Summer Training at
Max Super Specialty Hospital, Dehradun

• A Study to Assess the Reasons of Overtime and The Average Posts Filling Time in The Departments of MSSH Dehradun.

• A Study to Assess the Reasons of Delay for Kidney Function Test for IPD Patients in The Hospital Laboratory

By
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Under the guidance of
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MBA Hospital & Health Management
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Institute of Health Management Research
The IIHMR University, Jaipur

2018

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

CERTIFICATE

This is to certify that **Dr.Apoorva Mahar** has undergone summer training at **Max Super Specialty Hospital; Dehradun** from **2nd April, 2018 to 2nd June; 2018.** The candidate has earnestly completed the projects on:

1) Assessment of Overtime in the departments of MSSH &

2) Analysis of the reasons of delay for Kidney Function Test of IPD of MSSH.

Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish her success in all her future endeavors.

Arindam Das.

Dr.Arindam Das
Associate Professor
IIHMR University, Jaipur

for (Col (Dr) Ashok Kumar)

Col. (Dr) Ashok Kaushik 04.7.18.
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MAX HEALTHCARE

Date- 02-06-2018

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Apoorva Mahar** a student of IIHMR University, Jaipur pursuing MBA first year in Hospital and Healthcare Management has completed two projects under HR and operations from 02-04-2018 to 02-06-2018.

Projects:

- ***To understand the reasons of nursing overtime in critical areas***
- ***To assess the TAT for Kidney function test for the IPD***

During her tenure performance and conduct was excellent. We wish her all the best in her future endeavours.

For **Max Healthcare Institute Ltd**

Neha Shrivastav
DGM & Unit Head
Human Resources

Max Super Speciality Hospital
Malsi, Mussoorie Diversion Road
Dehradun-248001

Acknowledgement

I would like to extend my heartfelt gratitude to the Unit Head and Vice President Hospital Operation of Max Super speciality Hospital Dehradun Dr. Sandeep Singh Tanwar providing us the opportunity to undergo summer training in this esteemed organization.

I sincerely thanks Mrs.Neha Shrivastav Unit head of department of Human Resources at Max Super Speciality hospital for being a constant source of knowledge, support and guidance throughout our time in the hospital.

I am grateful to Mr.Rashmeet Singh Chhabra,Head Project manager at MSSH Dehradun for guiding us at each step and providing us oppurtunities of judicious learning by allotting us projects

I would also like to express gratitude to my mentor Mrs.Neha Shrivastav Unit Head HR for guiding me in the project, and providing many useful insights on various aspects of the hospital related to the project.

The completion of this undertaking would not have been possible without the wholehearted support of all the head of the departments of Max Superspeciality Hospital Dehradun.

I would also like to extend a note of thanks to our mentors at the IIHMR University Jaipur Dr.Arindam Das and Dr.Tanjul Saxena for being the constant guides.

Thanking You,

Dr. Apoorva Mahar

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Abbreviations

MSSH-Max super speciality Hospital

MICU- Medical Intensive care unit

Cath –Cathetrization

O.T-Operation theatre

CTVS ICU-Cardio Thoracic vascular surgery Intensive Care Unit

Post-Op-Post operative

Pre-Op-Pre operative

MAX Group Architecture

First MAX Group Health service was opened at Panchsheel Park - Day Care in year 2000.

MSSH Saket is the head office branch.

Max Corporate Office Gurgaon is the head office.

Mr.Analjeet singh is the founder of the Max Group.

Max Dehradun Unit head and VP Hospital Operations is Dr.Sandeep Singh Tanwar

- **Max Super Speciality Hospital, Dehradun**

MSSH Dehradun was inaugurated on 24th may 2012

Number of Beds Census: 172 / Capacity: 200

Operation Theater 6

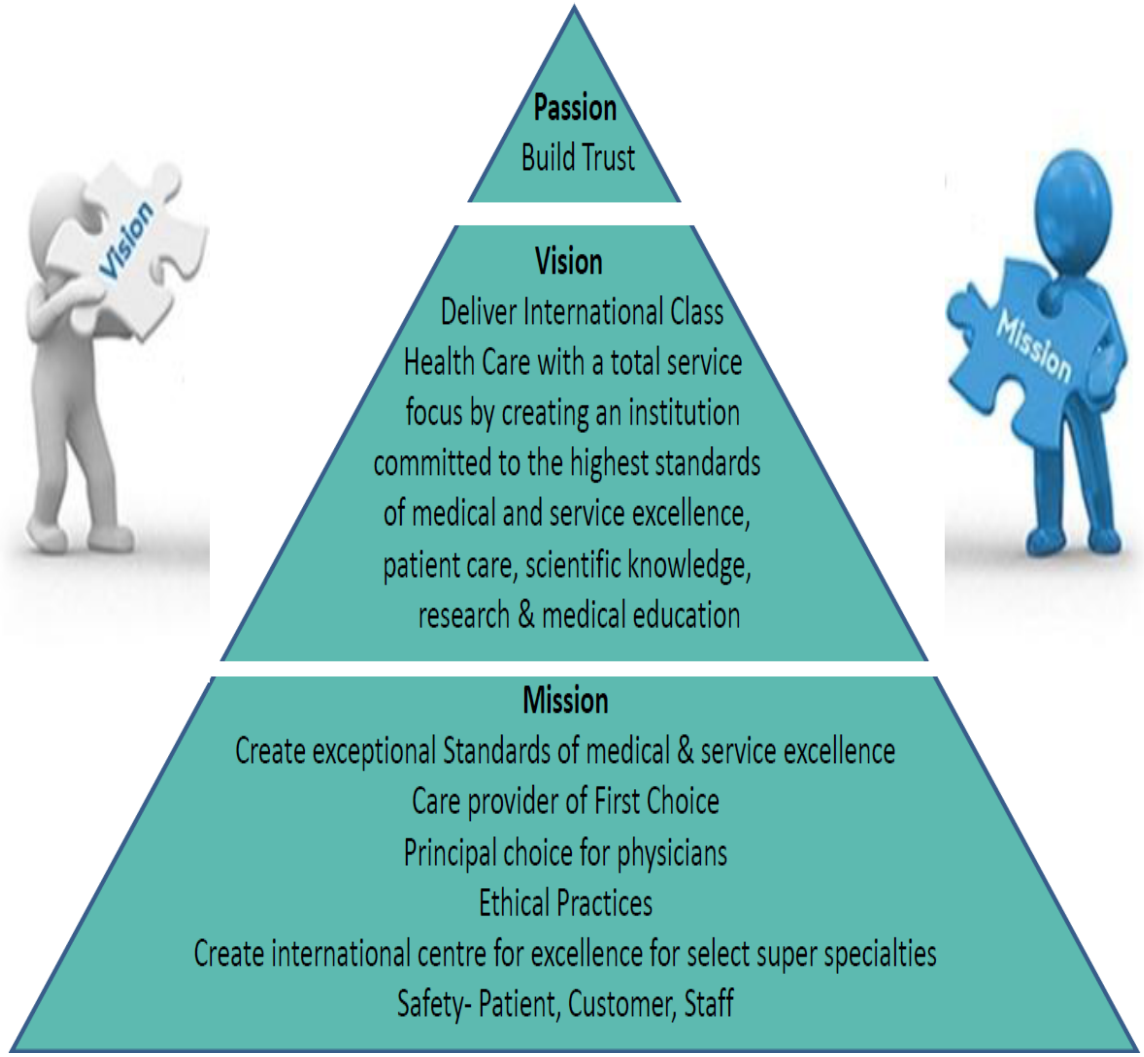
Labour Rooms 1

Physicians 116

Nurses 254

Total staff (on –roll) 614/Outsourced-367

VISION AND MISSION



1st NABH accredited hospital in Uttrakhand by Quality Council of India for maintaining high standards Clinical Care and Support Services.

 MAX is a LEED certified organization and has been awarded the Green Hospital Award for implementing and maintaining Green Initiatives

 NABL accreditation received on November 2015, confirming our commitment to continuous quality improvement

A study to assess the reasons for overtime in Medical ICUs,OT,Cath lab and Cardiothoracic vascular surgery ICU(CTVS ICU) department of Max Super speciality hospital Dehradun.

INTRODUCTION:

Manpower planning is the most crucial part of effective hospital administration. It falls under the ambit of Human Resource department of hospital.

The method of manpower planning includes-deciding the budgeted occupancy. It calls for the integration of information, formulation of policies and forecasting of future requirements of human resources so that the right personnel are available for the right job at the right time. It views employees are scarce and costly resources, whose contribution must be developed to the fullest by the management. This is done by studying three types of forecasts :

- Hospital's expansion forecast
- Economic forecast
- Employee's market forecast

Systematic manpower planning is a must for every dynamic organization. The management has to meet the challenge of various pressure such as political, economical and technological, to ensure that the future of the hospital remains bright under all circumstances.

Manpower Planning Steps:

Manpower planning covers the total activity of the personnel function such as recruitment selection, training career development staff appraisal etc. Manpower planning involves the following steps

1. Scrutiny of the current personnel strength
2. Anticipation of manpower needs
3. Investigation of turnover of personnel
4. Planning job requirements and job description

5. Analysing the average number of person requisition form sighned by the various departments

Research Question:

- What are the reasons for overtime in the Ot's, ICU's, Cath lab and MICU's of the hospital.
- What are the reasons for non-compliance of the Roster. Does the actual roster compliance matches to the desired roster compliance of at least 80%
- How can overtime be managed in the departments.

Research Objectives:

- To find out the reasons of overtime in the OT's,ICUs',Cath Lab and MICU2s'.
- To find out the reasons of not following of the rosters of the departments.
- To compare the actual roster compliance data of the sample departments to the desired roster compliance level.
- To provide suggestions to reduce overtime in the sample departments.

Methodology:

- The nurses of the MICU's, CTVS ICU,OT's and Cath lab were questioned through a unstructured questionnaire about the reasons of overtime.
- Daily observations of the given department were done to find out the reasons of extra duty hours; also the workflow and shortcomings in it were observed and noted.

Research Design:

A descriptive cross sectional comparative study was done in the OT's, ICU's,MICU's and Cath Lab.

Period of study: 2 months

Sampling design: Purposive sampling was followed in selected departments

Inclusion criteria:

All the nurses working in the OT's,Cath Lab, MICUs',CTVS ICU.

Exclusion Criteria:

- Pulled in nurses of other department.
- Recently joined nurses.
- Emergency staff

Tools for data collection:

A predesigned questionnaire was prepared to assess the reasons of overtime from the nursing staff's perspective.

Direct observation data was collected for the staff daily attendance for the month of April and May

Any discrepancy from the roster was thereafter quantitively analyzed by assigning the value "1"-in case of discrepancy present and "0" in case of no discrepancy.

Operation Theatre

Location:1st floor

Total number of OTs- 06

No.1	No.2	No.3	No.4	No.5	No.6
•General	•Cardiac	•ORTHO	•NEURO	•GENERAL	•EMERGEN.

Surgeons	Nursing Staff	Technicians
•41	•25 •1TL	•18

Manpower Planning:

I. Nursing Staff segregation:

5 in Recovery OT.

6 in Neuro OT.

5 in Ortho OT.

3 in Cardiac OT.

7 in General OT.

Nurse's Shifts: -

Morning-8am to 4.30pm

Evening-12pm to 8pm

The shifts of a staff are changed in alternative week.

II. Technicians:

General	+ortho	Neuro	Cardiac	Scrubbing
09		05	04	05

One technician always present in night.

III. GENERAL DUTY ASSISTANCE-05[outsourced]-3 shifts

Morning-8am to 2 pm

Evening -2pm to 8pm

Night -8pm to 8am

IV. O.T Coordinators-2,General Morning shift (8am to 4.30 pm)

- On call staff:

General	Cardio	Neuro	Ortho
3	3	3	3

Weekly oncall of every nursing staff

6 BEDS-For preop+postop+recovery

Patient is kept for approximately 1.5 hours for post op observation or until patient recovers from unconsciousness.

Rostering:

1. The roster is prepared at the beginning of every month by the team leader and is pasted in the department.
2. The roster prepared at the starting of the month is followed and changes if any are made as and when required. The duties of the staff are then intimated by the team leader on ‘whatsapp’.
3. The changes in the roster after its preparation are made in case of personal emergency of the staff.
4. The nursing staff in case of unplanned leaves inform the team leader, Who then make the changes in the duty according to the currently available staff.

Duties of nursing staff:

- Scrub nurse-assist the surgeon in her/his surgery.
- Floor nurse-assist the surgeon to get the required equipments during the surgery.
- Daily entry of the nursing notes
- Getting the pre anesthetic clearance of the patient from the doctor.
- Pre-operative preparation of the patient-checking all the clearances, administering the required medicines, noting the preoperative vitals of the patient.
- Checking the handover papers from the last nurse on duty while admitting the patient to OT from any department.
- Filling the required pre op details of the patient and getting the required consent forms filled by the patient.
- Filling of the pre op questionnaire, preoperative nursing checklist, and preoperative evaluation.

- The shifting of patient to recovery room, observing the vitals for 1.5 hour if stable then the patient is shifted to either critical care unit or the wards.

Duties of technicians:

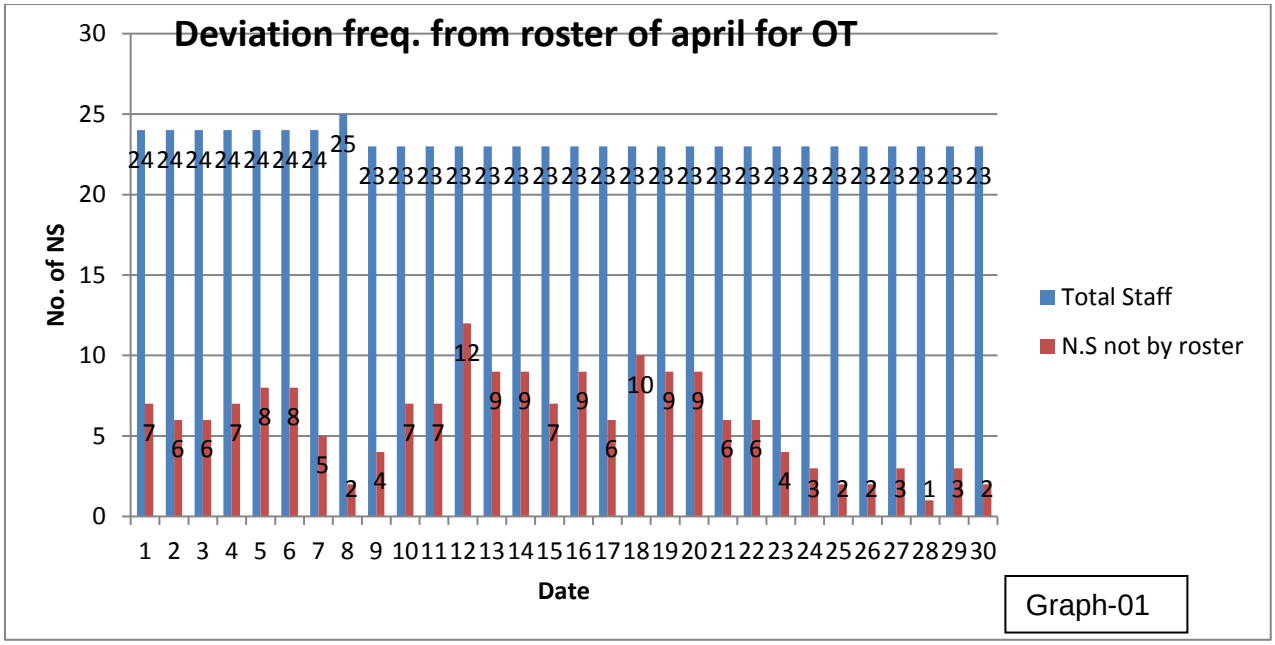
- Scrubbing
- Managing the equipments in the OT'S
- Dispatching the soiled instrument to the CSSD, collecting the clean instruments.
- Preparing the OT for next surgeries.

Reasons for overtime:

- Consent is usually taken at least 12 hours before the surgery; the attendants of the patient may not be available resulting in delay in procedure. This in turn causes extra hours for nurse.
- Surgeons do not report on time for the surgery.
- The required clearance of the patient before the surgery is not done on time. For instance the lab reports are not provided on time. Most of the lab reports delay was due to the late sample received from the patient.
- The pre anesthetic clearance by the doctors is not done on time, the staff keeps on asking the nursing station but there is no response. Due to this the lab investigations to be done are delayed and so the surgeries.
- Sometimes the patient's vitals are not stable for the surgery which delays the surgery. The patient may forget the pre op instructions like avoidance of food which delay the surgery.
- Some doctors might shift the surgery to their preferable time.
- Some surgeries or procedures like explorative laparoscopy are add on procedures this extend the O.T time.
- In the morning when the staff is available on time, the surgeries still not start on time because of incomplete investigations, late paperwork completion, and delay of doctor.
- Procedural delay in the surgery because of which the staff is bound to that surgery until it completes.
- The nursing staff is allocated to a particular sub department of OT, making the staff skilled in that department, thus doctors are unwilling to change their staff.

