

PRODUCTIVITY STANDARDS AND RESOURCE UTILIZATION MONITORING SYSTEM: A CONCEPT TO HOSPITAL MANAGEMENT IN NIGERIA

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ABSTRACT

Cost savings can be realized in hospitals through the proper utilization of employees to optimize labor cost since labor costs average over half of the expenses of a typical hospital. The health care management is often left to subjective feelings in evaluating the proper relationship between staffing and workload without a logical, systematic approach to productivity measurement. With proper training and understanding, the Resource Utilization Monitoring System (RUMS) can become a valuable tool in evaluating these relationships. There is no much evidence in the literature that productivity standards is often used as a planning and control tool of human resources in the administration of hospitals in Nigeria. The purpose of this paper is to explain how to determine productivity standard and the development of RUMS; and to explain their applications as a planning and control tool of human resources management of the hospitals costs centers in Nigeria.

Keywords: Hospital management, monitoring, productivity standards, resource utilization, and Nigeria

INTRODUCTION

Two important transformations that took place in the past that changed health care Worldwide were, more is better, now it is less that is better; and the driving force was quality and access no matter what the cost. Now, it is cost containment, quality, and access. A number of forces that have been acting on hospital costs are beyond the control of the individual hospital. Among them are inflation, increase in population, improvement in medical care, new medical equipment technology and the attitude of the patient towards the hospital (Johannides, 1979). When fringe benefits and contract labor are added to salaries and wages, total hospital labor costs constitute more than half of total revenue. According to Fitch Ratings reported in August 2004 that across its 215 rated not-for-profit hospitals, the labor ratio was 52.2 percent (Berger, 2012). Fogel (2012) stated that because labor is the largest expense in health care organizations, hospitals that want to reduce costs need to focus on reducing labor expenses. Hence, healthcare industries tend to use highly sophisticated productivity measurement systems to gather, calculate, and report data to control costs. The

current challenge to all health care administration, managers and supervisors is to contain costs and increase productivity.

As suggested by Dam (2006), when hospitals are facing periodic budget crises they embark on energetic initiatives to dramatically reduce labor, supply or purchased service costs. They adopt drastic measures such as labor budget cuts, hiring freezes and layoffs, or they even remove layers of management. Such approaches are always short-lived, disruptive and resented, causing significant morale problems. In the long run, they are ineffective and costly. A more sustainable approach is to nurture a culture of productivity. Productivity measures will become a critical management tool and essential information for those institutions, including hospitals which are able to influence their productivity in a positive manner, for survival and successful (Liljestrand, 1985). But to effectively measure productivity, a hospital first needs to employ standards as stated by Dam (2006). The management of labor in the hospital environment is a process that truly requires day-to-day oversight by the hospital leadership team. Salary, wages and benefits are the most significant

cost items for a hospital (CHCN, 2009).

Hospitals and health systems will continue to address questions related to productivity and efficient allocation of resources. Using comparative information to guide decisions related to resource allocation is critical (Managing the margin, 2005). The objective in the healthcare industry is to find ways to perform necessary activities more efficiently and to eliminate those that do not create customer value. The key questions to be asked are; can the activities be eliminated, combined, changed, simplified or improved? Trends in cost over time and measures of productivity changes can provide important measures of the efficiency of continuous improvement decisions. Cost must be properly defined, measured, and assigned for it to be of value (Bellandi *et al.*, 2001). Productivity means different thing to different people. Productivity could be defined as a measure of how well inputs (people, supplies and equipment) are used to produce quality outputs (therapies, admissions, nursing services, meals, bills, case procedures and others).

In the past, health care productivity monitoring has concentrated on measuring only the labor input component of productivity, because payroll expense makes up the largest percentage of total hospital costs. Historically, quality of the outputs has not been explicitly measured. When quality is not explicitly measured, productivity standards are based on work methods that meet established quality standards. Productivity is generally measured by the following equation (1):

$$PRODUCTIVITY = \frac{QUANTITY\ OF\ QUALITY\ OF\ WORK}{WORKED\ HOURS} \quad \text{-----} \quad (1)$$

To maximize productivity, work should be produced effectively with the desired quality characteristics as well as; efficiently with the minimum use of resources. The major responsibility of a manager is to manage the use of his/her area's resources as efficiently and effectively as possible to produce desired products. Therefore, the manager's responsibility is to manage productivity and its improvement daily. Although policies and goals provide guidelines and reports give useful information, productivity improvement will not occur unless each department director and supervisor based their daily decisions, plans, and actions on the goal of improving productivity. By taking an active approach to managing productivity improvement, department directors and supervisors of hospitals can realize several benefits to both the hospital and to themselves. These benefits include:

- i. Greater ability to plan, predict, and react to changing workloads which can lead to; improved patient services, improved employee morale, and increases in overall departmental efficiency,
- ii. Increased visibility and recognition of departmental performance, and
- iii. A feeling of self-satisfaction and worth to the hospital.

Productivity improvement can only be accomplished through change. "Change will occur whether people manage it or not. If people manage it, they exercise greater influence over their destiny they can shape and fashion change to the best advantage of the field, the organization, and its people" (Bennett, 1978a). In order to control change, managers and supervisors of each department should set obtainable objectives that are based on the overall goals of the hospital. "Objectives should be reasonable, measurable, future-related, specific in their intent, results-oriented, and based on the mutual consent and commitment of related departments" (Bennett, 1978a). According to Drucker (1973), "achievement is never possible except against specific, limited, clearly defined targets, in business as well as in a service institution. Only if targets are defined can resources be allocated to their attainment, priorities and deadlines set, and somebody held accountable for it." The term given to this process is called Management by Objectives (MBO). Managers and supervisors work to accomplish these objectives through the process of making plans, putting the plans into action, reviewing the results, and making adjustments and further improvements.

