

STUDY ON EVALUATING THE EFFECT OF LEAN METHODOLOGY ON QUALITY ASSURANCE IN DEPARTMENT OF RADIOLOGY IN THE MISSION HOSPITAL, DURGAPUR

Presented by –Dr. Neha Joshi

Guided by – Dr. Sameer Phadnis

Introduction

- Lean System was implemented lean in healthcare industry specifically the radiology department was to increasing demand for diagnosis hospitals also urge for bringing down cost incurred and turn-around time.
- The current value stream map of the process flow of the Radiology department of Mission Hospital was analyzed and the future value stream map of the process flow and patient pathway was redesigned with lean health care application tools in terms of Quality Improvement.
- The CT AND USG are profit generating areas for the hospital. The reimbursement rates for these services are very high, the scan times (especially in CT) are relatively low, and so the potential for additional revenue to the hospital comes with increasing patient capacity for these services.
- However, it is also a very competitive time for hospital radiology departments as many outpatient diagnostic centers are actively built drawing patients and efficient physicians, leading to major challenge for the hospitals.

- Value Stream Mapping is used for analyzing the current process flow and redesigning the entire process to add more value to system with visual representation of information and material flow.
- This technique requires mapping the entire process flow by direct observation and understanding the complex pathways of patient care that occur from the perspectives of all participants, that includes physicians, nurses, technicians, coordinators, and importantly the patients.

Aim of the study

- The Aim of the study is to bring improvements in the process flow and technology to achieve a competitive advantage over its competitors in The Mission Hospital, Durgapur. Involvement of the staff i.e. the technicians, radiologist, nurses and GDA for making it a comprehensive programme determining the suggestions and contributions from all aspects. Also including a feedback from the patients, the major stakeholder for improving the processes. Performing the GAP analysis between the current situation and the expected outcome and finding out loop holes and fulfilling them. Elimination of waste would be a greater challenge so that all sorts of waste should be eliminated that include overproduction, excess activities, errors in reporting which impacted the outcome severely. Generating the results in the specified turnaround time as given in the hospital protocols.
- Improving the effective communication in Radiology department was another essential aspect of the study, certain errors were caused due to ineffective communication between the Radiologist and the technicians and between the nursing staff leading to more errors in patient scheduling. Reducing the report writing time in department reducing typing errors was major task that increased the dispatch time for maximum reports.

- Implementation of HIS in Radiology because manual reporting leads to increased errors and wastage of time. Improving the Quality of outsourced reports, the outsourced reports are compromised i.e. poor quality and having more reporting errors.
- Implementing of Lean Management followed by Six Sigma would be a future AIM of the study

Research Question

- What are the factors that affect the implementation of Lean in Radiology Department in Mission Hospital, Durgapur?

Objectives of the study

- To ascertain the effect of lean management and Re- Engineering on selected indicators of Quality Assurance in Radiology department.
- To create Value Stream Mapping of the process flow in Radiology Department.
- To Identify the non-value-added time in the process flow from the value stream mapping.

Research Methodology

- **STUDY DESIGN-** Crossectional study design .
- **SAMPLE SIZE** – 300.
- **STUDY PERIOD** – Starting from 6 Feb till 15 April 2019.
- **STUDY DESIGN** – Crossectional study.
- **SETTING** – Radiology department The Mission Hospital, Durgapur.
- **STUDY TECHNIQUE** - To identify the causes leading to delay in generation and dispatching of reports i.e. aims to improve the turnaround time in reporting. Analyze the causes of frequent equipment failures and to why such incidences occur. The includes a sample of 300 patients samples collected based on convenient sampling. The study period was 3 months starting from 6 Feb till 30 April the sample was collected after following the patient and the patient reports for each process for the month of Feb till 15 April. Only those patient samples were taken which could be followed at each step

- **STUDY POPULATION** – Unplanned patients coming in radiology department for CT and USG investigations
- **INCLUSION** – OPD (unplanned) and health checkup(planned) patients coming for Radiology Investigation and the patients that could be followed at each at every step.