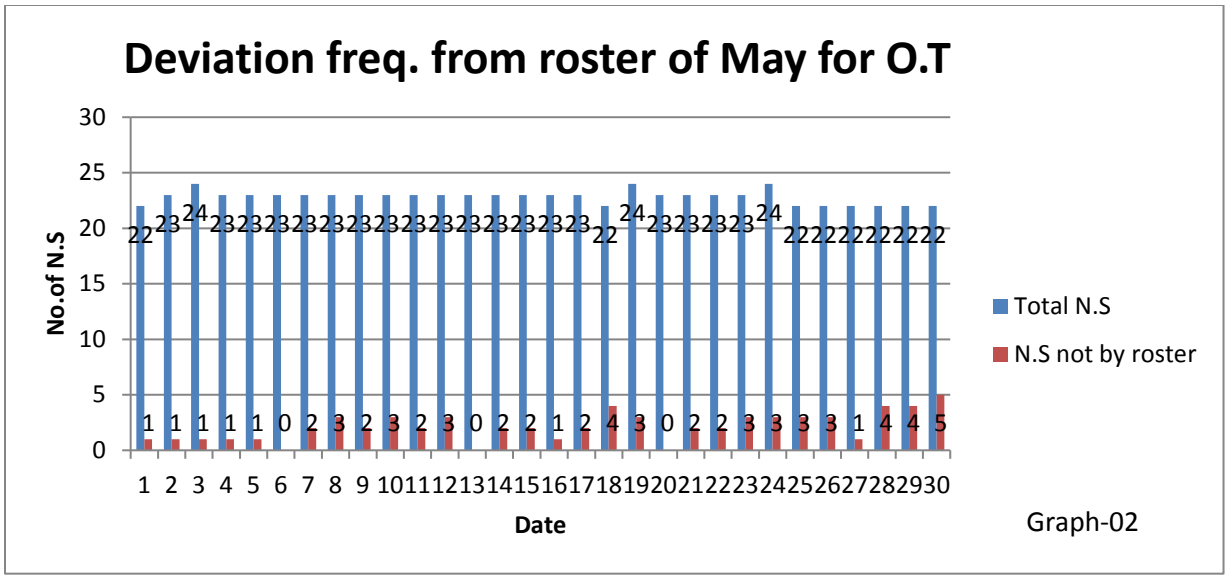
- During any emergency the nursing staff skilled in that department is called, this leads to "on calls" of a particular staff more then to other.
- Dependency on certain groups of employees who are required to work overtime due to their expertise in their position.

The Frequency of deviation from the Roster in month of April and May is:



Interpretation:

For the month of April an average of 6 People out of 26 nursing staff deviated from their roster duty daily.



Graph-02

Interpretation:
For the month of May an average of 3 people per day deviated from their roster duty daily.

MICU-1 AND MICU-2

- **Location:2nd floor**
- **Manpower planning:**

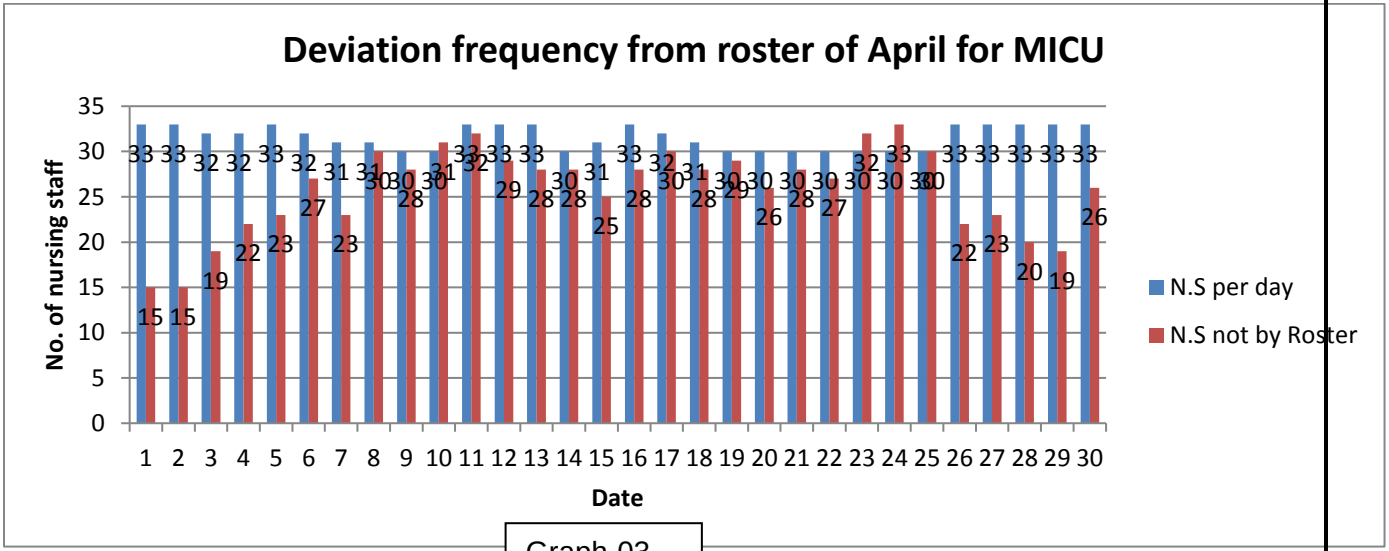
ONE MICU COORDINATOR PER MICU 10 beds in MICU-1 and 14 beds in MICU-2		
ONE SR AND ONE JR PER MICU	MICU-01 Nursing staff-20+1 TL MICU-02 Nursing Staff-26+1 TL	2 GDA each shift per MICU for every shift.

Working hours planning:

- 8 morning+8 evening shift+8 night shift+6 weekly of.
- 196 working hours to be completed. After 4 night shift one off is given.
- For nursing staff TL-8:00 am to 4:30 pm (General Morning shift.
- For TL-4 weekly off-work hours to be completed are 208.

Nursing-patient ratio:

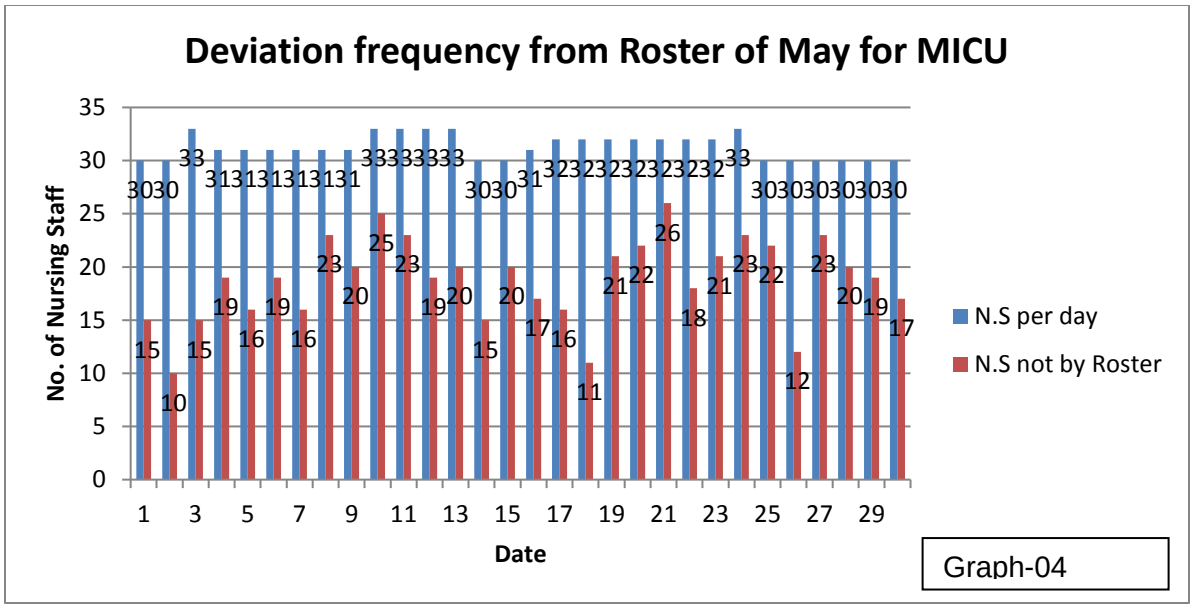
- 1:1 in isolation and ventilator patient
- 1:2 in non ventilator patient. It may be 1:3 also in case the patient is stable and staff is in short.
- Ideal staff requirement of MICU-2: if full occupancy is there and 1 isolation bed+7 ventilator patient+6 non ventilator patient are present……then nursing staff required is-1+7+3=11
- For 3 shift and night 12 hours duty 11*3=33.
- If we have 33 nurses then the roster prepared in the starting of month can be followed if occupancy is nearly 90%.



Graph-03

Interpretation:

For the month of April an average of 26 people per day deviated from their duty roster daily.



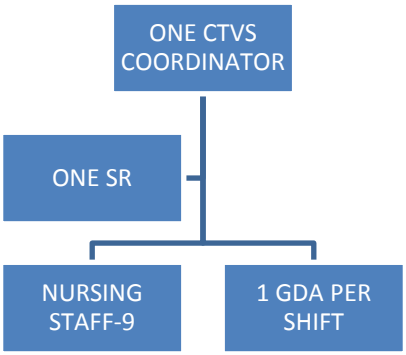
Interpretation: For the month of May an average of 19 nursing staff deviated from their roster daily.

Duties of the nursing staff:

- During shift change the TL of previous shift brief the current shift TL about the necessary information about equipments, drugs required
- Or any other briefing it takes approximately 15-20 mins.A TL handover register is also prepared and is filled in each shift handover.
- The nurses of current shift take the patient side handover from the last shift's nurse which takes approximately 5-15 minutes depending on the severity of the patient.
- The nurses enter the nursing notes on COW(Computer on wheels).and also bring or transfer patient from the OT/ward to ICU or vice versa
- The doctors come on round in each shift, doctor's notes or instructions are entered in the COW by JR.
- In situation of a "patient crash"{heartbeat=0}
- 2 nursing staff-for CPR
- 1 to administer drugs
- 1 on floor to bring necessary material
- A total of 4 nurses are required if any patient crashes.

CTVS ICU

[CARDIO THORACIC VASCULAR SURGERY ICU]



Location:1st floor

Total number of beds-6

Nursing patient ratio:-1:2

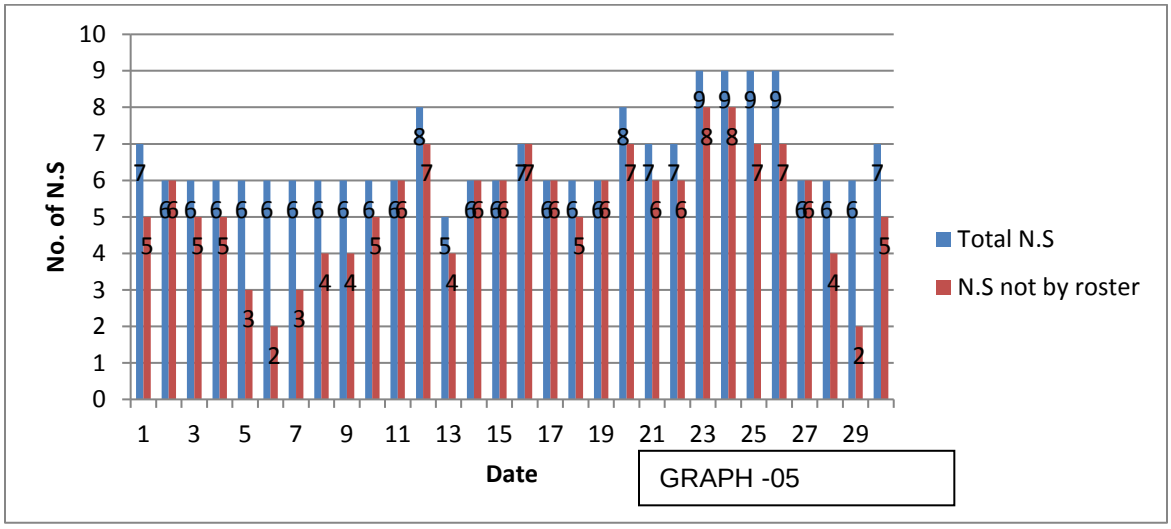
Generally 3 staff remains in duty per shift. The shifts are morning, evening and night.

The TL comes in general morning shift. For other shifts Shift TL are there.

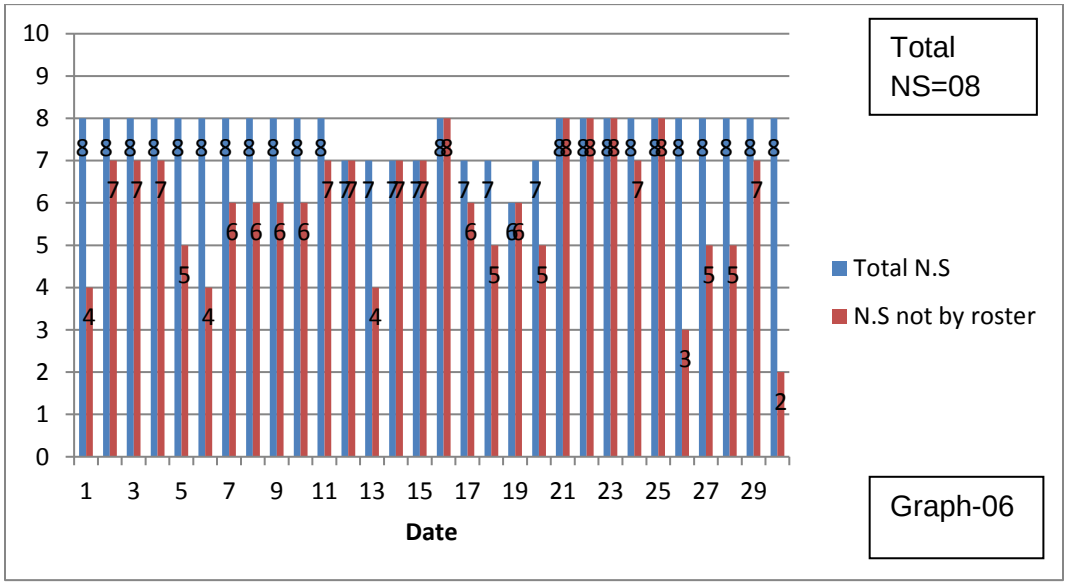
ROSTERING AND OVERTIME in ICU's:

- The roster is prepared at the beginning of the month keeping In mind the 3 shifts+(weekly off,pcd,any other leave).the duties of the staff are distributed accordingly.
- The leaves required by the nursing staff are told to the TL or communicated through communication register in the beginning of the month, the TL then make the roster accommodating the information.
- Due to daily changes in number of patients or any staff emergency leave the roster is changed every evening and the staff is then intimated.
- Currently per shift at least 5 nursing staff is present.
- The patient number fluctuates in the MICU because of which the number of nursing staff for patient care is changed almost every day.

- Changes in number of patients in the ICU due to which is there are no patients then the staff of ICU's is pulled out in other department.
- If the patients are more then the staff is pulled in the CTVS ICU,though the pulling in rarely happen despite of increase in patient.The TL request for more staff but its still not provided.
- In case of increase in number of patients the nursing staff has to do double duty.
- The staff double duty is compensated in compensatory off.



N=08 For the month of april an average of 5 people per day deviated from their duty roster daily.



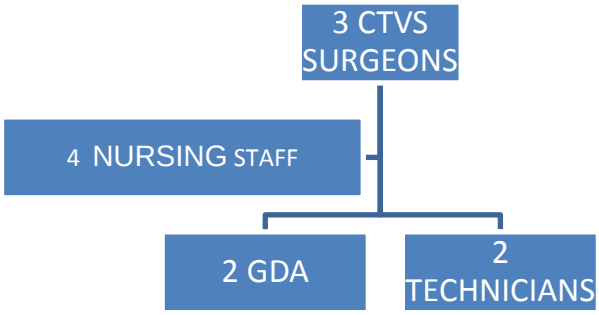
For the month of may an average of 6 people deviated from their duty roster daily.

