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Quality Management of Diagnostic Laboratories in a Corporate Hospital: An Overview

[*1.]Prof. Dr. ASM Giasuddin, MSc PhD PGD CSciFIBMS MNYAS MPH
Professor of Biochemistry & Immunology
MPH Programme (Friday), Department of Public Health,
School of Health Sciences, State University of Bangladesh (SUB),
Dhanmondi, Dhaka-1205, Bangladesh; Mobile: +8801787657685
[2.]Mr. Md. Asadur Rahman, BSc MScProgramme: MPH (Friday), Department of Public Health,
School of Health Sciences,
State University of Bangladesh (SUB), Dhanmondi, Dhaka-1205, Bangladesh
Mobile: +8801819294946
[3.]Dr. ANM Shamsul Islam, MBBS MPhil MPH
Associate Processor & Programme In-Charge (MPH),
NIPSOM Mohakhali, Dhaka-1212, Bangladesh; Adjunct Faculty at Department of Public Health,
School of Health Sciences, State University of Bangladesh (SUB), Dhanmondi, Dhaka-1205,
Bangladesh; Mobile: +8801715408123
[4.]Prof. Dr. Nawzia Yasmin, MBBS MPH (Sydney Univ-Australia)
Professor & Head of Department, Department of Public Health, School of Health Sciences,
State University of Bangladesh (SUB), Dhanmondi, Dhaka-1205, Bangladesh
Mobile: +8801766663383
*Author & Address for Correspondence:
Prof. Dr. ASM Giasuddin, MSc PhD PGD CSciFIBMS MNYAS MPH
Professor of Biochemistry & Immunology & Director MRU (Retd), Senior Consultant
(Biochemistry & Immunology), Division of Laboratory Medicine, Impulse Hospital Ltd,
ImHS&RCLtd, 304/E Tejgaon Industrial Area, Dhaka-1208, Bangladesh;
Email: asmgias@hotmail.com ; Mobile: +8801787657685

Abstract

In a corporate hospital, diagnostic laboratories are expected to provide quality results of investigations/tests timely to establish pin-point diagnosis of a provisional (clinical) diagnosis. This leads to a much betters onetime (recovery or rehabilitation) relevant to a particular disease or any other health related event in a patient. This modern medical science i.e. Laboratory Medicine would be most efficient and effective, if it is run cost effectively with modern management concepts of human resources management (HRM) and total quality management (TQM). HRM is important as individuals are the most vital and valuable assets of any institution particularly in a corporate hospital, as it engages varieties of professionals. When faced with pressures for both quality improvement and cost reduction, healthcare organizations or other industries implement a process termed total quality management (TQM). However, many problems arise in HRM and TQM, particularly in recruiting and managing HR and before and after the received specimens are analysed in the laboratory. That is why total testing process (TTP) need to be managed adequately in various phases including the quality diamond model (QDM) and plan, do, check, act (PDCA) cycle. This would ensure high quality results

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and services cost effectively and efficiently for patients leading to their satisfaction and also, higher profit and reputation for the corporate hospital. These modern concepts, system and processes are briefly discussed in this review article.

Keywords: Corporate hospital, Laboratory medicine, Human resources management, Total quality management, Total testing process, Quality diamond model, PDCA cycle.

Short Title: Quality in corporate hospital laboratory

CORPORATE HOSPITAL: DEFINITION

A corporate hospital is a large hospital/ institution/organization which provides health-care services i.e. medical and surgical treatments for ill/sick or injured people in all the subspecialties of medicine, surgery and obstetrics & gynecology including other services such as nursing care, diagnostic laboratory tests, radiology-imaging investigations, pharmacy, ICU, CCU, emergency/casually, etc.[1,2]