- **EXCLUSION CRITERIA** - IPD patients and patients that could not be followed. .
- **DATA COLLECTION TOOL** – Predesigned format for evaluating all the steps in the process flow.

Findings

PROCESS

PATIENT
PREPARATION
TAKING MORE
TIME

PATIENT
SCHEDULING
NOT DONE
PROPERLY

LACK OF MANPOWER

LACK OF TYPIST

1 RADIOLOGIST FOR
REPORTING CT, X-
RAY & MRI

NO NURSING STAFF

LACK OF GDA

Increased
turn around
time

RIS NOT
FUNCTIONAL

SERVER
DOWN

IT

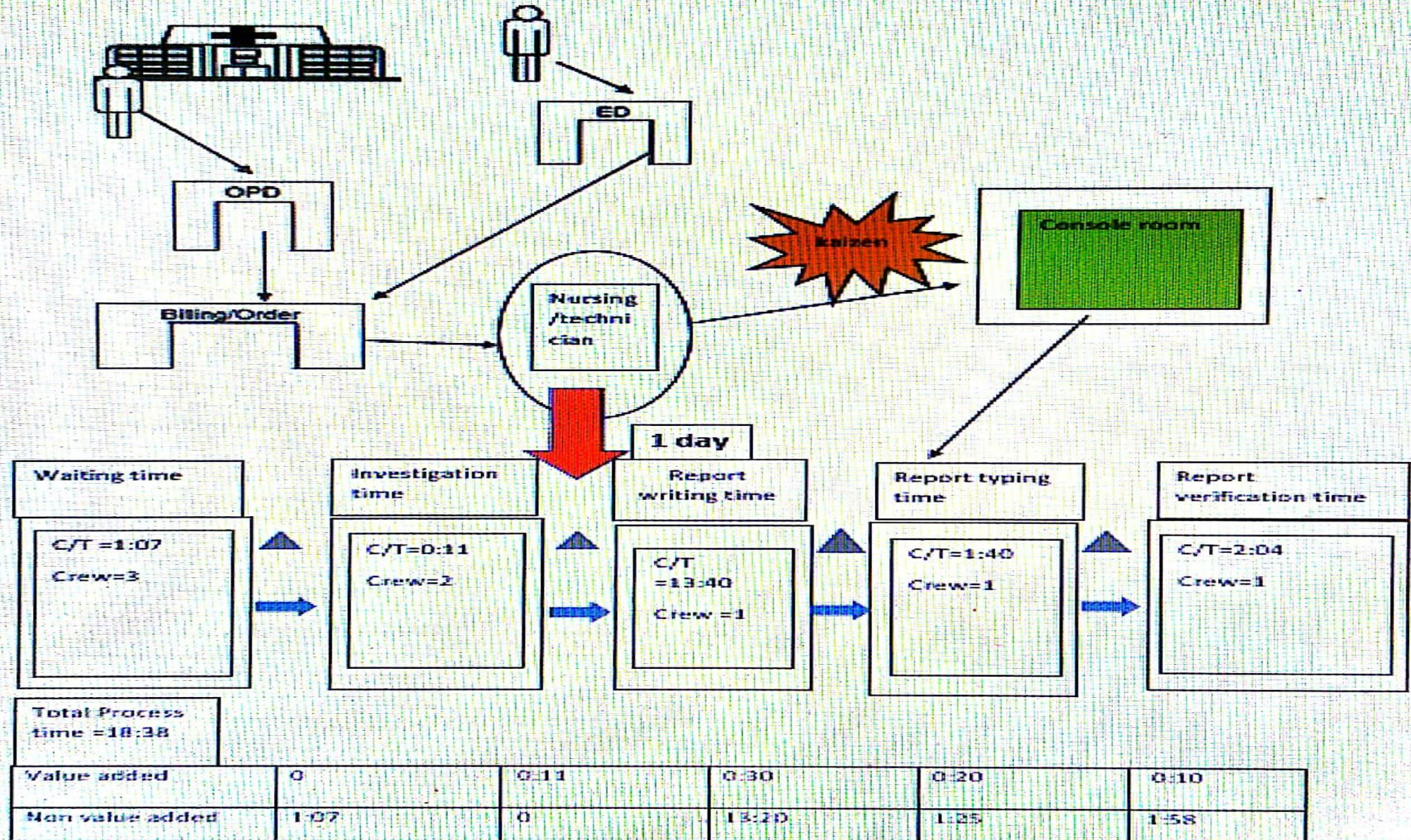
OUTSOURCE
D REPORTS
HAVE POOR
QUALITY

MACHINE

CALIBRATION
NOT DONE
FREQUENTLY

126 CT FREQUENT
BREAKDOWNS

(CURRENT) VALUE STREAM MAPING (CT)

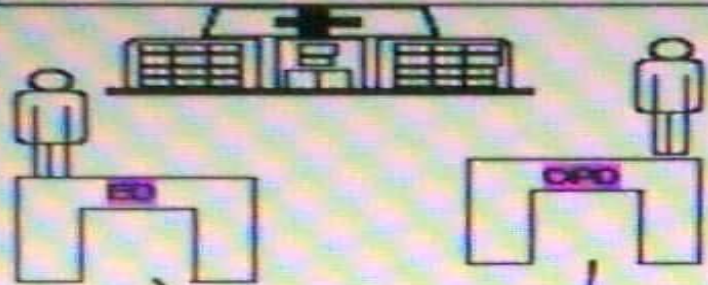


- Therefore, the Total process time for CT is 18 hours and 38 min. Value added time is defined as the process that adds value to the customer, for which the customer is willing to pay. The Nonvalue added times include the waiting time, move time plus the Inspection time. The generously required to perform an activity is called value added time which is the actual time taken to perform the activity.
- For CT,
- The value-added time would be =1-hour 11 min
- The non-value added = 16 hours and 3 min.
- We are excluding the waiting time for Ct as the billing is done earlier at 8 am while the OPD starts at 10:00am , these include patients from far off places.
- Time is included from the point of arrival of the patient in the department till the reports are generated.