CATH LAB

Location:1st floor

2 recovery beds

One OT bed



General morning shift from 9am to 5 pm

One staff generally on leave per day.

Rostering and overtime:

- The roster is prepared in the beginning of the month and is followed for the whole month.
- Usually the staff do not have any problem to follow the roster.
- The overtime happens through oncall only .Oncall of Rs.500 is given for all the call

Patient journey mapping in Cath lab:

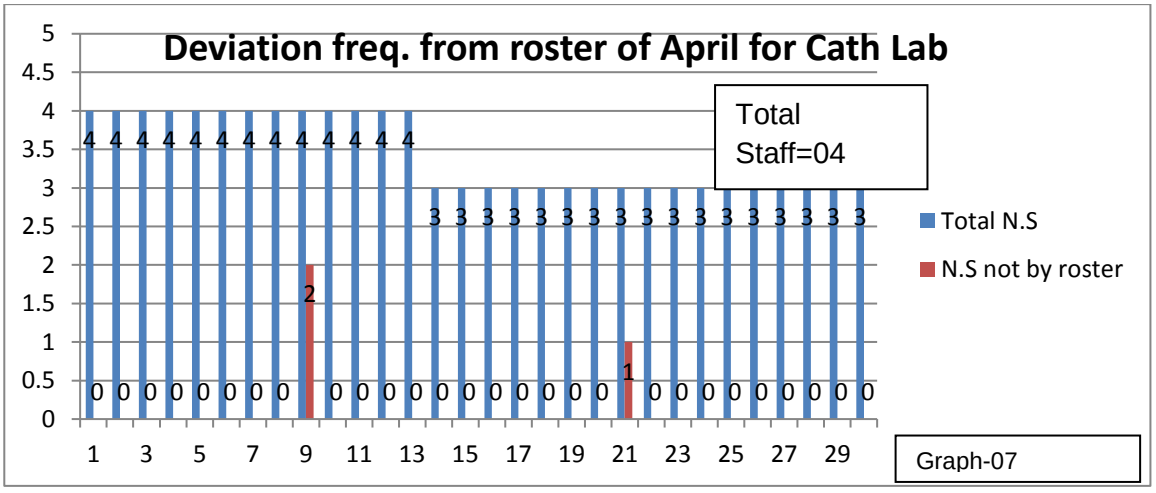
- The patient presented with symptoms in the OPD.
- According to the condition the patient is advised for Coronary Angiography (CAG).
- The patient is either admitted or taken for the procedure.

- Before the procedure the pt.is taken into the cath lab.The handover of the patient is done the details are taken in the handover register, all the consents of the patient and the attendant are recorded.
- For the procedure-The pt. is prepared,
    1. One nurse prepare the patient
    2. The other nurse sets the instruments for the surgery.

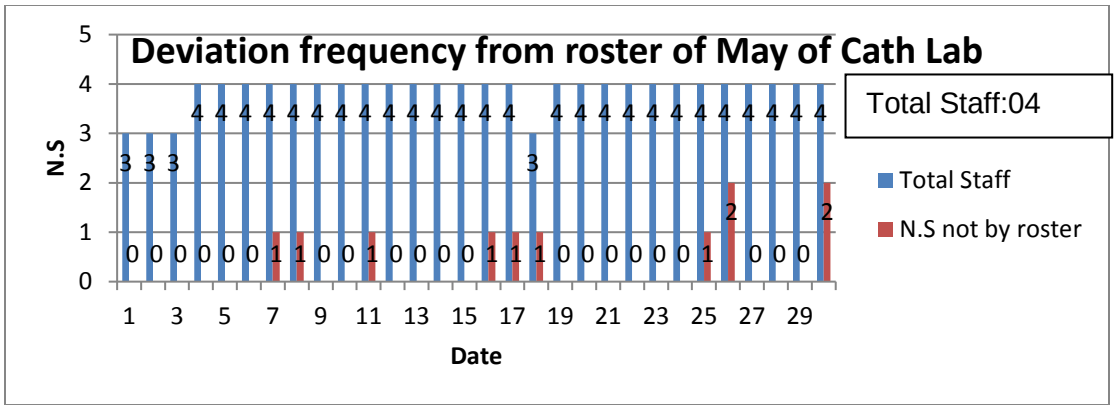
- The CAG procedure is of 15 min.for the procedure a doctor is assisted by the scrub nurse,a technician is on the machine,and a floor nurse is present,total 4 people are in the OT.
- In the case of a sick patient,an anesthetic is called and one extra nurse is present.
- While the 2 nurses are inside the OT,one nurse outside enters the notes.
- The coordination of the staff is so good that nursing notes are entered in the system by any four .
- When one technician is in the OT,the other enter the notes and completes the register entry .

After the procedure,the nurses clean the Procedure room.

The frequency of deviation from the roster for april and may is:



Only on 9th april when 2 people deviated from the roster and 21st april when 1 staff deviated from the roster.The staff has general morning shift only.And emergency oncalls.



Graph-08

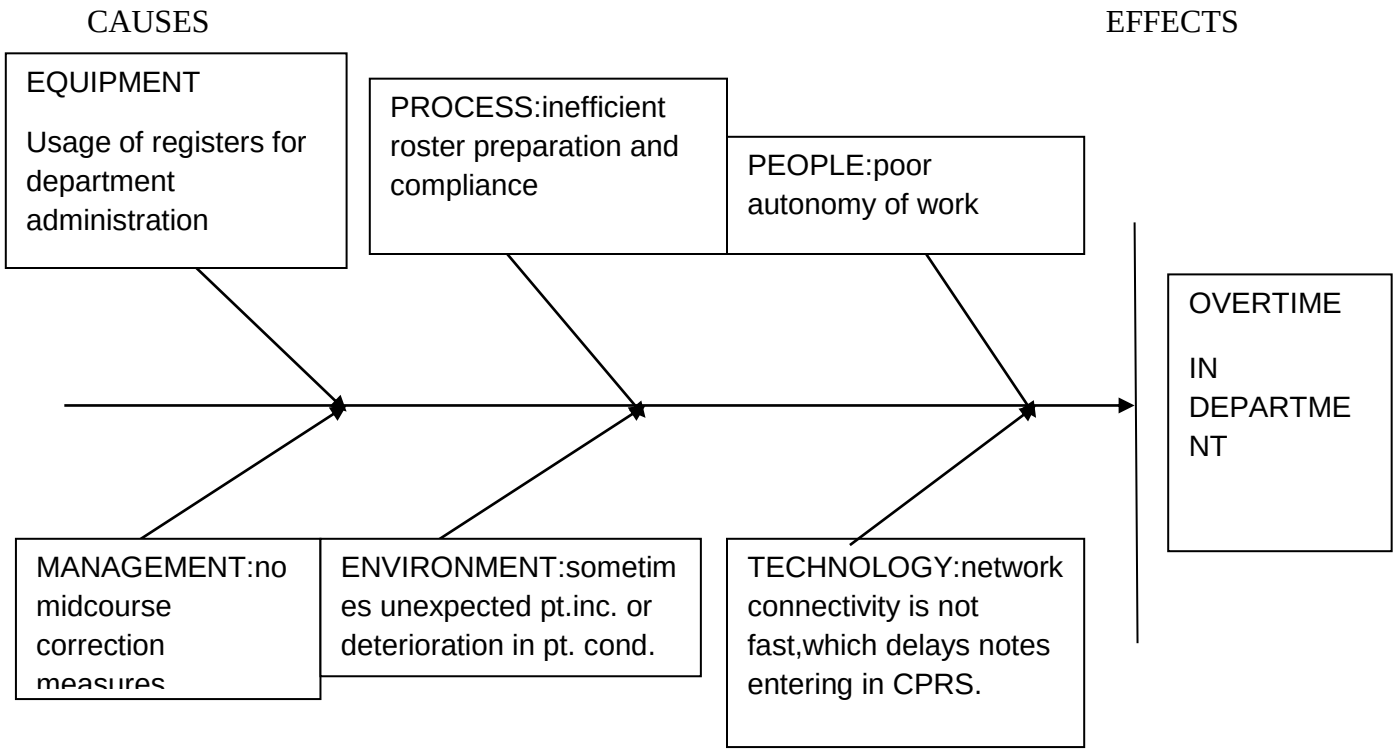
Only on 11th when one staff deviated,16th,17th,18th –one staff deviated and on 25th-one staff deviated,26th and 30th- 2 people deviated.

In Cath Lab the nursing staff and technicians are able to follow the roster properly.The extra pay in this department is due to the Oncalls only which happens when any emergency case comes.

Statistical calculations:
Hypothesis-There is no difference between the actual roster compliance in 4 departments and desired roster compliance(80%).

OT	MICU	CTVS ICU	Cath Lab
P=0.8 ;Q=0.2,n=27 April:p= 6;q=21 $z = \frac{\lvert p - P \rvert}{\sqrt{S.E(P)}}$ S.E(P)=$\sqrt{\frac{PQ}{n}}$=0.077 $Z_{calculated}$=18.74 $Z_{95\%}$=1.96 Since $z_{cal} > z_{tabulated}$:reject hypothesis.that means the actual roster compliance in OT is not as desired.	P=0.8;Q=0.2,n=40 April:p=26;q=14 S.E=0.063 $Z_{calclated}$=20 $Z_{95\%}$=1.96 Since,$z_{cal} > z_{tab,}$Hence we reject the hypothesis,i.e the actual roster compliance in MICU is not as desired.	P=0.8;Q=0.2,n=9 April:p=5;q=4 S.E=$\sqrt{\frac{0.8*0.2}{9}}$=0.133 $Z_{calculated}$=11.52 $Z_{95\%}$=1.96 Since,$z_{cal} > z_{tab,}$Hence we reject the hypothesis,i.e the actual roster compliance in CTVS ICU is not as desired.	P=0.8;Q=0.2;n=4 April:p=1;q=3 S.E=$\sqrt{\frac{0.8*0.2}{4}}$=0.2 $z_{calculated}$=$\frac{1-0.8}{\sqrt{0.2}}$=0.45 $z_{95\%}$=1.96 Since,$z_{cal} < z_{tab,}$Hence we accept the hypothesis,i.e the actual roster compliance in Cath Lab is as desired.

ROOT CAUSE ANALYSIS:



Discussion:

- Due to unprecedented increase in number of patients the staff required increases which leads to overtime by the other staff.
- The roster can be prepared by putting also the replacement staff in the roster.
- Due to emergency leaves of the staff other staff is made to do overtime.
- Due to attrition in department like MICU and the time required to fill that vacancy,the present staff has to do overtime to fill that space until the new staff joins.A bond of atleast one year can be filled by the nurse to serve in Max.
- The new staff is slow to learn because of which work is extended.Due to this the necessary register recording is also not proper as the new staff may forget to fill any-one register,or may miss entry in the system.Due to this the next shift staff may not get proper instructions.
- In critical care the required patient:nurse ratio is 1:1,and if there is a increase in number of critical patients then the requirement of staff increases.for example:
- in cath lab during a procedure if a patient becomes sick then 2 more nursing staff is called one to help the anesthetic,other to go for any drugs required.
- In MICU if a patient crashes then nurse requirement are more.Such emergency situation increases the staff requirements.

SUGGESTIONS :

- The review of overtime or extra duty hours of the staff should be done on the weekly bases.
- Collating this data with the patient admission/discharge/transfer and also to the types of patient (venti/non venti/isolated).
    - Everybody from the nursing staff to the nursing supritendent should be made to realize the importance of the right rostering method and the importance of it to the industry as well as to them.
    - A staff loyalty should be attained one method of doing it can be by comparing the work environment of other hospitals to that of max and the staff should be made aware of it.
    - Through this the staff will be able to appreciate the merits of working at Max.
    - This can be done in 14 days interval,in these meetings the shortcomings of the staff can also be addressed and corrective measures can be taken.A mid course improvemt can be done.
    - Though the " induction process" is done at the beginning,but attitude change is a continuous process.The nursing supervisor of each floor can be given this duty ,this can be done fortnightly.
    - At the end of the month "A best working department recognition","best staff coordination team recognition" can be given for first few months to make the staff feel confident about achieving the target.
    - When a new joinee comes in the department s/he is asked to observe work with a staff and take the patient handover.Along with this a proper walkdown of the records to be filled and enteries to be done should also be given.which is not done in the department,as the nursing staff is busy with their patients.
    - The persont taking the overtime,and the reason for overtime should be asked and noted regularly with every overtime.
    - The nurses are not much efficient and has no autonomy for the work,as they complaint of making enteries in the system a burden of their job.
    - A strict check is to be kept on overtime,as the staff and the supervisor get used to doing overtime and do not look for pulling in staff from other department in case of staff shortage.

- The departments are particular about their staff and do not prefer pulling in staff from other department,as the nurses of particular department are specialized in their work and are familiar with the environment.
- It has also been observed though according to the rules the roster should be prepared in starting of the month in consultation with the staff.But some nursing staff told that it is not done due to which staff takes unprecedented leave leading to overtime.
- A roster making time can be set out in starting of month in the presence of one administration staff,in which the nursing staffand the team leader sit together to make the roster.Though the communication register is present, but still the unplanned leaves are not managed properly.
- In case of higher occupancy the MICU's avoid pulling in staff from other department as different department has different procedures and different records to be taken.
- Which become tough to be told to the new staff. Thus there should be standard filling of registers in different departments and the staff should be trained and made to learn it.
- Thus a behavioral change is to be required to improve compliance of the staff to the procedures. The efficiency of the staff also needed to be improve to manage work more effectively.
- The interpersonal relations between MICU and OT and ward nurses are not much pleasant. The nurses believe in an eye for an eye pjilosophy.A fortnight training about the standard protocol followed during the transfer of the patient should be taught and practiced also.
- The Medical ICU's delays are mostly because of increase in critical patient and not enough efficient nursing staff to manage the workload.
- Manpower planning and management covers the most part of revenue expenditure of the hospital, a strict monthly check as well as mid month check on this expenditure should be practiced.

Recruitment process at the Hospital

People Requisition Form is raised from the department .

Or

A new position is approved from the department

It is signed by the department head and send to HR department.

The PRF goes to the HR Department :for posts of manager,clinician level the approval is asked from the head office of Max at Okhla

The HR head take approval from the Head Office of MAX at Gurgaon.

For posts of support staff the approval is done by the Unit Head and HR Head.

The new position can be budgeted or non budgeted

Start recruitment through sourcing,,online job portals and walk ins,referrals.

Selection from the prospective candidiates is done through personal interview and years of work experience.

Turnaround time for various posts:

4 cadres:

Physicians	Nursing	Paramedics	Front Office	Support
•1 month •Consultants-3months	•2 month	•1 month	•1 month	•3 months •includes managerial posts also.

The posts of Nursing and Technicians are filled within 15-20 days.

Conclusion:

Manpower planning is the most essential part of Hospital administration. It should be sufficient to manage the workload in a lean manner.Overtmie in departments which receive emergency patients is more for eg. Any emergency Cath procedurein the department like cath lab which have general shift of their staff have the least overtime and more on calls.

In OT's the procedural delays, late patient preparation, unavailability of doctors and staff on time are the main reasons of extra time.

References:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1067312/pdf/hsresearch00570-0078.pdf
2. http://www.who.int/hrh/en/HRDJ_3_3_05.pdf

Project-02

ACKNOWLEDGEMENT

I would like to extend our heartfelt gratitude to the Unit Head and Vice President Hospital Operation of Max Superspeciality Hospital Dehradun Dr.Sandeep Singh Tanwar for providing us the opportunity to undergo summer training in this esteemed organization.

We sincerely thank Mrs.Neha Shrivastav Unit head of department of Human Resources at Max Super Speciality hospital for being a constant source of knowledge,support and guidance throughout our time in the hospital.

We are grateful to Dr.Nalin Bhatia Quality Manager of Lab at MSSH Dehradun for guiding us at each step and providing us opportunities of judicious learning.

The completion of this undertaking would not have been possible without the wholehearted support of all the head of the departments of Max Superspeciality Hospital Dehradun.

We would also like to extend a note of thanks to our mentors at the IIHMR University Jaipur Dr.Arindam Das and Dr.Tanjul Saxena for being our constant guides

Thanking You

Dr. Apoorva Mahar

TABLE OF CONTENTS

To analyze the turnaround time of Kidney Function test for the Laboratory sample from Inpatient department of the Max Superspeciality Hospital Dehradun.