LABORATORY MEDICINE: CONCEPTS

In a large/corporate hospital, a laboratory is setup with the objective to provide diagnostic investigation/test results establishing pin-point diagnosis of a clinical observation (provisional diagnosis). This leads to a much better outcome (recovery or rehabilitation) relevant to a particular disease or any other health related event in a patient. In modern medical science and medicine, this specialty/area of patient's service is known as Laboratory Medicine. It consists of many sub-specialties as the following: Laboratory Hematology, Clinical Biochemistry or Chemistry (Biochemical tests, Hormones, TDM, etc), Clinical Microbiology (Bacteriology, Virology, Parasitology, Mycology), Diagnostic immunology, Cytopathology, Pharmacogenetics, Medical Molecular Biology, etc.[3,4,5,6]

LABORATORY MEDICINE: MANAGEMENT ASPECTS

It is evident from the definition that Laboratory Medicine is a highly complex modern medical science in a corporate hospital and much relevant to healthcare delivery. In a corporate hospital, Laboratory Medicine is a highly complex department consisting of several branches (units) of modern medical sciences as stated earlier. These branches of medical science are very much relevant to healthcare delivery. The timely and quality laboratory investigation results help to establish pin-point diagnosis of a clinical observation (provisional diagnosis). This leads to proper and adequate treatments with much better outcome (recovery and rehabilitation) of the patient for an illness and higher revenue income for the hospital. Thus, laboratory medicine would be most efficient and effective, if it is maintained cost effectively with modern management concepts of human resources management (HRM) and total quality management (TQM).

The diagnostic Laboratory services through laboratory medicine would be efficient and effective, if it is managed cost effectively with modern management sciences knowledge, concepts, views

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and principles. The management aspects of a hospital (Clinical/Diagnostic) laboratory consist of broad items and concepts as the following[1,2,7,8]

- **Human Resource Management (HRM)**
- **Total Quality Management (TQM)**

Human Resource Management (HRM)

Individuals are the most important and valuable assets of any institution/organization. This is particularly true in case of a corporate hospital as it engages varieties of professionals such as physicians, surgeons, pediatricians, gynecologists, radiologists, Laboratory consultants, nurses, medical technologists and general staff in administration. A successful organization provides environments for the employees in the form of two main things as the following[7,8,9,10,11,12]

(i) Building a Positive Culture: A positive culture is an environment that cultivates capable, dedicated and informed employees including components such as a clear mission and vision statements, leadership by example and attitude, recognition of the employee contributions, employee empowerment, performance evaluation/measurement and finally successful staffing, i.e. recruiting, training, transferring, promoting and retaining efficient and qualified employees.[7,8,10,]

(ii) Essential Management Tools: Successful management requires the effective use of meetings, memoranda, letters, reports and time management techniques. These tools are great assets to both the management/manager and the employees and facilitate accomplishment of the mission, vision and objectives of the organization, the real goal of all managers.[9,11,12]

Among these tools, time is the most important and critical resource to manage in practice. A time management system is a required tool for managers and employees and should accommodate hourly, daily, weekly, monthly and even early advance scheduling. In addition, one must recognize the growing importance of HR planning for the Laboratory also i.e. the process of forecasting demand for staff (present and new) in right numbers at right time with right education and skills and at right cost. Accurate long term strategic plan for physical space, facilities and manpower provides highly significant profitability and facilitates achieving goals and objectives of the organization.[8,9,10] More details about HRM were not the prime objective of the present review article.

Total Quality Management (TQM)

Quality is defined as conformance to the requirements of users or customers and the satisfaction of their needs and expectations. When faced with pressures for both cost reduction and quality improvement, healthcare organization and other industries implemented a process termed total quality management (TQM).[3,4,6,8,12]

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The focus on users and customers is important, particularly in service-industries such as healthcare. Users of healthcare laboratories are often the doctors and the nurses and their customers are the patients and other parties responsible for payment. If quality means conformance to requirements, then "Quality Costs" must be understood in terms of "costs of conformance" and "costs of nonconformance" as illustrated below **(Figure: 01)**.[6,8]

