

## Improved Utilization of Laboratory Services.

Vijay Gupta, Ph.D.<sup>1\*</sup>; Sanjoy Das, M.D.<sup>2</sup>; Amandeep Singh, M.D.<sup>3</sup>;  
and Dr. Arvind Kumar, M.D.<sup>4</sup>

<sup>1</sup>Professor, Forensic Medicine and Toxicology, HIHT University,  
Swamiram Nagar Dehradun-248140 (Uttaranchal), India.

<sup>2</sup>Professor and Head, Forensic Medicine and Toxicology, HIHT University,  
Swamiram Nagar Dehradun-248140 (Uttaranchal), India.

<sup>3</sup>Assistant Professor, Forensic Medicine and Toxicology, GMC, Chandigarh, India.

<sup>4</sup>Assistant Professor, Forensic Medicine and Toxicology, Lady Hardinge Medical College,  
New Delhi-110001.

E-mail: [guptavijay4@gmail.com](mailto:guptavijay4@gmail.com)\*

### ABSTRACT

The problems of medical errors are often times related to laboratory medicine and this situation has drawn great attention for a long time. Though there is abundant scientific literature related to increased laboratory quality, the literature on errors in laboratory medicine is not well developed. The main reasons for this could be 1) Insufficient attention paid to the problem and 2) Difficulty in reporting and measuring the number of errors.

In this review we searched the literature and gone through several MEDLINE queries. In addition, we reviewed data on the frequency and types of pre and post analytical variable. To overcome the problem, some strategies are also outlined.

(Keywords: medical laboratory quality, laboratory medicine, analytical variables)

### INTRODUCTION

An organization's achievements are judged not only by its history but by its vision. 'Vision' comes from knowledge; 'Knowledge' comes from Education. Education and practice comes from learning by doing.

Acquiring knowledge does not mean that one should be absolutely perfect, but a practitioner should always be eager to update his knowledge.

Any laboratory's greatest contribution should be to become a partner in the patient's care. Medical laboratories should ask themselves "Are we really caring for the patient's health?" This needs to be answered.

The volume of laboratory testing would not be a concern if increased growth were coupled with effective laboratory utilization and improved patient outcomes. Observations indicate that increased testing does not correlate positively with improved care.

### LABORATORY SERVICES AND ITS USAGE

Three patterns of faulty test ordering behavior characterize the inappropriate utilization problem:

1. Over Utilization: When a test is ordered but not clinically necessary.
2. Mis-utilization: When a test is clinically indicated but an:
  - a) Inappropriate one is requested
  - b) An appropriate test is ordered but with wrong timings.
  - c) Non-collection of reports: - when tests are ordered and reports are never collected.
3. Under-utilization: - Test is clinically indicated but not ordered.

### ECONOMICS OF LABORATORY UTILIZATION

As the sayings go, "A penny saved is a penny earned" and "A man is rich not by earning more, but by spending less".

- Eisenberg (1977) identified 51-65% of repeated LDH and 60-77% of calcium tests as unnecessary.
- Schroeder (1985) found out that 85% selected discrete tests and 30% of stat orders as unnecessary.
- James Michelson (1995), Orthopedic Surgeon at John Hopkins, observed that \$30 million could be saved annually without jeopardizing health by eliminating the follows up X-rays after a major type of ankle fracture. A Clinical examination in which a physician looks for tenderness at the fracture site and checks for the ankle's stability, serves as well. At \$100 per set of X-rays, that is significant saving; not to mention sparing possible harmful exposure to X-rays.
- Various workers have reviewed the laboratory cost analysis for therapeutic drug monitoring. Anderson (1976) and Slaughter (1978) opined that an amount of \$ 3570/yr could have been saved for improper timings for sample collection for Gentamicin and Digoxin levels.
- Bussey (1983), Frank (1984), and Guernsey (1984) found that \$ 34393/Yr to \$88,725/Yr were wasted either for unusable results, incorrectly performed or inappropriately interpreted results.

Inappropriate test use leads to unnecessary cost for the laboratory. The increased number of tests per disease has not been associated with improved patient outcome, rather the diagnostic yield and value of testing has declined.

#### **INAPPROPRIATE TESTS LEAD TO:**

- Unnecessary cost to the laboratory.
- Harm to the patient because as the number of tests performed on a single patient increases, the probability that a false positive result will occur, also increases, This induces further testing to resolve the 'Abnormality' and an iatrogenic condition may result termed as "ULYSSES SYNDROME" which is

characterized by mental and physical disorders that follow the discovery of a false positive result. This is a side effect of investigation and not of therapy.

#### **CAUSES OF LABORATORY UTILIZATION PROBLEMS**

- (A) **Physician variables:** In one of the studies, when 111 doctors were asked for the reasons for ordering one or more of the eleven frequently requested tests, their answers were:
- 35% for diagnostic purposes
  - 30% for monitoring to follow up
  - 32% for screening
  - 1% for M.L. purposes
  - 2% for repeat because previous result was not available

32% + 2% is a big bulk which can further be reduced with proper and careful approach.