- As indicated the Max time taken is after the procedure has been performed, the report writing is done the next day which increases the waiting time for the reports and hence increases the non-value-added time for the activity. The unavailability of the Consultant is major factor, due to manpower deficiencies the consultants are overburdened, for the patients that arrive after 3PM for major cases the reports are delayed as reports are not verified and signed by the Consultants.
- The reports lying pending on the nursing table which are not updated would be considered as waste. Over activities by the nursing staff which are not in order is considered waste activities. The reporting errors were majorly under reported in the department no register was maintained therefore it was hard to catch this and minimize them

PROCEDURE	CURRENT STATE	EXPECTED STATE	FACTORS
WAITING TIME	1HOUR 7 MIN	20MIN	Scheduled appointments
INVESTIGATION	11MIN	8-10MIN	Time taken for patient dressing, availability of technicians and GDA.
TRANSCRIPTION	1 HOUR	20 MIN	Efficiency of the radiologist, number of radiologists performing the investigations. Efficiency of the machine and clarity of the investigations. Outsourced reports have poor quality.
REPORT TYPING	7-8 HOURS	15-20MIN	Efficiency of the typist and number of typists would directly be affecting the indicator, pending reports.
VERIFICATION	2-3 HOURS	20MIN	Pending reports, availability of radiologist, typing errors by the typist, reports pending at the nursing desk.

Value stream mapping (USG)



