STUDY ON LAB REAGENTS UTILIZATION AND ITS IMPACT ON COST IN MANIPAL HOSPITAL, JAIPUR

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INTRODUCTION

- Laboratory testing is an integral part of modern medicine, with test results influencing diagnosis, prognosis, and management of disease. With increasing concerns about the overall rising costs of healthcare, analysis for the utilization of laboratory is important. Laboratory testing contributes significantly to the overall cost of hospitalization.

- Inappropriate laboratory utilization may include underutilization and overutilization, as well as ordering incorrect testing leads to wastage of the resources and the cost.

- Utilization management has been a traditional approach to control costs in health-care systems therefore, this study focus on the utilization pattern of the reagents in the lab and its impact on the cost that Manipal hospital has to incur.

- In Manipal Hospital, the diagnostic lab is divided into various sections like biochemistry lab, molecular lab, cytology lab, histopathology lab and haematology lab. The reagents utilization by these section is the major factor of concern for the hospital by checking the indenting and consumption pattern of the reagents and improvement in the process was required for proper functioning of the labs in the hospital.

AIM OF STUDY

To study the utilization pattern of lab reagents and understand its impact on cost in Manipal Hospital.

OBJECTIVES OF THE STUDY

- To determine the current utilization of lab reagents in the hospital.
- To find out the gaps in current procedure available for the utilization of the lab reagents.
- To analyse the impact on the cost by understanding the utilization pattern of the lab reagents.
- To give recommendations to improve the process of reagents utilization in the Hospital Laboratory.

RATIONALE

- Laboratories are the most essentials and high revenue generating department for the hospital therefore study was done which shows a low profitability in the laboratory.

  This project explores the gaps in the functioning of the lab and find out the ways to improve the profitability for the same in the Manipal Hospital.

METHODOLOGY

S.NO.	PARAMETER	DESCRIPTION
1	Research Type	Descriptive and Observational study
2	Study location	Manipal Hospital, Jaipur
3	Duration of study	3 months (February, 2018 to May, 2018)
4	Type of data	Quantitative data
5	Data collection	• Primary data collection (through interview, observation) • Secondary data collection (From April, 2017 to March, 2018) Hospital information system (HIS) Reports
6	Data collection instrument	• Retrospective Data from HMIS • Checklist for the audit
7	Data analysis	Microsoft Excel

DATA ANALYSIS

- Reagent utilization
- Reagent under-utilization
- Reagent over-utilization
- Over all Reagents Utilization
- Reagent Utilization Proportion
- Impact on the cost