INTRODUCTION:

Laboratory diagnostic service is required for providing effective diagnosis of the disease suffered by the patient, it aids in measuring the amount of medicines to be given for treatment, it quantify the extent of cure effected, also identify the medical sensitivities of the patient to avoid wrong/under/over medication resulting in adverse effects. The Lab services also help to extend the research and development capabilities of the medical process.

Medical treatment or patient care procedures have become highly dependent on diagnostic service to provide measured and accurate inputs. Keeping in view the requirement of evidence based medicine in this era of consumer protection act; it is not surprising that almost more than 80% of the medical treatment is dependent on proper diagnostic inputs. The Lab at MSSH Dehradun conducts one third of its tests as Kidney Function Test.KFT tests occupy the largest portion of tests done every month in the Lab.The parameters of this test are:-Bicarbonate ions,Chloride ions,Urea and Creatinine protein,Sodium and potassium ions.

The branches of Laboratory diagnosis is conventionally divided into two, anatomical pathology and clinical pathology.

Anatomical pathology includes histopathology, cyst pathology, electro microscopy etc and Clinical pathology includes, microbiology, bio chemistry, hematology, genetics, reproductive biology etc, each of these sub sections have further specialized fields of study which offer an in depth view of the disease and the body

Research Questions:

- What is the average turn around time for Kidney Function Lab Test from Nurse's sample collection to report verification of IPD patients.
- How many tests verifications are delayed from the standard turnaround time(after sample requisition) of 3 hours for Kidney Function test in IPD patients(for parameters-Bicarbonate,Chloride,Sodium,Potassium,Urea,Creatinine.)and how many are delayed from Nurse's sample collection of IPD patients.

Problem statement:
Due to delays in lab report of IPD patients, the respective procedures get delayed. Which further delays the other treatment to be given to the patient? The most frequent test required for the treatment is Kidney Function Test. Which has the standard Turnaround time (after sample requisition at the lab)of 3 hours. The verification time in some cases increases because of greater time difference between Nurse's collection and Sample requisition at the Lab.

Research Objectives:

- To analyze the collected data for month of April and may, for finding the average turnaround time of Kidney Function Test.
- To collate data to find out the number of dalays beyond the standard TAT of 3 hours for report verification.

To provide suggestions for delayed cases to reduce TAT.

Staffing at the lab

3 technicians in the morning shift -8 am to 16:30.

Of 3 one technician at the microbiology table-for stool test, urine test and Complete Blood Culture.

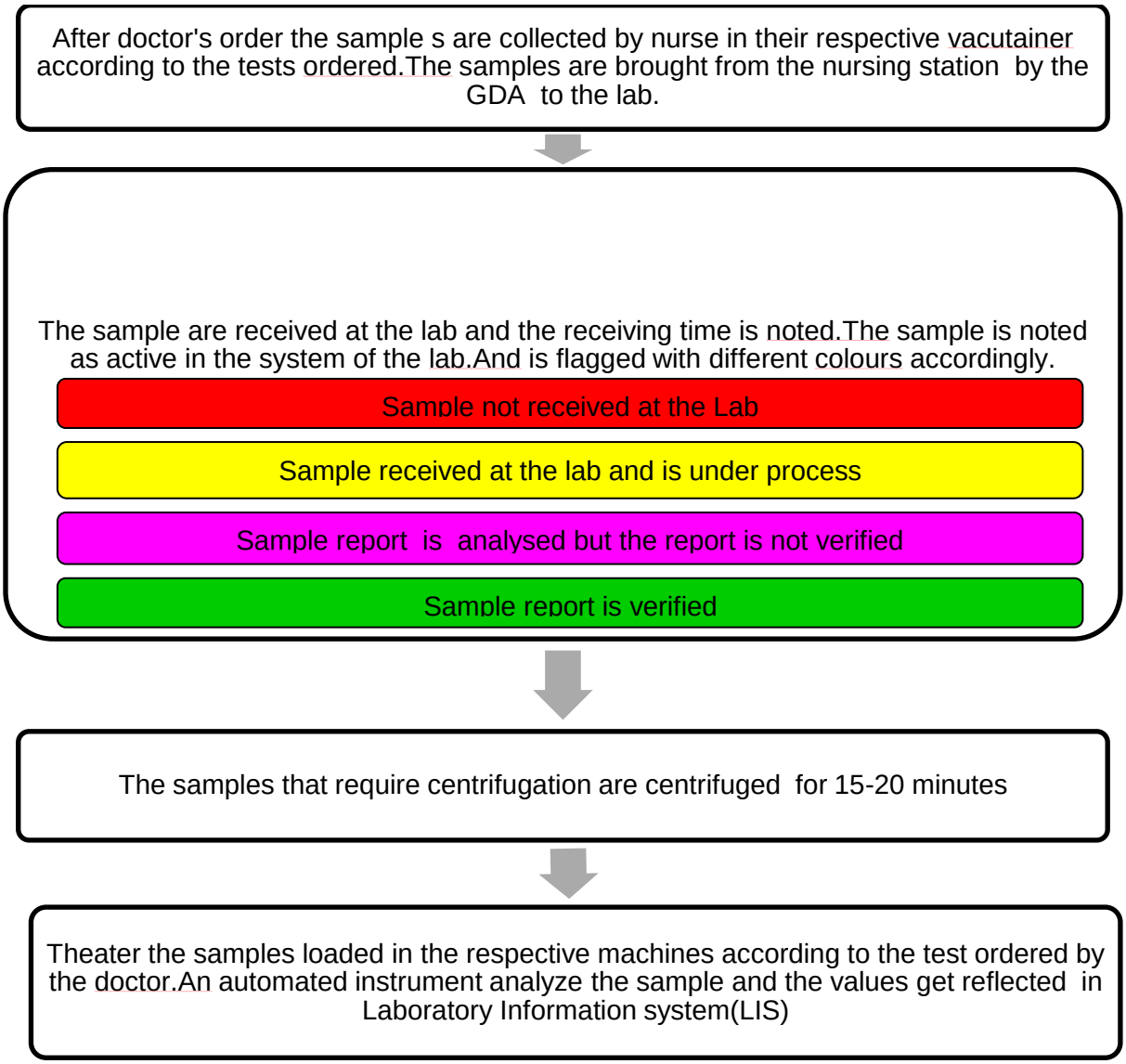
1 supervisor-general shift(8 to 16:30)

Total Staff-4.

1 staff at night

Trainees from the colleges of B.S.C MLT course also come for 6 months.

Workflow in the Lab:


After doctor's order the sample s are collected by nurse in their respective vacutainer according to the tests ordered.The samples are brought from the nursing station by the GDA to the lab.
The sample are received at the lab and the receiving time is noted.The sample is noted as active in the system of the lab.And is flagged with different colours accordingly.
Sample not received at the Lab
Sample received at the lab and is under process
Sample report is analysed but the report is not verified
Sample report is verified
The samples that require centrifugation are centrifuged for 15-20 minutes
Theater the samples loaded in the respective machines according to the test ordered by the doctor.An automated instrument analyze the sample and the values get reflected in Laboratory Information system(LIS)

After doctor's order the sample s are collected by nurse in their respective vacutainer according to the tests ordered.The samples are brought from the nursing station by the GDA to the lab.

The sample are received at the lab and the receiving time is noted.The sample is noted as active in the system of the lab.And is flagged with different colours accordingly

The samples that require centrifugation are centrifuged for 15-20 minutes.and for samples that don't they are set up for the further Lab analysis.

Thereafer the samples loaded in the respective machines according for the test ordered by the doctor.An automated instrument analyze the sample and the values get reflected in Laboratory Information system(LIS)

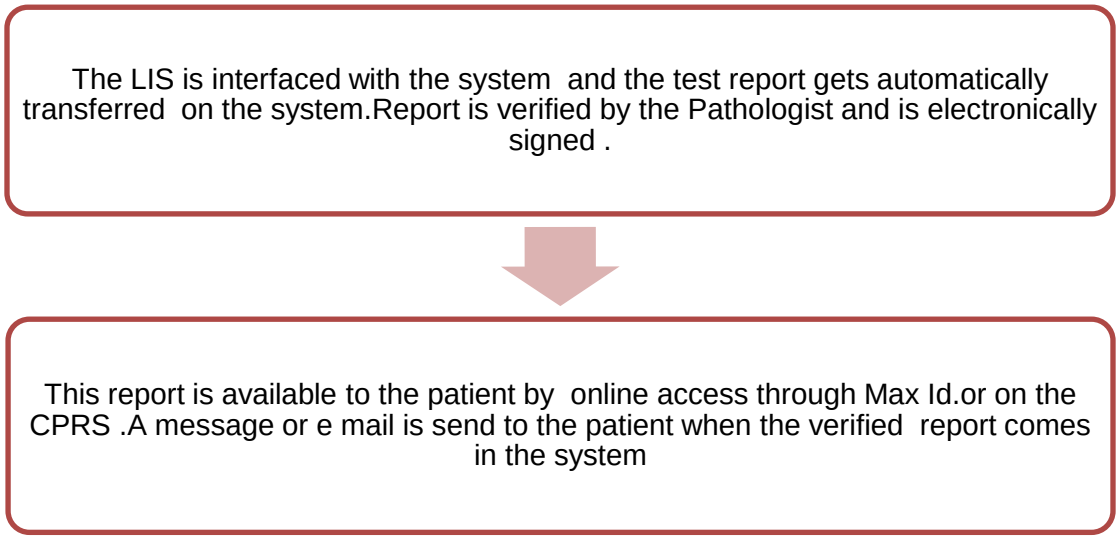


Fig.01

The biochemistry is done in the Machine(AU 480,Beckman Coulter which at a time can run 60 samples.

For any stat report an emergency tray is present.

Per sample biochemistry(kidney function test,Liver function test,Lipid profile)turnaround time is 1 hour.

Machine VITROS ECT-used for viral serology test

Machine Access 2-used for vitamin,iron content in sample calculation,etc.LH 750 is the bigger version of it with faster processing.

ACL ELITE PRO used for Prothrombin time and APTT calculation.

AXH 500-Used for Complete Blood Count and haemogram

Bactialert 3D Is used for blood,urine or stool culture

Vitek 2 is used for Culture Sensitivity

2 Centrifuge machines.

1 frozen section

1 pathology slide staining chamber.

Organogram at the Laboratory:

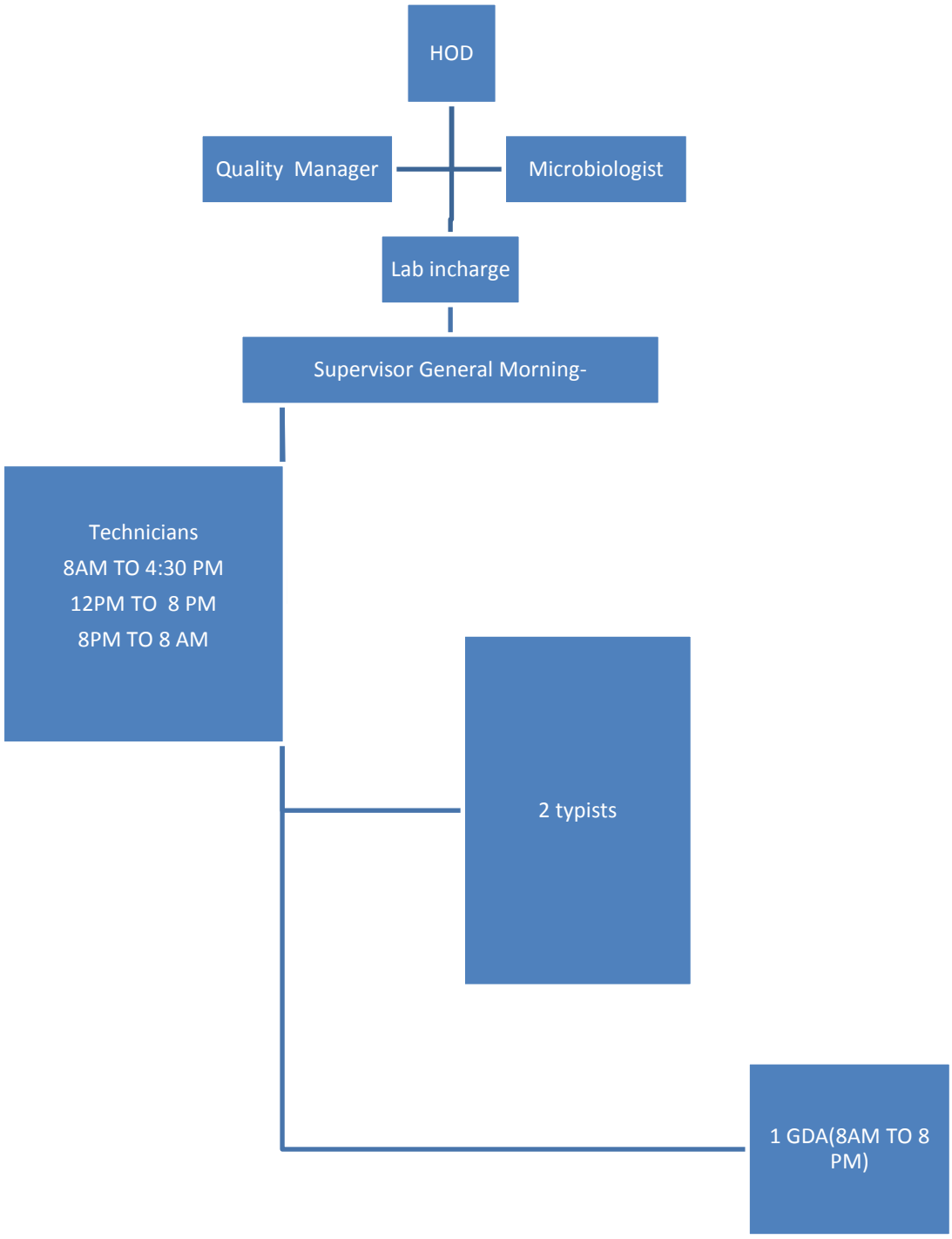
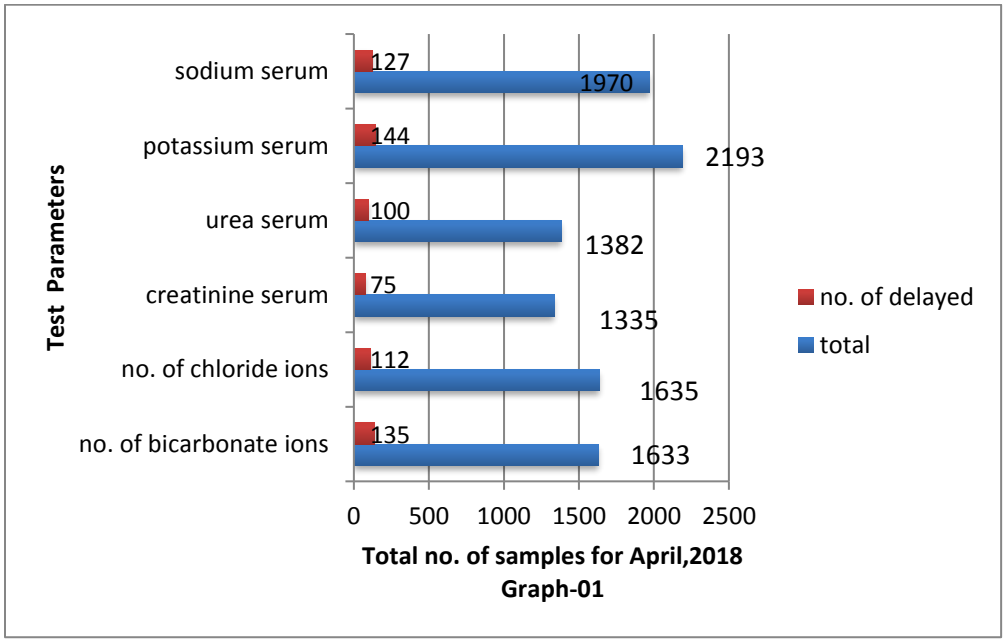