TOTAL PROCESS
TIME = 6 hours
55 mins

Waiting time
CT = 3 hour 22 min
Crew = 2

Investigation
CT = 0:09 min
Crew = 1

Report writing
C/T = 0:03
Crew = 2

Report Typing
CT = 1 hour 7 mins
Crew = 1

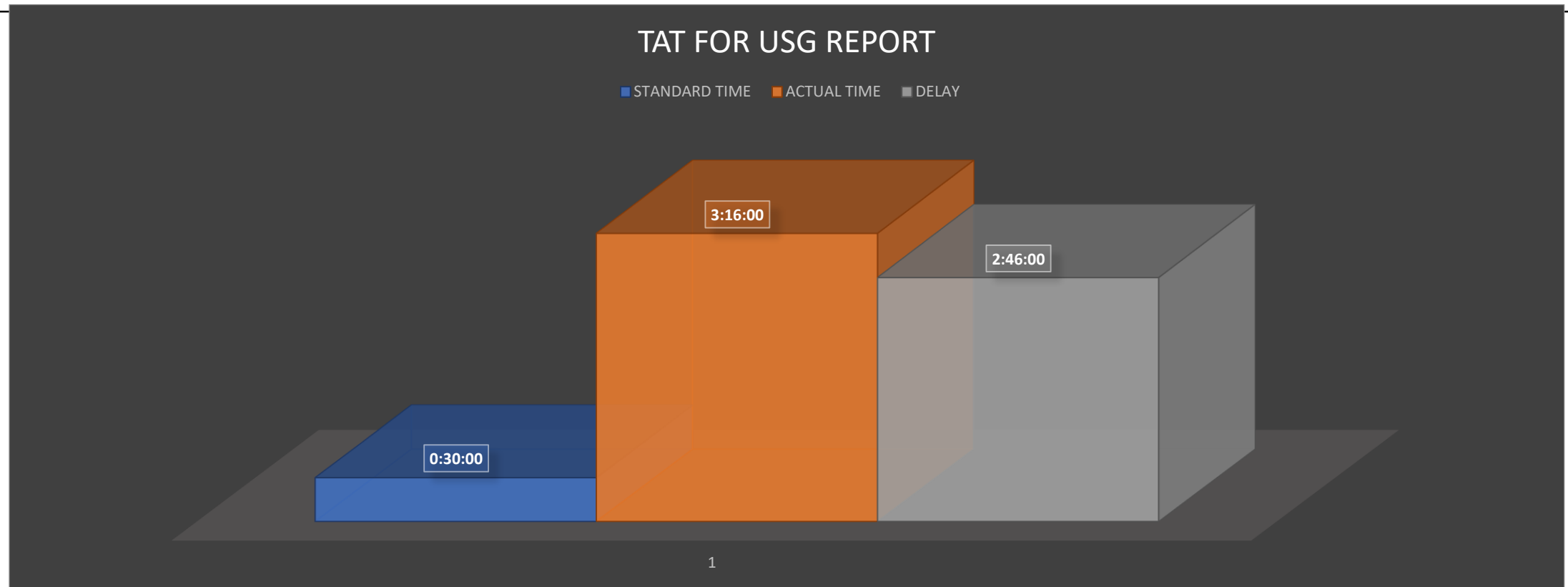
Report Verification
CT = 2 hours 14 min
Crew = 1



NVA	3:22	0	0	0:52	2:00
VA	0	0:09	0:03	0:15	0:14

- In case of the USG department the total process time is 7 hours. The Nonvalue added steps are added that includes all the waste steps and activities performed also the waiting times, i.e. 2 hours and 52 min
- Value added time is 41 min.
- The cycle time is the Average Time taken to perform one activity before shifting to the other it is calculated through the Excel and calculating the time taken for each step. The Value-added time is differentiated from the Non-Value-added time solely done on observation, depends on the Number of crew members and efficiency of the department.
- The steps that do not add value is discussed with the members of department waste steps are minimized.

