for verification till appropriate actions are taken for QC failure event.

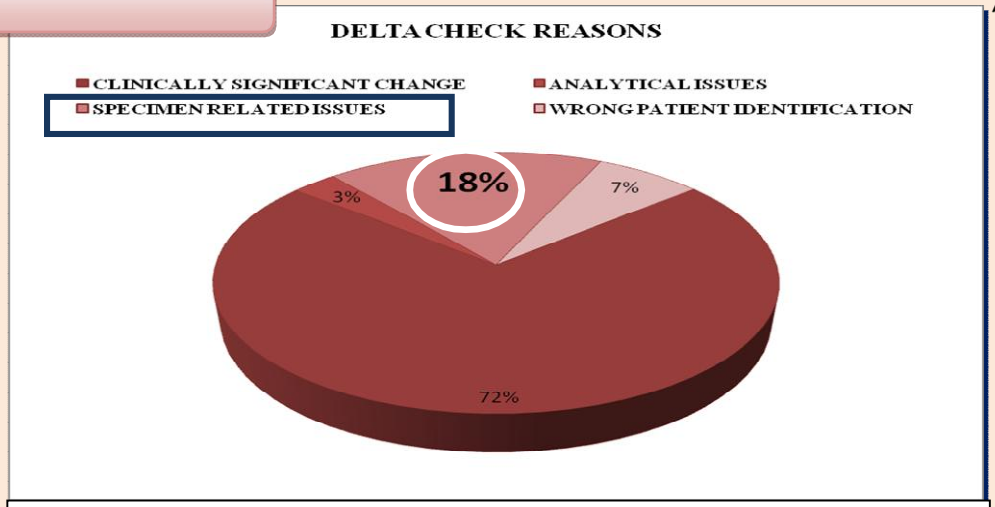
XI. DELTA CHECK:

Through IM, we could implement automated cross check of results of a patient with his/her previous lab findings. The criteria for this cross check between the current and the previous lab results(delta check) was established based on CLSI (E**P 33**).This significantly impacted on patient safety in terms of identification of errors potentially resulting in mismatch before the wrong results reach the patient or the treating consultant. The errors causing the result mismatch were able to be classified and our laboratory has started using the information available about these errors from automated delta check from IM as quality indicators for our continual improvement.

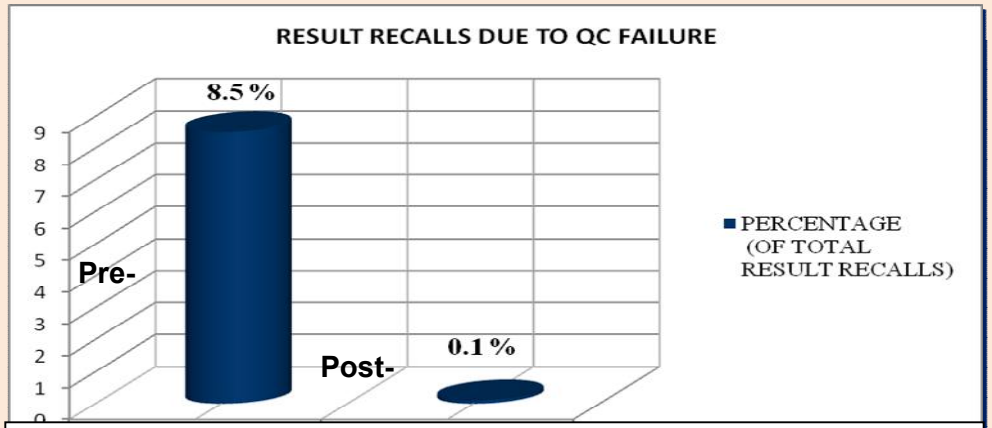
V. HOW DO WE KNOW W E IMPROVED THINGS?



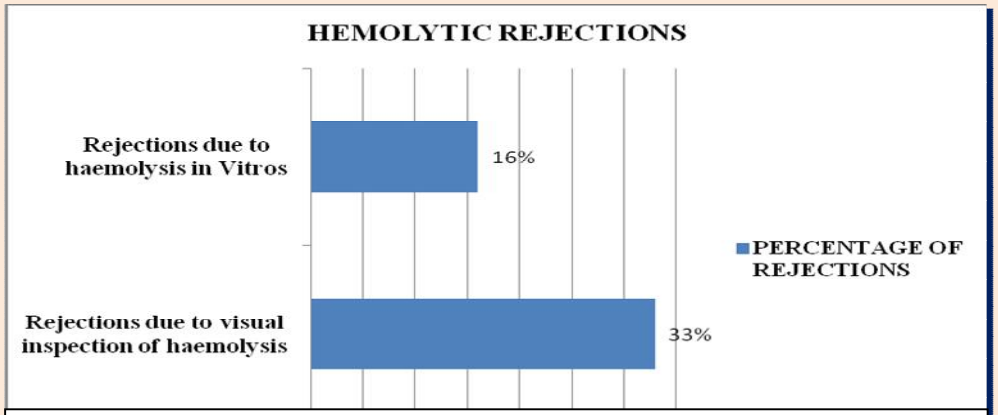
Introduction of Pre analytical automation system and track system (TLA) bought down our TAT from **4 hours to less than 2 hours** which immensely contributed to customer satisfaction and shortened Length of Stay (LOS).



Automated Delta checks and the underlying reasons were taken up as Monthly Quality Indicators. 3 month observation revealed high percentage of delta checks due to **specimen related issues** (**directed to human errors in collection**). This was taken up as scope of improvement to Train the phlebotomists and nursing staff.



QC Bracketing through Middle Ware (Instrument Manager) brought us a risk based Quality system procedure to prevent harm to patients through erroneous results in the advent of QC failure. (**Putting patients' safety first**)



Integration of HIT indices with each patient sample provided us an process improvement in meaningful rejection of samples due to hemolysis which improved the TAT and reduced the percentage of sample reworks.

Conclusion: The laboratory is one of the important wings of patient safety. The Quality Assurance Program of the laboratory should be robust to pick up and wean the errors of the system. As laboratory specialists, the PROJECT SYMPHONY gave us an immense opportunity to lean the process with applicable quality improvement steps to control and curtail unnecessary process steps resulting in greater productivity, reducing the errors and transforming the laboratory into a error free zone.