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Review Article

PROCESS OF PLANNING FOR MEDICAL EQUIPMENT

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Abstract: This paper presents a computer system for assisting the health care services planning and the acquisition process of medical equipment. After choosing one of the health services listed on screen, the computer system presents a second list of essential and secondary equipment for that specific service. To specify chosen equipment from that second list, the user has to answer a series of predetermined questions that are also displayed on screen. At the end of the questionnaire, the program generates a report containing the equipment characteristics defined by the user for its acquisition. All those questions were defined for given equipment based on data describing its own characteristics. The user is able to modify the predetermined questions to adjust them for a specific type of equipment. The answers, given by the users, are then stored by the system and presented every time a new specification for that type of equipment is made.

Keywords: Computer system, medical equipment, program.

Introduction: The process of planning is the foremost of management functions which enables an organization such as hospitals to deal with the present and anticipate the future. In the forecasting process the hospital management determines where it is at present and where it wants to be at some point of time in the future.

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It seeks to provide the management with information about the future, and involves the considering of certain basic questions:

1. What are we?
2. What are we expected to do?
3. Why it will be done?
4. When are we expected to do it?
5. Who is going to do it?
6. How will it be done?

The purpose is to assure the most efficient utilization of resources and economy of performance. Given the scarcity of resources, the management is required to establish long

and short range plans in order to avoid uncoordinated utilization of resources.[1]

Forecasting is inherent in planning. Whether it is forecasting the utilization of medical equipment, or the demand for a new specialist service, forecasting is common to all types of planning.

Planning Of Equipments: Planning requires making assumptions about internal resource needs and external environmental forces. In the area of healthcare, estimating the future involves addressing two key issues:

1. How far in the future is it important to estimate?
2. How far into the past is it appropriate to go in order to forecast?

The first determines whether the short term, medium term or long-term forecasting techniques are appropriate. The second will determine which forecasting techniques are feasible depending on the amount of past data available.

Concept of Medical Devices: The terms Medical Device and Medical Equipment are often used interchangeably to denote a medical instrument. It is important to note the difference. Medical Devices are instruments, apparatuses or machines used in the prevention, diagnosis or treatment of illness or disease, or for detecting, measuring, restoring, correcting or modifying the structure or function of the body for some health purpose. On the other hand, Medical Equipment are medical devices requiring installation, calibration, maintenance, repair, user training, and decommissioning which are activities usually managed by biomedical engineers. Medical equipments are used for the specific purpose of diagnosis and treatment of disease or rehabilitation following disease or injury; these can be used either alone or in combination with accessories, consumables, or other pieces of medical equipment. [2]

Medical devices that are implantable, disposable or meant for single-use are not medical equipment. Planning of medical equipment encompasses diverse and technically complex issues. It must be combined into a concurrent, multidisciplinary & interactive process. We should not focus our parameters on a single specialty but rather examine the strategic objectives of the total health delivery system of the hospital.

The approach must ensure balancing capital cost with long term operational cost. It should aim to minimize duplication of high cost equipment while at the same time achieve a patient-centered concentration which facilitates the delivery of quality healthcare.

Relation of Medical Equipments with Hospital: Today hospitals employ a market-based forecasting method to estimate future demand for their facilities by using a range of data that describe the nature of demand within their core catchment and referral service areas. This helps in assessing how many patients may be expected to use the services and the amount of investment in terms of medical equipment that will be needed. This would then define the types and volume of equipment needed to meet demand.

When hospitals decide to add new facilities such as a MRI, a CT, surgical equipment or any diagnostic imaging equipment, these must be informed decisions based on anticipated utilization after evaluating the medical technology coupled with financial analysis.

In the absence of such evaluation, hospitals often face the following problems:

- low utilization as a result of similar facilities existing in the hospital's core catchment area
- recently purchased equipment are infrequently used
- users experience difficulty in using the equipment
- frequent downtime and maintenance issues
- Maintenance costs emerging as a large single expense.

A study carried out to calculate the break even volume of MRI scans at a tertiary care teaching hospital showed that it was necessary to have an

average utilization of approximately 413.50 scans per month for the facility to break even.[2] However, the study revealed that average utilization was 213.40 scans per month, well below the breakeven point.

Another study carried out at a large multi specialty hospital in Chennai revealed that certain new equipment in the Operation Theaters had low utilization rates.

However, when hospitals plan on replacement of existing equipment or when they wish to purchase basic equipment, the need for detailed analysis may not arise.

The increasing scarcity of available resources on the one hand and the demand for quality healthcare on the other has created a paradoxical economic perspective for hospitals. It is in such an environment that hospitals have begun to manage their equipment related operation expenditures better. As deployment of medical equipment continuously evolve, its impact on the hospital operations and on the consumption rate of its financial resources increases. The ability to forecast and manage this continual evolution and its subsequent implications has become a major component in all healthcare decisions.

In a survey of three large hospitals in the U.S., the average number of medical equipment being used per bed has increased between 1982 and 2002 from four per bed to over 17 per bed. [3] This indicates that hospitals are experiencing a continual increase in the number of medical equipment used on a per bed basis.

The healthcare delivery system is going through a transition that is led by three major driving forces: cost, technology and patient expectations. The impact of these forces changes from time to time as do their relative significance. The system is constantly being subjected to mounting pressures from the need to identify its goals, select and define priorities, and to allocate their limited resources. A successful hospital is one that can balance these factors.

Technology means the use of tools; that is, the involvement of any agent which assists in the performance of a task. Such tools have been introduced at an increasing rate over the past century and include the use of techniques, instruments, materials, systems, and facilities. Of all the factors and resources that will shape the future of the health of mankind, the one that most often stretches the imagination is medical technology. But yet, it is also blamed for contributing to the escalation of healthcare costs without receiving due recognition.[4]

Conclusion: The question is no longer whether a medical equipment management plan is worth the effort, but rather, can we afford not to implement it and do we have the adequate tools to execute it? If we do, then hospitals will be able to make informed decisions regarding deployment of new technology as well as monitor its utilization.

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