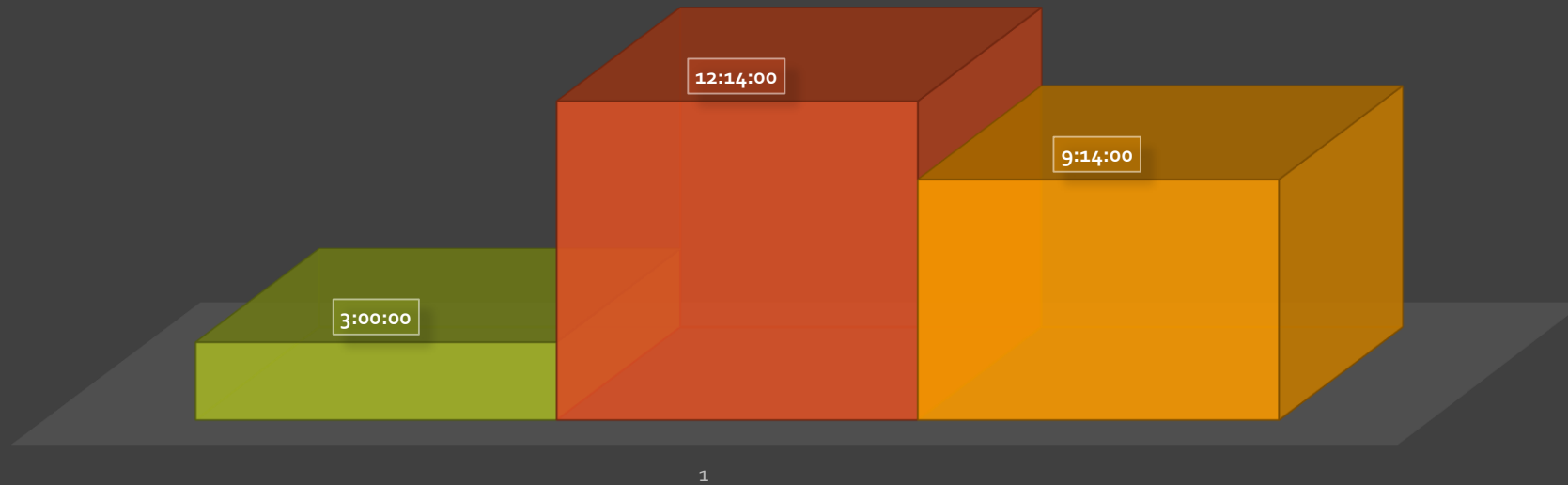
PROCESS	CURRENT STATE	EXPECTED STATE	FACTORS
WAITING TIME	P/T = 3:32 Minutes	P/T = 20 Minutes	Scheduled Appointment
INVESTIGATION	P/T = 9 Minutes	P/T = 5-8 Minutes	Except special cases, systematic patient preparation.
TRANSCRIPTION	P/T= 3 Minutes	P/T= 2-3 Minutes	Clear verbal orders, efficiency of the nurse to understand the orders of the doctor
TYPING	P/T 1 :07 Minutes	P/T= 10-15 Minutes	Efficiency of the system. Previous pending reports. Manpower
VERIFICATION	P/T = 2:14 Minutes	P/T = 5 Minutes	Less typing errors, availability of doctor, nursing staff handling the reports