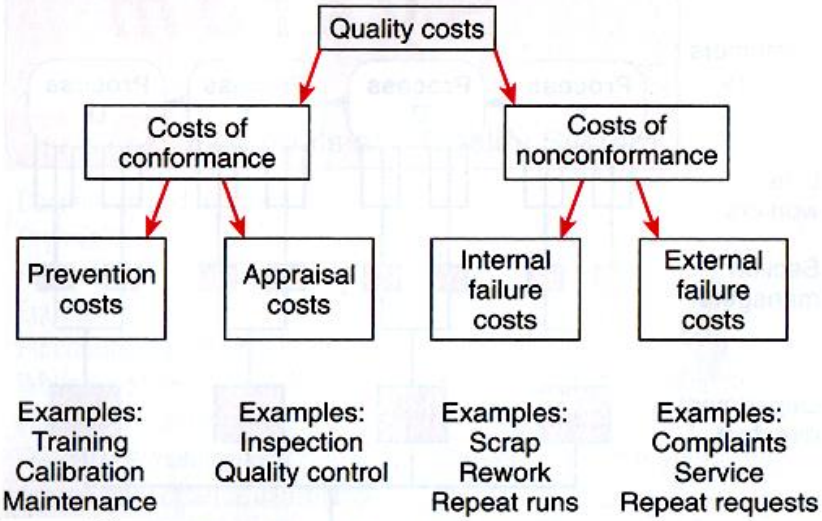

Figure-01: The cost of quality in terms of the costs of conformance and the costs of nonconformance to customer requirements.

Quality improvement occurs when problems are eliminated permanently. Problem arises primarily from imperfect process (85%) not from imperfect individuals (15%). The emphasis on work processes leads to a new view of the organization as a system of processes as shown below **(Figure: 02).**[6,8]

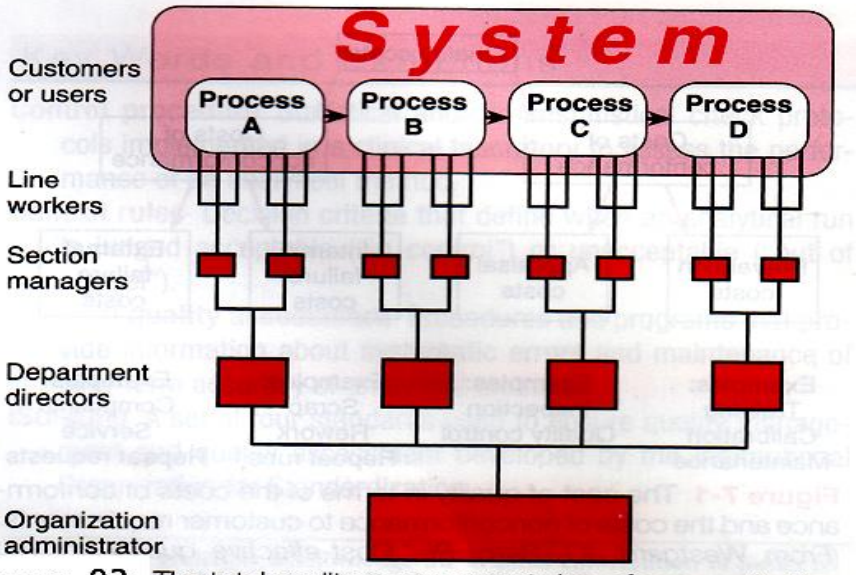

Figure-02: The total quality management view of an organization as a system of processes.

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The traditional framework for quality management in a healthcare laboratory emphasizes, establishment of the components as the following (Figure: 03): (i) Quality laboratory process (QLP), (ii) Quality control (QC), (iii) Quality assessment (QA), (iv) Quality improvement (QI) and (v) Quality planning (QP). These components which work together in a feedback loop, illustrate how continuous QI is accomplished and QA is built into laboratory processes.[4,6,8] The five - Qs framework also defines how quality is managed objectively with the scientific method or the PDCA (Plan, Do, Check, Act) cycle (Figure: 04).[13]

