TRAINING OF THE EMPLOYEES AS A PART OF IMPLEMENTATION OF LABORATORY INFORMATION SYSTEM IN A HOSPITAL

Internship Training
at
Zon Healthcare Consulting Pvt. Ltd. Mumbai

By
Aditi Vaidya

Under the guidance of
Dr. P.R. Sodani

MBA Hospital & Health Management
2013–15

Institute of Health Management Research
Jaipur
2015

Dissertation

At

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

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that **Aditi Vaidya** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Zon Healthcare Consulting Pvt Ltd, Mumbai** from 9th March, 2015 to 9th May, 2015.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her success in all his future endeavors.

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

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The certificate is awarded to

Dr Aditi Vaidya
Student of MBA in Hospital and Health Management from the IIHMR University, Jaipur
In recognition of having successfully completed her
Internship in the department of
Implementation and Projects
and has successfully completed her Project on
"Implementation of Hospital Information System"
Duration 9th March to 9th May 2015
Organization: Zon Healthcare Consulting Pvt. Ltd
She comes across as a committed, sincere & diligent person who has
a strong drive & zeal for learning
We wish her all the best for future endeavors

Mr. Vipul Singh
Chief Operating Officer

Ms. Kashmira Rai
Manager Admiinistration

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

IIHMR UNIVERSITY

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Training of the employees as a part of Implementation of laboratory information system in a hospital and submitted by Aditi Vaidya Enrollment No 1406 under the supervision of Prof. P.R. Sodani (Professor and Dean Training) The IIHMR University for award of MBA Hospital and Health Management of the university carried out during the period from 9th March, 2015 to 9th May, 2015 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.

Avaidya

Signature

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ACKNOWLEDGEMENT

I would like to express my sincere thanks and gratitude to **Zon Healthcare Consulting** for allowing me to complete my project in the facility. I would like to thank **Vipul Singh,COO** for giving me opportunity to do my project at **Zon Healthcare Consulting,Mumbai**

Foremost, I would like to thank **Mr. Santosh Badhan,Project Consultant** for implementation who was kind enough to spare his valuable time and provided several important suggestions at every stage of my study. His impeccable suggestions have added loads of value to my knowledge base.

Sincere thanks to all the staff at all levels for helping me at each and every step of my work. Heartiest gratitude to them for making my stay and work at this place a memorable one. Last, but not the least, I am thankful to all the laboratory staff in hospital, IT staff for involving me in some of new initiatives and designing of future plans for the hospital.

Thanks to one and all

Aditi Vaidya

BACKGROUND OF THE STUDY

Laboratory information system has evolved over past 30 years from simple system designed to generate accurate reports to complete system that can link laboratory data end to end across "total testing process", including the clinical related pre and post analytical activities .Health information technology and web based applications have enabled dramatic improvements in the ways in which laboratory communicate ,provide services ,educate their workforce and client, market themselves to client and track clinical data and information .Health care organisations have played a key role in advancing such communication by linking the LIS with hospital information system, pharmacy database systems etc.

In order to implement successfully the new HIS, it is necessary to conduct change management process that will help hospitals in preparing its organization for the usage of new tools and working environment.

The factors that influence mostly the successfulness of HIS implementation are in the direct or indirect relation with the change management, pointing out to the necessity of setting up the effective communication channels and the vision for change, among both hospital management and staff.

Two factors are involved in HIS implementation through change management process: social and technical factors. The relationship between the technical and social factors is determined by four components: structure, people, technology and processes. Although each of the four components can result in success or failure of the HIS implementation, social factors are more crucial than the technical ones, as people play the vital role in the success or failure of any change process.

A hospital may not achieve the necessary goals only by implementing HIS. Such system cannot work properly until proper training is provided to the people who will use this.

On-site technical support and trainings is must for user so that they can feel comfort while using the system successfully. Before implementing the LIS, make sure that the requirements of the physicians will be fulfilled by new system. When implementation of new LIS is completed then for the success, proper training is required to reduce failure rate.

OBJECTIVES OF THE STUDY

- To understand workflow for laboratory in order to train the users during training.
- To train the users to adequately learn them to use the new system

RESEARCH METHOLOGY

Location- MGM hospital, Vashi

Duration- 2 months, 9th march-9th may

Study type- Analytical

Sample size-30 laboratory staff

Study area- Pathology

Study population- Laboratory technicians(key and end users),doctors

Sources of data

1. Primary data-
   - Interpersonal interviews of five key users and twenty five end users study and observations of lab process carried out over the study period.The selection criterion for the key users was that they have been involved with the project from its initiation to the present.
   - Focus group discussions- a good amount of quality data was collected with focus group discussions with laboratory head,IT support staff,lab technicians and doctors.
2. Secondary data
   - Books, journals,internet searches ,review literature

Data collection tools and techniques

- questionnaire

RESULT

1. Most of the staff were involved and participated actively involved in design and development of new system and suggested changes while few staff was less involved as they did not participated much in hands on training.
2. User acceptance was high among the staff and there was no resistance to change.
3. Knowledge and skills among users was found to be lacking as they were less confident about using the system.
4. Most of the key users and IT staff were efficient in training of end users but few were unable to do so.
5. There was delay in implementation plan and training was one the main reason as users were not giving much time for learning the system.
6. Solution mapping was not done properly and there were problems faced during application designing.

CONCLUSION

A hospital may not achieve the necessary goals only by implementing LIS. Such system cannot work properly until proper training is provided to the people who will use this. On-site technical support and trainings is must for user so that they can feel comfort while using the system successfully. Before implementing the LlS, make sure that the requirements of the users will be fulfilled by new system. When implementation of new LIS is completed then for the success, proper training is required to reduce failure rate. Also Workflow designing of the laboratory is critical for effective and efficient throughput and will be responsible for future bottlenecks.It defines the role of LIS in the organisation

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1. INTRODUCTION

A medical laboratory is a place where tests are done on clinical specimens and samples in order to get information about the health of a patient as pertaining to the diagnosis, treatment, and prevention of disease.

Laboratory Services play a critical role in the detection, diagnosis and treatment of disease. Samples are collected and examination and analysis of body fluids, tissue and cells are carried out. Main services are:

- To Perform diagnostic tests
- To Identify organisms, like E-coli bacteria
- To Count and classify blood cells to identify infection or disease
- To Operate complex diagnostic equipment
- To Perform immunological tests to check for antibodies
- To Type and cross-match blood samples for transfusions
- To Analyze DNA

SCOPE OF SERVICES

Good Clinical Laboratory Practices should be used by all laboratories where tests are done on biological specimens for diagnosis, patient care, disease control and research such as:

• Microbiology & Serology

• Haematology & Blood Banking

• Molecular Biology and Molecular Pathology

• Clinical Pathology

• Clinical Biochemistry

• Immunology (Immunohematology and Immunobiochemistry)

• Histopathology/Pathology and Cytology

1.1 LABORATORY INFORMATION SYSTEM

Laboratory information system has evolved over past 30 years from simple system designed to generate accurate reports to complete system that can link laboratory data end to end across “total testing process”, including the clinical related pre and post analytical activities. Health information technology and web based applications have enabled dramatic improvements in the ways in which laboratory communicate ,provide services ,educate their workforce and client, market themselves to client and track clinical data and information. health care organisations have played a key role in advancing such communication by linking the LIS with hospital information system, pharmacy database systems etc.

As a strategic tool, the LIS should enhance quality and efficiency of healthcare professionals allowing them to deliver high quality, cost effective service. This module help the laboratory department to streamline the processing of various investigations starting from ordering of tests, registration of specimen, result reporting, reviewing of abnormal results, displaying of result trends and monitoring of quality control.

DEFINITION:

The specialized application of information technology to optimize and extend laboratory operations.

OR

A collection of computerized methods to acquire, analyze, store, and report laboratory data.

1.2 BENEFITS OF LIS

- Quality assurance and control
- Fast sample turnaround
- Management of information
- Very fast report access & queries
- Reduction in paperwork
- Improved data quality (reduction in errors)
- Improved operational efficiency
- Increased productivity (reduction of routine tasks)
- Productivity gains (instrument interfacing and auto-reporting)
- Integration with other departments/business systems
- Reduces transcription errors
- Increases throughput
- Avoids duplication
- ROI

1.3 COMPONENTS FOR LIS

It consists of-

Hardware, software, people, procedures and data

Hardware requirement

processor- intel Pentium III 832 MHz

RAM- 128 RAM

Hard disk- 100 MB or above

Software requirements

Operating system- Windows XP/98/2002 etc.

