Quality Assurance (Remapping of Processes in NABL Laboratory)

By

Ritu Chaudhary

Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management

Academic year, 2014-2016

The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer Airport
Jaipur-302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

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

IIHMR UNIVERSITY

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Ritu Chaudhary** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone dissertation training at **Monilek Hospital & Research centre Jaipur ,**from February 8 th 2016 to 8 May 2016.

The Candidate has successfully carried out the study designated to her during dissertation training and her approach to the study has been sincere, scientific and analytical. This training is in fulfillment of the course requirements.

I wish her all success in all future endeavors.

Dr. Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

Dr. Dhirendra Kumar
Professor
The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Near Sanganer Airport, Jaipur-302029, Rajasthan, India.
Ph.: 0141-3924700, 2791431- 32, Fax:0141-3924738,E-mail: iihmr@iihmr.edu.in,Web: www.iihmr.edu.in

Dt: 13.05.2016

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Ritu Chaudhary** of INSTITUTE OF HEALTH MANAGEMENT RESEARCH, JAIPUR has successfully completed her training in our hospital, under the Supervision of **Mrs. Kavita Kaushik.** She has undertaken a project **Quality Assurance** (Remapping of Processes in NABL Laboratory). The period of her involvement in the aforesaid project was from 8th February 2016 to 5th May 2016.

We wish her all the best in her future endeavours.

Kavita Kaushik
(Quality Head)
Monilek Hospital and Research centre

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled ***"Quality Assurance(Remapping of Processes in NABL laboratory"*** and submitted by **Dr Ritu Chaudhary**, Enrollment No. **IIHMR-U/MBA-HM/2014-2016/19-1607** under the supervision of **Prof. Dhirendra Kumar** for award of Postgraduate Diploma in Hospital and Health of the University carried out during the period from **2014 to 2016** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Ritu Chaudhary

Signature

Acknowledgement

For a management student, the power of knowledge is unattainable unless an element of practical observation and practical performance is added. Iconsider myself to be fortunate for having been provided an opportunity to undergo **Dissertation in Monilek Hospital and Research Centre**.

It is a great pleasure to express my sincere gratitude to Dr Praveer Chandra (medical director) And Mr Bhagwan Manwani (Administrator Director) for providing me an opportunity to undergo training in this highly esteemed organization.

My very special thanks to Mrs Kavita kaushik (Quality Head) for helping me with his valuable suggestions in the completion of my report. He has been constant guiding light.

I would also like to thank the **Team of Laboratory Department** for clearing my doubts regarding my topic and providing the necessary details whenever was required.

I would also like to thank my faculty at IIHMR-Jaipur, especially my mentor Prof . Dhirendra Kumar.

Lastly I would like to express my gratitude all those people who took time out from their busy schedules and cleared my queries. I would like to thank my family and friends for being constant source of inspiration to me.

THANK YOU ALL.

TABLE OF CONTENT:-

Acronyms-

OPD	Out-Patient Department
IPD	In-Patient Department
OT	Operation Theatre
ICU	Intensive Care Unit
CT	Computerized Tomography
USG	Ultrasonography
NABH	National Accreditation Board for Hospitals and Healthcare providers
NABL	National Accreditation Board for Testing and Calibration Laboratories
TAT	Turnaround Time
HR	Human Resource
PET-CT	Positron Emission- ComputerisedTomography
ED	Emergency Department
CBC	Complete Blood Count
OPG	Orthopantomogram
MHRC	Monilek Hospital & Research centre
CSSD	Central Sterile Service Department
PACU	Post Anesthesia Care Unit
BPL	Below Poverty Line
PFT	Pulmonary Function Test
MIS	Minimally Invasive Surgery

EQAS	External quality assurance scheme
IQC	Internal quality control
CBC	Complete blood count
QA	Quality assurance
TAT	Turn around time
NC	Non Compliance

REPORT

QUALITY ASSURANCE(REMAPPING OFPROCESSESIN NABL LABORATORY)

ABSTRACT

Quality Assurance (Remapping of Processes in NABL Laboratory)

Dr. Ritu Chaudhary

Advisor: Prof. Dhirendra Kumar

Key words-Internal Quality control, External Quality Assurance Scheme

Background: Quality Assurance is the total process whereby the quality of laboratory reportscan be guaranteed by IQC, EQAS, Quality indicator, Remapping of processes. Incorrect Laboratory results may be due to errors occurring duringspecimen collection (pre-analytical stage), testing (analytical stage) and/or whilereporting and interpreting (post-analytical stage) test results. Along with monitoring of quality indicator, accuracy and reliability, timely reporting of laboratory test results is now considered an important aspect of the services provided by the clinical laboratory. Accuracy of reports can be checked by the internal and external quality control. Quality indicators are the key performance areas of a lab. Quality indicator value is used to check the Quality assurance in NABL lab.TAT is also important aspect to check the efficiency of a lab. Whether or not, faster turnaround time can make any medical difference, patients and their physicians want reports as rapidly as possible. A recent review of laboratory turnaround time indicated that analysis of this time interval has helped in determining the cause of delay, which is then followed by the improvement in turnaround time.

Aim:

The aim of study was to study the Quality assurance of NABL lab by the aspect of IQC, EQAS, Quality indicators &Remapping of processes and find reasons of delay of turnaround time (TAT) of tests in the section of Clinical Biochemistry , Hematology, Clinical Pathology.

Objective-:

- To Study the Quality Assurance by IQC &EQAS in NABL Lab,
- To Study the Quality Indicator in NABL Lab,
- To Study the difference between time taken for lab reports generation and dispatch with the standard time set by hospital,
- To Find out the cause of delay in process of sample collection to lab report dispatch,
- To Check and observe the maximum utilization of resources.

Methodology:

This is a Descriptive study and Observational study,Study Area 101 beded Monilek Hospital & Research centre jaipur,Sample size: Total 200 patient,100 for OPD & 100 For IPD, Data Collection- Primary data- information about process of sample collection, dispatching and processing is taken by direct observation & through interactive session with pathologist, technicians and phlebotomist.(For IQC daily IQC Report is analyzed, For EQAS monthly report is analyzed).

Results:

IQC&EQAS Report - If parameter are not in range, Then Root cause Analysis is Done Main Reasons are Equipment maintenance status,Equipment Calibration status. Quality Indicator in lab are Numbers of reporting error/1000 investigation is 8, Percentage of re-dos is 7%,Percentage of reports co-relating with clinical diagnosis is 88.6%, Percentage of adherence to safety precautions by employees working in diagnostics is 100%.Reasons for difference in TAT are-Manual slide preparation for every patient and small rotator machine ,less no. of coolant box, No fixed ward boy to dispatch sample from Dept to Lab.OPD TAT- Haematology -1:35 hr,Biochemistry-1:30 hr,Clinical Pathology-2hr,IPD TAT Haematology-2 hr,Biochemistry-2hr 7 min,Clinical Pathology-3hr,after remapping of processes,OPD TAT- Haematology -1 hr,Biochemistry-1 hr,Clinical Pathology-1:30hr,IPD TAT Haematology -1:30 hr,Biochemistry-1:30,Clinical Pathology-2hr.

Recommendations:

Calibration of machine should be at proper time, Manual entries of patient & slide preparation only when critical values. Mixer or rotator machine should be of greater capacity, Every department should have coolant box according to no of patient in department.

Conclusion:

Quality assurance by the aspect of IQC,EQAS, Quality indicator, Remapping of processes helps in reducing Transcription, Analytical errors, reducing TAT in NABL Lab & improvement of efficiency of lab.

1-<u>INTRODUCTION-:</u> Quality Assurance (QA) is the total process whereby the quality of laboratory reportscan be guaranteed by IQC ,EQAS,Quality indicator, Remapping of processes. Incorrect Laboratory results may be due to errors occuring duringspecimen collection (pre-analytical stage), testing (analytical stage) and/or whilereporting and interpreting (post-analytical stage) test results. Whereas, Internal QualityControl (IQC) refers to the process of minimizing analytical errors, QA encompassesprocedures adopted for minimizing errors that may occur at any stage. Provision ofprecise and accurate laboratory results optimize medical management. Inappropriatetest selection, unnecessary investigations and incorrect test results not only haveserious health implications but are also a financial burden to the individual andcommunity. Reports from a laboratory with a high level of QA will help the physician toarrive rapidly at a correct diagnosis. To provide QA, all laboratories must have a QualityAssurance Programme (QAP) in place.

The two important tools toward maintaining laboratory quality are-

- Internal Quality Control (IQC) - for detection and minimization of immediate errors
- External Quality Assessment (EQA) - for monitoring long term precision and accuracy of results.

1(i)<u>INTERNAL QUALITY CONTROL</u>- Practice of IQC **,** This includes following:

• Recognition of errors which arise within the laboratory during analytical stage.

- Taking steps to minimize errors.
- Equipment & method calibration, method validation.
- Laboratories should perform IQC
- Every day on tests run daily
- Every time the tests are run in case of infrequently used tests.
- Quality control checks should be employed for both quantitative and qualitative tests

Levy Jennings's (LJ) chart should be used to plot daily QC values. It indicates the changes in trends and shifts of the laboratory performance.Westgard rules should be used to interpret daily QC values. The level of QCapplied in the laboratory varies according to the number of specimens analyzedper day. The following protocol may be adopted by the laboratories accordingto the total number of specimens analysed per analyte.

Less than 40 per day - apply at least one level QC once a day.

Between 40-80 per day - apply two level QC at least once a day.

More than 80 per day - apply two level QC at least twice a day for suchanalytes.

• For Haematology, 2 level QC (using normal & high OR normal & low controls)

should be analyzed at least once a day although it is preferable to run 3 level QC (using normal, high & low controls) once a day.

• The following guidelines will be useful to the laboratories in the practice of IQC using either one level or two level QC materials.

When one level QC is used,Reject test run if following errors occurs.

- Value is outside 3 SD (13s)
- 2 consecutive values are outside 2 SD on the same side, but within 3 SD**(22s)**
- 4 consecutive value are outside 1SD on the same side, but within 2SD**(41s)**
- 10 consecutive values are above or below the mean, but within 2 SD (10x)

When two level QC are used:Reject test run if following errors occur:

- Either QC value is outside 3 SD (13s)
- Both QC values are outside 2 SD on the same side, but within 3SD (22s)
- Difference between the two level QC values is >4 SD i.e. one level QC is

>2 SD and other level QC is < 2 SD (R4s)

- 10 consecutive values of the same level QC are above or below the mean,but within 2 SD (10x)

The laboratory personnel performing the test should determine theappropriate corrective action to be taken for QC data that fall outside theestablished tolerance

limits. Corrective action should be documented withTests for which control material is not available or when running of control isnot viable due to low volume of tests, the laboratory should apply alternate ,5 consecutive values of one level QC and 5 consecutive values of theother level QC are above or below the mean, but within 2 SD (10x).Laboratories need to establish guidelines for responding to out-ofcontrol.