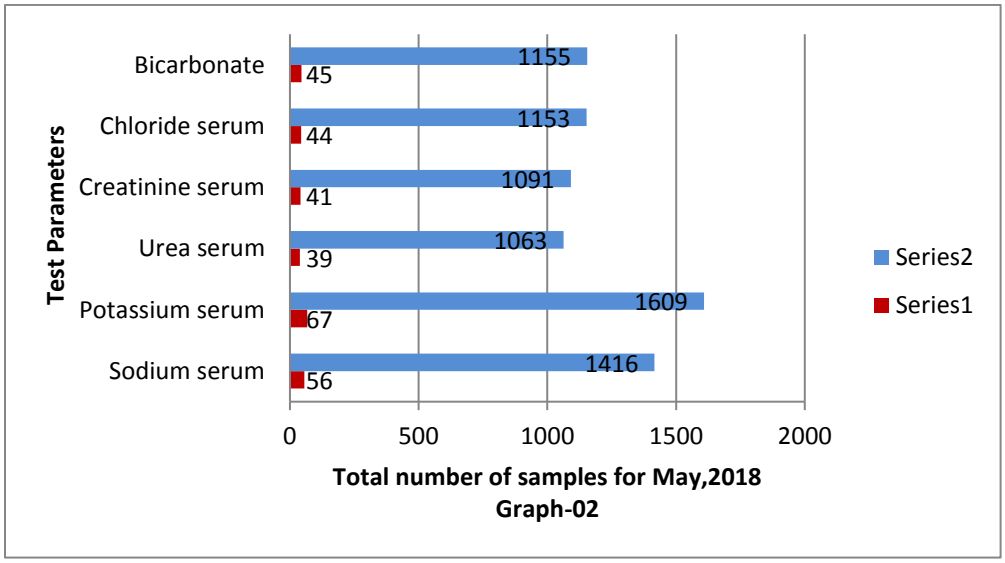
Fig-02

Data analysis for kidney function test for the month of April and May: Number of delays in components of Kidney Function tests calculated from sample requisition to test verification.
For:2nd April -30th April 2018 and

For: 1st may – 30th may 2018



Graph-01



Graph-02

Interpretation:
Average delay percentage of the test parameters for Kidney Function Test from sample requisition time

For April,2018

Bicarbonate:2.1%

Chloride ions:3.8%

Creatinine,serum:5.6%

Urea,serum:7.2%

Potassium ions:2.0%

Sodium ions:1.3%

For May,2018

Bicarbonate:3.9%

Chloride ions:3.8%

Creatinine, Serum:3.7%

Urea,Serum:3.7%

Potassium ions:4.16%

Sodium ions:4%

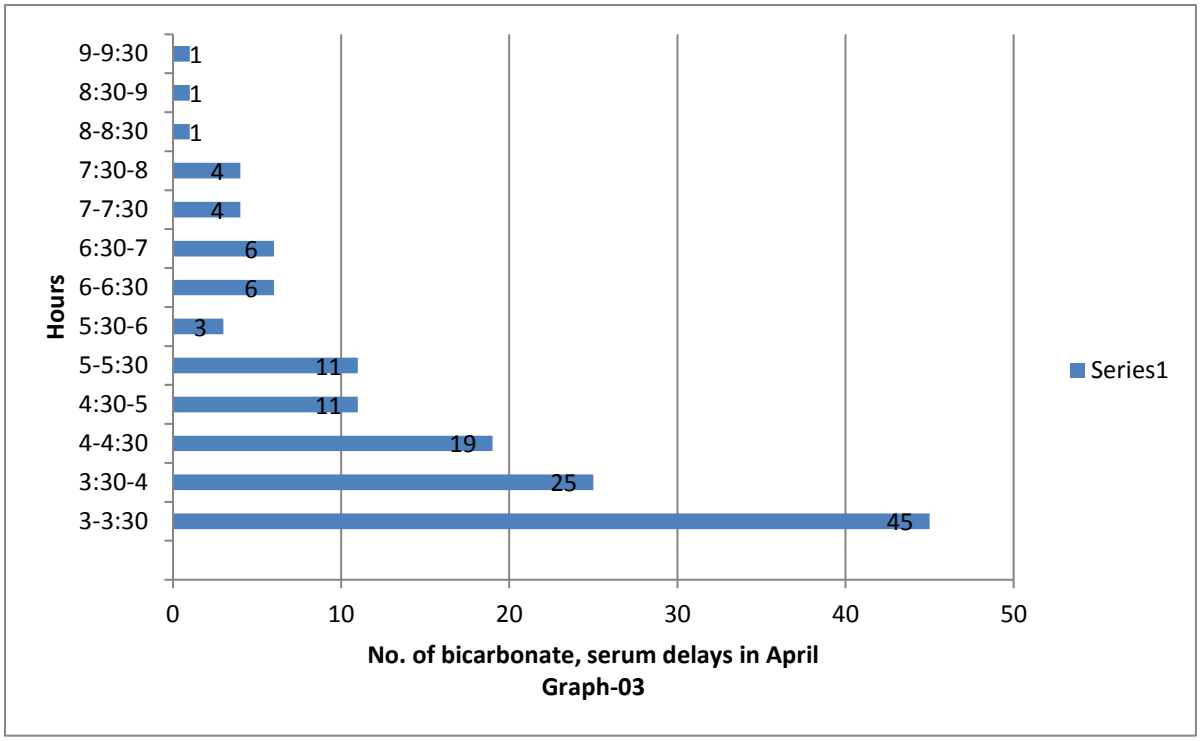
Per parameter delays:

The standard time for Kidney Function Test from the time of sample requisition is 3 hours**.** following are the total number of delays from the sample requisition to test verification time in the lab for each parameter of Kidney Function Test.

Each parameter is taken as a single entity and accordingly delays are calculated.

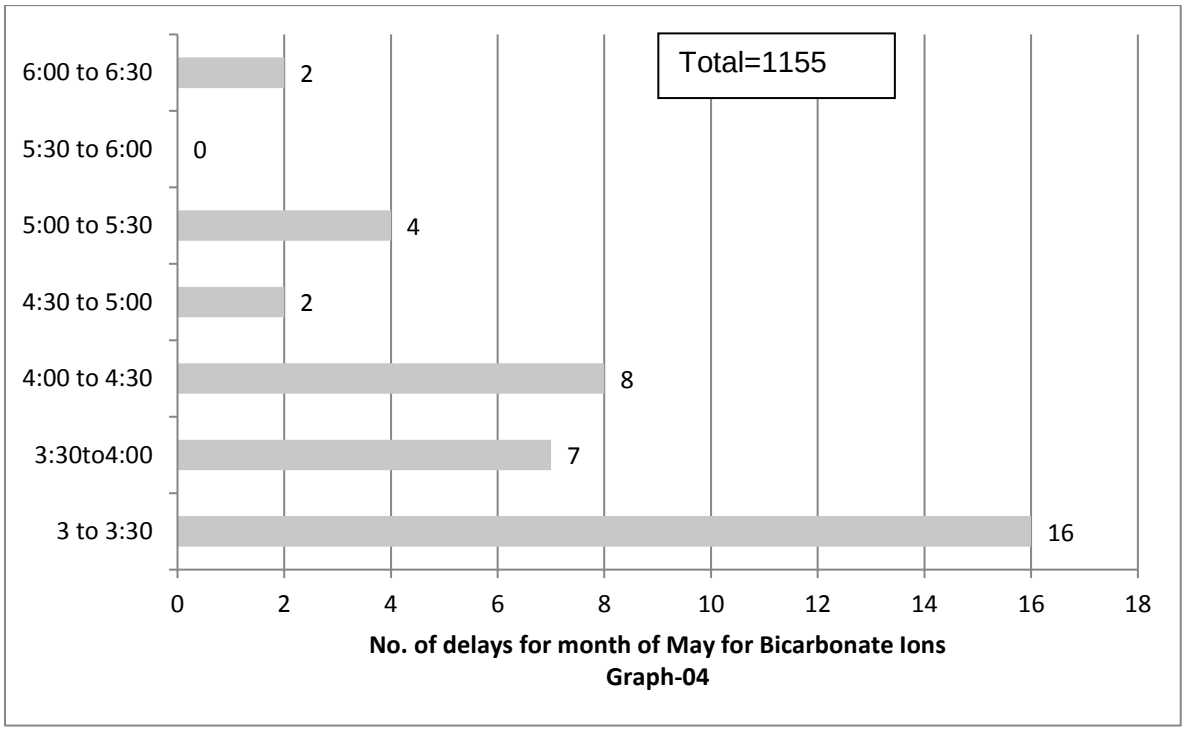
Bicarbonate ions:

Total=1633



Graph-03

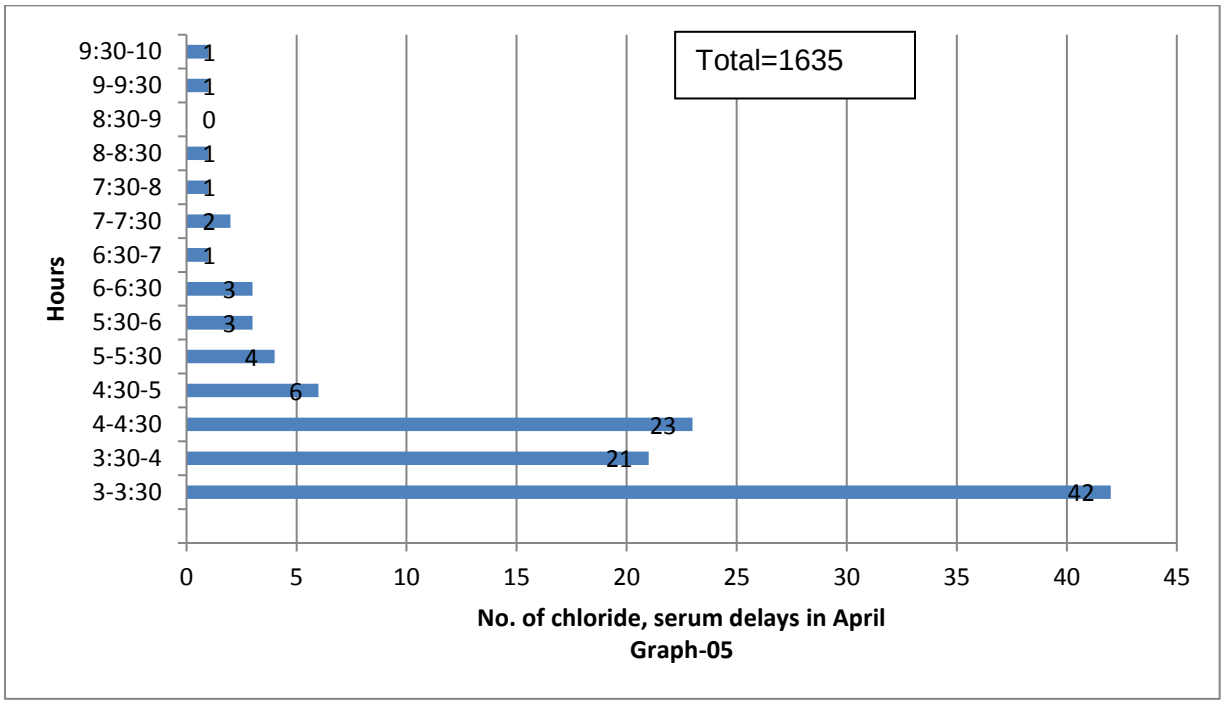
Most delays are of 3 to 3:30 hours.For which test requisition time was between 8 am to 12 pm.



Graph-04

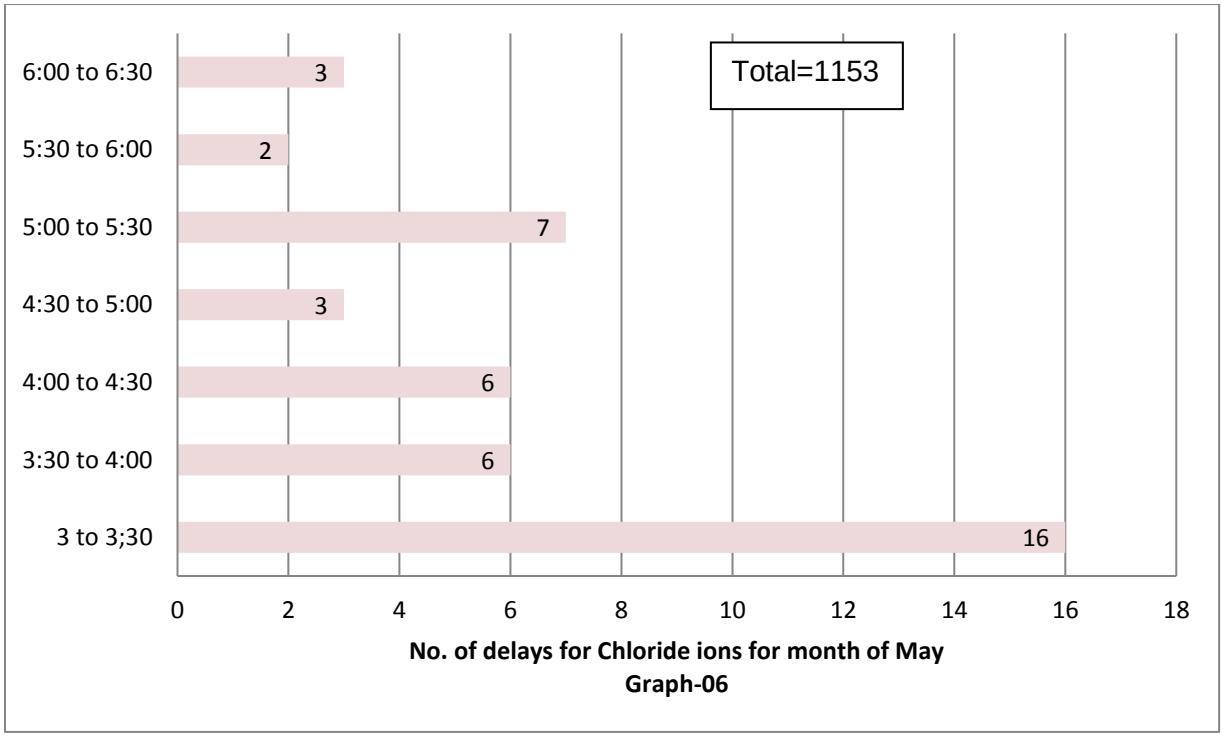
Most delays are of 3hrs to 3:30hrs.for which sample requisition time is between 8 am to 12 am. and test verification time was more then 3 hours.

Chloride ions delays:



Graph-05

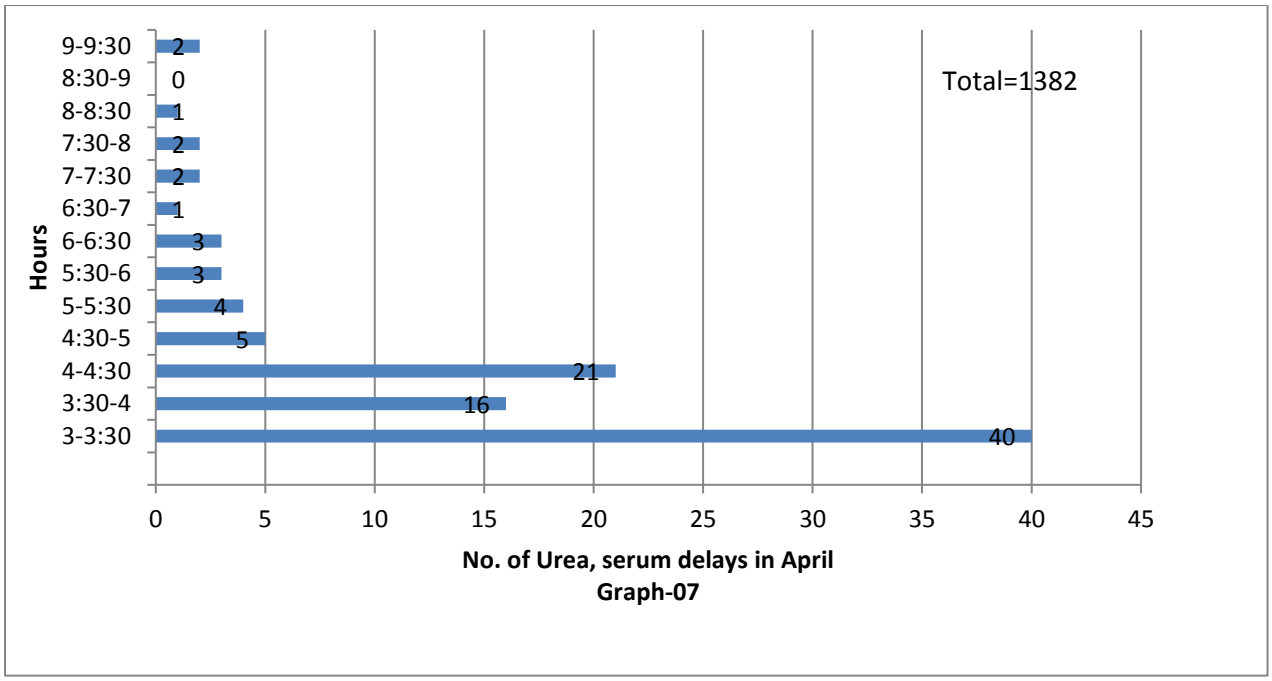
60% delays of 3 hrs to 3:30 hrs for which sample requisition time is between 8 am to 11 am. and test verification time is more them 3 hrs.