FRONT END

eg. Visual Basic, JAVA, Web front end

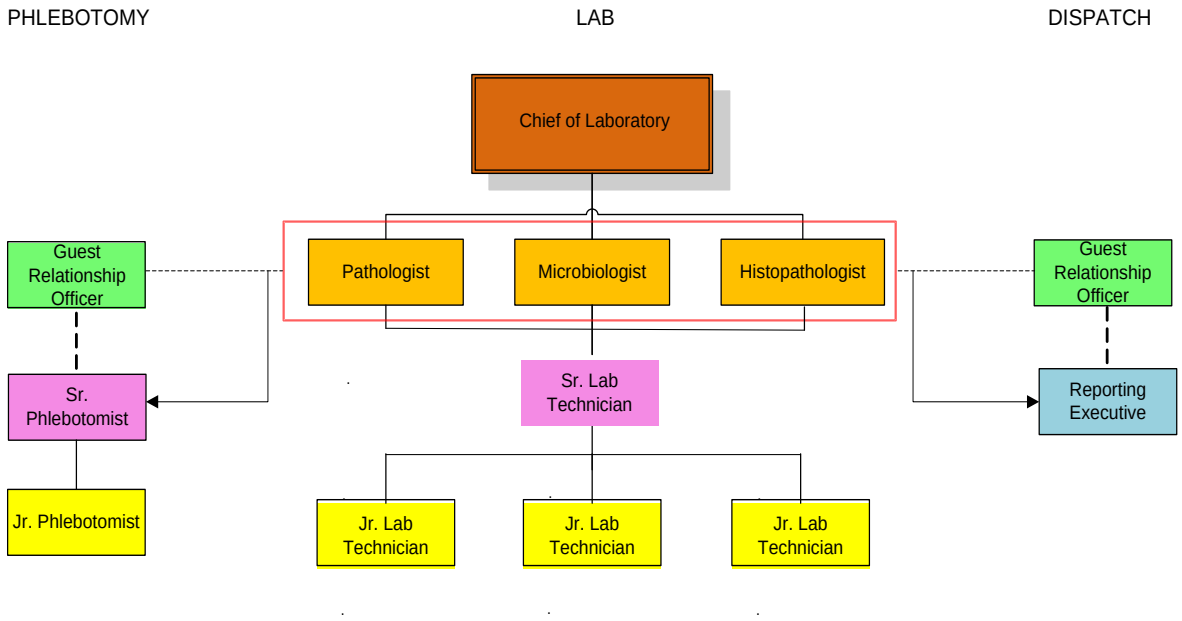
BACK END

eg. Access, Sql server, Oracle, DB2

1.4 FUNCTIONS OF LIS

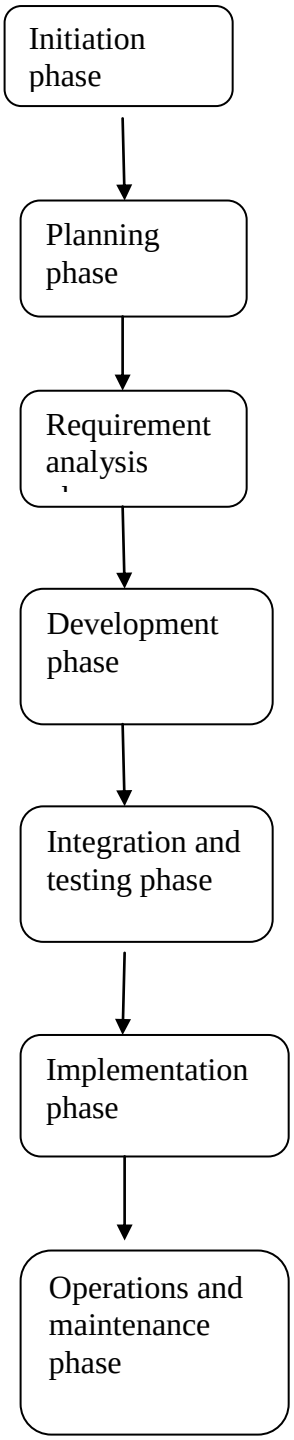
- Track specimens from receipt, processing, testing, reporting to storage
- Electronically capture results from lab diagnostic equipment and store with specimen details
- Protocols and algorithms for testing and final result determination
- Enable determination of patient outcomes
- Integrate patient and specimen information
- Support patient management and care/treatment

1.5 ORGANOGRAM OF LABORATORY



1.6 HIS LIFECYCLE

Hospital information system undergoes different phases as depicted in the flowchart below



1.7 PROBLEMS WITH EXISTING LIS

- Lack of immediate retrievals
- Lack of immediate information storage
- Lack of prompt updating
- Error prone manual calculation
- Preparation of accurate and prompt reports
- Redundant data storage
- Lack of integration with other departments
- No equipment interfacing for result generation
- No barcode printing
- Increased workload and TAT

1.8 GOALS OF PROPOSED LIS

- Planned approach towards working-the working in the organisation will be well planned and organised.
- Accuracy
- Reliability
- No redundancy
- Immediate retrival of information
- Immediate storage of information
- Easy to operate

2. REVIEW OF LITERATURE

- An Introduction and Guide to Successfully Implementing a LIMS (Laboratory Information Management System) by Ben Tagger.

  LIMS have been around for over twenty years, but still remain difficult to implement successfully. This paper will provide a brief introduction of LIMSs followed by a description of some of the existing technologies available to users of today's LIMS. The paper will describe some of the pitfalls of LIMS implementation and some of the most likely causes for a failed LIMS project. It will then give a generalised approach for the development of a successful LIMS implementation and finally, a look to the future addressing some of the needs of the LIMS industry.

- **Lynn Rasmussen Clinton B. Maddox Bill Harten E. Lucile White** performs study on :A Successful LIMS Implementation: Case Study at Southern Research Institute:

Laboratory process tracking is a critical part of any high-throughput operation. With increased throughput comes increased risk and increased cost of failure. As throughput increases, so does the need to track all aspects of the workflow that can contribute to success or failure. Personnel training, instrument validation, reagent expiration, and instrument performance are just a few of the many parameters that need to be tracked to ensure success in a high-throughput environment. An effective method of mitigating these risks is a well-designed laboratory information management system (LIMS). Cost, flexibility, ease of use, and ease of implementation are all important considerations when choosing a commercially available LIMS product.

- **Alan serro,ted paczek and Christine paszako**, October 2007 on laboratory needs assessment benefits LIMS implementation: many laboratories may have the expertise to translate manual processes and laboratory automation requirements into a detailed

specification document for all of the system requirements,features and function of laboratory information system.however,that may be the best use of their resources.as expert needs assessment can provide a strong foundation for the successful implementation of a LIMS and can also save the laboratory significant resources.

Not only does it allow the laboratory LIMS team to focus their resources at those areas that will return the greatest value,but it allows the laboratory to fine tune their processes to optimize efficiency,productivity and ensure regulatory compliance.it should be done as early in the planning process as possible.this allows the laboratory to really examine what they want the LIMS to do,which features they want and what scope of total project will be.

3. RESEARCH METHOLOGY

RATIONALE OF STUDY

It is said that successful LIS implementation is closely linked to selection process.there is a reason for formal selection process of LIS..there are many steps involved in selection process.one of the most important steps in LIS selection is workflow analysis.the type of functionality required from the lis depends on the workflow of the laboratory.workflow designing of the laboratory is critical for effective and efficient throughput and will be responsible for future bottlenecks.it defines the role of LIS in the organisation.Requirements must be clearly specified,concise and well understood.on the basis of workflow, a comprehensive lists of required functionality/features of LIS can be derived.this list is useful for prioritizing the needs of the organisation and aids in vendor selection.

A hospital may not achieve the necessary goals only by implementing HIS. Such system cannot work properly until proper training is provided to the people who will use this. On-site technical support and trainings is must for user so that they can feel comfort while using the system successfully. Before implementing the LIS, make sure that the requirements of the physicians will be fulfilled by new system. When implementation of new LIS is completed then for the success, proper training is required to reduce failure rate.

AIM-

To improve the quality of hospital diagnostic services provided at the hospital so as to enhance department efficiency,reduce waiting time so as to contribute in increasing hospital revenue

OBJECTIVES-

- To understand workflow for laboratory in order to train the users during training.
- To train the users to adequately learn them to use the new system

Location- MGM hospital,Vashi

Duration- 2 months, 9th march-9th may

Study type-Analytical study

Sample size-30 laboratory staff

Sampling technique- Probability sampling

Study area- Pathology

Study population- laboratory technicians (key and end users),doctors

Sources of data

1. **Primary data**

- Interpersonal interviews of five key users and twenty five end users study and observations of lab process carried out over the study period.The selection criterion for the key users was that they have been involved with the project from its initiation to the present.
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2. **Secondary data**