1(ii)**- EXTERNAL QUALITY ASSESSMENT:**

External Quality Assessment (EQA) refers to a system in which theperformance of a laboratory is assessed PERIODICALLY ANDRETROSPECTIVELY by an independent external received by the organizing agency and compared with a "correct" answerretrospectively and a performance score is assigned. All the participatinglaboratories are identified by a code and reports issued to the participantscontain the performance score of all participating laboratories including itsown score. This allows a comparison of quality between laboratories andthus describes the "state of the art" for that area of laboratory work

encompassed by EQA programmes.Agency to indicate to thelaboratory staff of any shortcomings in performance. It indicates a need forimproving and/or changing IQC procedures. An organizing agency or laboratorysends identical specimens to all participating laboratories for testing by methodsroutinely adopted by them. The results from the participating laboratories are ,In India, participation in EQA schemes is a pre-requisite for clinical laboratoriesapplying for NABL accreditation but is not required for obtaining license.However, in some countries participation in EQA is mandatory for licensure. It is desirable that all laboratories take part in one or more EQA programmes.

If EQA for a particular analyte is not available, an appropriate inter-laboratorycomparison is recommended.

Benefits of EQA:

- Assesses the overall performance of laboratory
- Establishes inter-laboratory comparison
- Serves as an early warning system for problems
- Identifies systematic kit problems
- Provides objective evidence of laboratory quality

- ❖ Indicates areas towards which efforts need to be directed for improvementof quality of resultsIdentifies training need

A medical laboratory or clinical laboratory is a unit where tests are done on clinical specimens in order to get information about the health of a patient as pertaining to the diagnosis, treatment and prevention of disease. It acts as a spine for the patient care. Accuracy, precision, timeliness, and authenticity are the four pillars of efficient laboratory services

Clinical laboratory practices should be used by all laboratories where test are done on biological specimens for diagnosis, patient care, disease control and research such as:-

- Microbiology and Serology
- Hematology and Blood Banking
- Molecular Biology and Molecular Pathology
- Clinical Pathology
- Immunology (Immunohematology and Immuno-biochemistry)
- Histopathology/ Pathology and Cytology

Following sections are conducting all the basic investigation round the clock:

- Surgical pathology includes frozen section, histopathology and IHC
- Cytology includes FNAC, fluid cytology, cytospin preparation, cell block
- Hematology includes CBC, PBF, Bone marrow aspiration & Biopsy, and cyto-chemistry
- Biochemistry includes RFT, LFT enzymes, lipid profile and electrolytes
- Microbiology
- Serology & immunology includes tumor markers, HIV & HBsAg, Hormone & anemia profile by chemiluminsence

For specialized investigations laboratory has tie up with outside laboratories. The department caters to the needs of the outdoor and indoor patients of the hospital, as well as to the outside cases for opinion.

“A total turnaround time is defined as the cumulative time taken for a sample to be processed. It includes the start time at which the sample is taken from a patient, time spent in

transportation, its arrival at reception, pre-analysis and post-analytical phases until validation by laboratory staff, the result being issued and its subsequent receipt by the requesting physician."

"A laboratory turnaround time is defined as the total time taken for a sample to be processed within the laboratory, from its arrival at the reception until a validated result has been released to Patient.

2-LITERATURE REVIEW –:

Along with monitoring of quality indicator, accuracy and reliability, timely reporting of laboratory test results is now considered an important aspect of the services provided by the clinical laboratory. Accuracy of reports can be checked by the internal and external quality control. Quality control techniques such as :

- Retesting of any randomly chosen specimen/s
- Replicate test of specimen by different method, different machine anddifferent person, wherever applicable
- Correlation of test results with other parameters, IQC for Qualitative Tests

For qualitative tests, positive and negative controls should be included with each run.

For staining procedures, gram stains require both Gram positive and Gram negative

control organisms to be used once per week.EQAS is done by the inter laboratories comparision.

Quality indicators are the key performance areas of a lab.Quality indicator value is used to check the quality assurance in NABL lab.TAT is also a important aspect to check the efficiency of a lab. Whether or not, faster turnaround time can make any medical difference, patients and their physicians want reports as rapidly as possible. A recent review of laboratory turnaround time indicated that analysis of this time interval has helped in determining the cause of delay, which is then followed by the improvement in turnaround time.

A recent review of the laboratory turnaround time indicated that the most common way to monitor TAT is by recording some starting point and end point, and then analyzing the difference between the two.

The laboratory needs to manage clinician expectations and demonstrate that it is meeting those expectations. TAT monitoring is the ideal choice of activity to illustrate the laboratory's commitment to providing a high quality service. Improved TAT can be the key to greater user satisfaction with the laboratory.

Inspection of the literature reveals a variety of different approaches to definition of TAT. TAT can be classified by test (e.g. potassium), priority (e.g. urgent or routine), population served (e.g. inpatient, outpatient, ED) and the activities included. This last area is the greatest source of variation in reporting of TAT. The steps in performing a laboratory test were outlined by Lundberg, who described the brain to brain TAT or "total testing cycle" as a series of nine steps: ordering, collection, identification, transportation, preparation, analysis, reporting, interpretation and action.[(2)]

Unsatisfactory TAT is a major source of complaints to the laboratory regarding poor service and consumes much time and effort from laboratory staff in complaint resolution and service improvement. Despite advances in analytical technology, transport systems and computerization, many laboratories have had difficulties improving their TATs

3-RATIONALE-:

Laboratory are the one of most revenue generating component in the mega million industry that health care has become nearly 19% of this is related to diagnostics. Discussion with patients showed that they were not happy because of the transcription errors, analytical errors, they have to wait long for lab reports. There was lots of complaints regarding delay in lab reports & Analytical errors. Hence management wanted to know the reason for delays in the report generation above the. standard turnaround time set by hospital & reasons for the analytical errors, transcription errors. The results would help in increase in Quality assurance & reducing the lab report process time and increase patient satisfaction. Appropriate and timely clinical decisions depend on Quality assurance & timely reporting, which in turn affects patient outcome.

4-AIM –:

The aim of this study was to study the quality assurance of NABL lab by the aspect of IQC,EQAS, Quality indicators & Remapping of processes and find reasons of delay of turnaround time (TAT) of tests in the section of clinical biochemistry , hematology, Clinical pathology.

5-OBJECTIVE-:

1. To Study the quality assurance by IQC &EQAS in NABL Lab.
2. To Study the Quality indicator in NABL Lab.
3. To study the difference between time taken for lab reports generation and dispatch with the standard time set by hospital.
4. To find out the cause of delay in process of sample collection to lab report dispatch.
5. To check and observe the maximum utilization of resources.

6-RESEARCH METHODOLOGY-:

- Study Design: This is a Descriptive study and Observational study
- Study Area:101 beded Monilek Hospital & Research centre Jaipur.
- Study duration: 8th FEBRUARY TO 8th MAY
- Study subjects: Patients providing sample for hematology, biochemistry test& Clinical pathology test.
- Sample size: Total 200 patient,100 for OPD & 100 For IPD,
- Sampling technique: convenient sampling is done.
- Study time- 8 hr working day (Monday to Saturday)
- Inclusion criteria: patients who come for hematology and biochemistry investigations for OPD patients & IPD Patient.
- Exclusion criteria: Emergency patient & STAT Patient.
- Data Collection-**:**Primary data- information about process of sample collection, dispatching and processing is taken by direct observation and through interactive session with pathologist, technicians and phlebotomist..(For IQC daily IQC Report is analyzed, For EQAS monthly report is analyzed).
- Data Collection Tools: Observation, review of records – Registers , Literature review

7-DATA ANALYSIS AND INTERPRETATION:

7(i)-IQC Report-IQC runs daily in Biochemistry ,Haematology, Clinical pathology. If parameter are not in range,then Root cause Analysis is Done .Main Reasons for parameter are not in range are-calibration of machine is not in a proper time,machine breakdown.

7(ii)-EQAS Report- EQAS Report of Haematology Department –after every 4 month (Quaterly) Declairs.

EQAS Report of Biochemistry Department-after every month.

If parameter are not in range,then Root cause Analysis is Done .Main Reasons for

parameter are not in range are-

- Transcription error
- Assay Settings
- On board Reagent Stability
- Environmental Condition
- Temperature
- Humidity
- Equipment maintenance status
- Equipment Calibration status

Most common reasons for parameters not in range are- Equipment maintenance status,Equipment Calibration status, Environmental condition.

7(iii)-Quality indicators in lab-:

- Numbers of reporting error /1000 investigation
  (Reporting error include those picked up before & after dispatch it shall include transcription errors.)

$$\frac{numbers\ of\ reporting\ error}{numbers\ of\ test\ performed} \times 1000$$

8/1000*1000=8

- Percentage of re-dos
  (This shall also include test repeated before release of result to confirm the findings)

$$\frac{number\ of\ re-dos}{number\ of\ test\ \ performed} \times 100$$

35/500*100=0.07=7%

- Percentage of reports coreletated with clinical diagnosis
  (co-relation means that the test results should match either the diagnosis written in the requisition form)

$$\frac{number\ of\ reports\ co-relating\ with\ clinical\ diagnosis}{number\ of\ test\ performed} \times 100$$

$\frac{443}{500} \times 100 = .886$=88.6%

For Hospital with < 100 test /month = it should be100%

For Hospital with <100-200 test / month = it should be atleast 50%

For Hospital with 300-500 test/month= it should be atleast 20%

For Hospital with >500 test/month = it should be atleast 15%

- Percentage of adherence to safety precautions by employees working in diagnostics .

$$\frac{number\ of\ employees\ adhering\ to\ safety\ precautions}{number\ of\ employees\ sampled} \times 100$$

For Hospital with <25 employees working in these areas: it should be = 100%

For Hospital with 26-50 employees working in these areas = it should be atleast 50%