REAGENT UTILIZATION

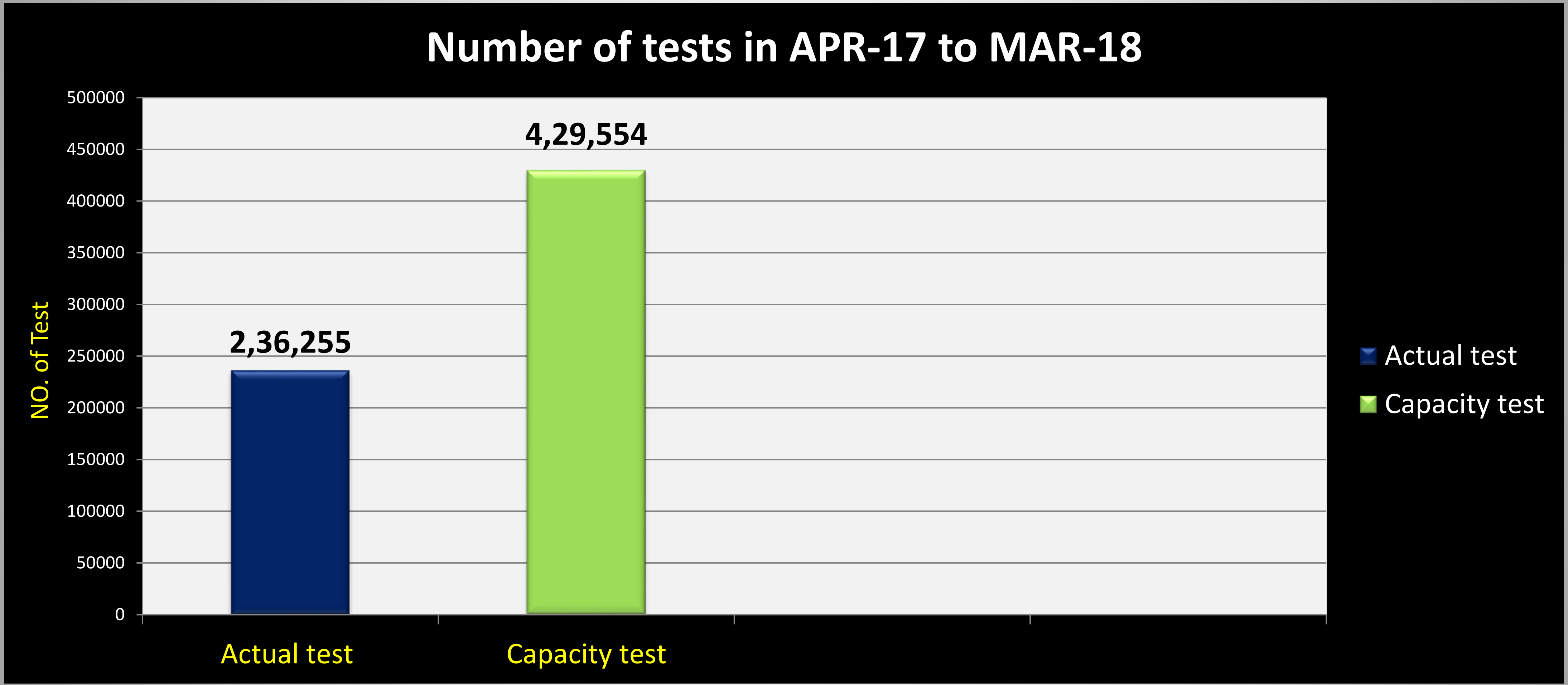


Fig1. Depicts the number of test that has been performed in the in last one year that is April' 2017 to May' 2018 and the capacity test that can be performed.

Table 1.

S.no	Test done	No of test
1	Actual Test	2,36,255
2	Capacity Test	4,29,554

It shows difference between the actual test performed and capacity test that can be done

Therefore, the overall utilization in percentage is calculated by:

- Actual test done / capacity test x 100 = 55%
- Therefore 55% overall utilization has been analysed from the one year data, which was done for 220 reagents.
- The study was done on 40 regents out of 220, as these 40 reagents are 19% of the total reagents and consists of 53% of the total reagent purchase value.