    - Books, journals,internet searches ,review literature

Data collection tools and techniques

- Questionnaire

PROCESS MAPPING

Objective

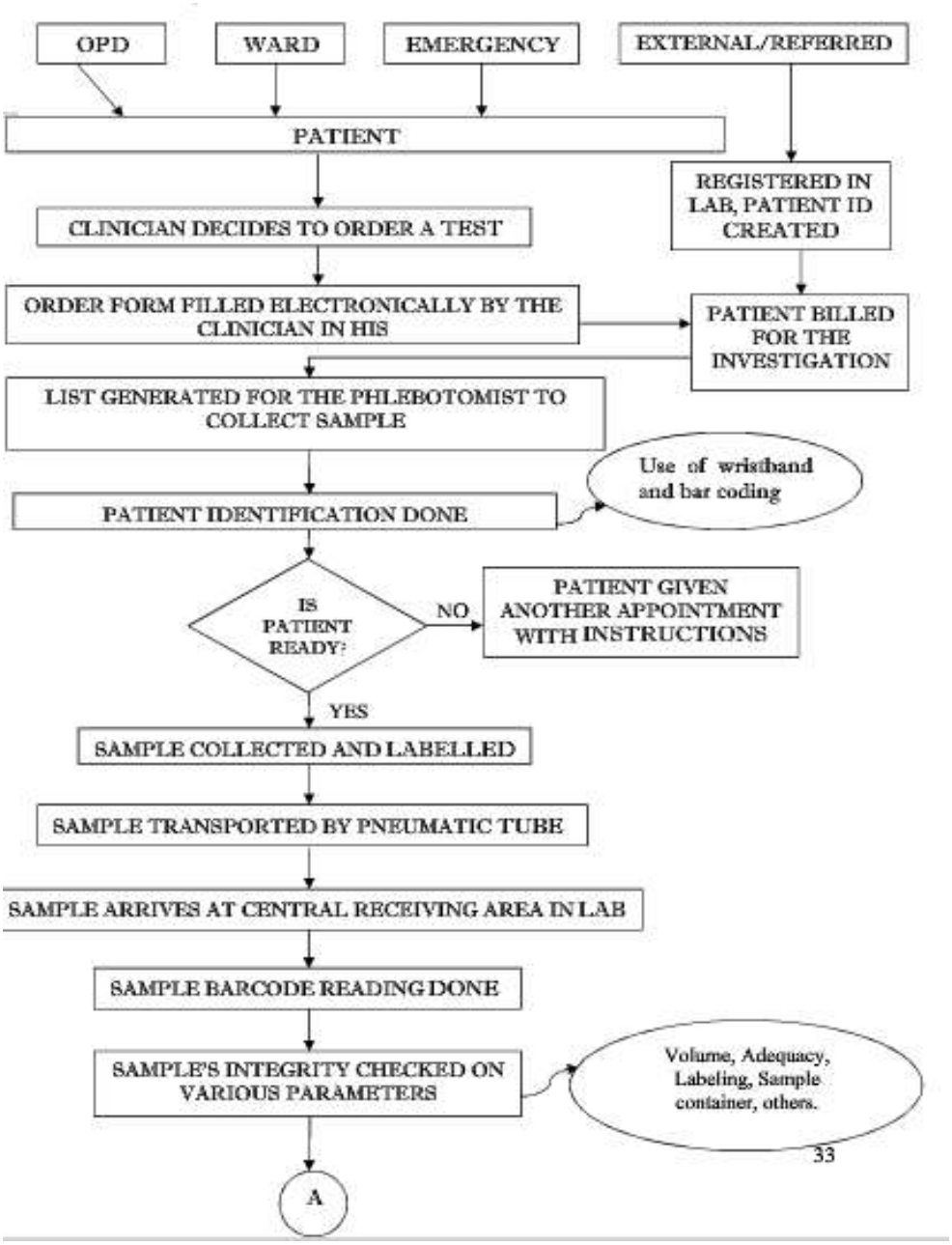
To analyze and develop an improved process

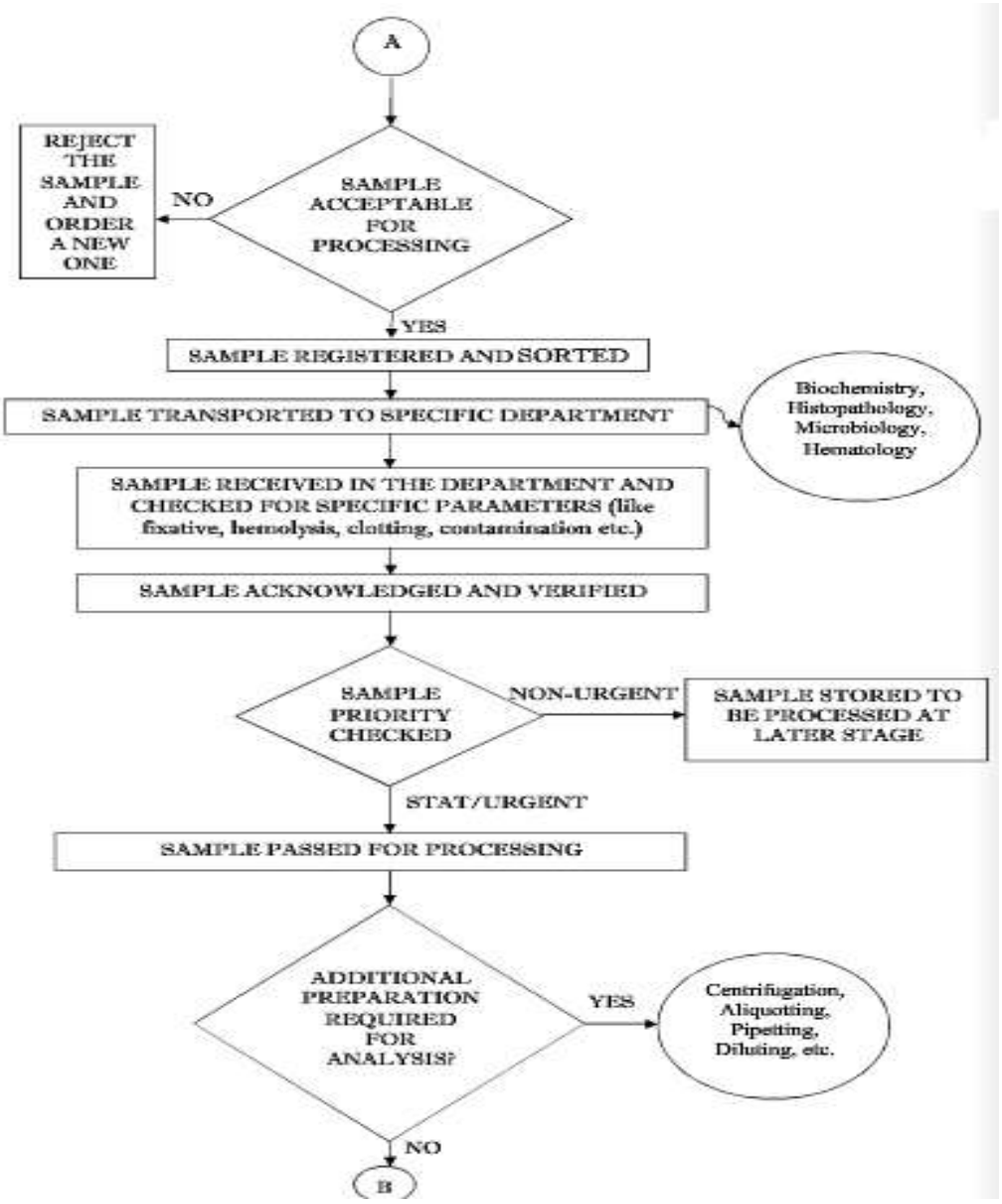
LABORATORY WORKFLOW STAGES

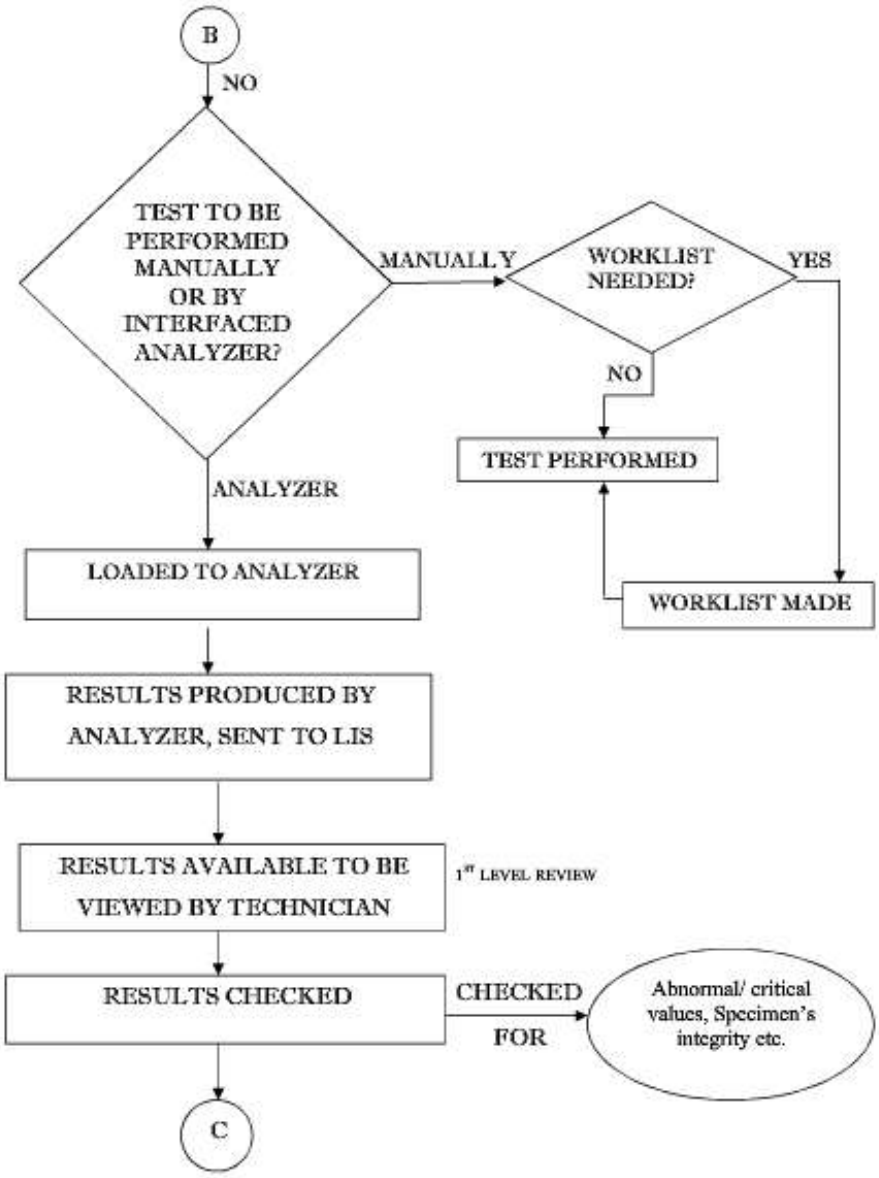
Pre analytical phase	Analytical phase	Post analytical phase
Test selection and ordering	Specimen analysis	Test turnaround time
Patient preparation	Report review	Notification of critical values/test results
Patient identification	Report interpretation	Report formatting
Specimen identification/labelling	Report verification	
Specimen collection		
Specimen delivery		

