



COST ANALYSIS OF ABG ANALYZERS TO EVALUATE REAGENT RENTAL CONTACT VS PURCHASING

Dr. S. Naga Satish Kumar*

Assistant Medical Superintendent, Care Hospitals, Banjara Hills, Hyderabad
*Correspondence Author

Dr. N. Satyanarayana

Professor & H.O.D., Department of Hospital Administration, Nizam's Institute of Medical Sciences

ABSTRACT

Procurement of laboratory equipment becomes an important aspect in budgeting of hospitals. Recently, hospitals are preferring reagent rental contract over purchasing model. The present study analyzes these two models of procurement, through cost analysis of ABG Analyzers in Nizam's Institute of Medical Sciences, India conducted retrospectively for the period of January to December, 2013 using Activity Based Costing method. The study reveals that profit generated by Reagent Rental Contract (Rs.1,18,25,620) was 23% more profitable than Purchasing the equipment (Rs.1,10,40,030). Considering the pros and cons of two models, hospital administration must analyze various important aspects like costing, maintenance service, obsolescence, advancements in the equipment before adopting any one model to procure the equipment.

KEYWORDS : Purchasing, Reagent Rental, Laboratory Equipment, Cost Analysis, Activity Based Costing, ABG Analyzer

Introduction:

Clinical laboratories are part of the health institution team which not only provide important information for patient care, but also major revenue centres.¹ So, procurement of laboratory equipment becomes an important aspect in budgeting of hospitals. Although a variety of acquisition methods exist for laboratory equipment, the two most common procurement models are Purchase and Reagent rental contract.² Considering the complex nature of lab equipment, a "one size fits all" strategy is not suggested for choosing the procurement. Cost-effectiveness and return on equipment analyses need to be performed extensively when choosing the most appropriate model.³

In a direct purchase agreement, the facility owns the instrument and related accessories. They can either choose to pay for the entire purchase upfront or finance it from either the vendor or a third-party lender. It is the most practical method for general purpose equipment such as centrifuges, pipettes, refrigerators, heating blocks, etc.²

In a reagent rental agreement, the instrument is "free" with the purchase of reagents. The "free" instrument is a misconception, as typically this scenario has an upcharge that is tacked onto each reagent item to offset the price of the equipment and service.² Reagent rental contracts are arrangements between diagnostics companies and laboratories in which an analyzer will be placed in a laboratory in exchange for either the guaranteed purchase of reagents over a period of time or with the agreement that the laboratory would pay a specified amount per test run on the analyzer, based on the laboratory's estimated test volume by type.⁴ Reagent rental contract may be useful for large automated closed testing systems such as those for clinical chemistry, hematology and serology, where the platform costs are considerable and systems must be maintained regularly.²

Based on the context, the present study was planned to determine the better model for procurement of laboratory equipment for the hospitals. Cost analysis study was conducted on Arterial Blood Gas (ABG) Analyzer in Nizam's Institute of Medical Sciences, Hyderabad, a 1250 bedded tertiary care teaching hospital which is an apex institute for the state of Telangana. ABG analyzer is an important routine investigation to monitor the acid-base balance of patients, effectiveness of gas exchange, and the state of their voluntary respiratory control.^{5,6,7,8} The institute procured 2 ABG Analyzers as per Reagent Rental Contract with payment made by Cost-per-test (CPT).

Aim of the study:

The present study aims to compare the two models of procurement i.e. purchasing and reagent rental contact, using cost analysis of ABG Analyzers in Nizam's Institute of Medical Sciences, Hyderabad, India.

Methodology:

The present study is a retrospective study done for the period of January to December, 2013 using Activity Based Costing (ABC) method to study costing of ABG analyzer. Profitability is established by computing revenue generated based on the quantum of tests done. Since the institute procured the equipment on reagent rental contract, the cost analysis directly reflects profitability of this model. To understand profitability of purchasing model, a simulation technique was adopted to analyze costing of the same equipment, as if it was procured by purchasing model.

In ABC method, costs are divided into direct and indirect costs, which can be fixed or variable costs. Direct costs are expenses which are directly identifiable with a test, whereas Indirect cost is the common laboratory cost shared by all tests. Fixed costs are independent of number of tests done and remain constant, whereas Variable costs vary with the number of tests done. Usually variable cost is directly proportionating to number of tests done and is a direct cost.

Results:

The institute had set up ABG Analyzers separately as Point-of-care testing (POCT) in proximity to all ICUs and OTs with separate dedicated staff to carry the analysis round the clock. Number of tests done during the period of January to December, 2013 were 65304 tests.

Costing for ABG Analyzers is as follows (Table – 1):

- i. **Fixed Direct cost:** Includes cost of equipment, infrastructure, salaries provided for the staff working on the equipment, overheads like rent of the space, electricity, water and other miscellaneous costs like stationary, linen and laundry, housekeeping, etc. Equipment cost will be Rs.0 for reagent rental contract, whereas the same equipment would cost Rs.11,97,000 which includes Taxes and AMC, if purchased. Infrastructure, Staff and Overheads will be same for both the models and are Rs.1,20,000, Rs.20,40,000 and Rs.1,54,320 respectively.
- ii. **Fixed Indirect cost:** Includes administrative and supervisory cost which is common for all the laboratories, calculated as per the proportion of time spent for these activities. It is same for both the models i.e. Rs.2,40,000.