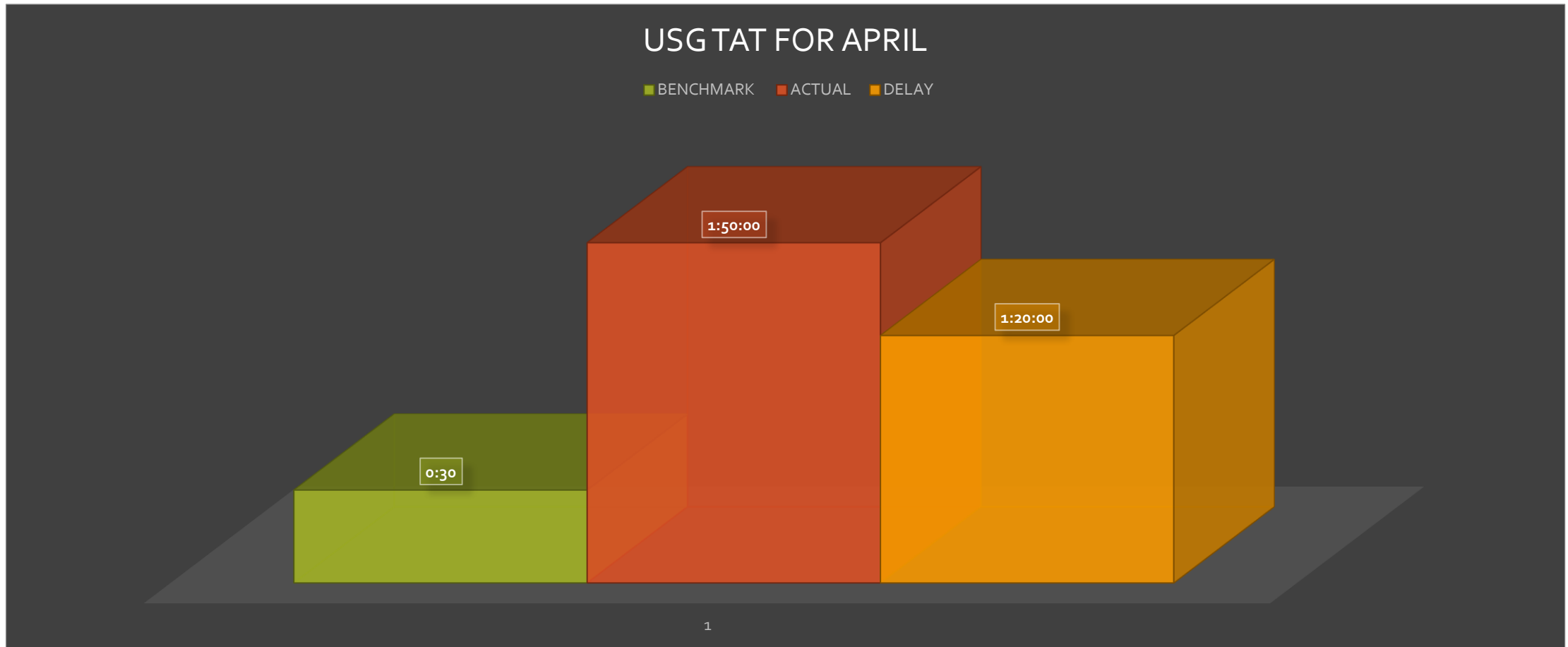
The graph represents the Expected time for generating the reports , the delay and the actual time for the month of February .