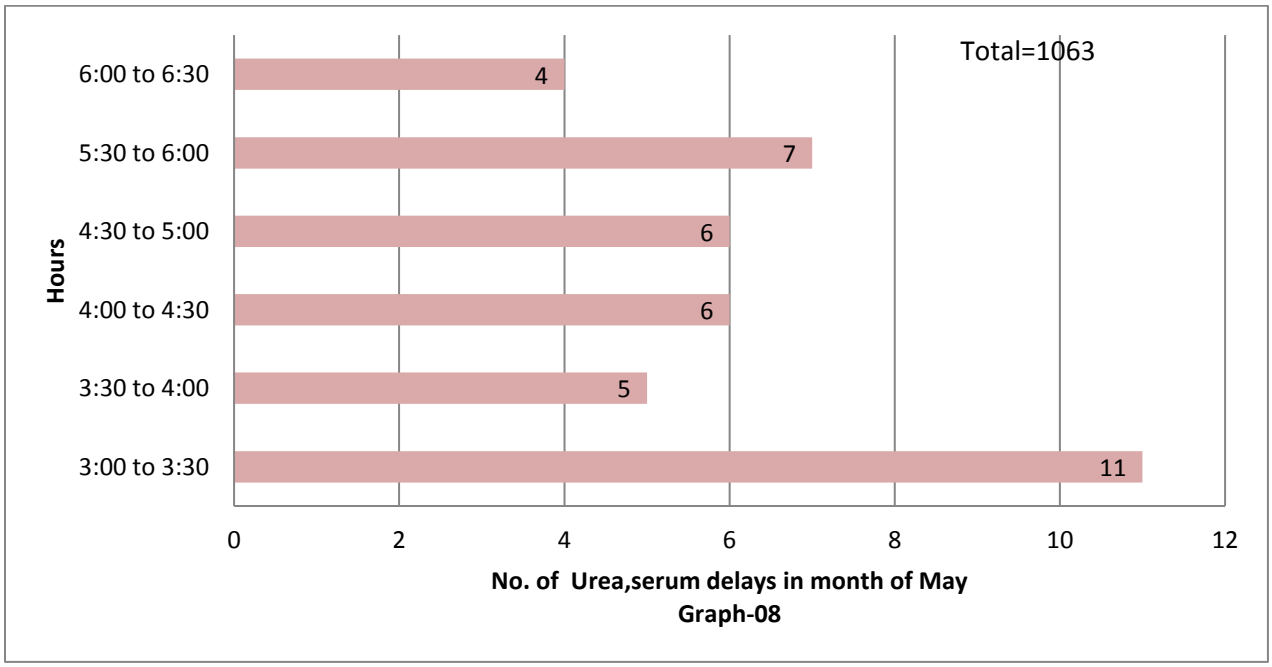
Graph-06

70% delays of 3 hrs to 3:30 hrs have test requisition time between 9 am to 11 am.and test verification time is more then 3 hrs.

Urea, serum test report delays for month of April and May:



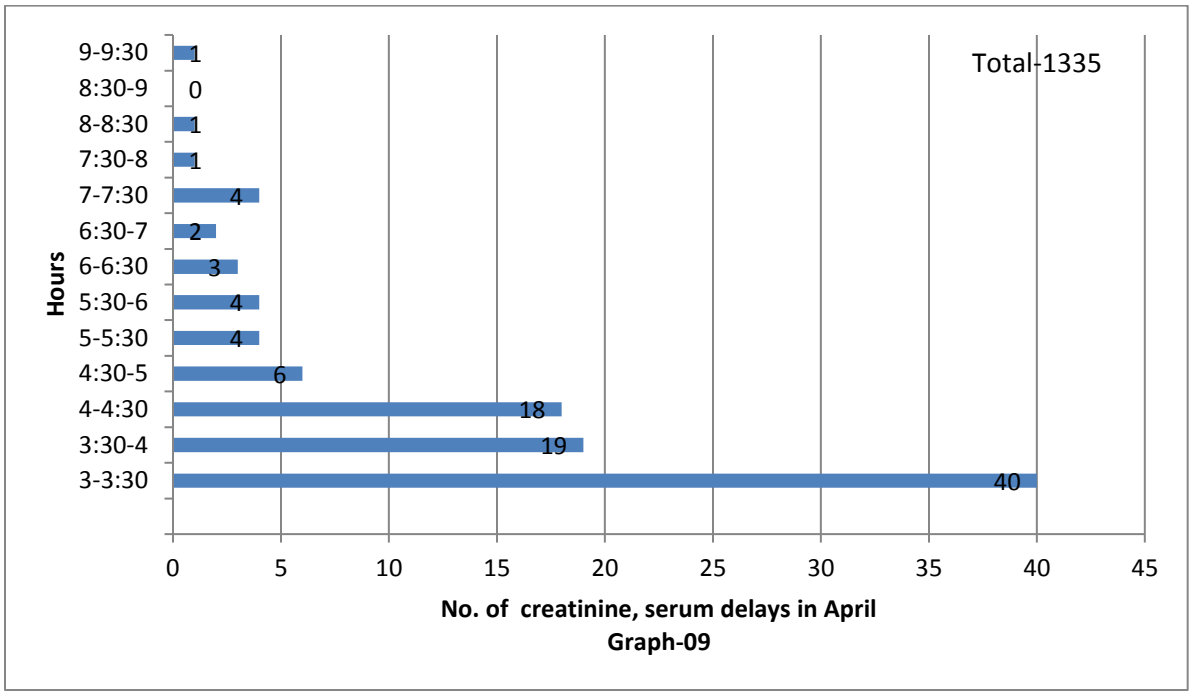
Graph-07



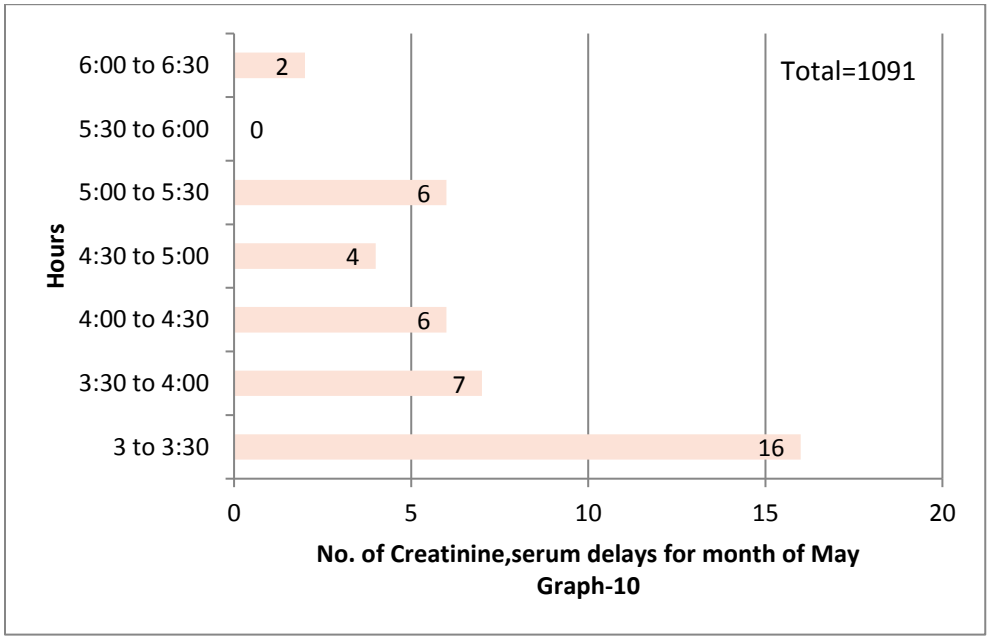
Graph-08

Interpretation: Most of the delays of 3hrs to 3:30 hrs have sample requisition time of 10 am to 12 pm and test verification time of more than 3 hrs.

Creatinine,Serum report delays for month of April and May:



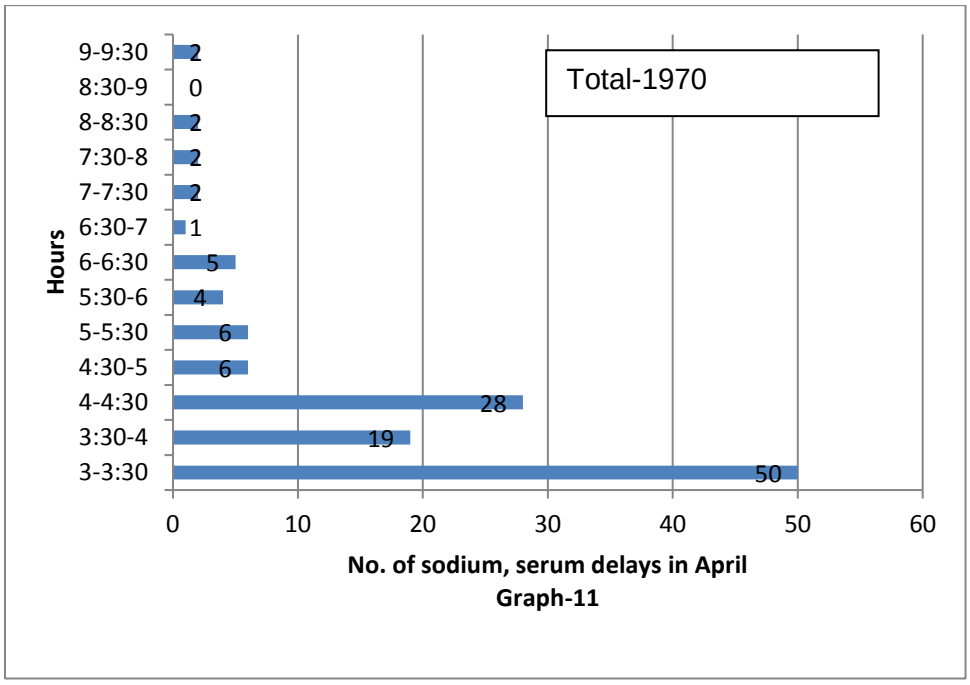
Graph-09



Graph-10

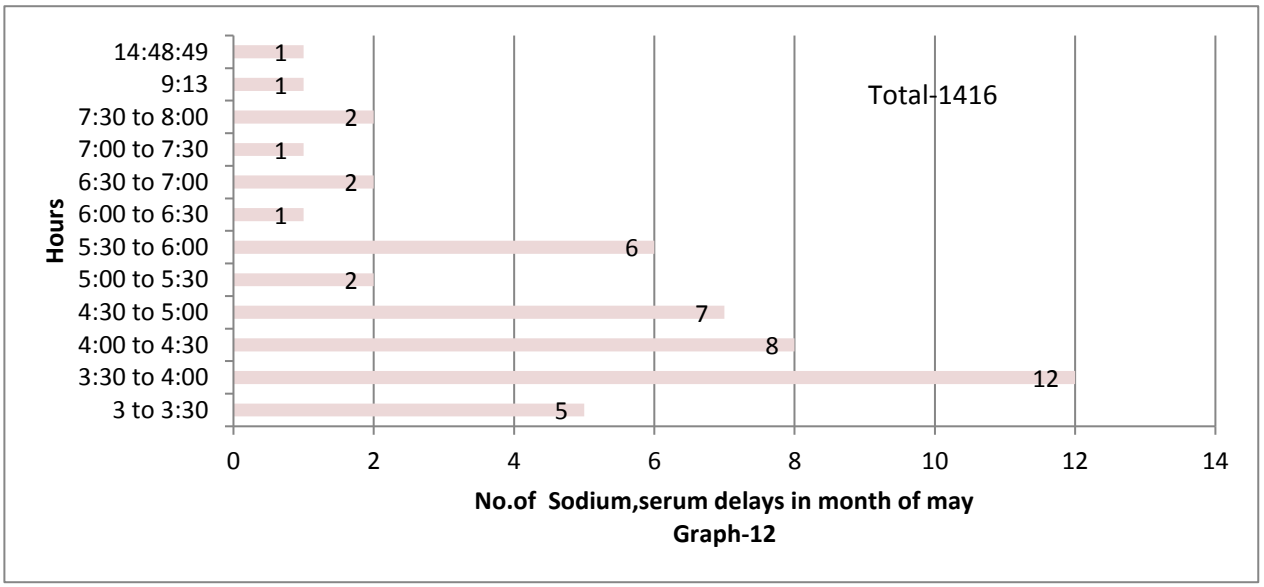
For both months 60% delay of 3hrs to 3:30 hrs have sample requisition time between 10am to 2pm,and test verification time of more than 3 hrs.

Sodium ions delays:



Graph-11

60% of 3hrs to 3:30 hrs delays have sample requisition time between 11 am to 2 pm.

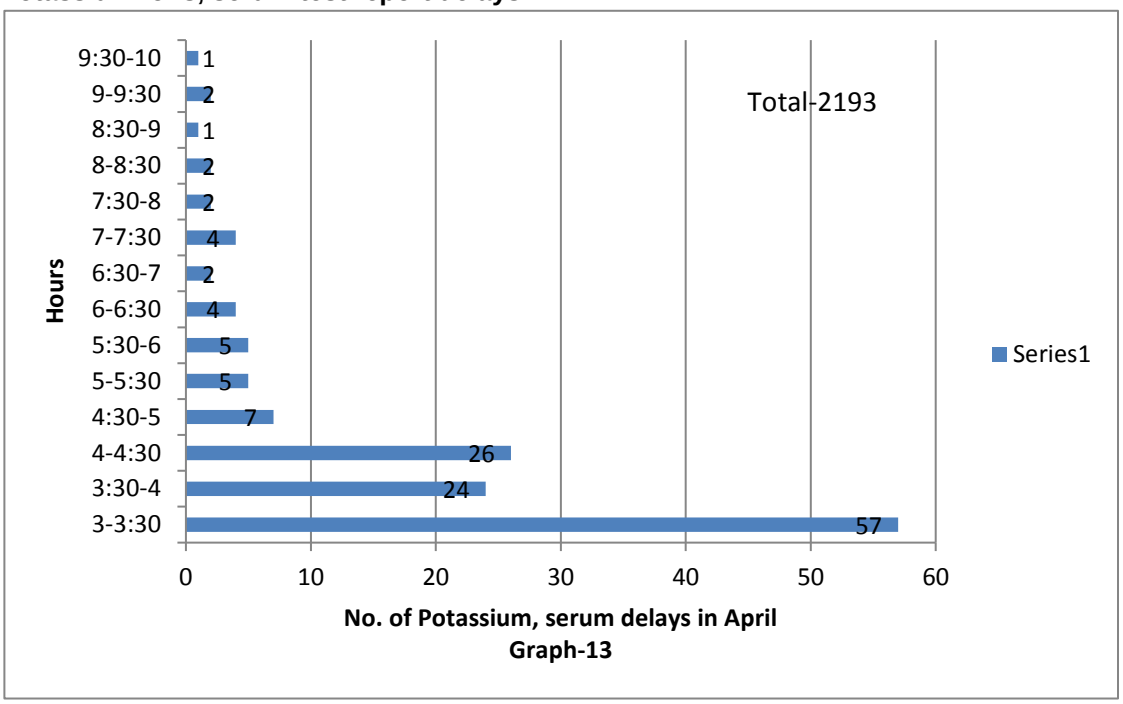


Graph-12

50% of delays between 3:30 hrs to 4:00 hrs have sample requisition time of 2pm to 5pm,and test verification time of 3:45

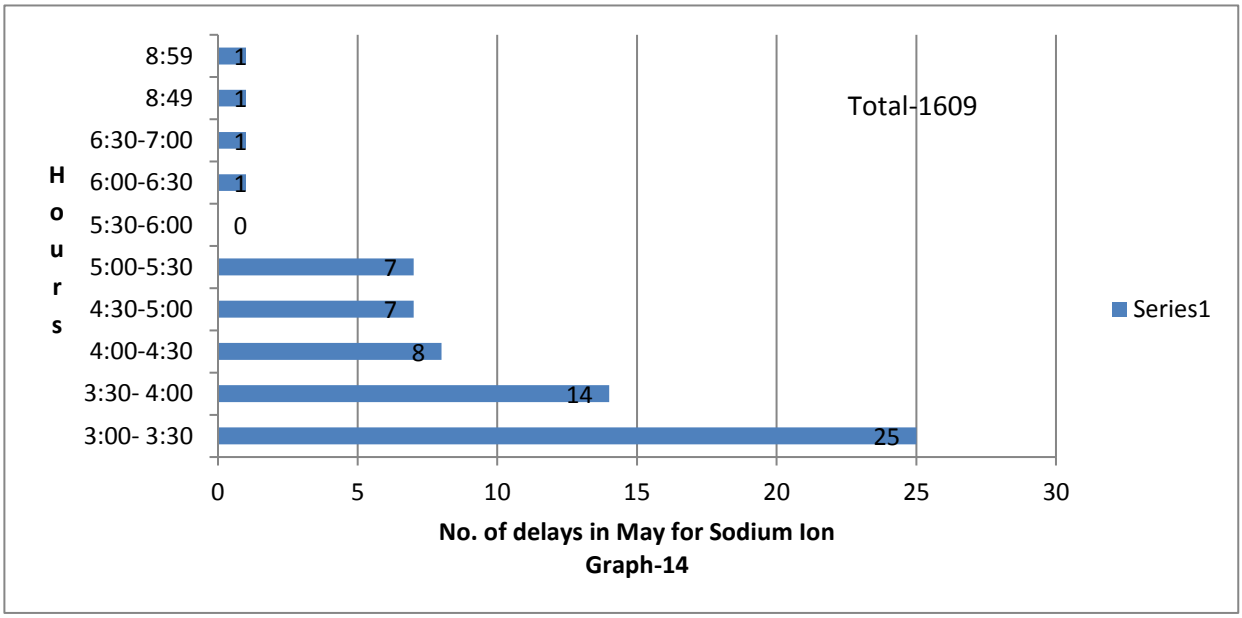
hours.