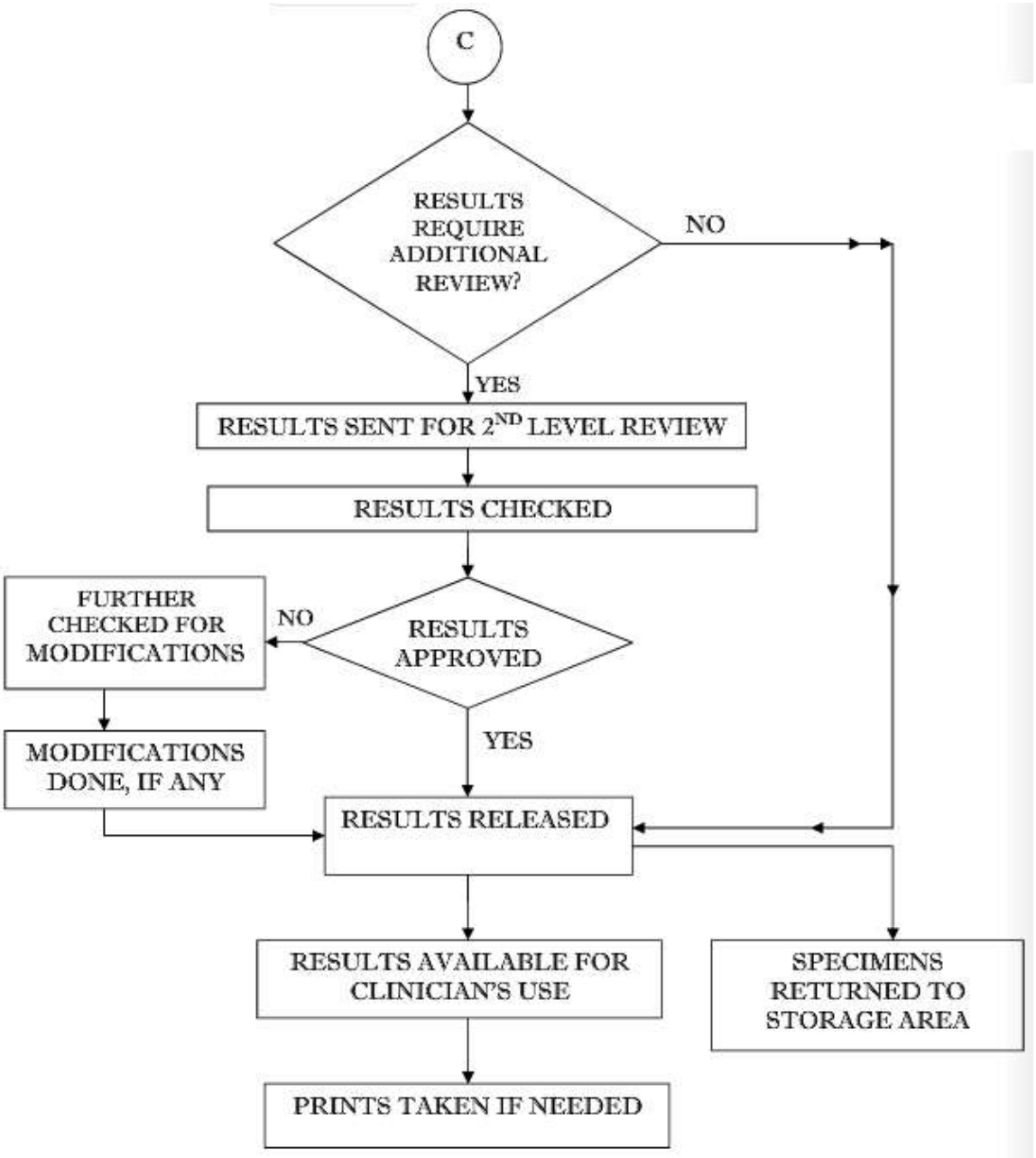
When the patient visits the hospital, he is segregated by reception as OP/IP/Emergency/walk in patients.OP/ER patients are redirected to doctor's chamber.Doctor advices the procedure required to be done on patient on requisition form.Patient is guided to billing counter.Patient is guided to billing counter and then to the sample collection room with requisition and bill slip.The laboratory technician checks requisition form and billing receipt.After that prerequisites required for the test to be done are matched.In case the patient fails to meet the criteria,he is asked to come again prepared and if he fulfils all the criteria,lab technician takes consent and if

applicable and collects specimen and entry done in sample collection register. In case the sample is insufficient,repeat sample is advised and recollection is done.in case the patient is insourced and came to lab directly then it is directly entered into sample collection register.In case of in patients,consultant prescribes order,nurse fill requisition form and then she collects sample and send it to lab.After receiving of sample it is entered into register and sample is verified.After receiving of samples lab decides whether sample will be done in house or out sourced.lab tech enters data and load sample in machines.Data is generated by equipment which is captured by lab tech and verified by pathologist .Report send to typist followed by validation by pathologist.After validation report is dispatched to central dispatch counter.In case of outsourced sample,result scanned/photocopied and dispatched to central dispatch counter and photocopy retained in lab.


OPD
WARD
EMERGENCY
EXTERNAL/REFERRED
PATIENT
REGISTERED IN LAB, PATIENT ID CREATED
CLINICIAN DECIDES TO ORDER A TEST
ORDER FORM FILLED ELECTRONICALLY BY THE CLINICIAN IN HIS
PATIENT BILLED FOR THE INVESTIGATION
LIST GENERATED FOR THE PHLEBOTOMIST TO COLLECT SAMPLE
Use of wristband and bar coding
PATIENT IDENTIFICATION DONE
IS PATIENT READY?
NO
PATIENT GIVEN ANOTHER APPOINTMENT WITH INSTRUCTIONS
YES
SAMPLE COLLECTED AND LABELLED
SAMPLE TRANSPORTED BY PNEUMATIC TUBE
SAMPLE ARRIVES AT CENTRAL RECEIVING AREA IN LAB
SAMPLE BARCODE READING DONE
SAMPLE'S INTEGRITY CHECKED ON VARIOUS PARAMETERS
Volume, Adequacy, Labeling, Sample container, others.
33
A


A
REJECT THE SAMPLE AND ORDER A NEW ONE
NO
SAMPLE ACCEPTABLE FOR PROCESSING
YES
SAMPLE REGISTERED AND SORTED
SAMPLE TRANSPORTED TO SPECIFIC DEPARTMENT
Biochemistry, Histopathology, Microbiology, Hematology
SAMPLE RECEIVED IN THE DEPARTMENT AND CHECKED FOR SPECIFIC PARAMETERS (like fixative, hemolysis, clotting, contamination etc.)
SAMPLE ACKNOWLEDGED AND VERIFIED
SAMPLE PRIORITY CHECKED
NON-URGENT
SAMPLE STORED TO BE PROCESSED AT LATER STAGE
STAT/URGENT
SAMPLE PASSED FOR PROCESSING
ADDITIONAL PREPARATION REQUIRED FOR ANALYSIS?
YES
Centrifugation, Aliquotting, Pipetting, Diluting, etc.
NO
B