TAT FOR C-T REPORTS

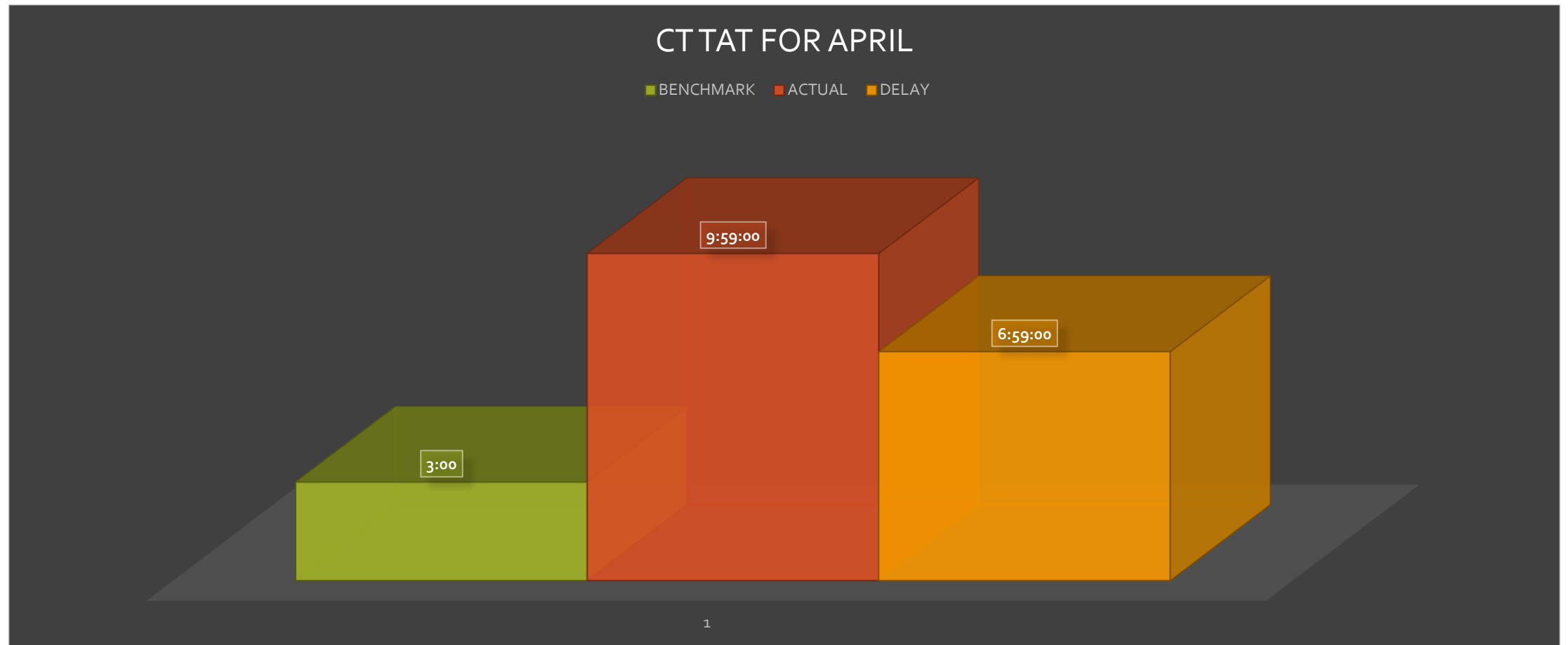
■ BENCHMARK ■ ACTUAL TIME ■ DELAY



The graph represents the Expected time , the delay and the actual time for generating the reports for the month of February.



The graph represents the Expected time, the delay and the actual time for generating reports.



The graph represents the Expected time , the actual time and the delay in generating the reports.

Representing the Total patient footfall with the sample size taken for both CT and USG .

Department	Month	Total patients	Sample size taken
USG	FEB	614	52
	MARCH	717	81
	APRIL	317	98

Department	Month	Total patients	Sample Size taken
CT	FEB	367	25
	MARCH	377	31
	APRIL	215	13

TOTAL = 300 Sample Size

Conclusion

- The Turn around time for the USG reports was considerably reduced from initially 3 hours 14 mins to 1 hour 50 min.
- In the CT Department there were not many changes seen in turn around time could not be reduced due to construction; due space constraints. New CT 128 slice underwent installation.
- Immediate requirement of the Nursing staff as the contrast injection were administered by the technicians.
- Immediate requirement of typist for writing the night reports that went pending till morning increasing the workload on the typist and simultaneously increasing the turnaround time.
- Outsourcing the reports is not a long-term solution for compensating the manpower deficiencies.
- Lack of calibration / servicing done by the Biomedical department has led to frequent breakdowns and reduced the life of the machine.
- Assigned GDA should be present in the department specially a female GDA for assisting the female patients.

Recommendations

- Infrastructure should be improved in the CT room should have a change room for patient privacy especially for female patients.
- There should be proper zoning to avoid any Un – authorized patient from entering the restricted zones to avoid accidents.
- Patient Scheduling should be done prioritizing the critical patients
- Number of typists should be increased in alternated shifts. At least 1 typist should be added for completing the night reports for investigations conducted at night.
- The hospital faces a deficient manpower with an urgent requirement of a Radiologist at least for reporting of procedures separately, following segregation of work uniformly such that the burden is not a single Radiologist.
- There should be a separate GDA staff for assisting CT and MRI patients separately.

- Recommendation for using dragon software i.e. speech recognition software that understands the specialty terminology with more than 99% accuracy. Optimizing the workflow with custom configurations that support the unique process of dictation in a radiology setting.
- Recommendation can be given for Digital Pen for avoiding transcription errors and saving time. In mission hospital the radiologist verbally dictates the findings to the nurses which is typed by the typist. This results in huge errors and corrections leading to increased wastage.
- Internal Trainings should be given to the Radiology team, with a brief discussion about the problems faced during the processes to avoid miscommunications and providing effective solution as Lean is a comprehensive process involving all the members of the department.

- Radiology Information System would reduce manual errors. Therefore, it should be properly implemented.

THANKYOU