Potassium Ions, serum test report delays:



Graph-13

55% of delays of 3 hrs to 3:30 hrs have sample requisition time of 12pm to 2 pm,



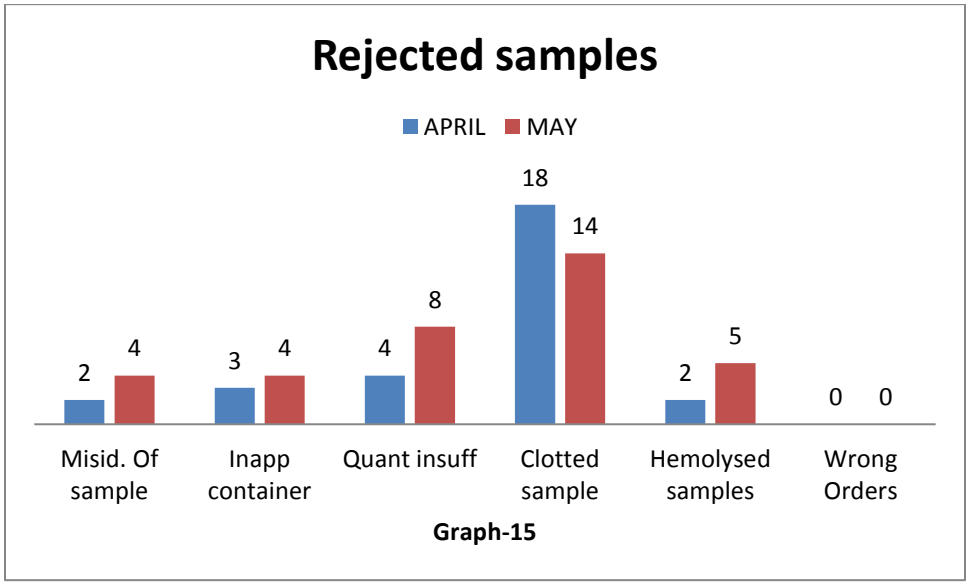
Graph-14

65%of delays of 3 hrs to 3:30 hrs have sample requisition time between 12pm to 2 pm

TABLE FOR TIME-SAMPLE REQUISITION-GDA DELIVERY TIME:

FOR BICARB.IONS	CHLORIDE IONS	UREA	CREATININE	POTASSIUM IONS	SODIUM IONS
Statistics: N Valid 1157 Median 1:06:59 Mode 0:34:34a Minimum 0:00:04 Maximum 6:31:23 a Multiple modes exist. The smallest value is shown	Statistics: N Valid 1155 Median 1:06:57 Mode 0:36:16a Minimum 0:00:10 Maximum 6:31:24 a Multiple modes exist. The smallest value is shown	Statistics: N Valid 1065 Median 1:07:38 Mode 1:05:21 Minimum 0:00:05 Maximum 6:31:51	Statistics: N Valid 1091 Median 1:07:19 Mode 0:34:20a Minimum 0:00:16 Maximum 6:31:35 a Multiple modes exist. The smallest value is shown	Statistics: N Valid 1606 Median 1:06:16 Mode 0:35:24 Minimum 0:00:02 Maximum 8:59:07	Statistics N Valid 1417 Median 1:07:17 Mode 0:42:20a Minimum 0:00:17 Maximum 14:12:01 a Multiple modes exist. The smallest value is shown

Analysis of the Sample rejection data for: April and May



Graph-15

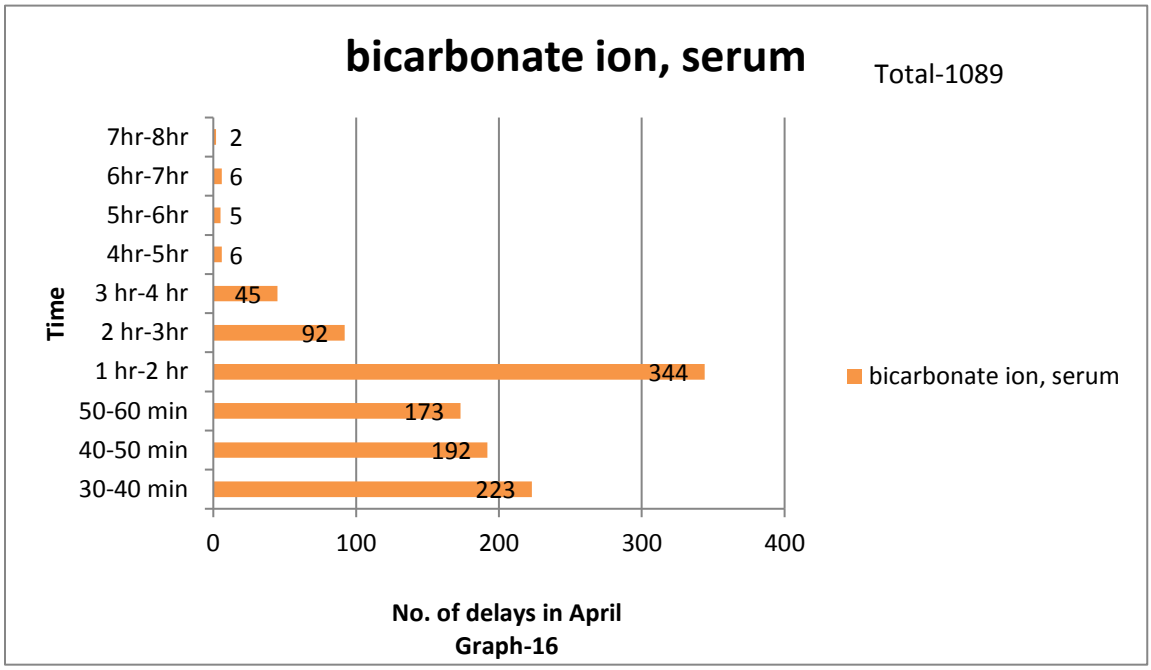
The hemolysed samples are because of the improper method of sample taking.

Some of the nurses take samples through syringe instead of using Vacutainer method,this leads to haemolysis of the sample.

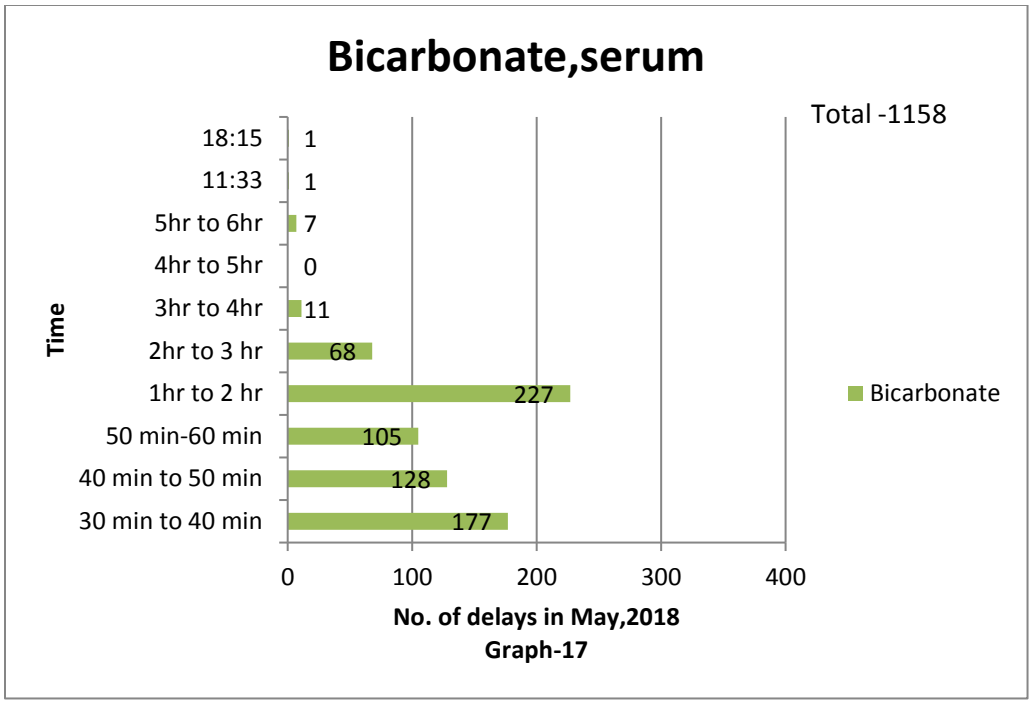
For some samples the haemolysis is found out after centrifugation.These samples are then rejected and send for retaking.

Samples which have bar code error are categorized under misidentification of sample.

Delay time from nurse's collection to sample requisition in the lab:



Graph-16



Graph-17

Most delays are of 1-2 hours from sample collection.Delays above 1 hour in 80% of cases are seen for samples taken during 2 am to 8 am.

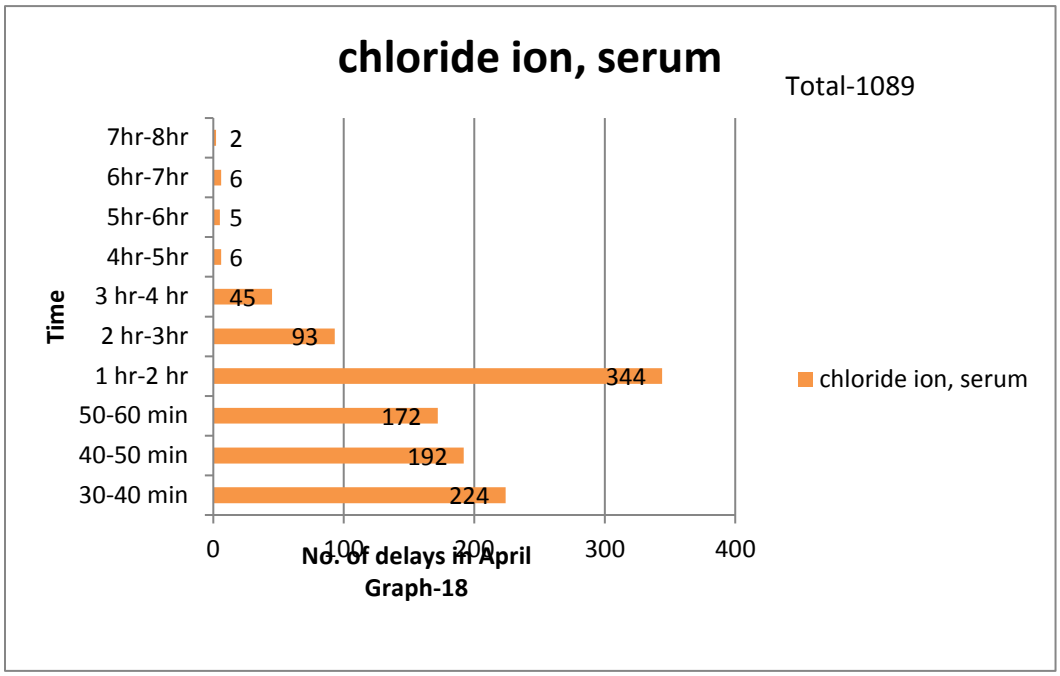
Statistics

Sample requisition time – nurse's collection time

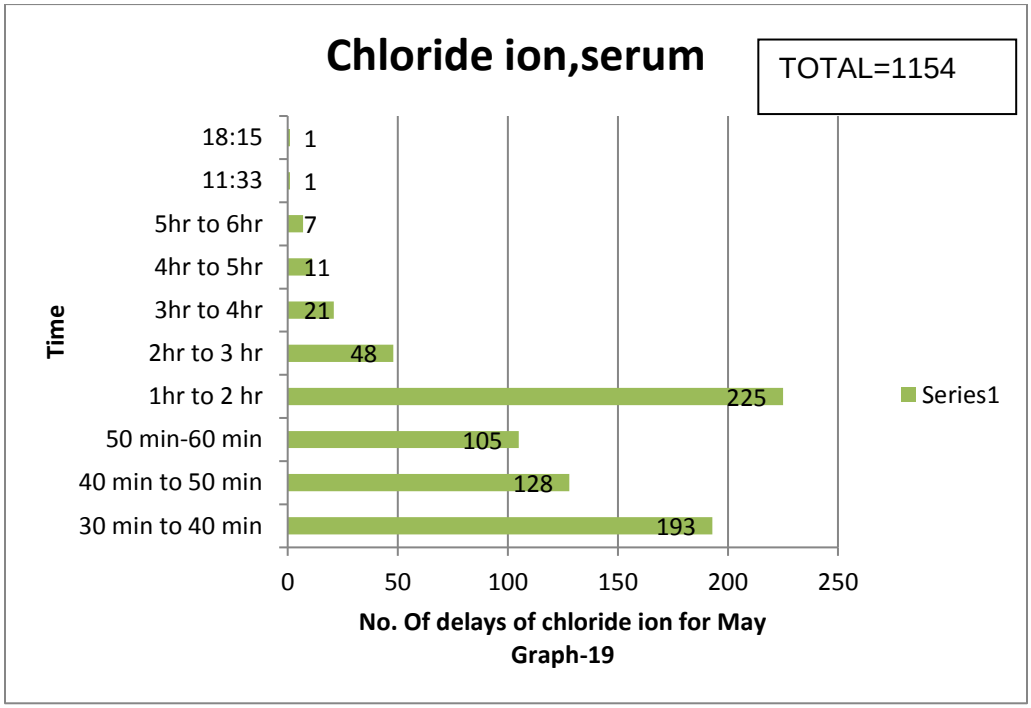
Mean	1:14:09
Median	0:55:36
Mode	0:31:17[a]

a. Multiple modes exist. The smallest value is shown

For Chloride ions,Serum:



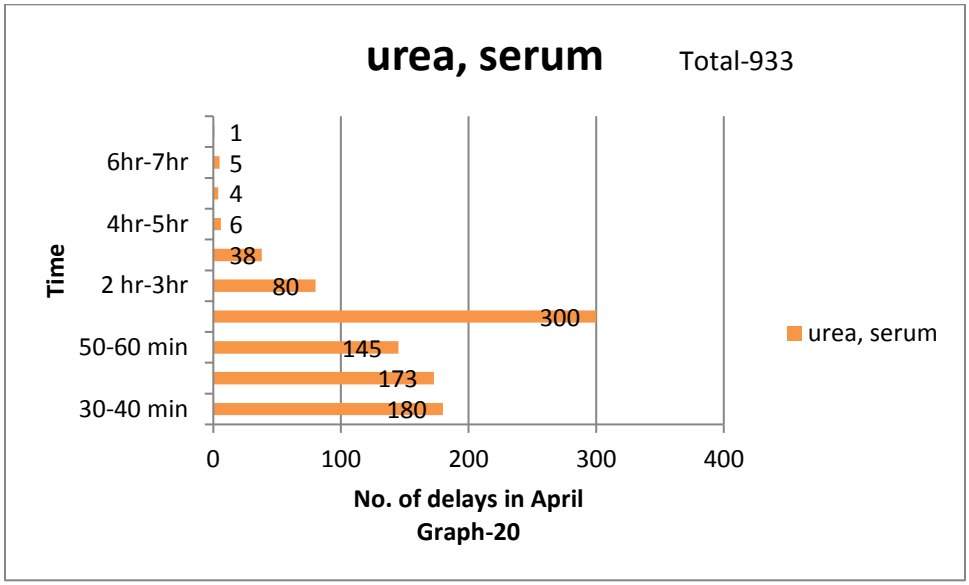
Graph-18



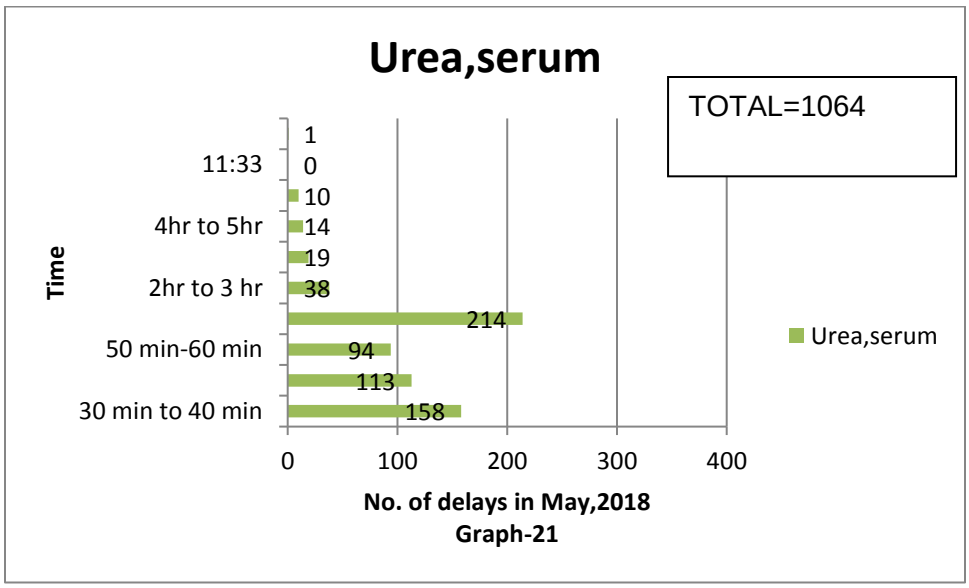
Graph-19

Most delays are of 1-2 hours from sample collection.Delays above 1 hour in 80% of cases are seen for samples taken during 2 am to 6 am.