REAGENT UNDER-UTILIZATION

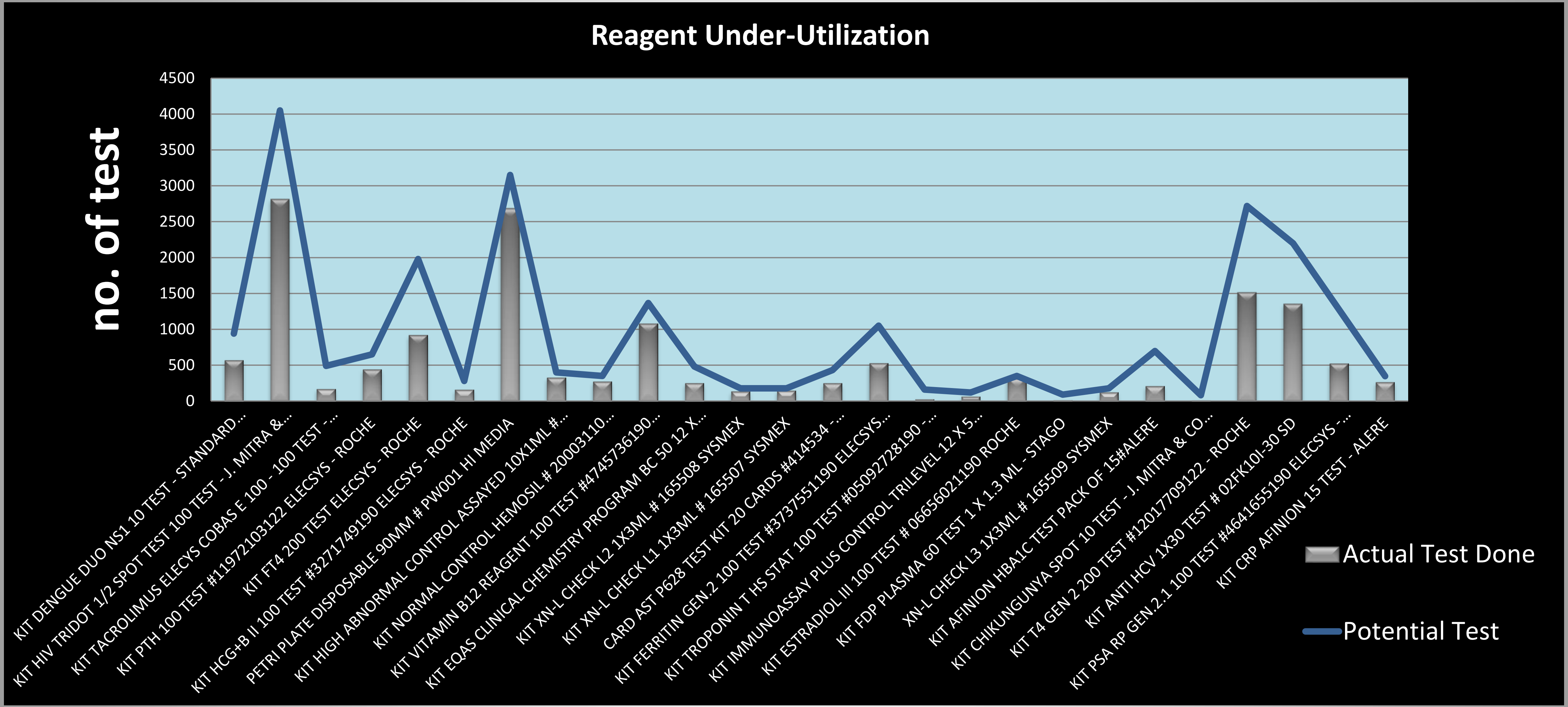


Fig 2. Depicts the 30 reagents that are underutilised among the 40 reagents that are taken in the study

There is difference between the actual test done and the potential test that has been performed in the lab and the utilization of reagents is 57%.

CAUSES OF UNDER-UTILIZATION

- Redo of investigations
- Reagents used for calibration and Quality control
- Reagent kit expire due to less work load
- Pilferage or leakage of the reagents
- Misuse of the reagents