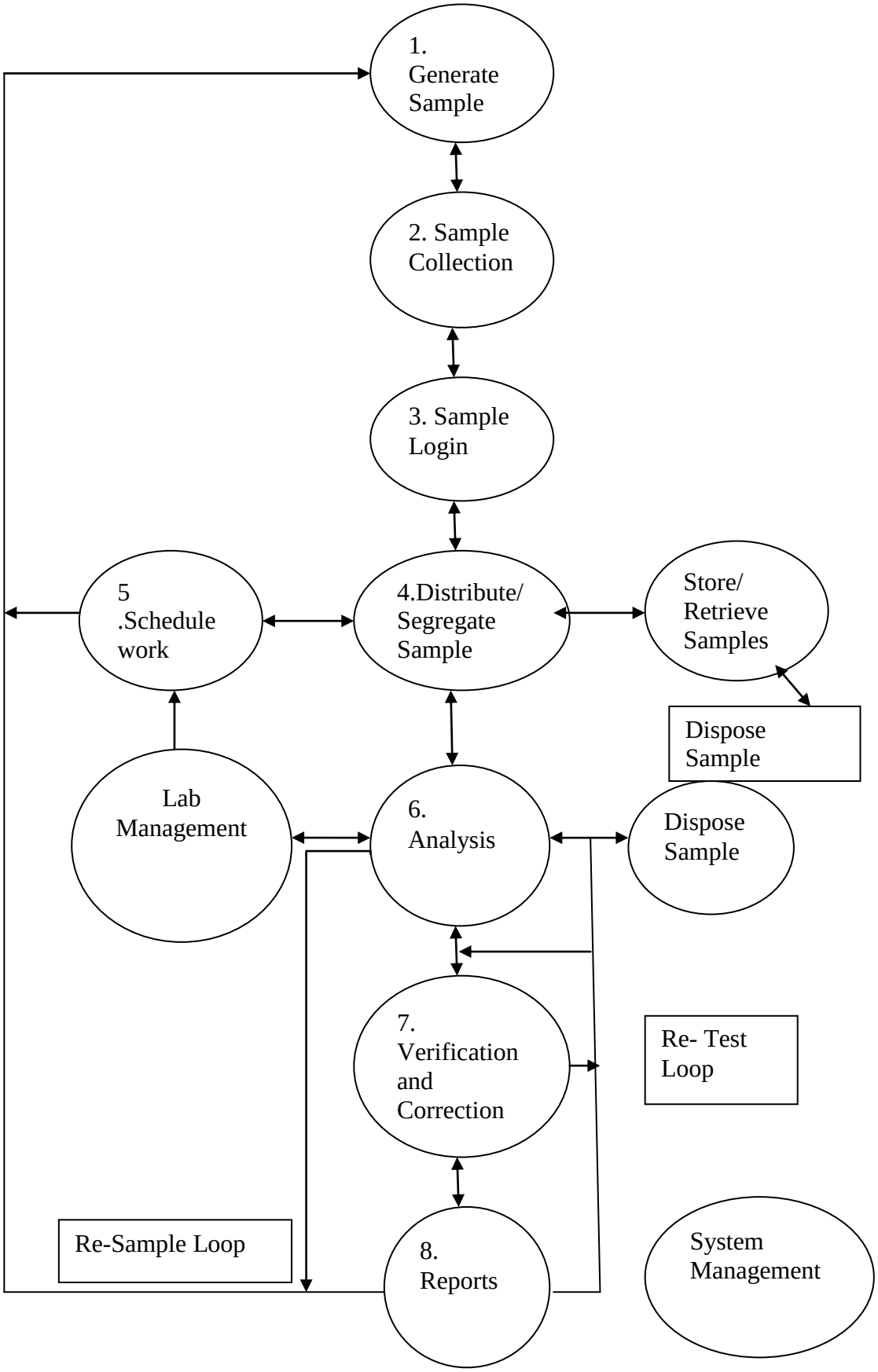

B
NO
TEST TO BE PERFORMED MANUALLY OR BY INTERFACED ANALYZER?
MANUALLY
WORKLIST NEEDED?
YES
NO
TEST PERFORMED
ANALYZER
LOADED TO ANALYZER
WORKLIST MADE
RESULTS PRODUCED BY ANALYZER, SENT TO LIS
RESULTS AVAILABLE TO BE VIEWED BY TECHNICIAN
1ST LEVEL REVIEW
RESULTS CHECKED
CHECKED FOR
Abnormal/ critical values, Specimen's integrity etc.
C


C
RESULTS REQUIRE ADDITIONAL REVIEW?
NO
YES
RESULTS SENT FOR 2ND LEVEL REVIEW
RESULTS CHECKED
RESULTS APPROVED
NO
FURTHER CHECKED FOR MODIFICATIONS
MODIFICATIONS DONE, IF ANY
YES
RESULTS RELEASED
RESULTS AVAILABLE FOR CLINICIAN'S USE
SPECIMENS RETURNED TO STORAGE AREA
PRINTS TAKEN IF NEEDED

TRANSACTIONS IN LIS

STEPS INVOLVED	**PERSON RESPONSIBLE**
Sample collection	Phlebotomist
Sample distribution	Phlebotomist
Sample acceptance	Lab technician
Result entry	Lab technician
Result authentication	Pathologist
Batch printing	Lab technician
Report dispatch	Lab technician

LIS WORKFLOW



STAFF TRAINING

- Successful" implementation was defined as the system installed institution-wide, with users routinely using and being satisfied with the system
- Training of end users will be accomplished in phased introduction to the new system, focused on building their skills and confidence to use the system effectively in their role.
- The goal of training is more than just entering the right data in the right field on the right screen. The goal is to enable users to think logically about how to best use the system in order to maximize the benefits of the system for patients and for the hospital.Training of the users was carried out on a one-to-one, on-site and hands-on basis rather than in the more theory-based. This seemed to have been better accepted by the users. The key factor that led to user acceptance was the practical usage of the system. It seems to have worked well to "release" the system in its early stage of development thereby engaging the users early in the development process leading to their "real" involvement. Only when the technical staff experienced using the system did they realise its value. They were then able to identify how it could be improved, which was critical in the development of a system that was suited to the local requirements. Early involvement also put the users at the leading end. enabling them to help develop the system, rather than being at the receiving end where the end users are imposed an "externally" developed system. All this worked in favour of user acceptance.

TRAINING PROGRAM TIMETABLE

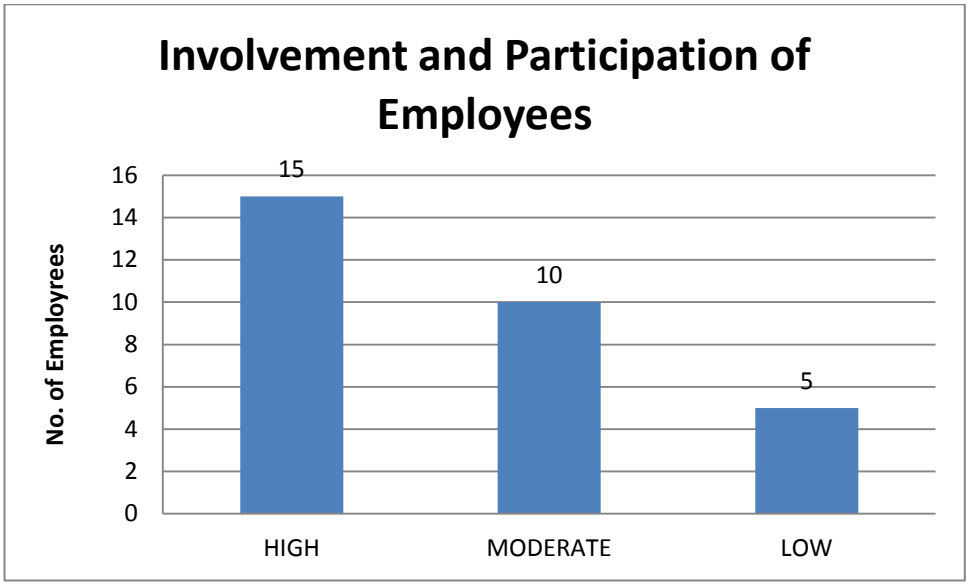
Key User Training		**6.5 Days**
Overview and process of LIS Work flow		0.5 days
Key User Training on LIS Lab Masters		1 day
Key User Training on LIS Application		2 days
Key User Training on Equipment & LIS parameter mapping		2 days
Test & UAT Certification		1 days
End User Training by Key Users		6 days
Training End User on LIS by Key User		4 days
Test & End User Certification by Key User		2 days

4.DATA ANALYSIS AND INTERPRETATION

Total Number of staff present during training- 35

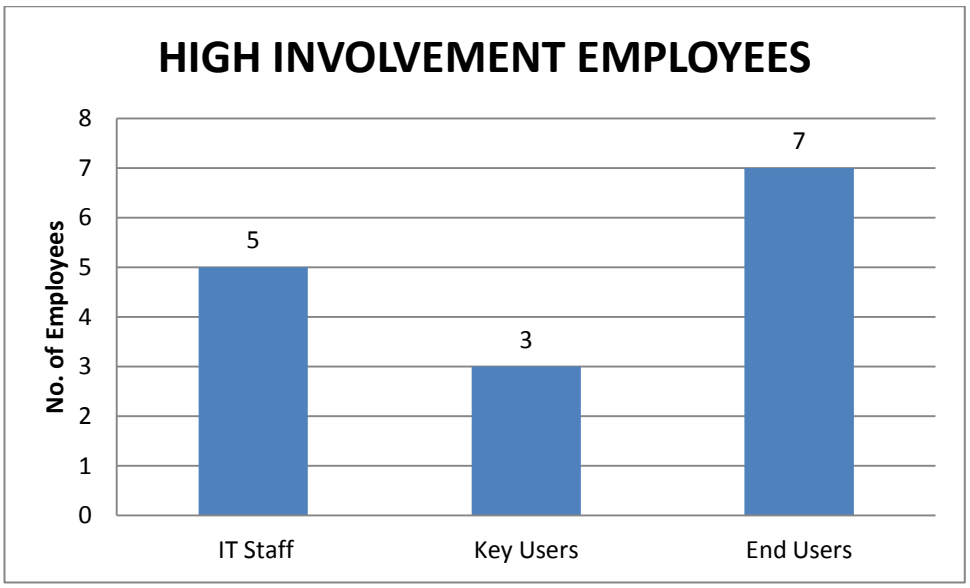
- Key users – 5
- End users – 25
- IT staff – 5

After training gap analysis was done to know the training effectiveness among users.