For Urea,serum:



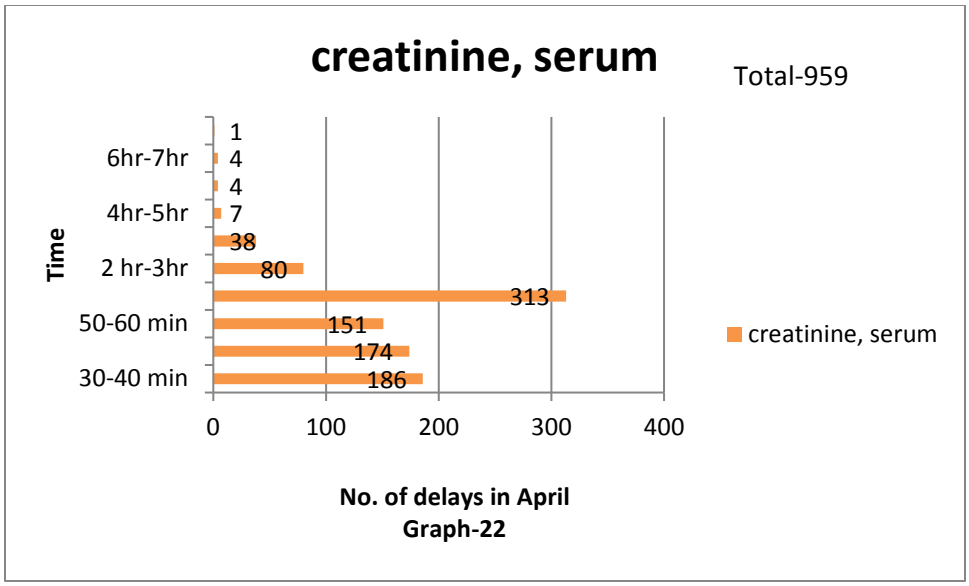
Graph-20

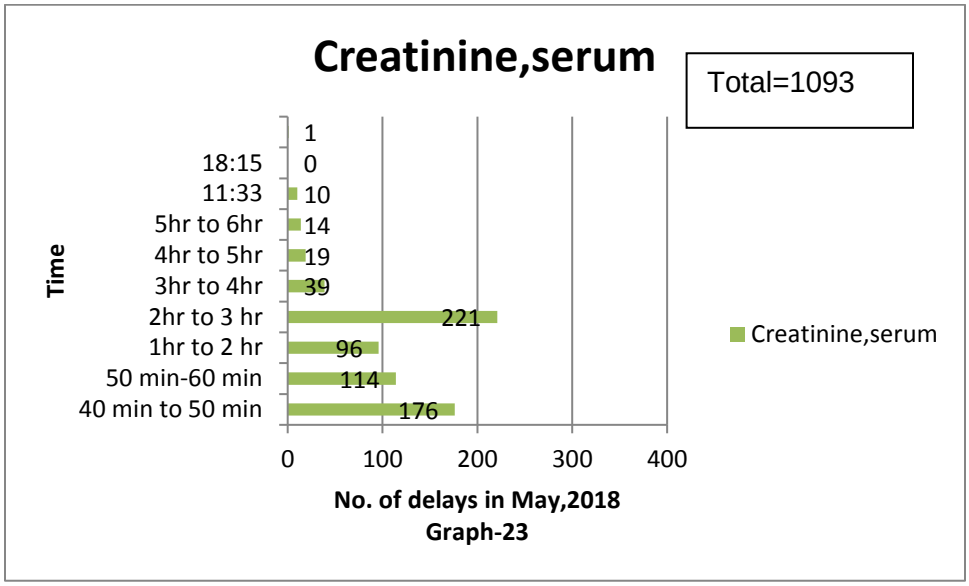


Graph-21

Interpretation:80% of 1-2 hours delayed sample were taken between 3 am to 5 am.

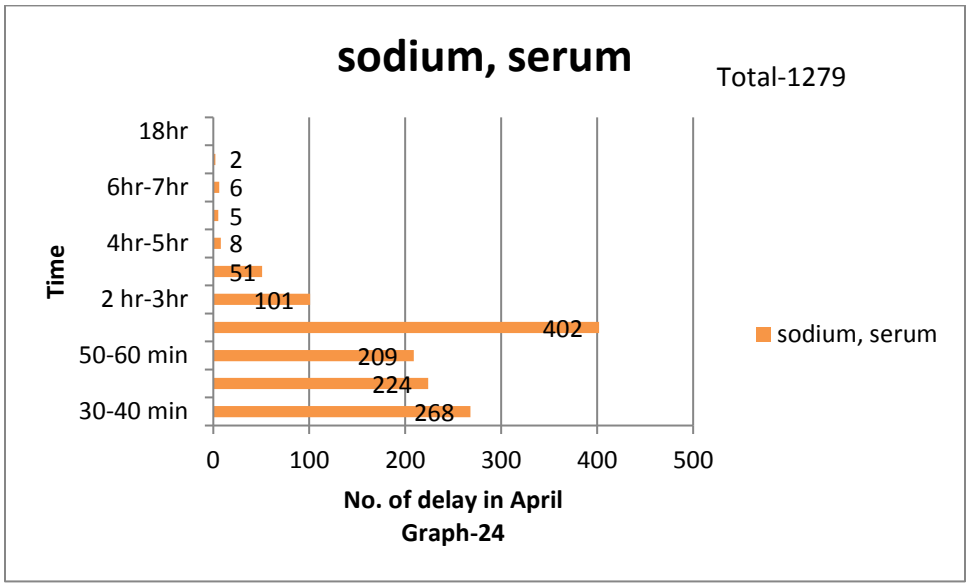
For Creatinine,serum:



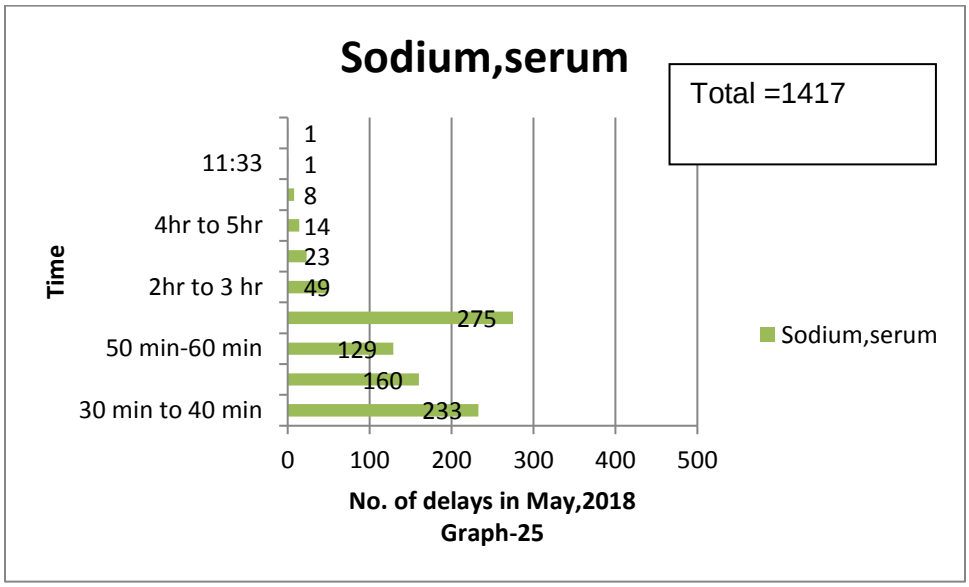


80% delays are for samples collected between 2am to 5 am

For sodium ions,serum:



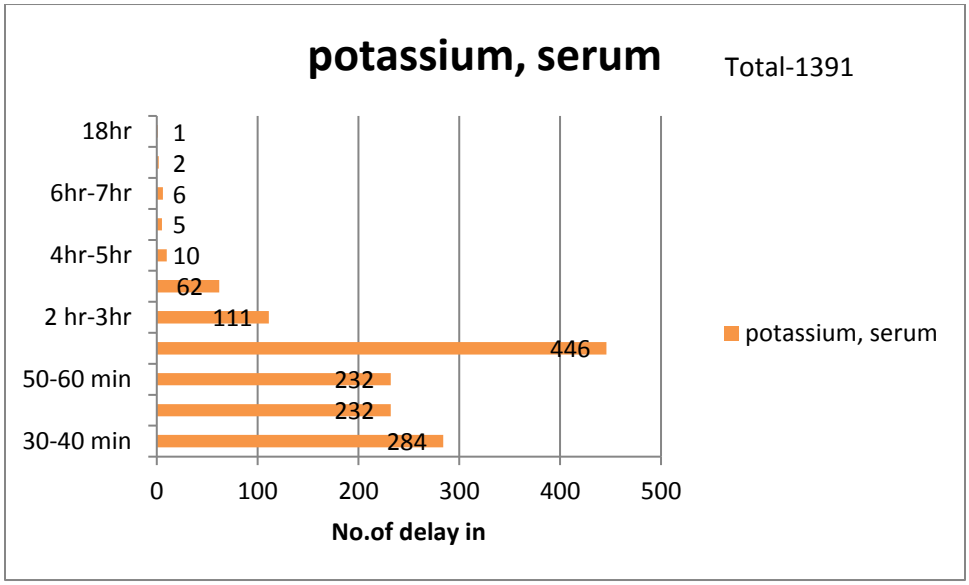
Graph-24

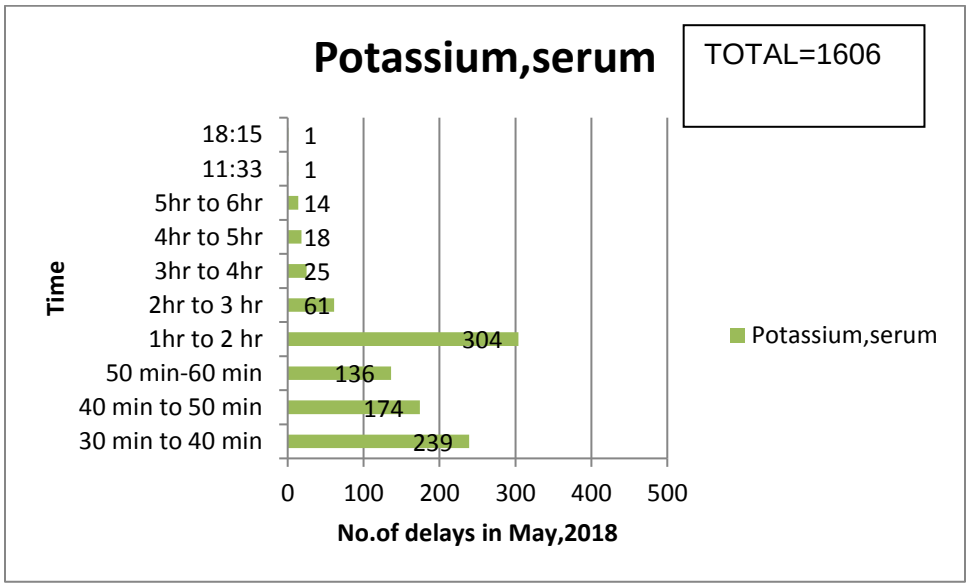


Graph-25

Interpretation: for 70% delays of 1hr to 2hr the nurse's collection time is between 2 am to 5 am. Which was further delayed by the GDA to get requisitioned in the lab?

For Potassium serum:





Interpretation:80%of the delayed sample are collected between 3am to 5 am.

TIME FOR GDA DELIVERY TIME –NURSE'S COLLECTION TIME:

Bicarbonate ions	Chloride ions	Urea	Creatinine	Sodium ions	Potassium ions
Statistics: N Valid 726 Median 0:55:36 Mode 0:31:17a Minimum 0:31:06 Maximum 18:15:22 a Multiple modes exist. The smallest value is shown	N Valid 740 Median 0:54:47 Mode 0:40:48 Minimum 0:29:59 Maximum 18:15:22	N Valid 1065 Median 0:39:00 Mode 0:07:17a Minimum 0:00:27 Maximum 18:15:23 a Multiple modes exist. The smallest value is shown	N Valid 1093 Median 0:38:55 Mode 0:25:40a Minimum 0:00:24 Maximum 18:15:22 a Multiple modes exist. The smallest value is shown	N Valid 1418 Median 0:38:37 Mode 0:17:51a Minimum 0:00:25 Maximum 18:15:23 a Multiple modes exist. The smallest value is shown	N Valid 1606 Median 0:37:42 Mode 0:25:34 Minimum 0:00:25 Maximum 18:15:23

Discussion and suggestions:

1. After sample collection by the nurse most delays are in samples taken near 2am to 6am.
2. Most of the delays are because of late sample taken by the nurse of the IPD patients. Reasons for which are :

- Pt. not willing to give the sample at that time.
- Nurses are busy with other patients.
- In some cases nurse were not aware of the pt.sample to be taken.
- Nurses forget the sample to be taken in case of multiple samples ordered by the doctor.

3. The GDA delivery time was more in some samples which was because of:

- Due to unavailability of GDA at the time the sample remains kept
- The kept sample is then delivered late by the GDA to the lab.

4. .For OT patients, the patient are seen to be admitted late for the preop checks which in turn delay the further process.
5. In some cases it was seen that the reports are verified and available but the nursing staff responsible for the patient delays in collecting the printed reports for patient file.
6. Due to staff shortage sometimes the tests are delayed.
7. The analyzed gaps can be covered by preparing a Standard Operating Procedure for nurses to collect the lab reports on time.

8. Better patient management should be practiced by the nurses so that sample taking is not delayed.
9. In lab the staff should be taught better work management so that they are not overwhelmed by increase in workload which mostly happens in seasons.
10. The repeated samples quantity should be reduced as the sample remains active In the system until the repeated sample is obtained. This in turn increases the sample verification time.

Conclusion:

Hospital Laboratory plays a very crucial role in Patient care. The treatment doses are adjusted on the basis of the Lab reports. thus its efficient management improves the quality of care provided in the hospital. For sample collected in the night after 12 pm and before 6 am needs to be monitored so that they are timely requisitioned in the lab and the patients reports are not delayed thereof. Also for samples tested in the lab after 10 am and between 2 pm ,they should monitored for their test verification is done on time.