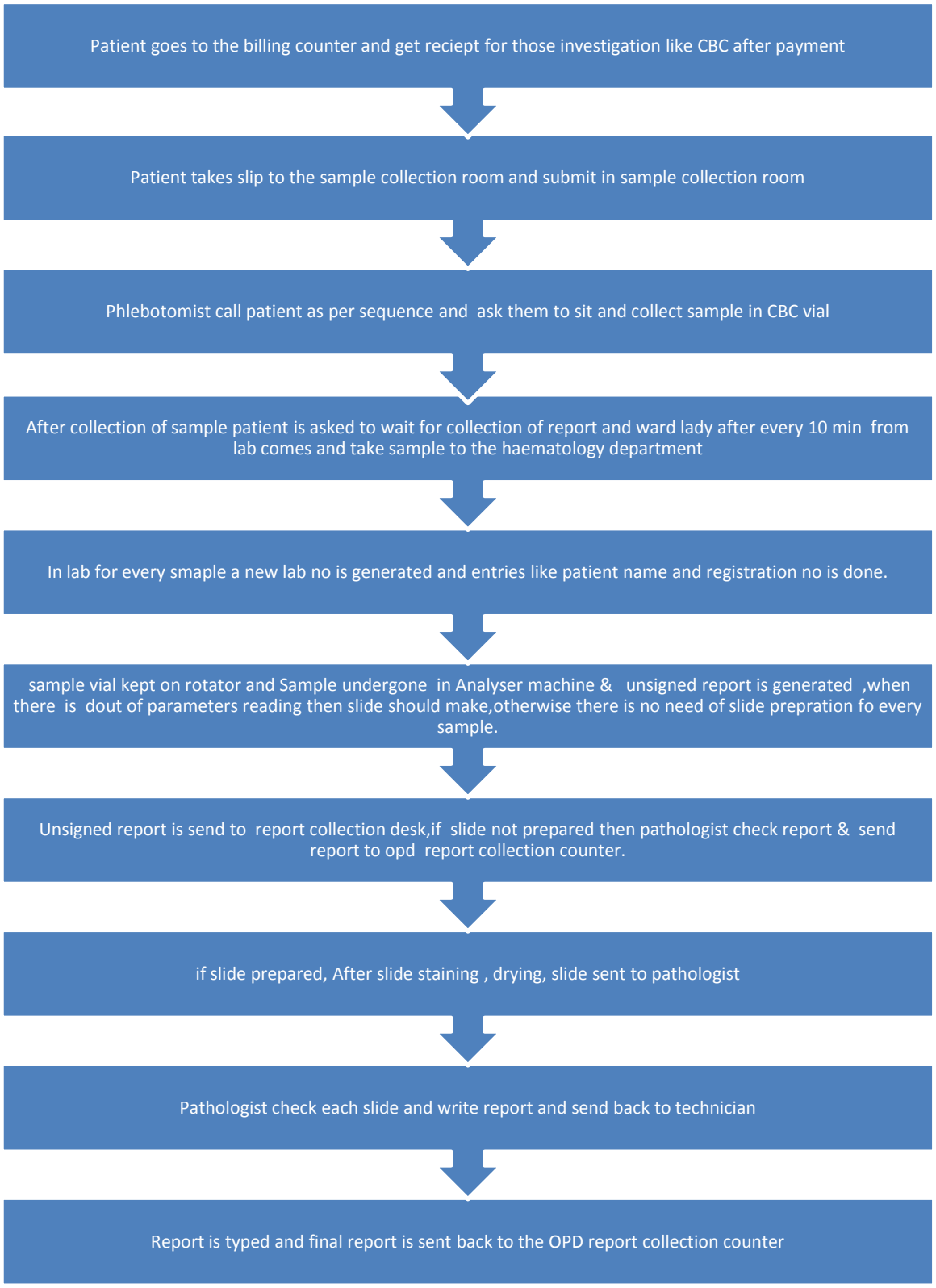
For Hospital with 51-100 employees working in these areas := it should be at least 30%

For Hospital with >100 employees working in these areas == it should be atleast 20%

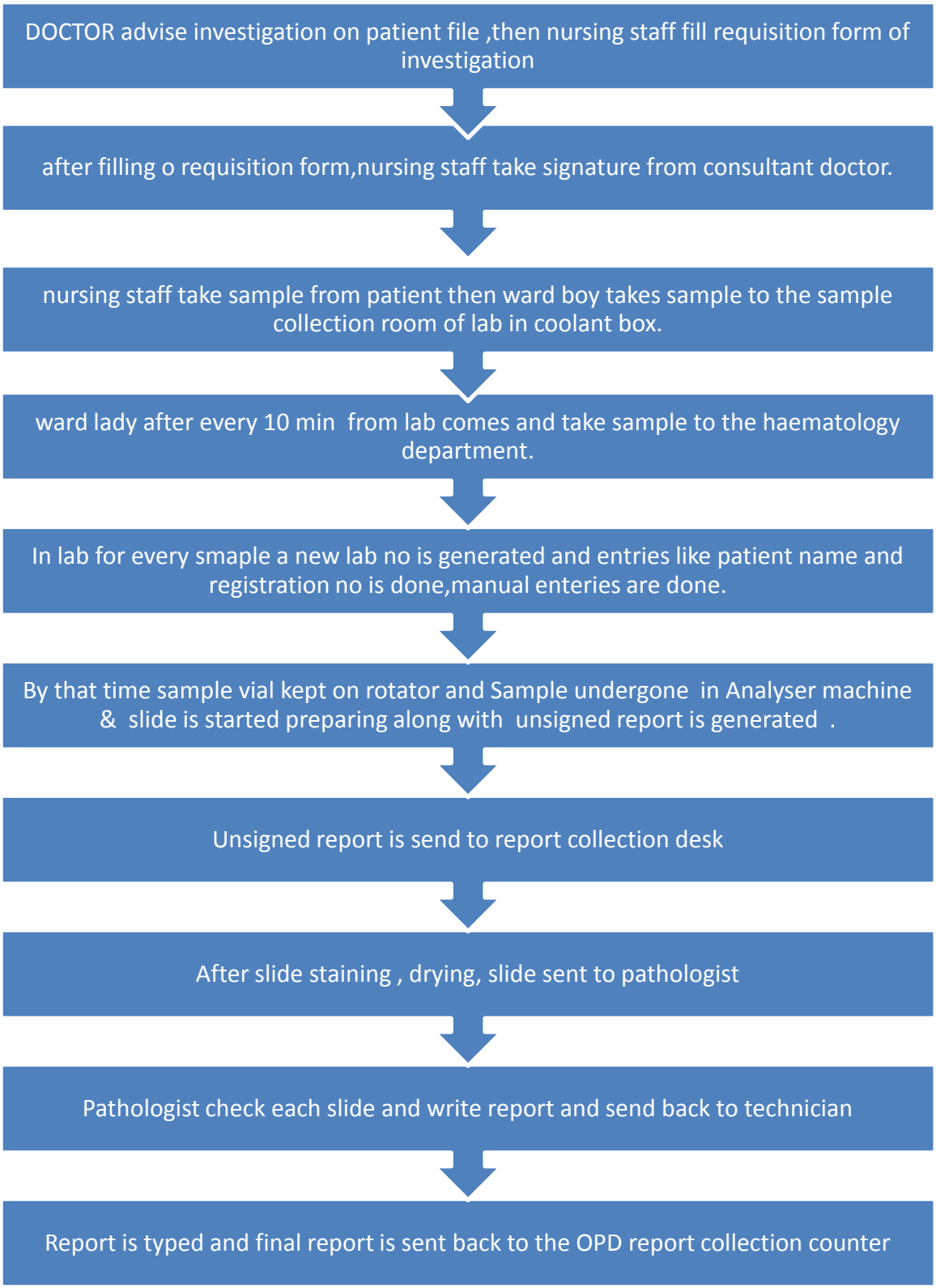
$$\frac{15}{15} \times 100 = 100\%$$

7(iv)-HEMATOLOGY PROCESS FLOW CHART OPD:

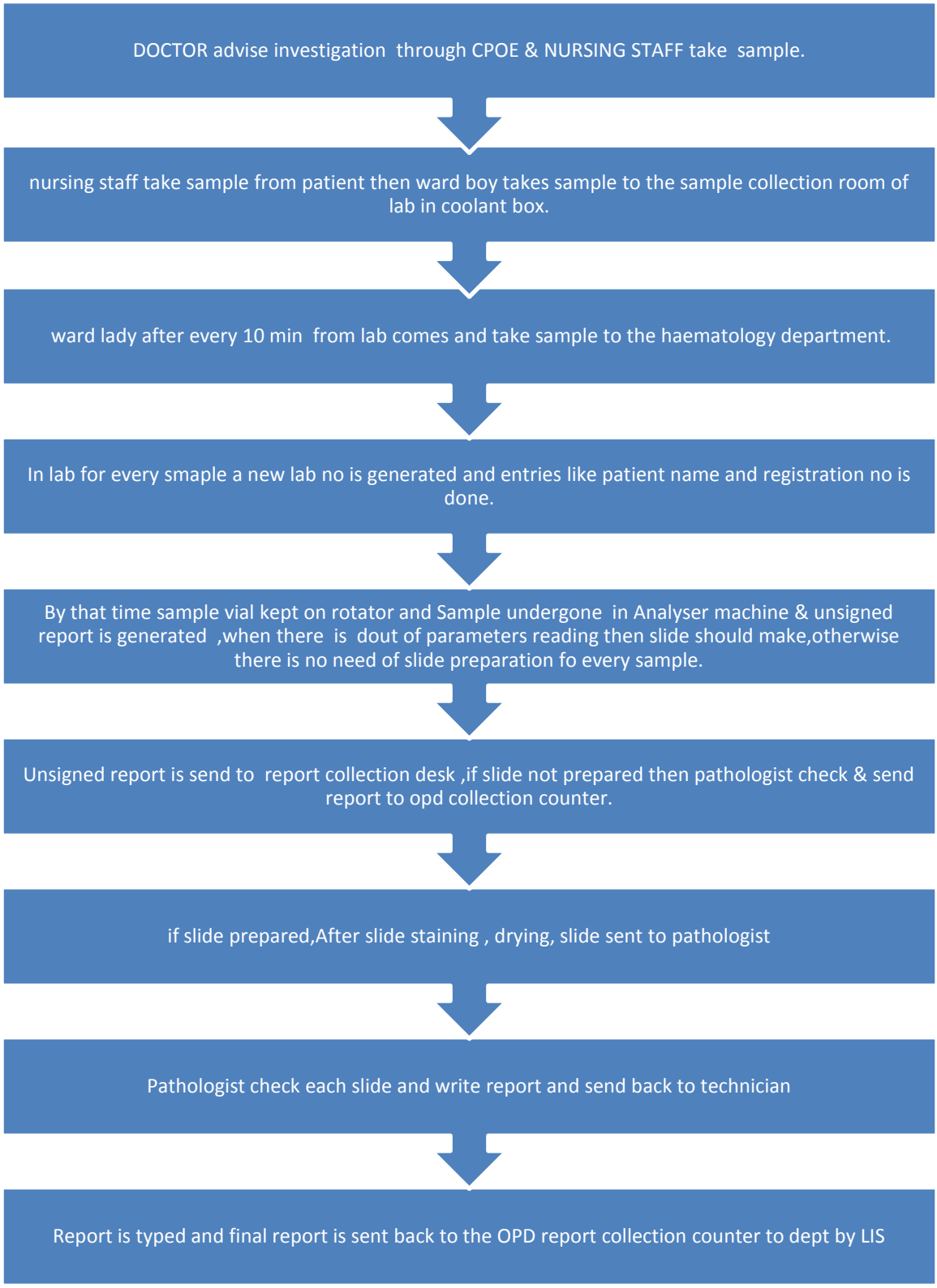
7(v)-REMAPPING OF HAEMATOLOGY OPD PROCESS:



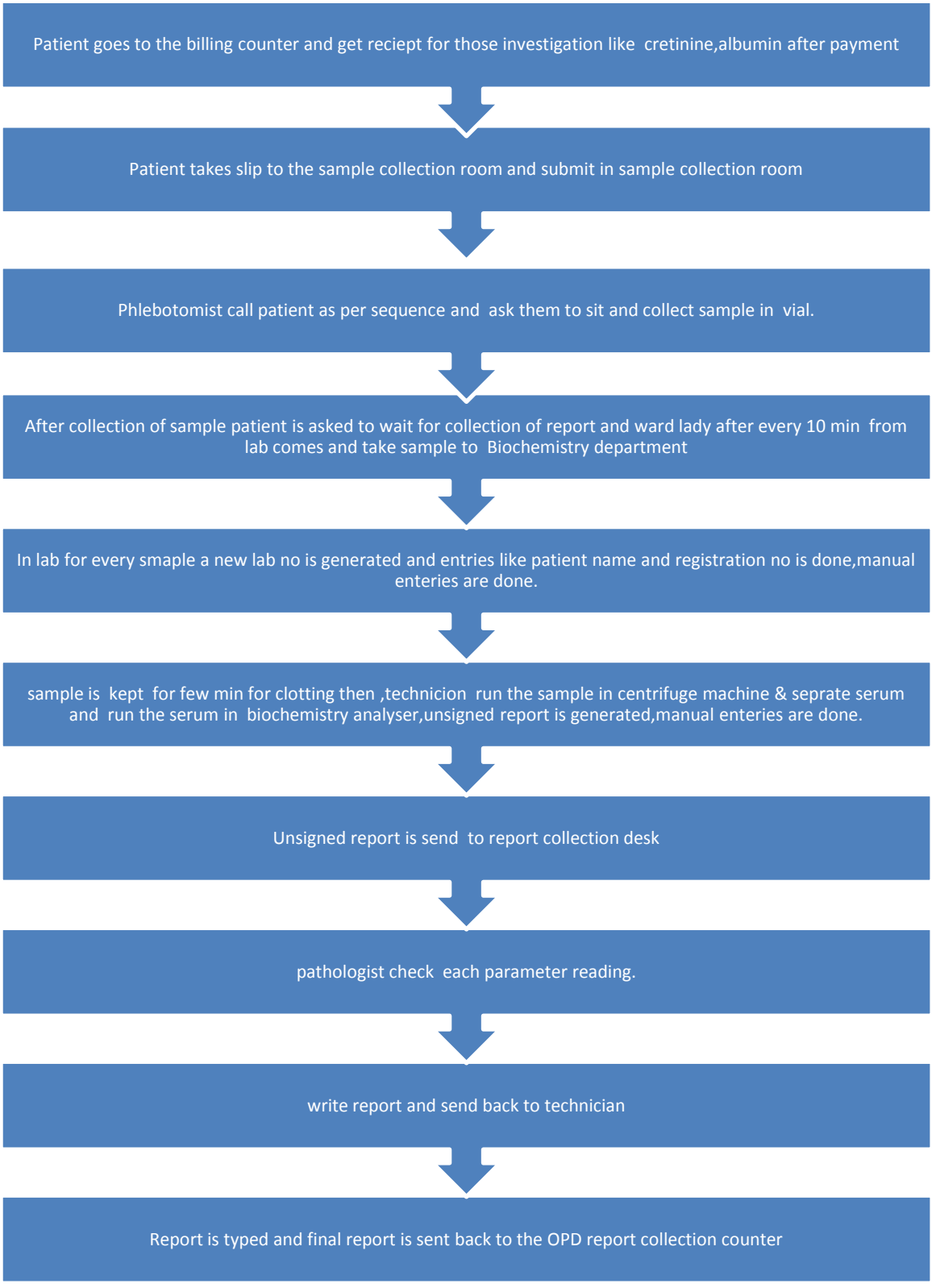
7(vi)-HAEMATOLOGY IPD PROCESS FLOW CHART:



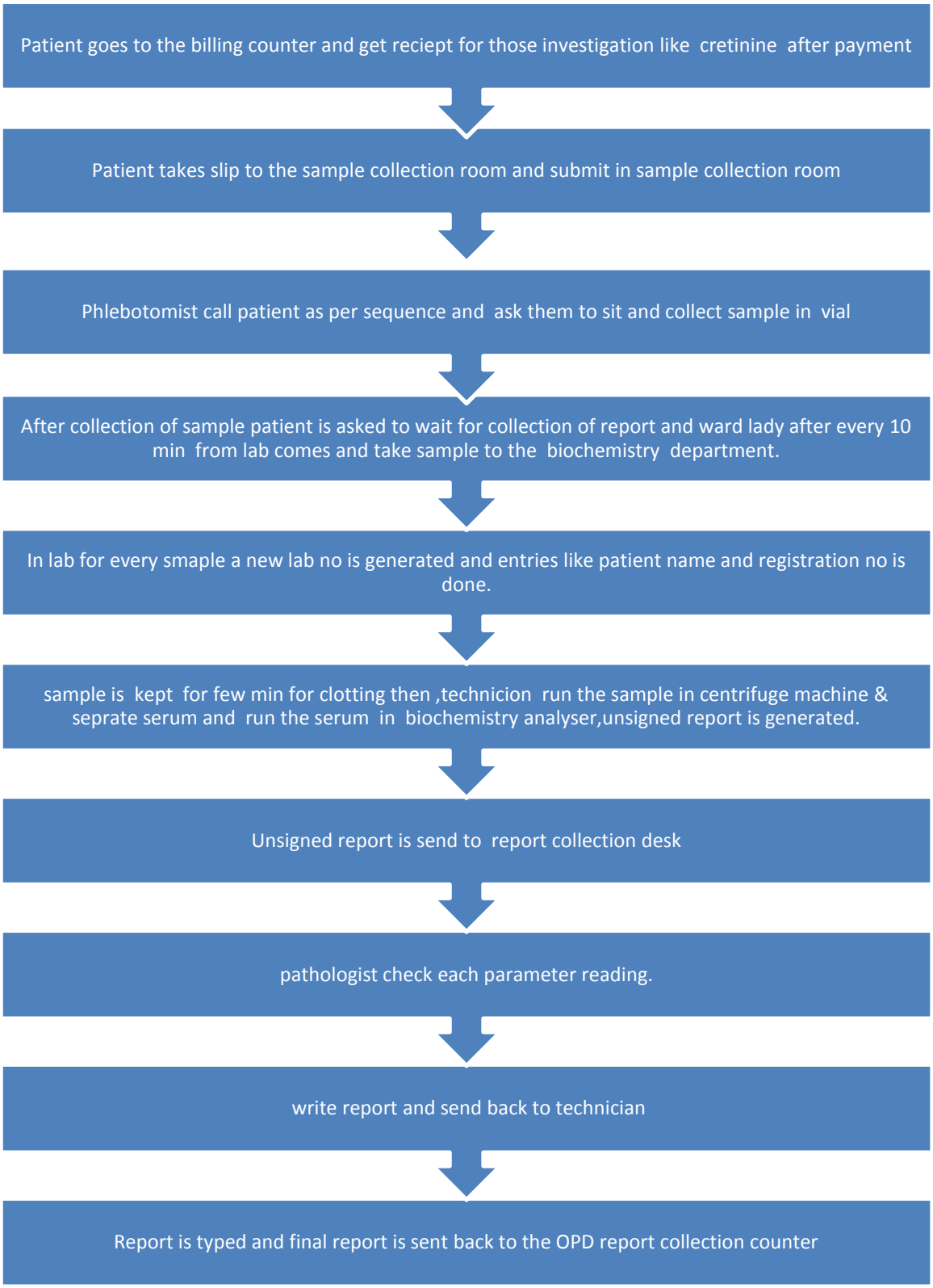
7(vi)-REMAPPING OF IPD PROCESS OF HAEMATOLOGY:



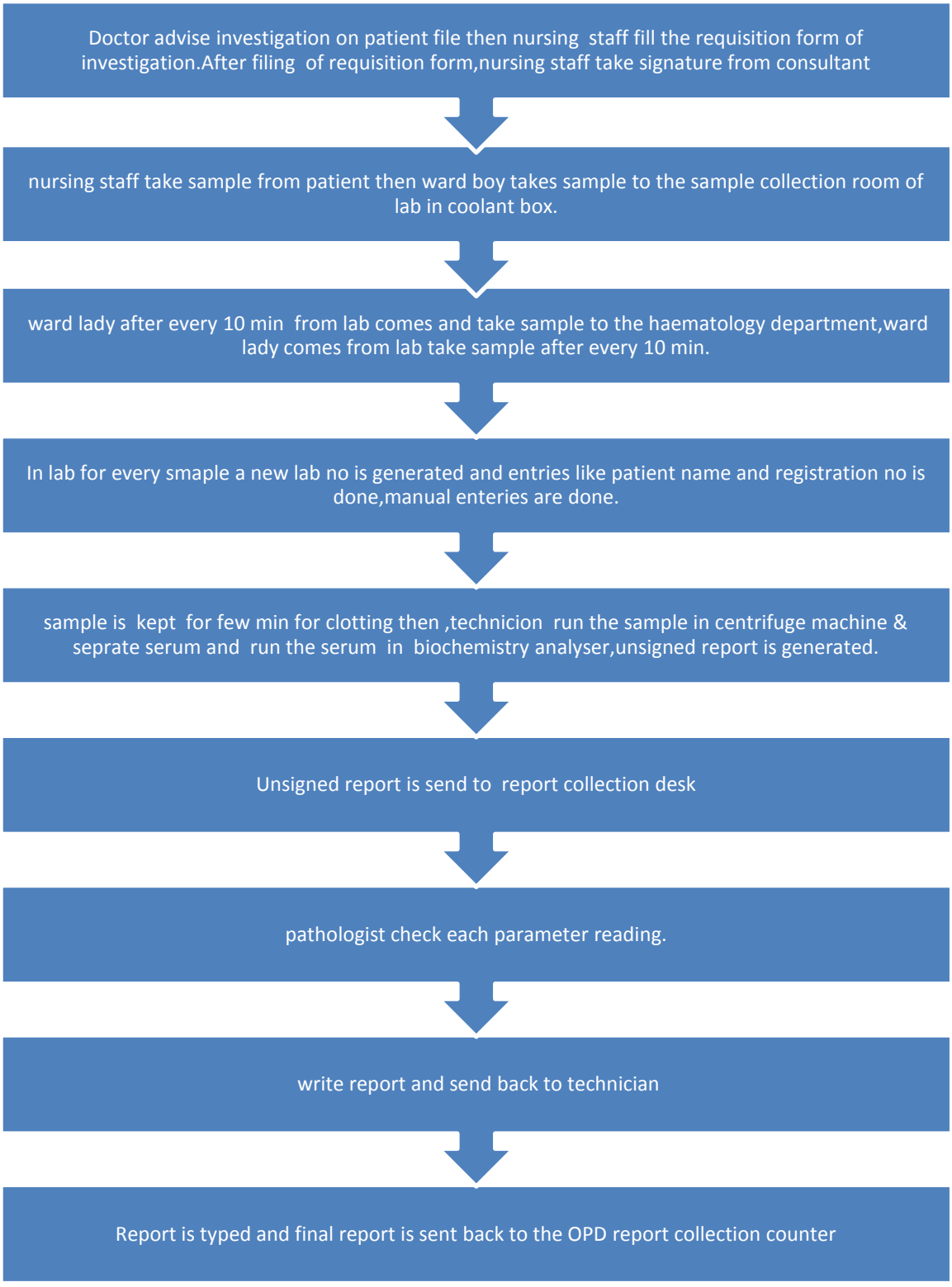
7(viii)-BIOCHEMISTRY OPD PROCESS:



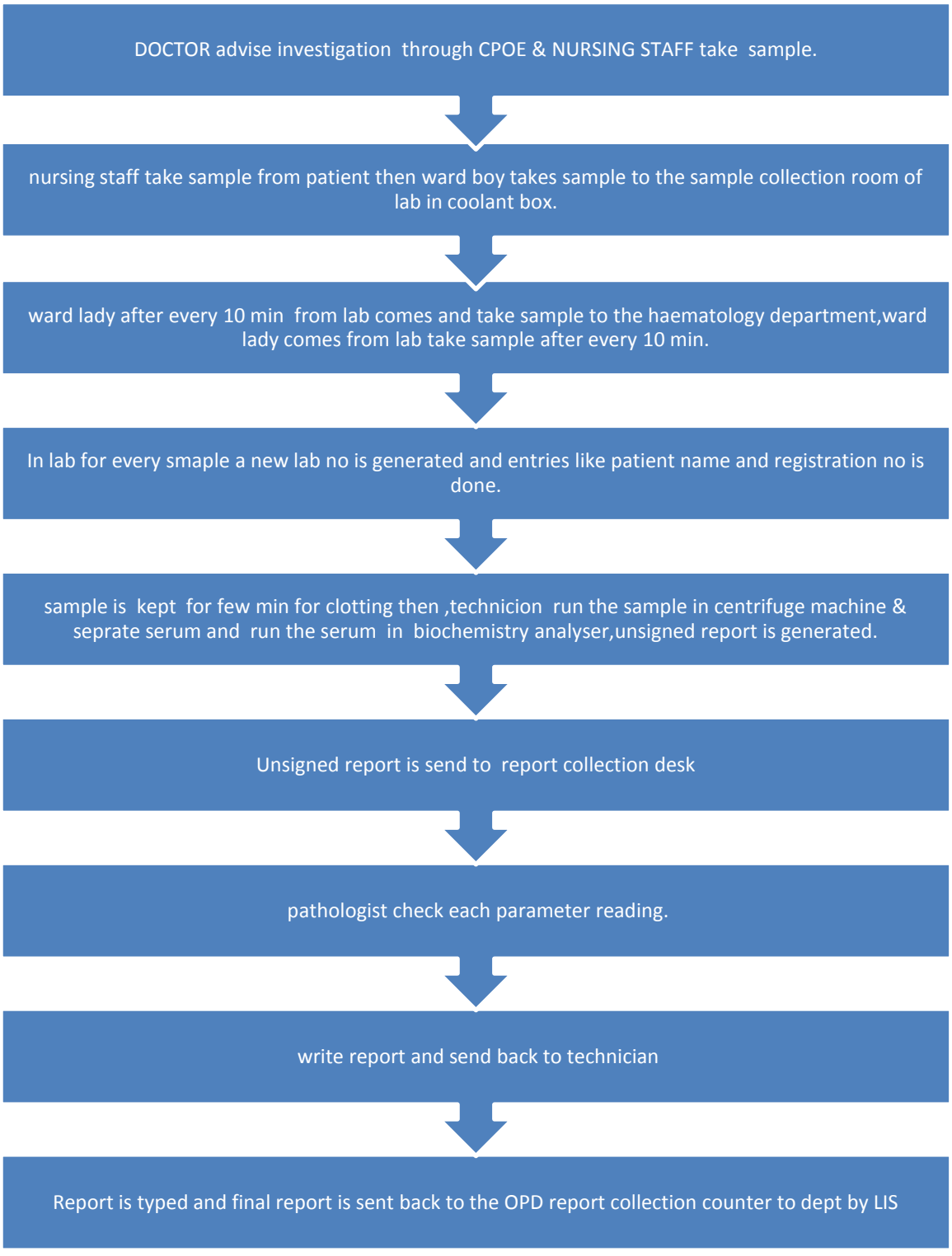
7(ix)-REMAPPING OF OPD PROCESS OF BIOCHEMISTRY:



7(x) -BIOCHEMISTRY IPD PROCESS FLOW:

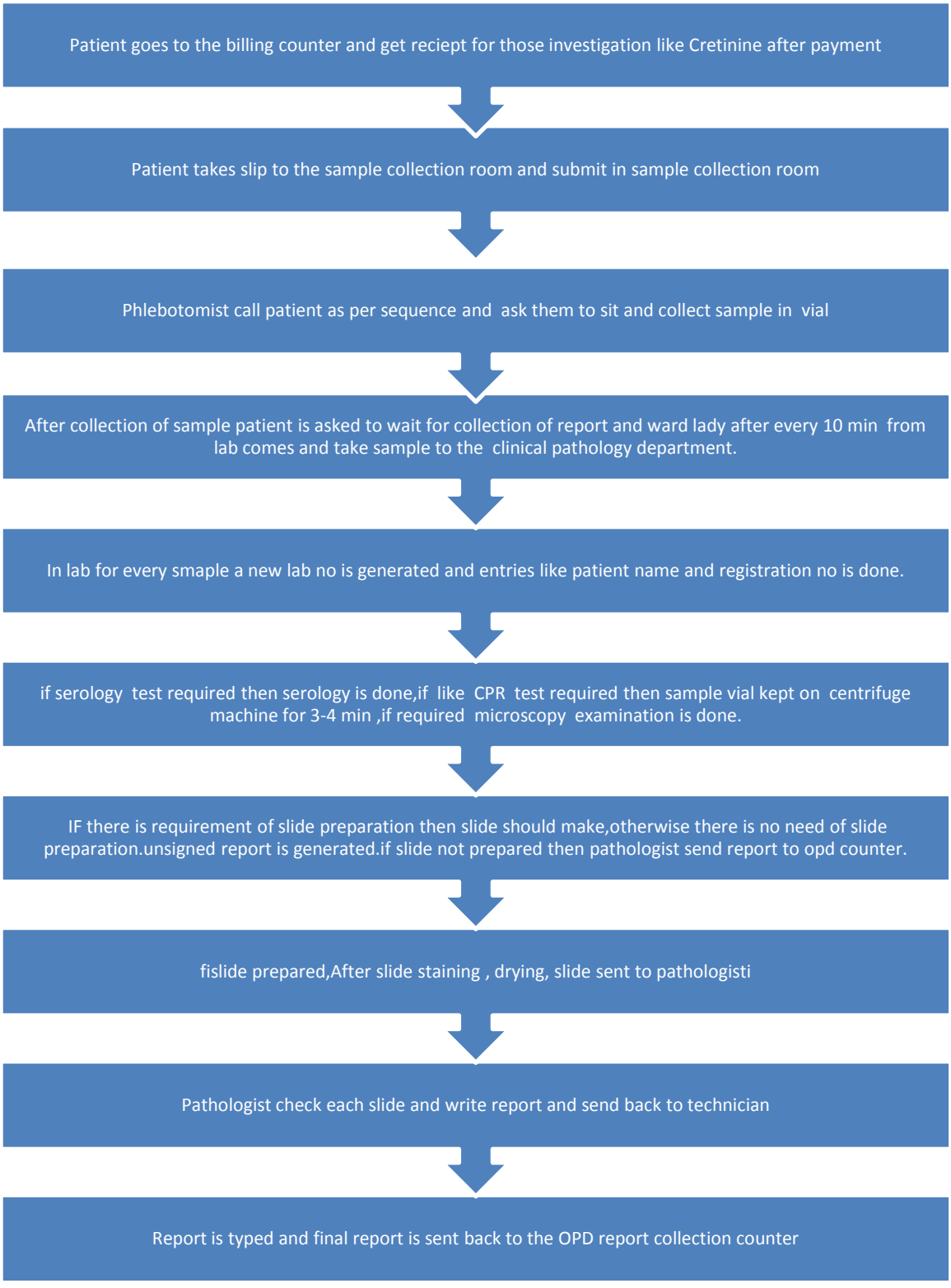


7(xi)-REMAPPING OF BIOCHEMISTRY IPD PROCESS:



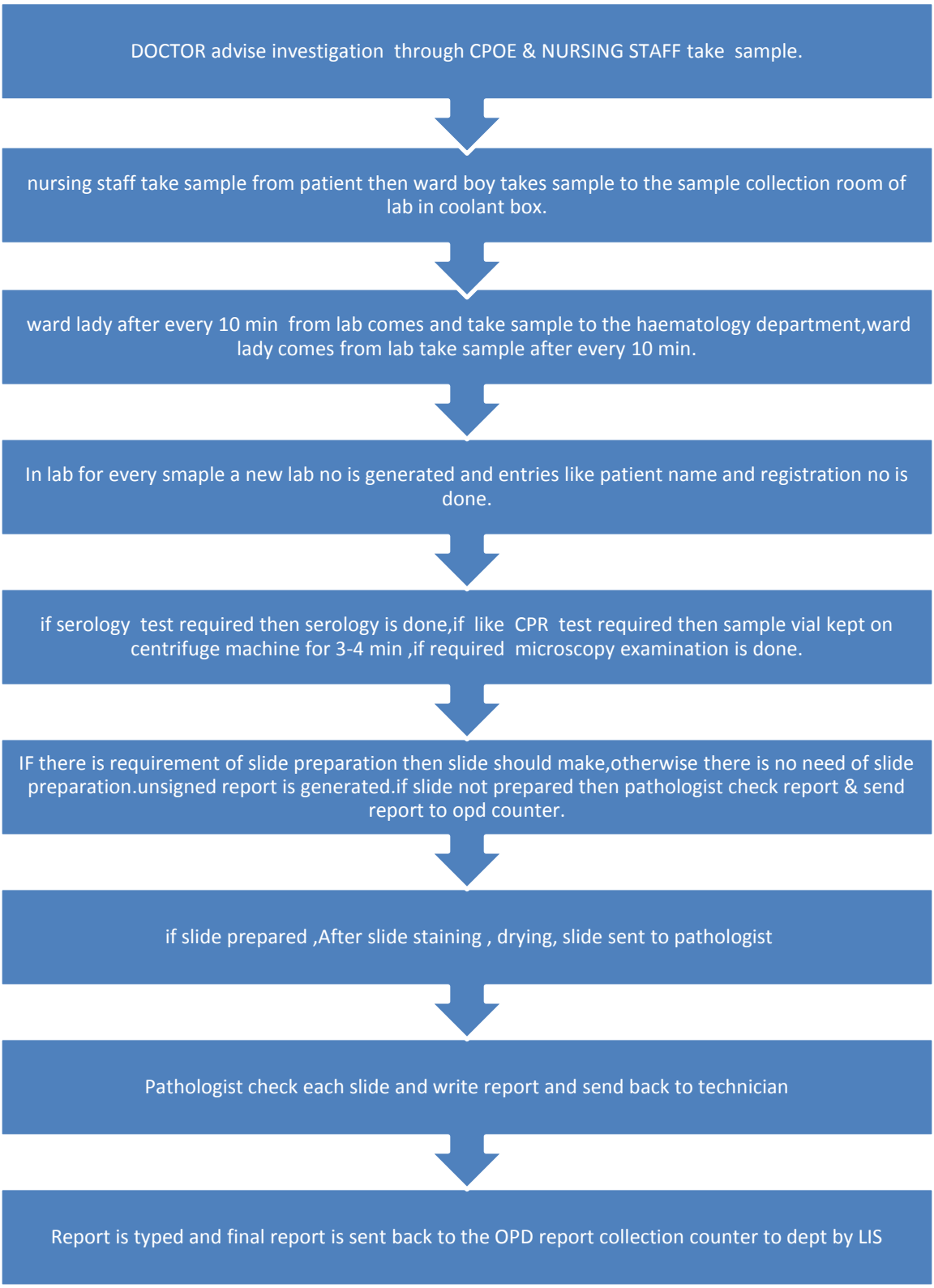
7(xii)-CLINICAL PATHOLOGY OPD PROCESS:

7(xiii)-REMAPPING OF OPD PROCESS OF CLINICAL PATHOLOGY:



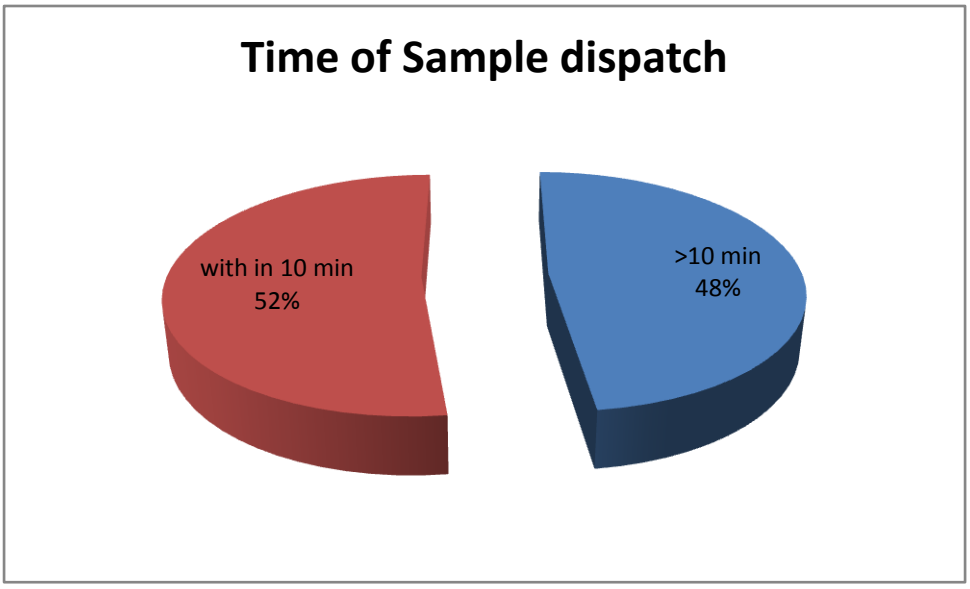
7(xiiii-)IPD PROCESS OF CLINICAL PATHOLOGY:

7(x)-REMAPPING OF IPD PROCESS OF CLINICAL PATHOLOGY:



HAEMATOLOGY- Standard time set for sample dispatch from sample collection room to lab is 10 minutes.(200 sample size)

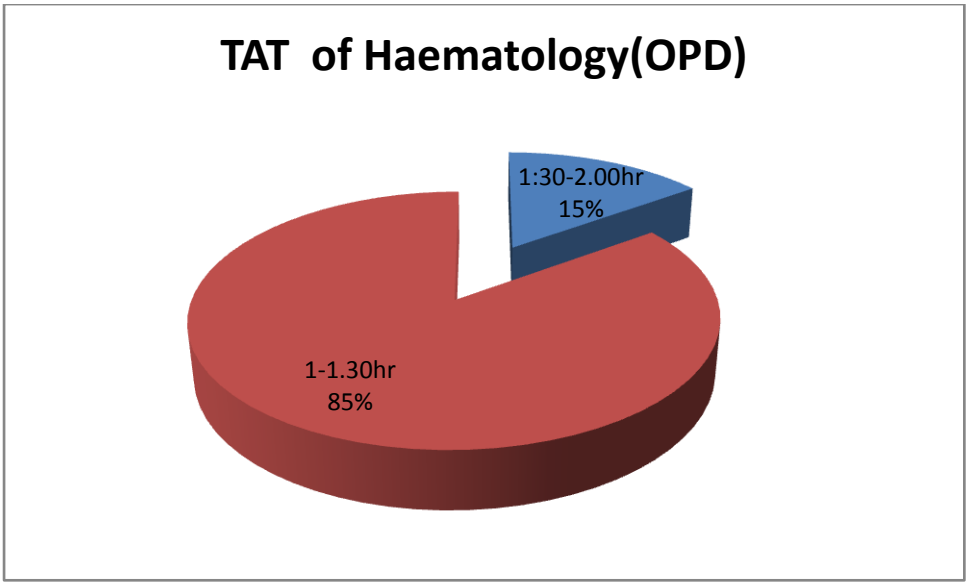
Delay in sample dispatch from sample collection room to laboratory



This pie charts shows that 52% sample dispatch within 10 min from sample collection room to lab. And 48% sample dispatch more than 10 min.

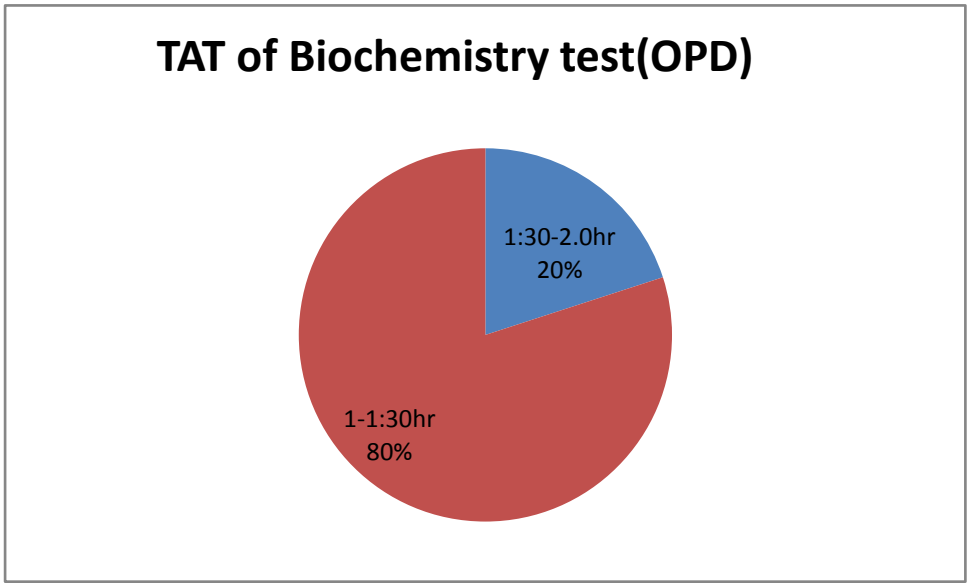
- **HAEMATOLOGY TEST TAT FOR OPD PATIENT: (30 PATIENT SAMPLE SIZE)**-1:35 hr average time

STANDARD TAT FOR HAEMATOLOGY OPD PATIENT-1.30 hr



This pie chart shows that 85% sample report of Haematology test dispatch for OPD Patient 1-1:30 hr,15% sample report dispatch for OPD Patient 1:30-2.00hr.

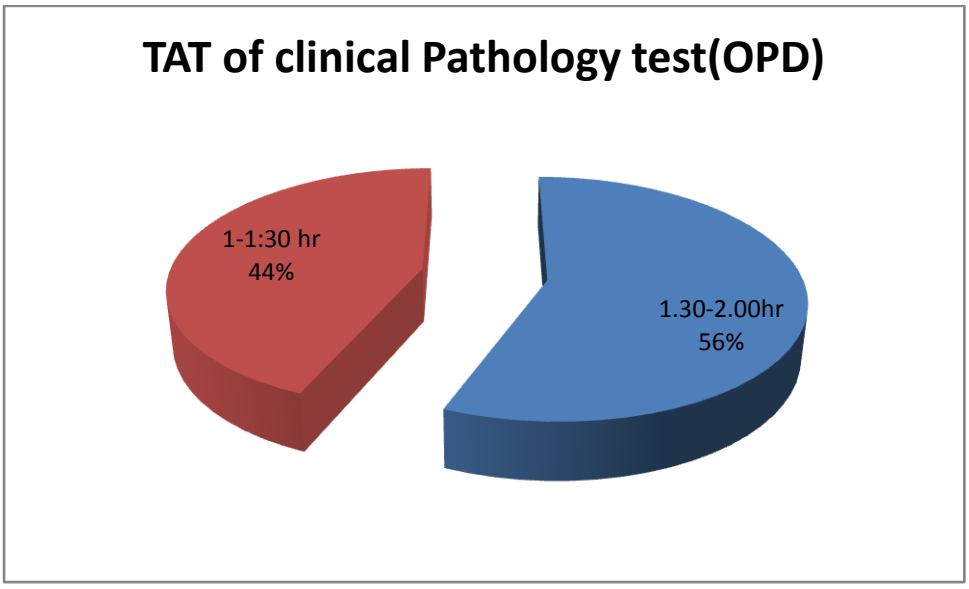
- **BIOCHEMISTRY TEST TAT OPD PATIENT-(40 PATIENT SAMPLE SIZE)-**1:30 hr Average time,
  STANDARD TATFOR BIOCHEMISTRY OPD PATIENT-1:30hr,



This pie chart shows that 80% sample report of biochemistry test dispatch for OPD Patient1-1:30hr,20% sample report of biochemistry dispatchfor OPD Patient 1:30-2:00hr.