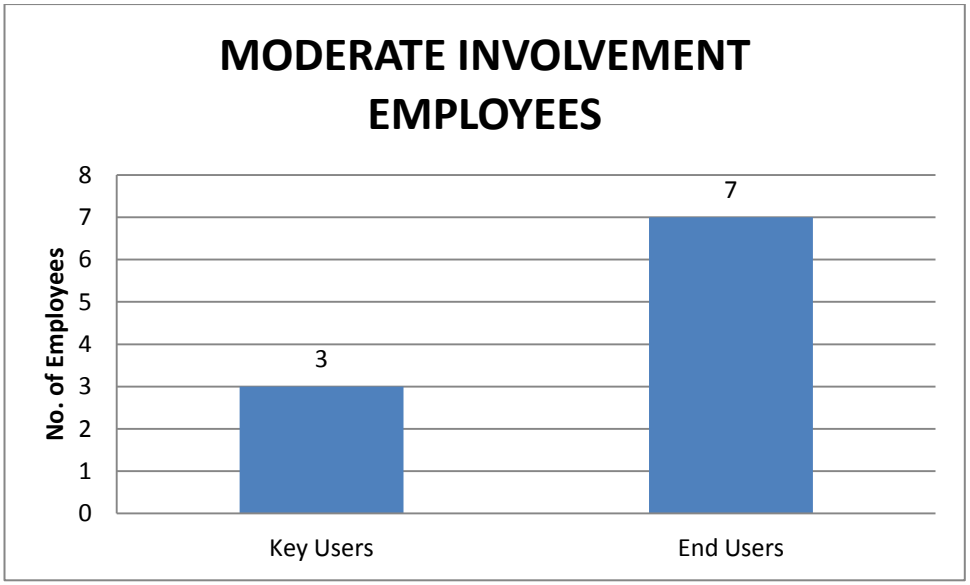
Graph 1: Involvement and Participation of employees(High, Moderate and Low)

From the above graph it is evident that large no. of employees are highly involved i.e out of 35,15 of the employees were actively involved in training program.



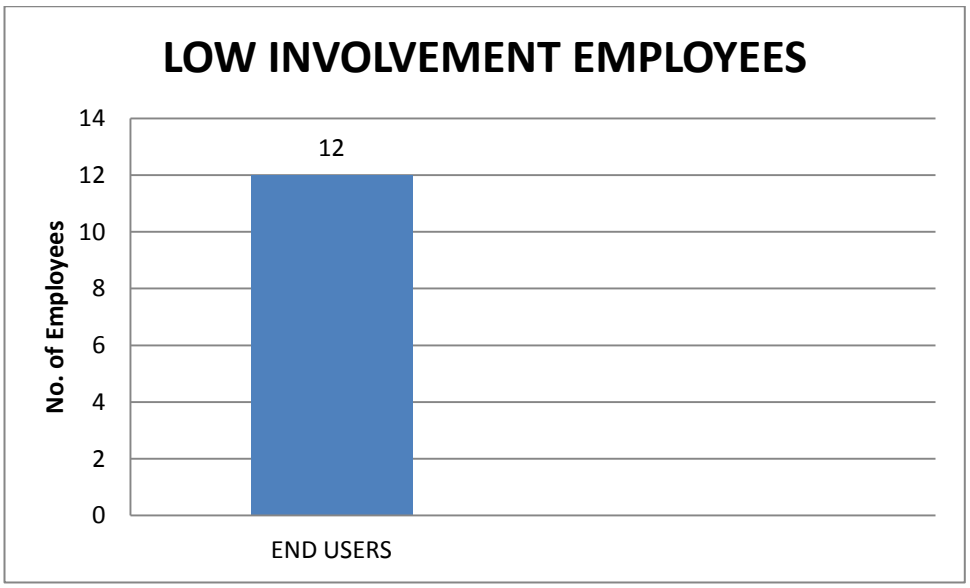
Graph 2: No of high involvement employees

From the above graph it can be concluded that all the 5 IT staff were highly involved while 3 key users out of 5 were highly involved and 7 out of 25 end users were highly involved.



Graph 3: No of Moderate involvement employees

From the above graph it can be concluded that out of 5 key users,3 were moderately involved and out of 25 end users,7 were moderately involved.



Graph 4: No of low involvement employees

From the above graph it can be concluded that out of 25 end users,12 were having low involvement in training program.

5.KEY FINDINGS

7. Most of the staff were involved and participated actively involved in design and development of new system and suggested changes while few staff was less involved as they did not participated much in hands on training.
8. User acceptance was high among the staff and there was no resistance to change.
9. Knowledge and skills among users was found to be lacking as they were less confident about using the system.
10. Most of the key users and IT staff were efficient in training of end users but few were unable to do so.
11. There was delay in implementation plan and training was one the main reason as users were not giving much time for learning the system.
12. Solution mapping was not done properly and there were problems faced during application designing.

LIMITATIONS

Complete lifecycle of HIS implementation could not be studied and i was only part of system implementation training.the system implementation could not go live during the dissertation period so some of the important findings were missed out due to limitation of time.the LIS that was going to be updated was only for OPD patients.for IPD patients it will be implemented in the second phase and during implementation of IP module.

6.RECOMMENDATIONS

1. Laboratory should make sure that a well developed feedback mechanism is there during installation of LIS so that lab personnel can put their problems and resolve it.
2. Requirements of stakeholders should be properly understood and then proper planning should be started.
3. Strong leadership in support of the implementation of HIS should be there for successful implementation and select competent leader for conducting change.
4. Create a clear vision regarding new system and motivate the employees to accept new system.
5. Motivate employees to participate in process designing.
6. Employee's satisfaction should be assured while designing process

7.CONCLUSION

A hospital may not achieve the necessary goals only by implementing LIS. Such system cannot work properly until proper training is provided to the people who will use this. On-site technical support and trainings is must for user so that they can feel comfort while using the system successfully. Before implementing the LlS, make sure that the requirements of the users will be fulfilled by new system. When implementation of new LIS is completed then for the success, proper training is required to reduce failure rate.Workflow designing of the laboratory is critical for effective and efficient throughput and will be responsible for future bottlenecks.It defines the role of LIS in the organisation.

8.REFERENCES

1. http://jla.sagepub.com/content/12/6/384.full accessed on 14.05.2015 at 2:00 p.m.
2. A Plan for Implementation of Hospital Information System in Developing Country: Recommendation from socio-technical perspective in Linnaeus university
3. HIS Implementation Guide in EU-IHIS integrated hospital information system.
4. An Introduction and Guide to Successfully Implementing a LIMS (Laboratory Information Management System) by Ben Tagger.

ANNEXURES

QUESTIONNAIRE

1. How users can change their password?

2. How users can match the list of services registered in pending list sample collection?

3. If two samples types are allocated to one service and user has to collect any of the sample type how that can be done?

4. How to reprint barcode?

5. Define lab process?

6. What do you mean by location in sample collection?

7. What is the Process of sample rejection and recollection?

8. If patient sample is rejected and patient is not willing to give sample again and wants refund?

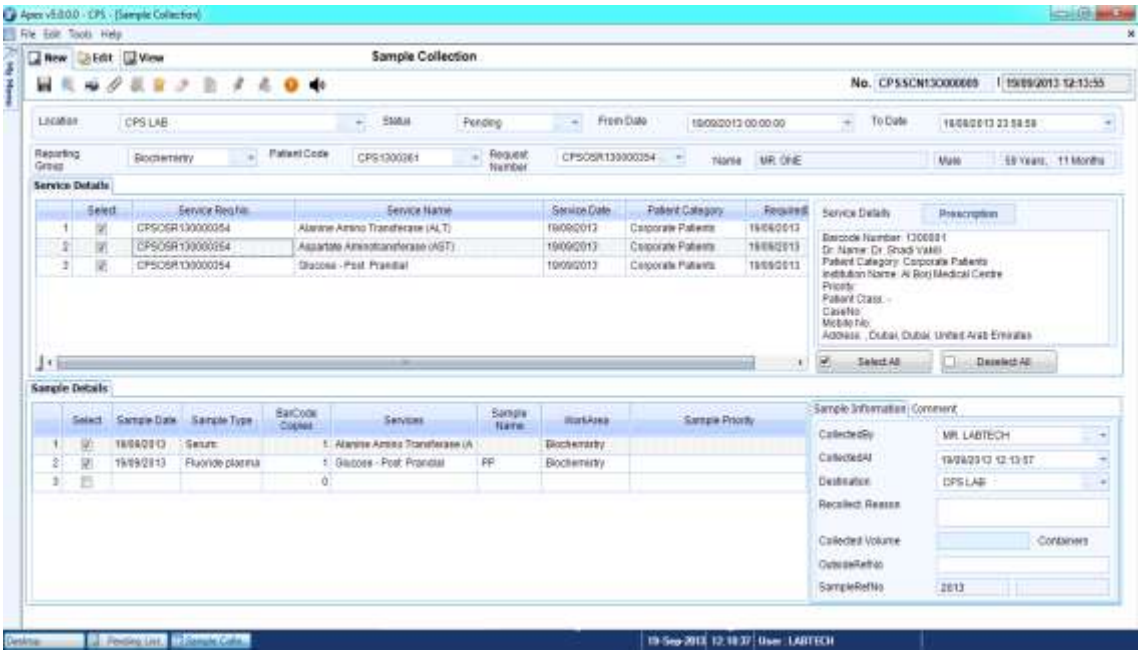
9. Patient not fit for sample collection and you have selected sample collection?

