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## Managing cost, quality and profitability in a clinical laboratory

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Accreditation of clinical laboratory has always been regarded as an expensive affair but effective implementation of accreditation system ensures quality, saves cost and increases profitability. In most of the cases, laboratories consider accreditation as a piece of paper, which may be utilised only as a marketing tool. But sadly, due to lack of interest from top management, lack of knowledge about the requirement of accreditation and its implementation, it is left unimplemented in most of the cases.

Equipment history is one of the prime areas where cost can be managed and profitability can be increased. Equipment breakdown may affect laboratory sample testing turnover severely and lead to clinician and patient dissatisfaction.

Present clinical laboratory standard ISO 15189 is well defined. Continual improvement (clause no 4.12) will help the accredited laboratory to find out the scope of profitability and other facets like cost saving etc and can be implemented in the following way:

- Required to maintain the breakdown history data.
- Find out the down time of the machine.
- Find out the reason of breakdown.
- Prepare statistical chart.
- Draw fish bone diagram to find out the root cause.
- Prepare an improvement plan to reduce the breakdown of the machines.
- Monitor the action.
- Prepare a statistical data on down time.
- Find out the profitability.

A) Technical Awareness of phlebotomists/ nursing staff and medical officers: Test results often misguide the clinician when nursing staff lack training in sample collection, patient preparation, storage and transportation of sample.

They should be thoroughly trained in (i) drawing blood from indwelling (arterial, central venous) or umbilical lines. While drawing blood form indwelling lines or catheters errors due to dilution and or contamination from flushing solution should be avoided.

ii) When an intravenous solution is being administered in a patient's arm, blood should be drawn from the opposite arm. If an intravenous infusion is running in both arms, samples may be drawn after the intravenous infusion is turned off for at least two minutes before venipuncture and applying the tourniquet below the intravenous infusion site. These causes repeat sample test and ultimately one has to bear the cost of re-testing of sample. The condition of the sample deteriorates due to lack of knowledge in sample handling. Laboratory can collect the data in the case of number of repeat test and accordingly prepare a plan to reduce it, which can be considered as continual improvement.

B) Technical awareness of clinician: A laboratory can increase the relevant knowledge among clinicians by organising a formal workshop/seminar. In many cases, results are misrepresented due to insufficient information about the patient or history.

For the tests of monitoring anticoagulant therapy, the request forms must have a column for the physician ordering the test to indicate the purpose of the test e.g monitoring heparin/ low molecular weight heparin and/or oral anticoagulant therapy as applicable.

Laboratory should bring awareness among clinicians about the necessity of clinical history as required for various cases especially in histopathology and cytopathology test area. All this will help laboratory to reduce repeat tests, reduce correlation tests and save time of consultant and technician.

C) Control of non-conformance: This is another area, which is almost neglected, laboratory should maintain the non conformance records, non conformance and its root cause records can indicate the area where preventive action plan is required that will cover cost and profitability as follows:

Non conformance data will indicate the volume of reagent/consumables, man-hours involved which can be converted into loss and by managing it can be profitable for the laboratory.

It may prevent occurrence of any potential non-conformance may identify the technician's competency requirement and equipment performance which can help to improve the testing turnover by effective utilisation of resources

D) Inventory control: Most of the laboratory does not calculate reorder level. Sometimes testing cannot be done due to non-availability or shortage of kit/reagent and all this area can be considered and will profitable.

E) Storage: Storage of kit reagent, consumables and sample is another area. Condition can be deteriorated in both the cases if kit is not performing correctly or if the sample condition is deteriorated, repeat test or correlation test is done, or re-sampling is done. All this repetition of work involves man-hours, reagent, machine operation and use of other lab equipment. This can also be converted into rupees and saving of that will be a profit for the laboratory.

F) Handling of equipment: Equipment is defined in ISO 15189 that covers all equipment, reagent, consumables, reference etc. A simple method study tool of Industrial Engineering application can indicate the amount of wastage thereby help saving the resources.

G) Turnaround time or reduction of reporting time cycle: In this stage also, duplication of work is involved. In some cases, resources are not competent and not utilised effectively, target on reduction of reporting time also involve co-ordination of all laboratory activities and this will automatically improve the productivity means testing turnover.

H) Feedback and complaint: This is another area of laboratory identifying the problem and to determine the scope of improvement. Analysis of complaint and feedback statistically will provide the necessary data on the area of improvement. Data collection will cover the number of complaint in a period, repetition of complaint even after taking corrective action, classification with nature of complaint and its numbers. Using Fish bone diagram can solve critical complaint and bottleneck areas. Presentation of data can indicate all those areas needed to improve.

Laboratories can make or prepare a target plan on each area, which should be followed by an action plan, implementation monitoring, record keeping and finding the profitability. Implementation of ISO 15189 standard and NABL 112 document will also help the laboratory on managing quality and profit both. For a big laboratory, Six Sigma can be applied for better management of cost savings.

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