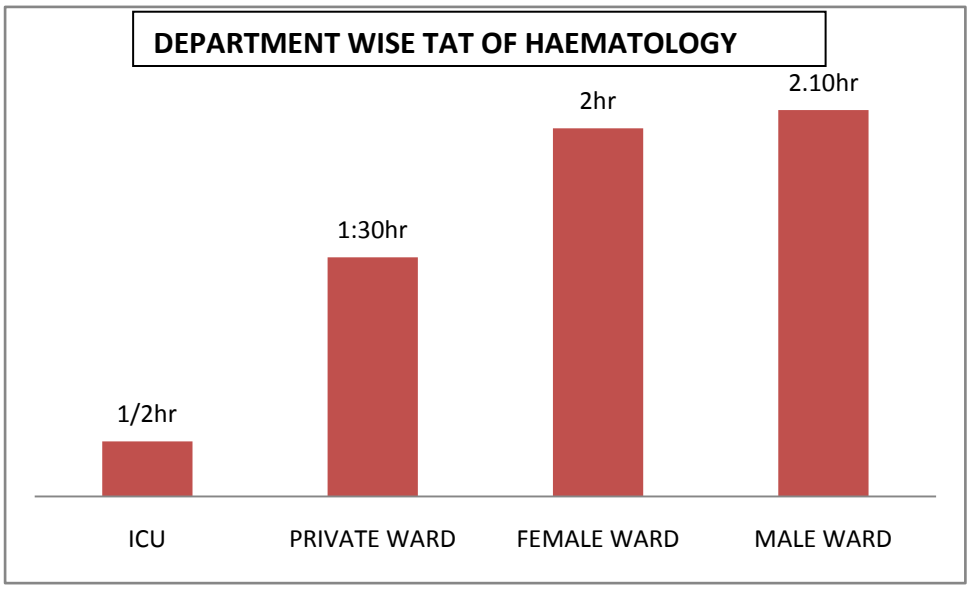
- **CLINICAL PATHOLOGY TAT OPD(30 PATIENT SAMPLE SIZE) -2 hr AVERAGE**

STANDARD TURNAROUND TIME FOR CLINICAL PATHOLOGY;1.30hr

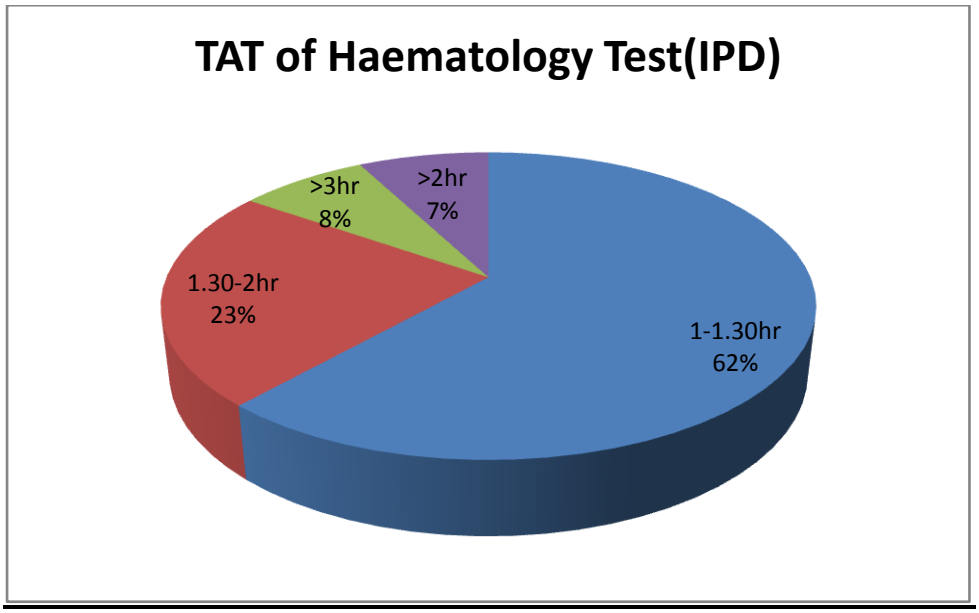


This pie chart shows that 44% clinical pathology test report dispatch for OPD Patient -1-1:30hr,56% sample clinical pathology report dispatchfor OPD Patient -1:30-2:00hr.

- **HAEMATOLOGY TAT FOR IPD PATIENT – (30 PATIENT SAMPLE SIZE)--2hr,Standard-1:30hr**



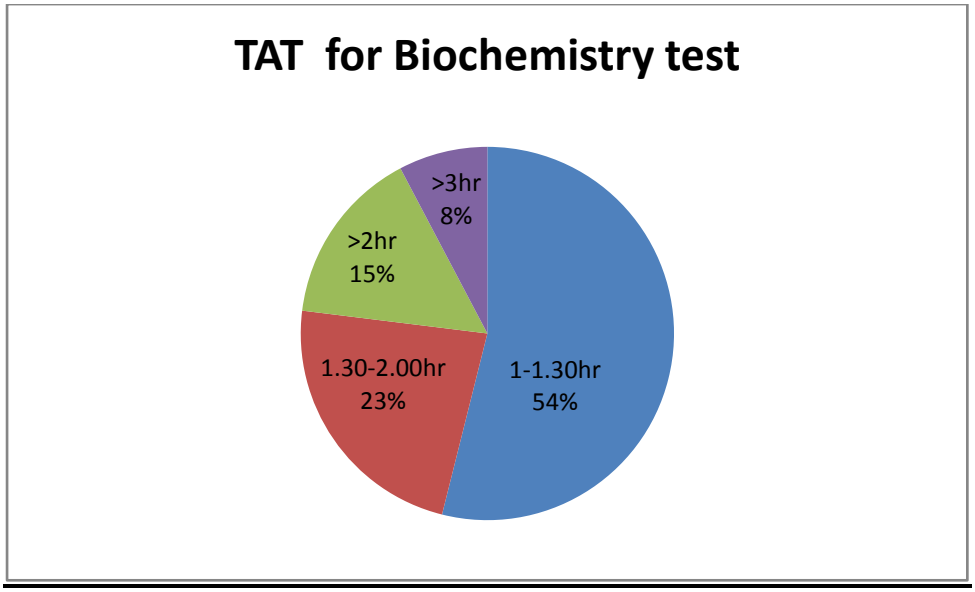
Department wise TAT- ICU TAT for hematology test for IPD Patient -35 min, Private ward TAT for hematology test for IPD Patient-1:30 hr, Female ward TAT for hematology test for IPD Patient-2:00 hr ,Male ward TAT for hematology test for IPD Patient.-2:10 hr.



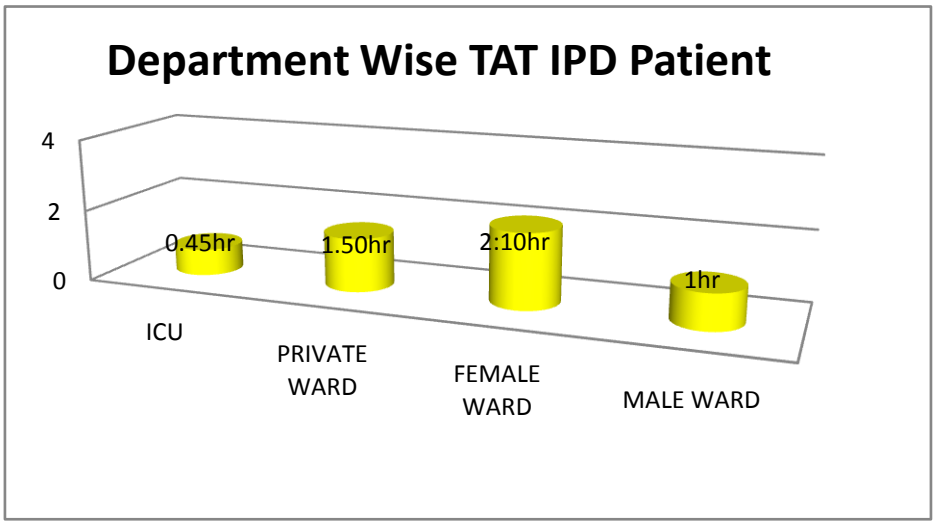
This pie chart shows that23% cases TAT of hematology test is 1:30-2:00 hr,8% cases TAT is >3hr,7% cases TAT is >2:00 hr,62% cases TAT is 1-1:30 hr.

- **BIOCHEMISTRY REPORTS TAT FOR IPD PATIENT (40 PATIENT SAMPLE SIZE):-2hr,7min**

STANDARD TAT FOR BIOCHEMISRY TEST - 1.30 hr



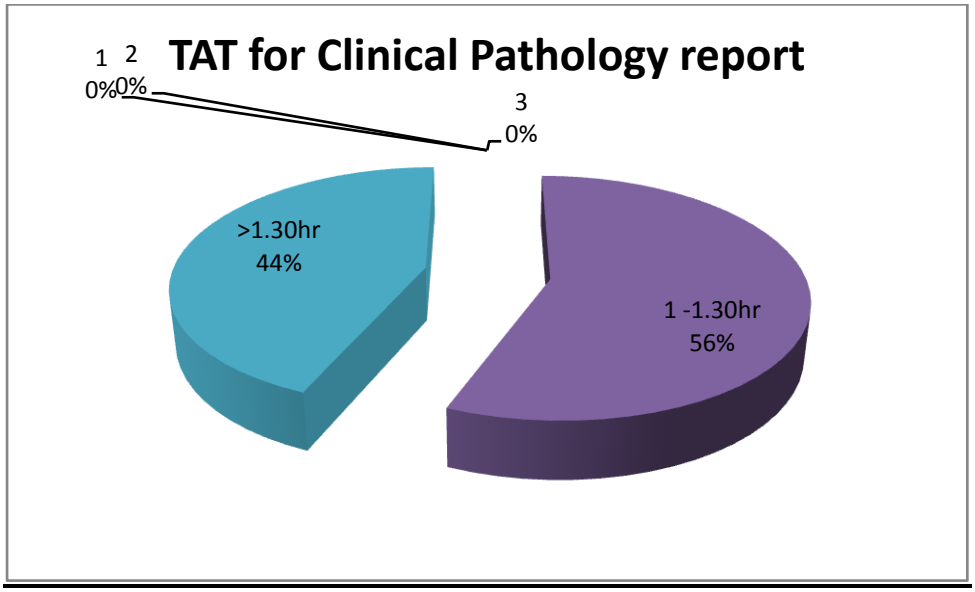
Pie chart shows that 23% biochemistry report test TAT for IPD Patient is-1:30-2:00 hr,54% biochemistry report TAT is 1-1:130hr,15% cases TAT is >2hr,8% cases TAT is >3hr.