REAGENT OVER-UTILIZATION

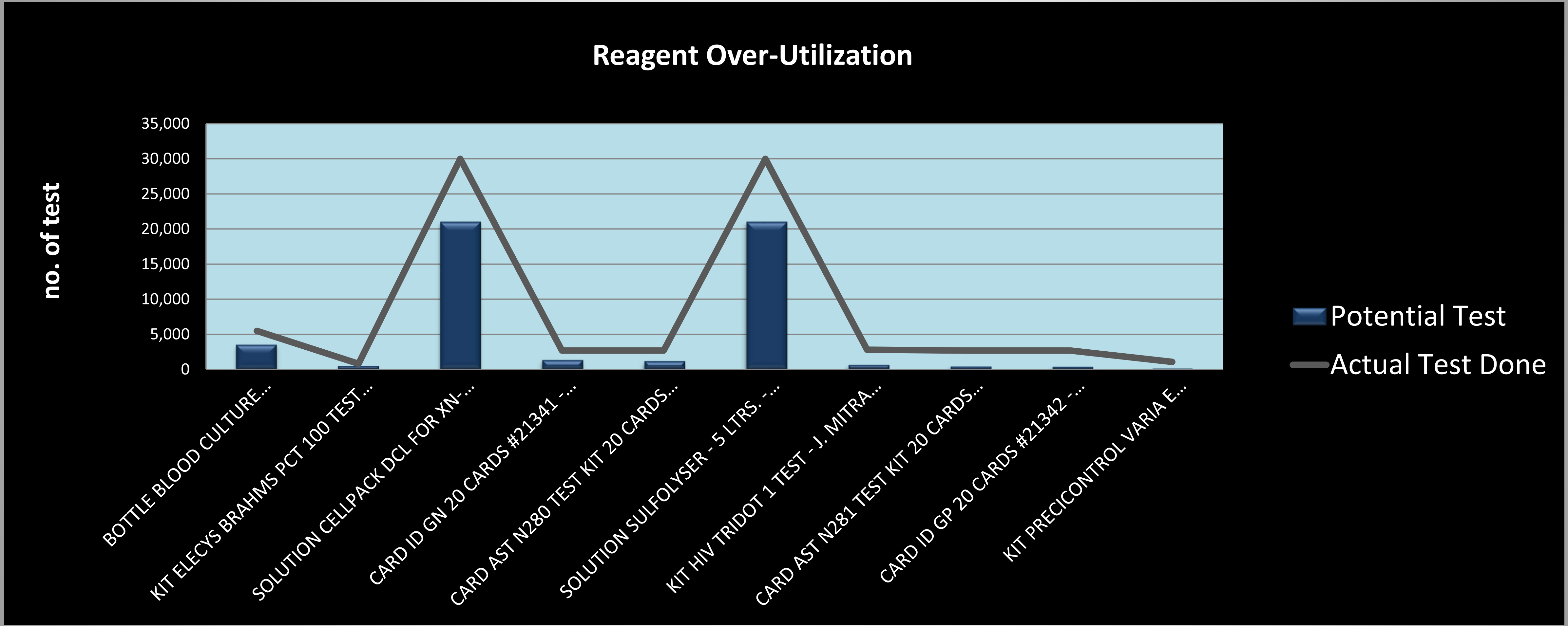


Fig3: Depicts the Reagent over-utilization, there were 10 reagents that were over utilized among the 40 reagents taken in the study