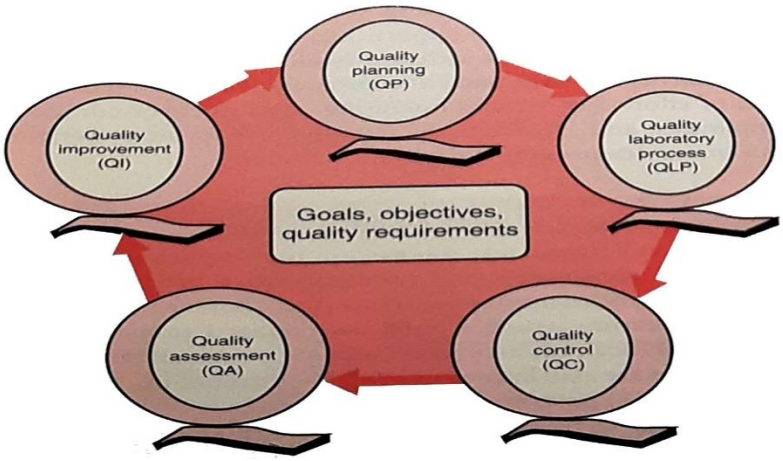

Figure-03: Total quality management framework for management of quality in a healthcare laboratory. (from Wastgard JO. Burnett GN. Quality management science in clinical chemistry: A dynamic framework for continuous improvement of quality.

Clin Chem 1990;36:1712-6)[6,8]

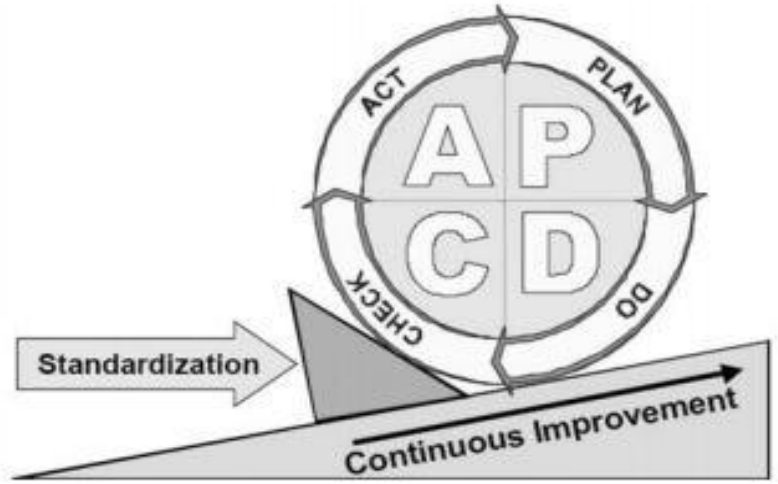

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Figure-04: Plan, Do, Check & Act (PDCA) Cycle.[13]

TOTAL TESTING PROCESS

Accurate and timely test reports are the responsibility of the Laboratory Medicine Division. However, many problems arise before and after received specimens are analyzed. Therefore, the Total Testing Process must be managed properly in the (i) pre-analytical, (ii) analytical and (iii) post-analytical phases. The many steps or sub-processes that take place from the time of the initial request for a test to the time of final interpretation of the test result are determined through performance of a system analysis.Table-1 shows the steps and sub-processes of a typical clinical laboratory testing process and the potential errors associated with them. All analyses therefore must receive rigorous attention in terms of structure, man, material and money relevant to Laboratory Medicine. TQM and its continuous improvements and establishment of the system are very important determinants for an organized corporate hospital including laboratory medicine providing high quality services for human patients.[6,8] The "Quality Diamond Model" relevant to patient (customer) satisfaction & TQM are briefly stated below.

DEMING'S QUALITY DIAMOND MODEL (QDM)

The quality diamond model was proposed by Deming to consist of four elements i.e. Customer/ Patient, Commitment, Expectation and Continuity as shown in **Figure-05** below**:**[13,14,15,16]