- In another survey, the need "to be complete" was the frequently cited reason.
- Compulsion to rule out or document every possibility creates much unnecessary testing.

Faculty can reinforce this attitude by criticizing/penalizing the omission of tests rather than rewarding restraint and thoughtful use of diagnostic tests.

- Multiplicity of Testing: When a patient comes to the Emergency Room, certain tests are ordered and when the patient is transferred to the ward and/or intensive care unit, the test are again ordered by the Resident doctors who receives the case.
- Physician use the laboratory test as a form of communication with patients and colleagues – patient thinks that something is being done.
- Lack of guidance in proper selection of the test and interpretation of results (Medical curriculum lacks in this) – This results in to wrong interpretation of normal physiologic variation in to pathologic changes. In one study it was observed that 3rd year resident request

fewer tests than 2nd year resident and second year fewer than 1st year.

- Financial incentives offered by many institutions to physician leads to over utilization of Labs.

## B. Laboratory Variables

- In most health care systems, laboratories are run more as an industry than a medical specialty.
- Laboratories try to produce large quantities of tests at a low cost per test by using cheap reagents. In this process they have become less effective in solving medical problems.
- Most of the time problems are caused by system variance (i.e., analytical system and the reagents are not in accordance).
- Automation has not been accepted in the right perspective- it has created an increased demand for tests.
- In an attempt to assist physicians, laboratories provide request papers that group tests according to organ profile. This policy has resulted in overutilization (e.g., in a diabetic where FBS is required- because blood is taken- a group request requiring a single tick mark can be selected for FBS, Urea, electro LFT, etc. Similarly, the scenario is the same with T<sub>3</sub>, T<sub>4</sub>, TSH and X-ray, AP, and lat, etc.

## OTHER CONTRIBUTORY FACTORS TO THE PROBLEM

1. Samples are not properly distributed to appropriate sections – especially outstation samples.
2. Samples are accepted even after 20-30 days of collection. Utility of such results is questionable.

Factors 1 & 2 are usually observed with Forensic Science Laboratory.

3. Lists of tests available with various sections are not circulated to the hospital with periodic upgrading. This results in

unnecessary sample collection – sample deterioration, besides wastage of tubes and syringes. The laboratory does not know the requirements of hospital and hospital does not know that what all is available with the lab.

4. Same tests for the same patient is accepted more than once a day for no significant reason.
5. Unjustified requests: Asking serum drug level on the day when treatment started. No concept of steady state or half-life of drug.
6. Improper or repeated sample collection: Junior doctors are not aware that for a particular test the sample to be collected in which specific tube. In CO poisoning for COHb, 10 ml blood is collected at one time and such test is requested at least 3-4 times a day.
7. Lack of coordination between lab and Hospital: Right person is not at the right job. Frequent turnover of staff does not work. Lab specialist should do the interpretation job and should interact with the physician.

## STRATEGIES TO IMPROVE LAB UTILIZATION

1. **Restructuring of Medical Education:** This should be the first and foremost task for the regulatory authorities governing medical education. Of course, medical teachers also have a great role to play. The medical education regulatory body in India is MCI and it has laid down the minimum subject courses for undergraduates. It never says that nothing should be taught beyond the prescribed syllabus. The medical teacher's role should be to provide need based education which should be more of practical application.

This will help to improve clinical decision making and, in turn, the cost awareness of the medical treatment and laboratory investigations. A laboratory course in medical school, reinforced by additional training during residency, should improve the laboratory utilization. During internship, fresh graduates should be posted to important sections of the laboratory.

2. **Hospital Based Cost-Awareness Program:** Physicians generate lab tests but they frequently lack knowledge of cost involved.
3. **Rationing:** Ration the number of tests that each physician can order during a day. List of certain tests which a G.P. is not authorized to write. Urgent/stat requests to be countersigned by the consultants.
4. **Incentives:** Positive incentives for rewarding appropriate ordering patterns. Negative incentives penalizing overutilization and mal-utilization. It is rightly said the "Incentives generate initiative".
5. **Eliminate Standing Orders.**
6. **Modify Lab Request Forms:** Clinicians should fill the request for desired tests with all relevant details for which the tests are ordered.
7. **Primary Testing has to be Abnormal:** For further diagnostic study (e.g., If cell count is normal), differential can be refused. If AP x-ray is normal, lateral can be refused.
8. **Encourage Research:** Incorporate it in practice. Transmit knowledge by conducting seminars and symposium.

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## CONCLUSION

Cost containment has challenged us with a new responsibility – Let us not pass it up this time. "It does not take much strength to do things but it requires great strength to decide what to do (Elbert Hubbard)

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