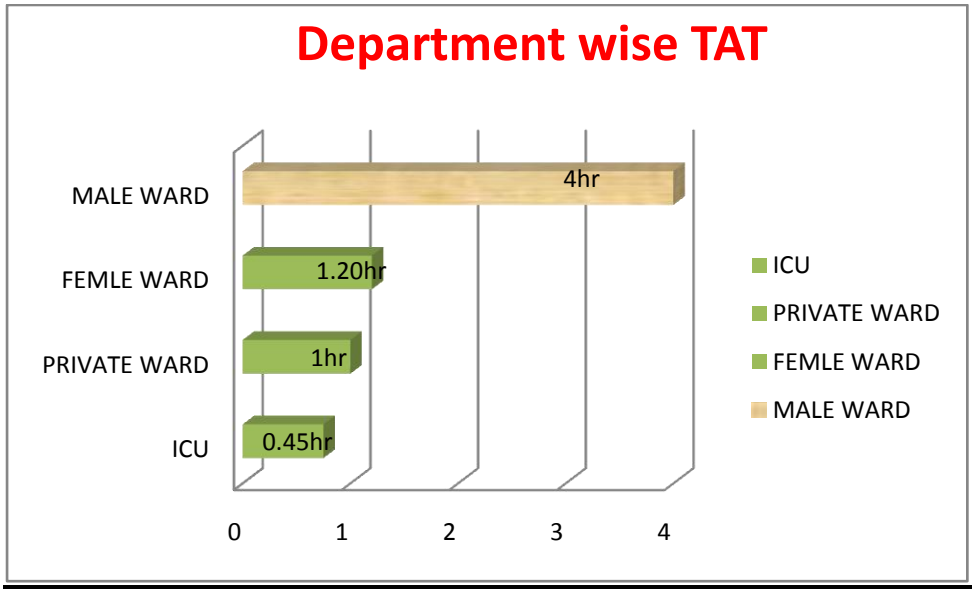
This column chart shows ICU Dept TAT for IPD Patient-45 min, Private ward TAT for IPD Patient of biochemistry test-1:50hr,Female ward TAT for biochemistry test-2:10 hr, Male ward TAT biochemistry test-1:00 hr.

- **CLINICAL PATHOLOGY TAT OF IPD PATIENT-(30 PATIENT SAMPLE SIZE)-3 hr**

  STANDARD TAT FOR CLINICAL PATHOLOGY TEST: 1.30 hr



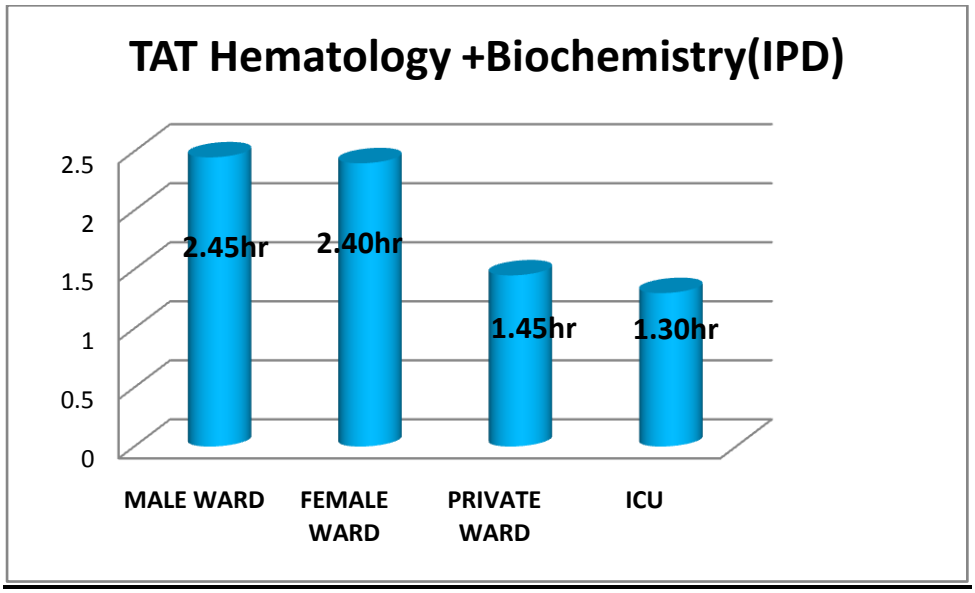
This pie chart shows that 44% IPD cases clinical pathology test TAT for IPD Cases->1.30hr, 56% IPD cases clinical pathology test TAT-1-1:30hr.



This column chart shows that ICU TAT For clinical pathology test-45 min, Female ward TAT for IPD Patient for clinical pathology test-1:20 hr,Private ward-1hr, Male ward-4 hr,

HAEMATOLOGY+ BIOCHEMISTRY TEST TAT FOR IPD PATIENT:2:20 hr,Standard TAT-2 hr(30 sample size)

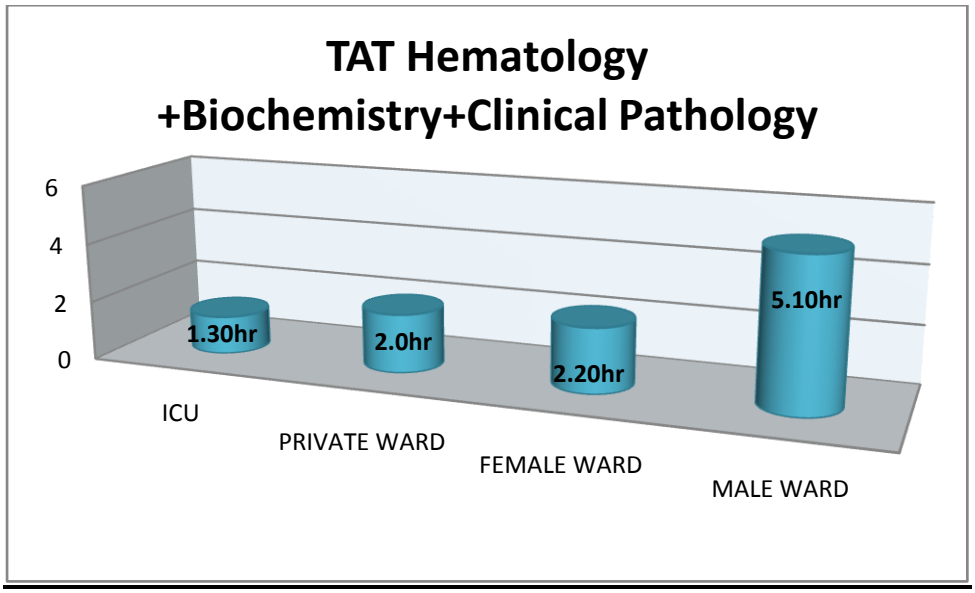
Department wise are, for ICU-1:30 hr, Private ward-1:45 hr, Female ward-2:40 hr, Male ward-2:45 hr.



HAEMATOLOGY +BIOCHEMISTRY+CLINICAL PATHOLOGY TAT FOR IPD:-

Patient-2:40 hr, Standard TAT-2 hr (30=n)

Department wise are-Male ward -5:10 hr, Private ward-2 hr, ICU -1:30 hr ,Female ward -2:20 hr.



AFTER REMAPPING OF PROCESSES OF HAEMATOLOGY,BIOCHEMISTRY,CLINICAL PATHOLOGY TEST PROCESSES TAT (200 PATIENT SAMPLE SIZE-100 OPD,100 IPD)

HAEMATOLOGY OPD-1 hr

HAEMATOLOGY IPD-1:30 hr

BIOCHEMISTRY OPD-1hr

BIOCHEMISTRY IPD-1:30

CLINICAL PATHOLOGY OPD- 1:30hr

CLINICAL PATHOLOGY IPD-2 hr

8-FINDINGS-:

- Callibration of machines is not at the proper time schedule.
- Sometimes machine breakdown leads to delay in work process .
- At haematology section machine report is generated in approx.1-1: 30 hr but manual report takes almost more than 1/2 hour due to complex process i.e.-
  a. Slide preparation
  b. Staining of slide and drying
  c. Send for reporting by pathologist, which is a time consuming process and patients have to wait long time for a CBC report.
- There is no permanent ward boy for taking collected sample from Dept to laboratory in Female & male ward,because of this TAT is more in male ward& Female ward. There is only one ward boy who have lots of responsibilities.whenever he free he takes sample to laboratory.
- Approximately 10 samples come at a time in coolant box, every department have only one coolant box, bought by ward lady from department to lab, due to which delay dispatch occurs.
- For every sample comes to laboratory, entry is done in computer and lab no is generated.
- CBC cost is very less on 3 part analyser as compared to 5 part analyser but every time using 5 parts machine for both CBC and TLC which is a loss.
- Mixer machine or Rotator Machine is of small size, can carry 9 vials at one time.
- Reports take longer time to dispatch both in OPD and IPD because delayed authorization of report.
- Shortage of staff in biochemistry as more of the work load has on one staff and sometimes when machine breakdown occur then creates double burden on them.

9-RECOMMENDATIONS-:

- For machine breakdown & Calibration, engineer should meet and check machine.
- Most of the times unsigned report is similar to manual reports so for cross checking send only those reports to manual check or slide preparation which has some critical values or out of range values.
- There should be fixed ward lady/boy for dispatching the collected sample from Dept to laboratory.
- Every department should have more coolant box, it should be according to no of patient in department.
- Online authorization- the facility for online authorization of reports should be provide to consultant to reduce the authorization time.
- Manual entries of patient is not nessesary, because for every patient lab entries & lab no is generated.
- Either use 3 parts analyser machine for TLC test and if 3 part analyzer has some technical problem then ask consultant to write only CBC test (not TLC or Platelets as separate test) so that there will be no loss and will be able to generate revenues.
- Mixer or rotator machine should be of greater capacity so that more sample can be rotated and less electricity consumed, less time consumed.
- Counselling should be done by doctor /phelebotomist before investigation.

10- Conclusion: Quality assurance by the aspect of IQC,EQAS, Quality indicator, Remapping of processes helps in reducing Transcription errors, Analytical errors, pre analytical errors, Post analytical errors , reducing Turn around time of processes of Biochemistry test, Clinical pathology test, Haematology test in NABL Lab & improvement of efficiency of NABL Laboratory.

11-REFERENCES-:

1.Determination of Delay in Turn Around Time (TAT) of Stat Tests and its Causes: an AKUH ExperienceF. Bilwani, I. Siddiqui, S. Vaqar (Section of Chemical Pathology, Department of Pathology, Aga Khan University Hospital, Karachi.)

2.Turn Around Time (TAT) as a Benchmark of Laboratory Performance, Binita Goswami • Bhawna Singh • Ranjna Chawla; Published online: 14 September 2010

3. Hospitals—Management and Use of Diagnostic Imaging Equipment;Follow-up on VFM Section 3.06, 2006 Annual Report

4. Streamlining a Radiology Practice: Balancing Brand & Efficiency; (By Erica Olenski on November 9, 2010

5. Mapping Turnaround Times (TAT) to a Generic Timeline: A Systematic Review of TAT Definitions in Clinical Domains; Bernhard Breil*†, Fleur Fritz†, Volker Thiemann† and Martin Dugas