Over all Reagents Utilization

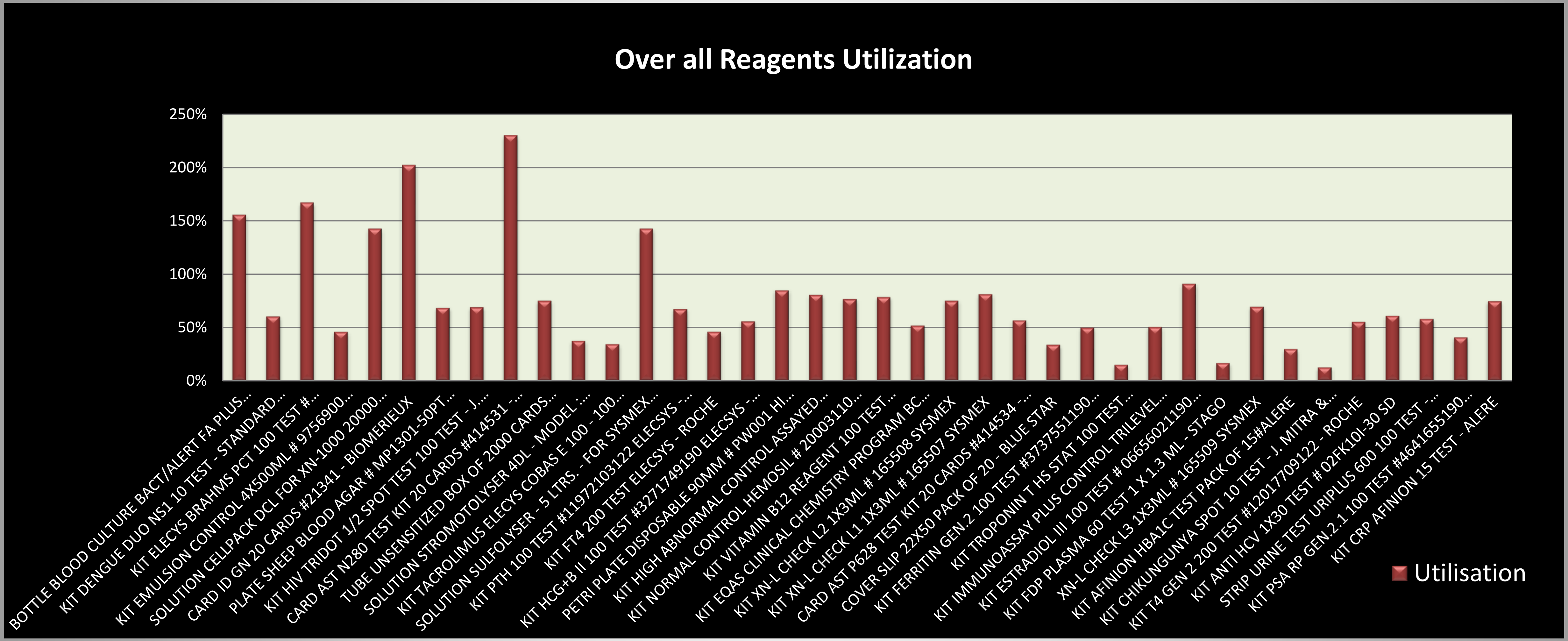


Fig 4. Depicts the percentage of overall reagents utilization

Reagent Utilization Proportion

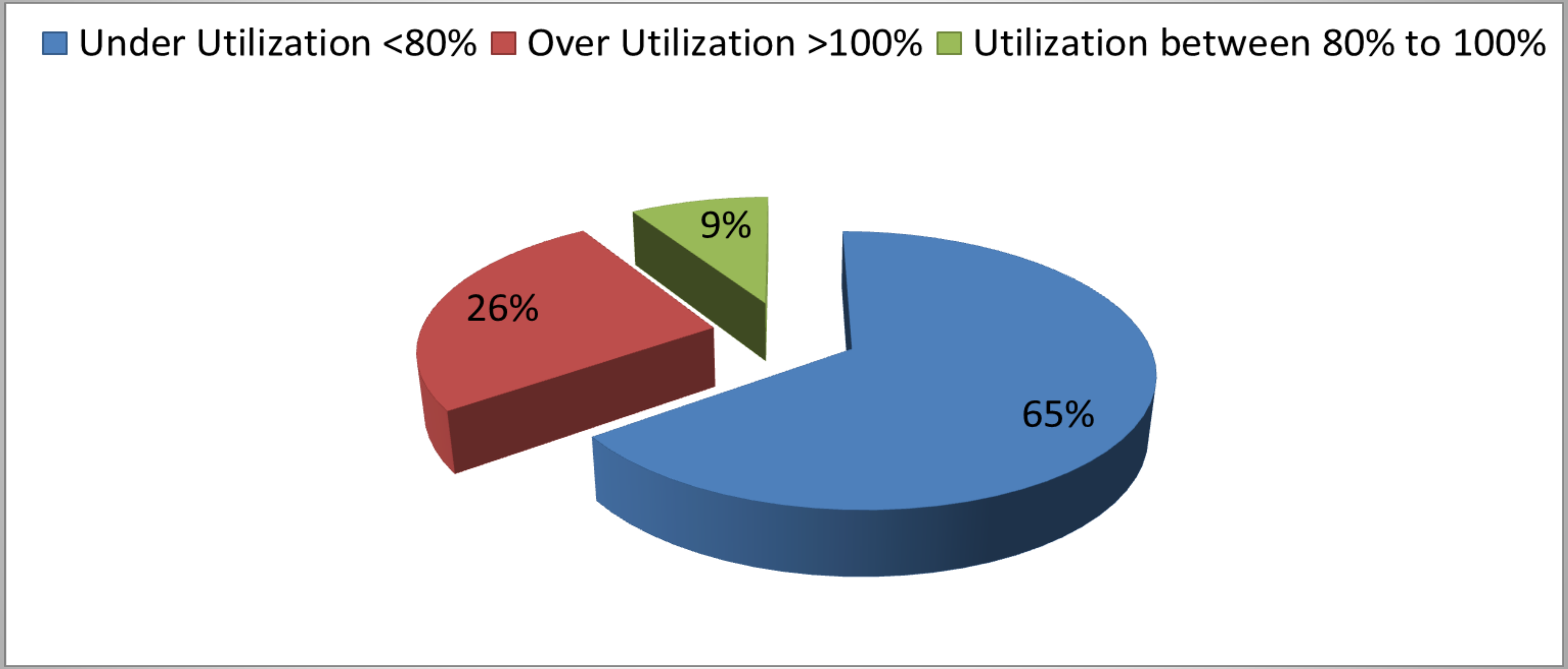


Figure 5. Depicts the percentage of underutilization, over utilization and reagents utilization between 80% to 100%.