10. How to find patient code in the pending list of sample collection?

11. Sample distribution is done from where?

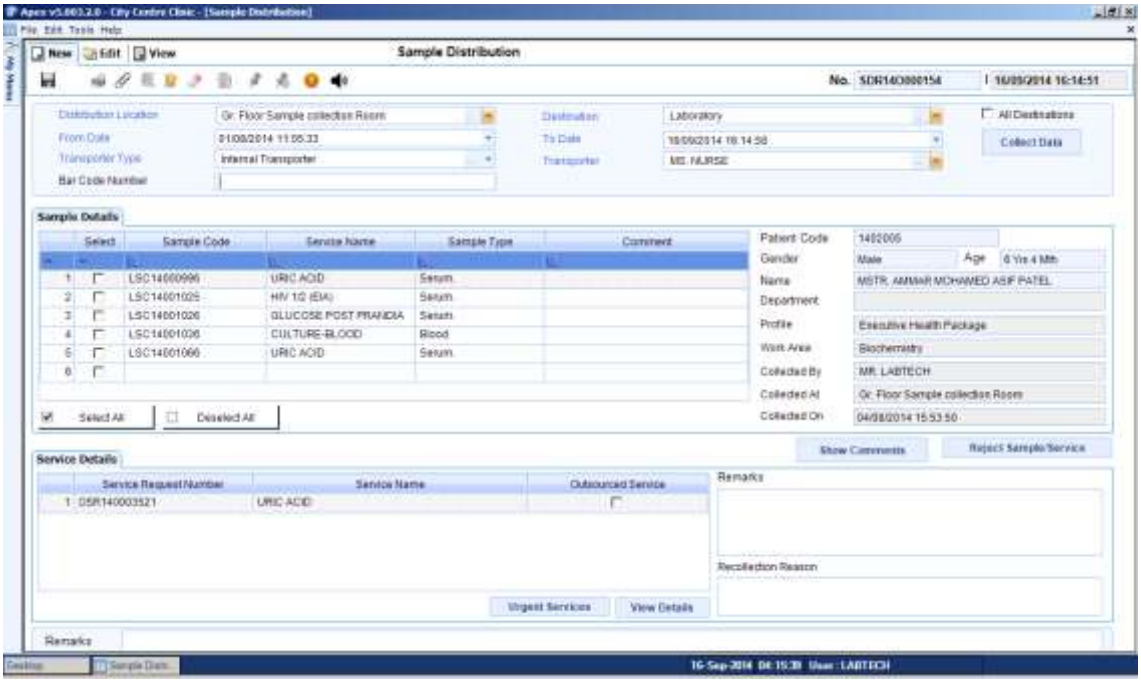
SCREENSHOTS WITH TEST SCENARIOS

Sample Collection Screenshot

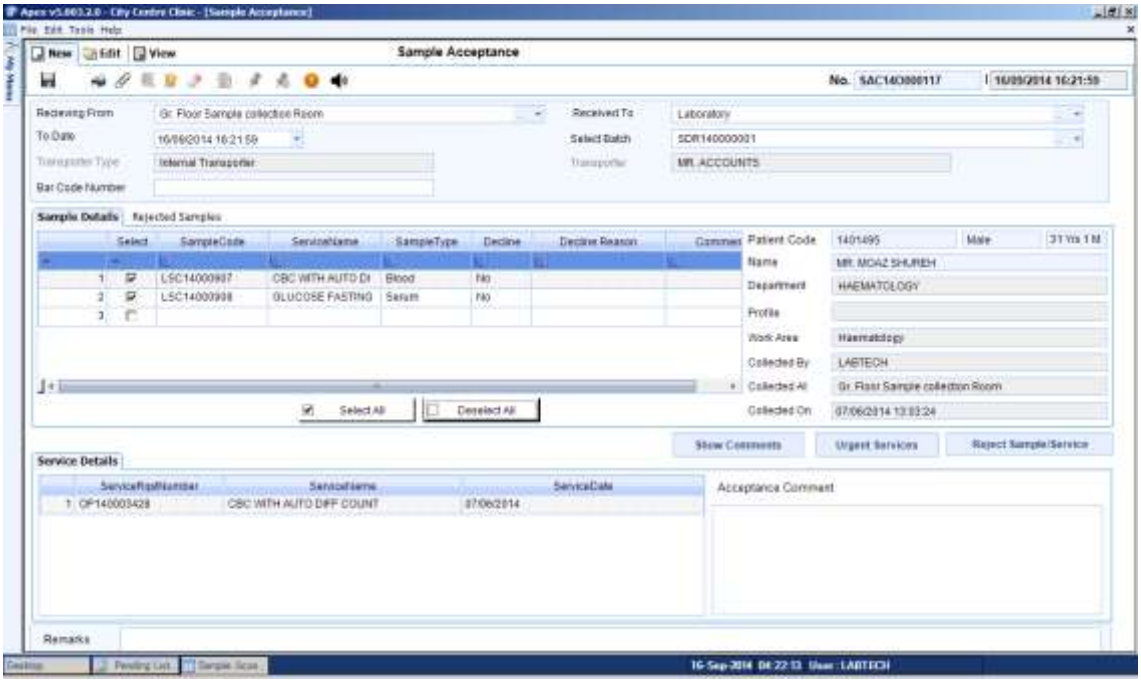


No.	Scenarios
1.	Collect Samples and Print Barcode Labels.
2.	Reprint Barcode Labels.
3.	Collect sample for urgent service Request.
4.	Receive Sample rejected by the Pathologist/Technician During Processing.
5.	Keep the Test on Hold in case of delayed Collection (e.g. Glucose PP)
6.	Exclude the Test in case of Sample found Unusable.
7.	Enter Remarks while collecting the sample.
8.	Samples received from outside on credit base