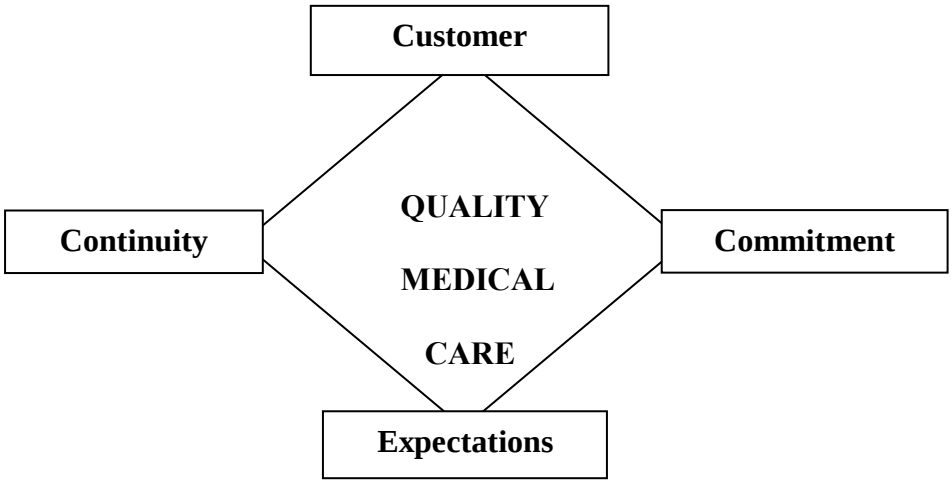

Figure-05: Deming's QDM

Customers: All types of customers/ patients whether there difficult to deal with, desirable, timid, questioning, unprepared, lacking in knowledge and uncertain about what they want or need have to be handled; **Commitment:** Commitment of any organization to quality services must be 100%. If anyone is interested in something, s/he does it when s/he has time; if s/he is committed to something, s/he makes time to do it. An organization should build a team which is committed to

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quality services; **Expectations:** One has to master the art of handling customers/ difficult patients considering them as the people who are testing the quality of services of the hospital.

Expectations of customers/ patients are to be fulfilled as much as possible. When things go wrong: Apply the triple 'A' action plan i.e. Acknowledge, Apologize and Amend. One should differentiate between the wrong act and the doer and criticize the wrong act and not the doer; **Continuity:** It is the loop-closer in the 'quality diamond model' which is a method for ensuring continuous, consistent, ever-improving and never-ending service quality. It is wise to link this step to PDCA (Plan, Do, Check, Act) cycle including measurement, evaluation and monitoring the progress. Continuity ensures that services get better day after day ensuring patient satisfaction. It opens windows of human mind and late in new ideas.[17,18,19]

Table-1: Laboratory Testing Processes and Their Potential Errors

Processes	Potential Errors
Test ordering	Inappropriate test Handwriting not legible Wrong patient identification Cost or delayed order
Specimen acquisition	Incorrect tube or container Incorrect patient identification Inadequate volume Invalid specimen (e.g. hemolyzed. Too dilute) Collected at wrong time Improper transport conditions
Analytical instrument	Instrument not calibrated conditions Specimen mix-up Incorrect volume of specimen Interfering substance present Instrument precision problem Poorly writing laboratory procedure
Test reporting	Wrong patient identification Report not posted in chart Report not legible Report delayed Transcription error

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Test interpretation	Interfering Substances not recognized Specificity of test not understood Precision limitations not recognized Analytics sensitivity not appropriate Previous values not available for comparison

CONCLUSIONS

HRM and TQM are very complex and sophisticated areas for a corporate hospital involving modern management sciences concepts. Human recourses are critical components of TQM. Building positive cultures through development i.e. training and education are vital for the performance of employees of a corporate hospital. The fundamental responsibilities and objectives of Laboratory Medicine are to provide test results efficiently, effectively and timely maintaining absolute quality with full confidence; These should lead to positive outcome in terms of patient's satisfaction i.e. recovery, rehabilitation and finance. In addition, one must recognize the growing importance of human recourses planning for the laboratory i.e. the process of forecasting demand for staff (present and future) in right numbers at right time with right education, right skills and at right cost. Accurate long-term strategic plan for physical space, facilities and manpower provides highly significant profitability and facilitates achieving goals and objectives of the corporate hospital. TQM and its continuous improvements and establishment of the system are very important determinants for an organized corporate hospital including laboratory medicine. These provide high quality services for human patients leading to their satisfaction and also higher profit and reputation for the hospital.

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