Impact on Cost

Utilization analysed for the 30 reagents	**57%**
Revenue generated from the investigation in the last financial year from 30 reagents	**100%** **(2.82cr)**

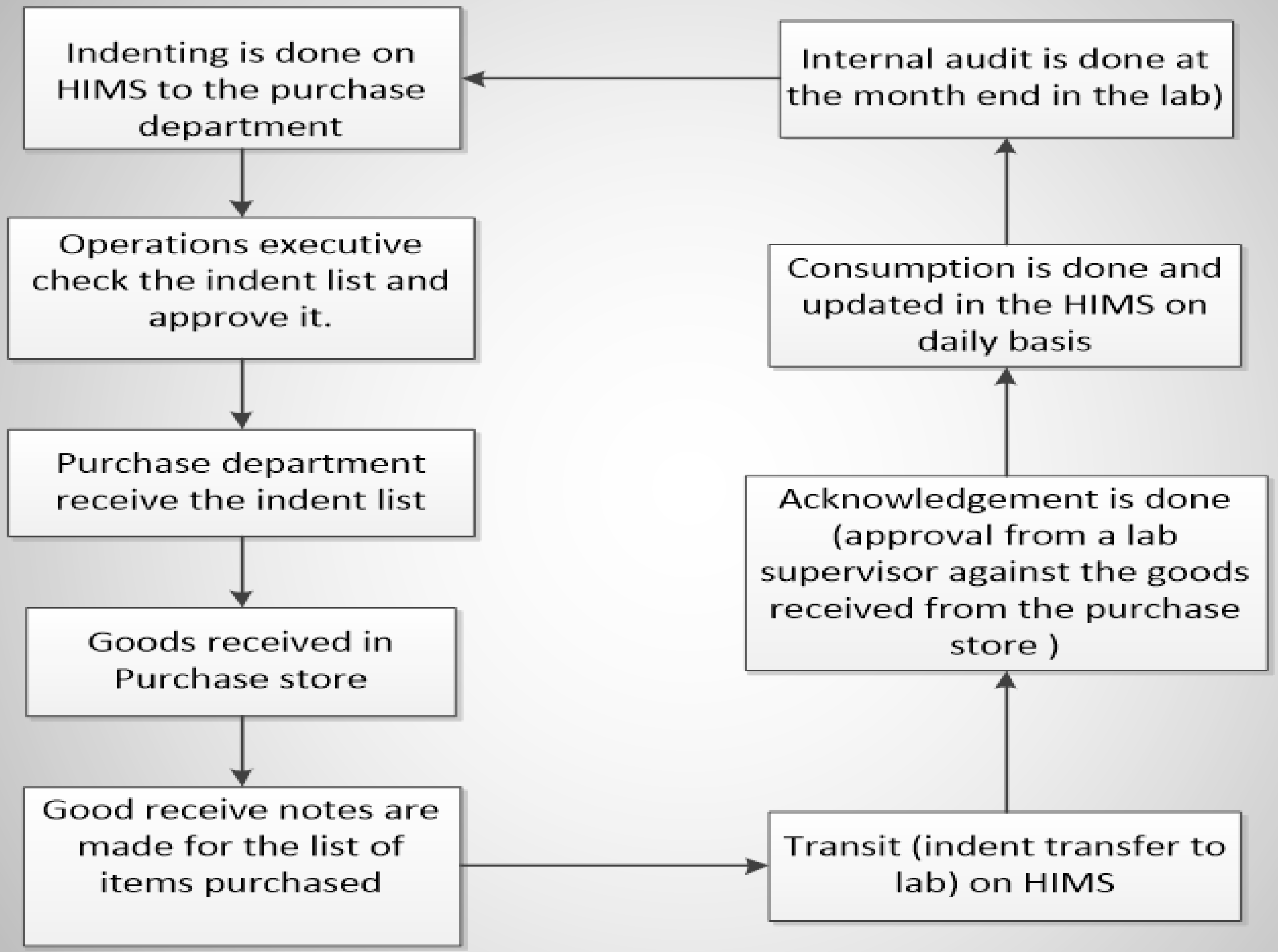
30 reagents	**Cost Before utilization analysis**	**Cost After utilization analysis**
Cost incurred by the hospital in last financial year.	23%	13%
Margin from the investigation performed in last financial year.	77%	87%

Margin from these investigations for the last financial year can be increased up to.	**10%**

FINDINGS

- Indent and consumption of all the items in the lab were not centralised as individual lab indenting was done.
- The reorder level was not set for the lab inventory.
- Indent and consumption process flow was not followed correctly.
- There was leakage and pilferage against the reagents items.
- Two similar equipment (E4/11) run at the same time in the lab, which need extra calibration and quality control reagent kit.