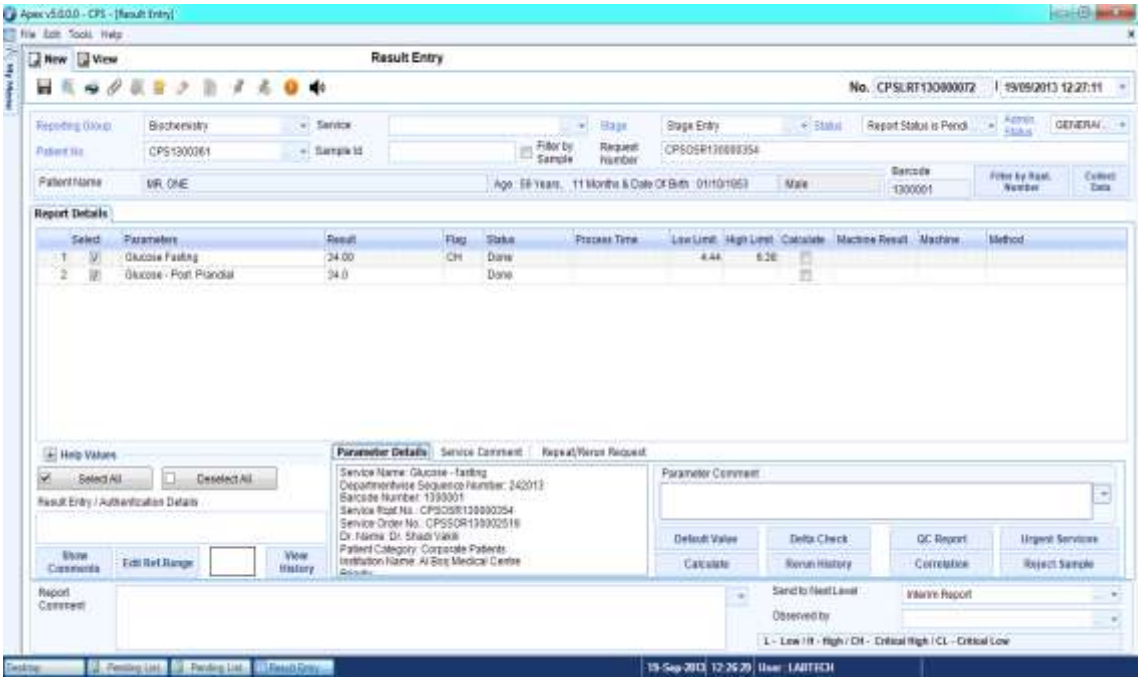
Sample Distribution Screenshot



Sample Acceptance Screenshot



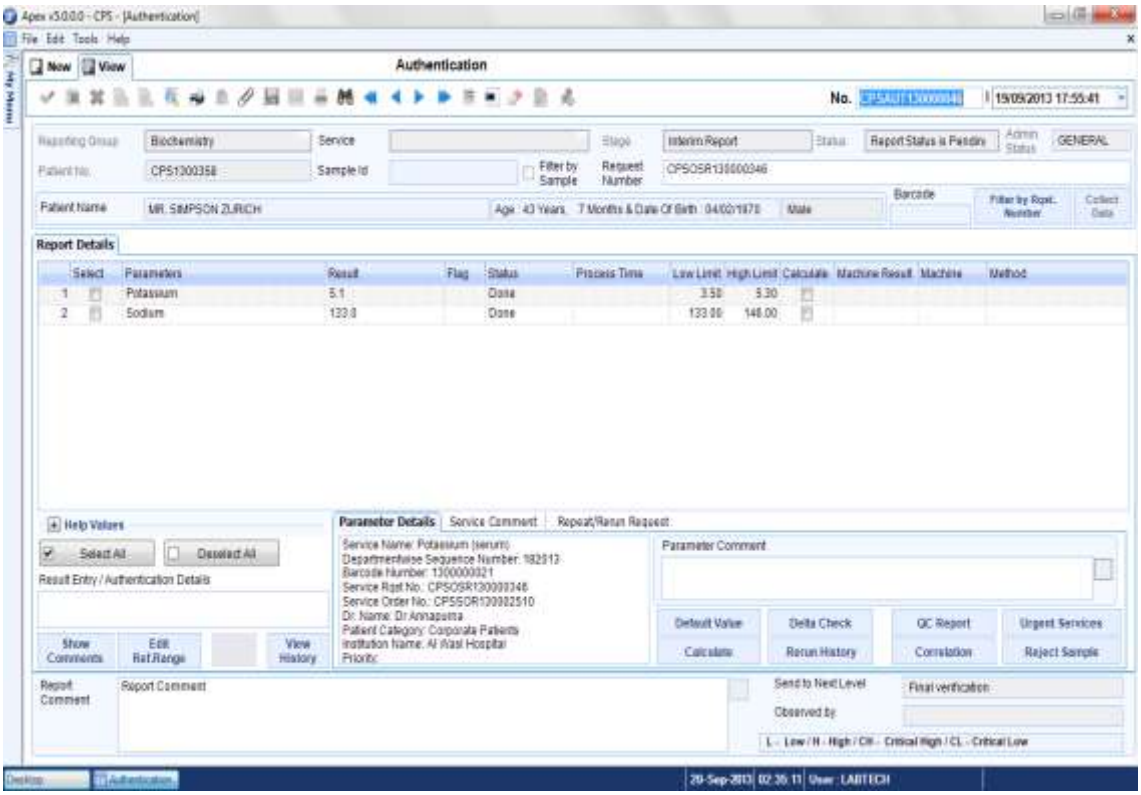
Result Entry Screenshot



No.	Scenarios
1.	Enter Results For Particular Patient
2.	Enter Results for Particular Test
3.	Validate the Auto transferred Result from Medical Equipment
4.	Update Rerun Result to the test
5.	Enter comments for Test while entering Results
6.	Enter Comments for Entire Group of Tests
7.	Use Default Values while entering Results for Tests.
8.	Use Help values while Entering Results
9.	Modify Results after Results are Authenticated by Doctor
10.	Calculate Results for Tests wherever applicable (Cholesterol, Protein, etc)
11.	Use Correlation Feature
12.	Verify results received from Medical Equipments
13.	Edit reference range for a parameter

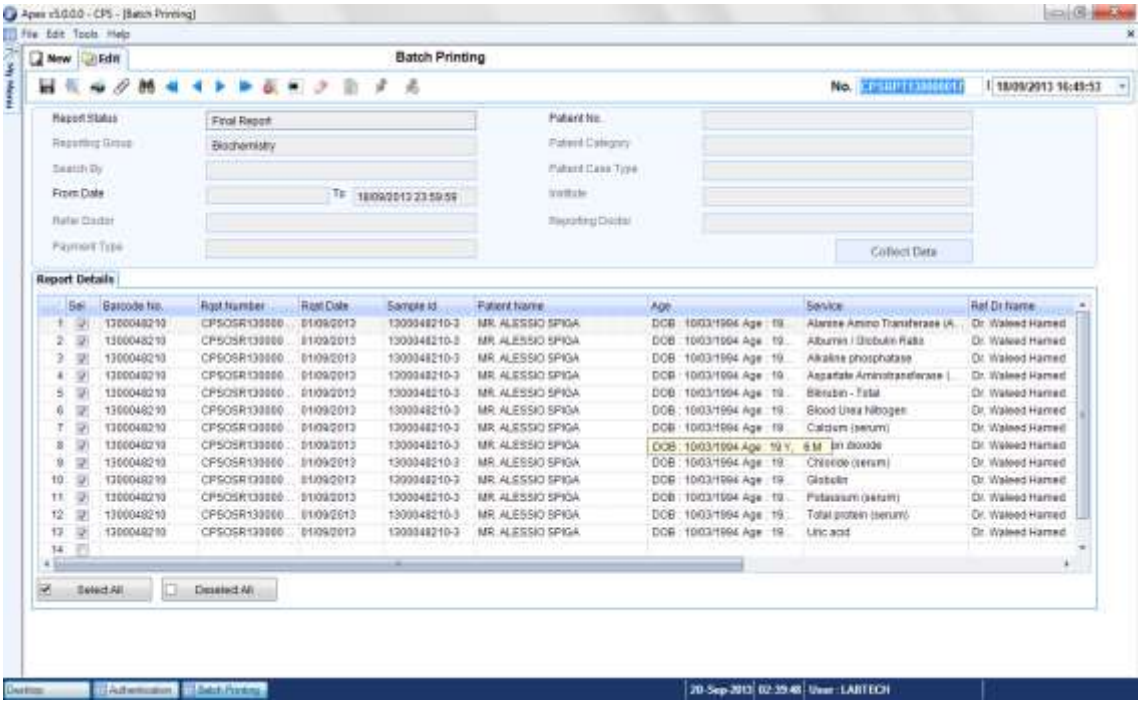
1	Update Result value of Rerun samples received from Medical equipment
1	Authenticate Results of Completed tests.
1	Keep results on Hold while Authenticating
1	Forward Results for Authentication while Authenticating it.
1	Repeat sample for a test while authenticating it.
1	Enter the result for selected Micro test.
2	Enter the Result for Micro test for Growth found for the Organism
2	Add comment to the report
2	Forward Results for Authentication

Authentication Screenshot



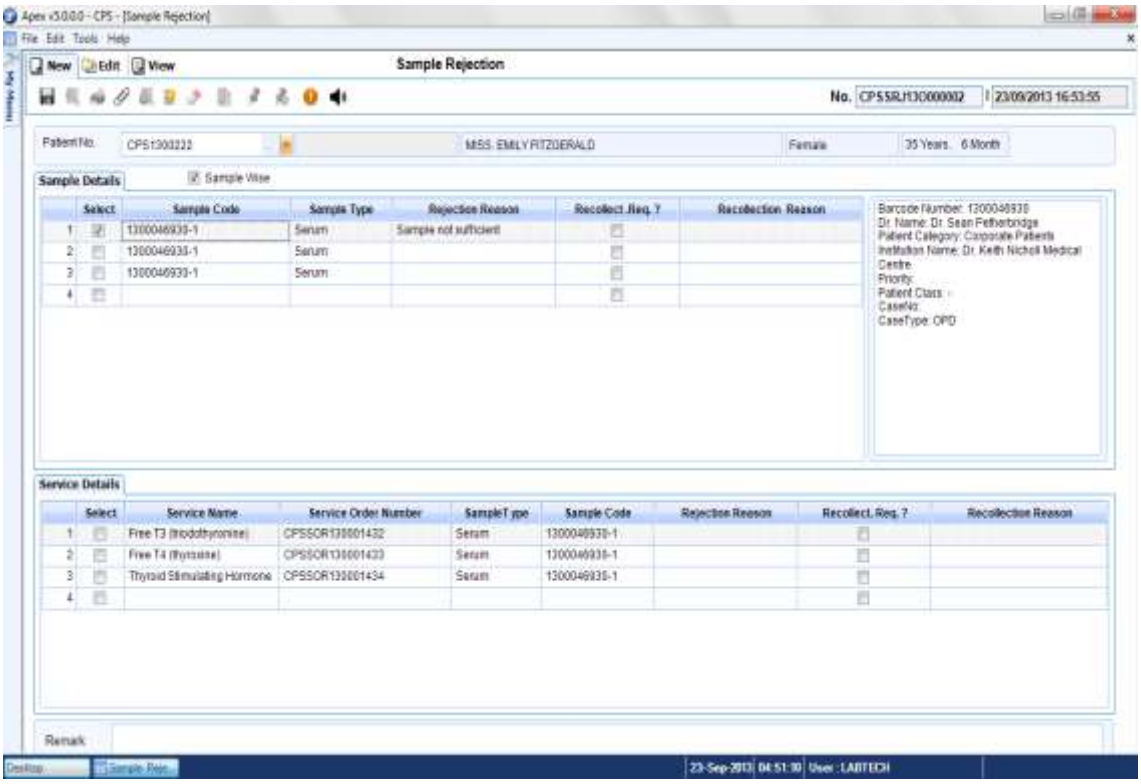
No.	Scenarios
1.	Authenticate forwarded test results
2.	Modify results before authenticating
3.	Request to rerun the test
4.	Reject test while authticating
5.	Add comment for a test
6.	Add comment for entire report

Batch Printing Screenshot



No.	Scenarios
1.	Print the Test Reports for Multiple Patients.(All reports Authenticated)
2.	Print Partially authenticated Reports
3.	Print Test Reports for particular Referring Center
4.	Print Test Reports for Particular referring Doctor
No.	Scenarios
1.	Print the Test Reports for Multiple Patients.(All reports Authenticated)
2.	Print Partially authenticated Reports
3.	Print Test Reports for particular Referring Center
4.	Print Test Reports for Particular referring Doctor

Sample Rejection Screenshot



Scenarios

1.At what stage sample can be rejected.

stages
Sample collection
Result entry
authentication

1. Which are the various reasons wherein Samples can be rejected?

Reasons
Sample Unusable
Haemolysed
Lipemic Sample
Storage not Proper
Quantity not Sufficient
Patient has not followed the instructions
Sample Spillage