- iii. **Variable (Direct) Cost:** Includes cost incurred by purchasing reagents. Cost of reagents under Reagent Rental Contract was Rs.75 per test with additional tax of 5%, whereas cost of reagents for Purchased equipment will be Rs.70 per test with additional tax of 5%. Variable cost for Purchased equipment and Reagent Rental Contract was Rs.47,99,850 and Rs.52,11,260 respectively.
- iv. Total costing of Purchased equipment and Reagent Rental Contract for the period of January to December, 2013 was Rs.85,51,170 and Rs.77,65,580 respectively.

Revenue generated for the period was Rs.1,95,91,200. Profit for Reagent Rental Contract model was Rs.1,18,25,620 (129%), whereas estimated profit for Purchased equipment would be Rs.1,10,40,030 (152%). Reagent Rental contract was 23% more profitable (Rs.7,85,590) than Purchasing the equipment.

Table – 1: Comparison of Purchasing vs. Regent Rental Contract models for ABG Analyzer

Cost Analysis of ABG analyzer (in INR)			Purchasing	Reagent Rental
Costing	Fixed Direct	Equipment Infrastructure	11,97,000	0
		Staff	1,20,000	1,20,000
		Overheads	20,40,000	20,40,000
			1,54,320	1,54,320
	Fixed Indirect	Administrative and Supervisory costs	2,40,000	2,40,000
	Variable (Direct)	47,99,850	52,11,260	
	Total	85,51,170	77,65,580	
Revenue generated			1,95,91,200	1,95,91,200
Profit			1,10,40,030	1,18,25,620
Profit percentage			129%	152%

Discussion:

The choice between purchasing or renting laboratory equipment is one of the key decisions. Owing to high competition and decreasing revenues, hospitals must constantly seek ways to cut down the costs incurred in laboratories, while still remaining competitive in terms of various tests performed. Many have found that reagent rental contracts with diagnostic manufacturers provide a viable solution to these challenges, especially in the clinical chemistry and immunoassay testing arenas.⁴ The decision to buy or rent equipment in the lab involves a complex analysis, further complicated by the large number of reagents and consumables required to run instruments that may not be included in some agreements.⁹

In the present study of comparing profitability of both the models, it was shown that reagent rental contract was 23 % more profitable than purchased equipment. Moreover the equipment is not owned, implying a chance to review the contract to upgrade the equipment if the existing technology becomes obsolete, having an advantage to access latest and advanced equipment, which is major limitation in purchasing.

The advantage of purchasing is that laboratories can choose to use the equipment beyond useful life, provided it is in good working condition. Additionally, the information provided in a direct purchase scenario is typically broken down by instrument(s), service, reagents and consumables, etc. which help in facilitating initial/ongoing negotiation and higher observed savings.^{2,9,10}

The disadvantage of purchasing is that negotiating each piece of the agreement is a time intensive process. Upfront capital would be required resulting in the lab going through a typically long capital approval process, and the technology may become obsolete before exceeding the useful life of the instrument.^{2,9} A purchase usually carries the lowest interest rate for a loan, but the capital equipment

must be depreciated over a period of time and appears on the balance sheet as a long-term debt.¹⁰

The advantage of reagent rental is that a monthly/annual payment may be easier to budget. Implying, organization need not have to go through the capital committee as there is no large capital investment upfront. It is easy to upgrade to the latest/advanced model of equipment and dispose the obsolete once the reagent rental contract expires. It also eliminates the need to contract for service annually after the warranty has elapsed because the service is covered in the contract. It provides greater incentive for the vendor to ensure the equipment is functional as payment is based upon test throughput.^{2,9} In acquiring reagent rental instruments, not only the liabilities (insurance and maintenance, etc.) are transferred to the instrument supplier, but also direct cost prior to the performance of the test decrease.¹¹ This can be noticed in the present study. (Direct cost for Purchased equipment and Reagent Rental Contract was Rs.83,11,170 and Rs.75,25,580 respectively)

The disadvantages relate more to the costs, or hidden costs, as it is typically not clear as to what is included in the pricing. There could be penalties for decreased usage.² Failure to estimate correctly could mean paying for tests that are never run, or losing the lower cost per test advantage that generally accompanies growth. Though the instrument is perceived as being free, the cost of the equipment and service are typically rolled into the CPT and if the contract is renewed without renegotiating the terms, the equipment could be paid for more than once without ever achieving ownership.⁹

Conclusion:

Nevertheless, a thorough financial study should be made before deciding whether to buy or rent laboratory equipment and then proceed to procure the equipment with proper agreement including clauses for price protection, performance guarantee, response time guarantee for service, enhancement/obsolescence protection, etc.

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