Process flow for the Indent and consumption for the lab reagents



This process map was designed and implemented for the indenting and consumption of the lab reagents to make the process more accurate and effective and avoid any misuse, over or under utilization of the lab reagents

- **Indenting** is done from the lab for the required items to the purchase department in the HMIS.

Every section of the lab like biochemistry, histopathology, haematology, microbiology and cytology were indenting there items individually which cause delay in receiving the indent items and the process was not under control.

Implementation:

- Now the process is being formulated for the indenting and consumption,
- All the sections of the lab has centralised indent process which give a control to the process.
- Lab supervisor is responsible for requesting the indent items for the sections of the lab which has to be done within first week of the month, expect some emergency items

- There was no proper check on the list of the indent items which leads to over indenting of the items or the regents and it also leads to high cost to the hospital.

Implementation:

- **Operation** executive keeps a check on the list that has been updated by the lab supervisor on the HMIS system to the keep the tack on the ordered items to avoid any over indenting of the lab reagents and to have check on the cost control

- **GRN (Goods receive notes**) which include the item list that is purchased from the vendor which has to be updated in HMIS by the purchase department while receiving the items to keep the track on the purchase, which was not followed by the purchase department due to urgent requirement in the lab and due to improper or pending GRN there was no compliance of the acknowledgement of the items in the system by the lab technician which leads to improper tracking of the items purchased.

Implementation:

- GRN (Goods receive notes) was set mandatory to be updated in the system at the time of the receiving the goods from the vendor without any failure or delay.
- Without updating GRN in the system purchase store cannot transfer the items to the lab
- Lab technician could not receive the items indented without GRN been updated in the system
- Purchase department has to handover the received item to the lab within first week with GRN
- Which leads to no delay in receiving the items and it also reduces the emergency requirement of the lab.
- Following GRN without any failure helps in keeping the track to all the items purchased and also helps in cost control for the received items.

- **Acknowledgment** was improper due to the pending GRN (goods receiving notes) which leads to mismanagement of the goods received

Received items were individually acknowledged by the lab supervisor for all the section of the lab.

Implementation:

- Acknowledgement by the lab supervisor is done without any failure to keep the track on the items received
- Centralised acknowledgment for the received items by the lab supervisor is done.

- As the process was not followed properly by the staff, pending GRN or delay in the updating the items in the system leads to noncompliance to the **consumption** update.

Due to heavy workload and unavailability of the sufficient staff, delay or no update of the consumption.

The process of the consumption was done for the individual for all the sections of the lab.

Implementation:

- As the process was implemented properly, GRN was updated in HMIS therefore proper consumption update in the system was followed.
- Centralised consumption update is implemented in the labs.

- **The internal audits** were not performed on regular basis which leads to high variance in the stock, lack of audits leads to poor control and mismanagement in the lab. Documentation for indenting and consumption were improper.

Implementation:

- Internal Audits on monthly basis are performed to improve the process and performance of the lab
- It helps to lower the variance in the lab and helps to control and manage the stock availability in the lab.

RECOMMENDATION AND IMPLEMENTATION

- Process flow was set for the indent and consumption of the lab reagents

- Centralising all the indent, acknowledge and consumption of the items in the lab is done.

- Implementation of the reorder level is required for smooth an effective functioning of the lab.

- Two similar Equipment E4/11 (Immuno Chemistry)were running together but work load was not that much so, recommended to run one equipment only , which will reduce the number of test consumed in calibration, quality control, electricity and maintenance cost. It was implemented by the lab.

Conclusion

- Staff should be trained properly for their roles and responsibilities.
- Reorder level for the lab reagents should be set to achieve better inventory management.
- Process flow for indenting and consumption should follow for proper utilizations of the lab reagents.
- Equipment utilization should be follow to reduce the over consumption of the resources.

THANK YOU