According to Bain (1982), to improve the utilization of human resources, three basic types of departmental changes must be made:

1. Improve methods and equipment.
2. Improve utilization of resources by effectively matching the amount of work with the resources available to the department through scheduling and work flow improvements.
3. Improvements in performance levels by gaining better employee efficiency.

This does not mean making employees work harder than a normal rate, but enables employees to accomplish more work through improved methods and improved operational systems. After making changes, the manager needs to have a method of evaluating the impact of this change on

the department. The RUMS report provides information that can be used in evaluating these management decisions.

METHODOLOGY

In productivity standards development, the three necessary components to measure productivity are the number of hours worked during a period, the number of units produced during a period, and a productivity standard. A productivity standard is a measure of the time that is required to complete one unit of work under normal (quality) circumstances by an average worker. By comparing the time required to do the work (the variable standard multiplied by the number of units produced) to the actual hours worked, the RUMS is used to report each cost center or department's calculated productivity index.

For this reason, the development and maintenance of good standards is a vital part of the productivity monitoring system. Two basic attributes of a good standard are fairness and credibility. More specifically, a good standard is based on a unit of work which measures the workload as precisely as possible; separated into fixed and variable components; developed according to an organized, acceptable method; and based on defined procedures and methods that meet the quality standards determined by the department and medical standard committees. The fixed, variable standards and different methods of developing productivity standards are explained in the following subsections.

Fixed and Variable Standards

Fixed activities are those that require, on the average, the same amount of time each period to complete, regardless of short-term fluctuations in the workload. Some examples of fixed activities are supply ordering, periodic equipment cleaning and maintenance, and regularly scheduled meetings. Variable activities are tasks for which total time requirements vary based on the volume of work. The average time per activity does not change but the number of times the activity is performed does. Examples of variable tasks include setting up equipment and supplies before working with a patient, performing a specific therapy, charting results and transporting a patient. To assure that fluctuations in the volume of work do not affect the calculation of fixed time requirements, fixed and variable activities are represented by separate standards.

Different methods of developing productivity standards

Productivity standards can be developed by several methods. These methods vary from

simple to complex. The appropriate standard development methodology should be selected based on the length of time that can be spent developing the standard, the desired degree of accuracy of the standard, and the size and complexity of the department under consideration.

Calendar Days

This type of standard is used for departments with few employees on their Table of Organizations. Most of the Calendar Days productivity standards are calculated by summing the number of paid hours for filled positions, subtracting the department's average benefit hours, and dividing by the number of days in the historical period used in determining paid hours.

Historical Data

This method uses base period data as the standard and compares all future activity to the present period. This technique is rapid and inexpensive and provides a base for comparing gains or losses in productivity, but it is limited because it incorporates the inefficiencies or inequities of the current operation. The standard is calculated by estimating the time required for fixed activities and subtracting this from historical hours worked during the preceding year. The remaining historical hours are then divided by last year's number of procedures to determine average variable hours worked per procedure.

Estimation, Expert Opinion, or Delphi Method

These methods involve the people who are familiar with the procedures or operations for which standard times are being set (often supervisors). The supervisors make an estimate of the average time required to perform each task under normal circumstances. The Delphi method is a group effort in which several people make individual estimates, pool their responses, discuss the involved factors, and reach a mutual decision on the standard time.

Established Standards

In this approach, published time standards are adapted for individual rehabilitation facilities, by adjusting for differences in work methods and environmental characteristics. An example is the CAP (College of American Pathologists) units used in the laboratory which could be adjusted for use in any other hospital's laboratory.

Direct Observation

This method for setting standards is the most accurate but also the most time-consuming approach. The work methods in a department are defined and standard times are developed by having an observer (or the worker himself) record the time requirements for a job. To get a normal

time, a statistically adequate sample of times is averaged.

A combination of several of these methodologies may be used to give greater flexibility in meeting an organization's desired relationship between the amount of development time and the degree of accuracy. For example, the direct observation and Delphi methods can be combined; times for the most frequently performed activities can be obtained through observation and times for the remaining procedures can be estimated. This method can be effective in reducing study time while maintaining an acceptable level of standard accuracy.

RUMS REPORT

The essential information contained in the Resource Utilization Monitoring System (RUMS) report should include the following:

1. Header and Productivity Information
2. Data Audit Information
3. Management Decision Information.

The header and productivity information section should contain the department name, run date, target utilization, standards, pay period descriptions, and the data average headers. The data audit information contains data used in calculations so that the user can validate the statistics in the management decision information section. For RUMS analysis, the user should focus on the management decision information section. This area contains information that can be used as a basis for evaluating labor and supply utilization. All the above including the definition and calculation are shown in Appendix A.

REPORT ANALYSIS AND USE

All of the components previously described are important in a productivity reporting system. However, analysis and use of the RUMS report is also very important. The report provides information to assist in making decisions and taking action. But unless action is taken, productivity will not improve. This section describes ways in which department directors and managers can use the report as a basis for action. The ways in which a manager takes action can be summarized in the following functions; planning, budgeting, organizing, motivating and controlling. Planning and budgeting involve setting goals, setting specific result-oriented objectives and planning step-by-step methods to accomplish each objective. Organizing and motivating is putting plans into action, scheduling and assigning personnel. Controlling involves review performance, identifying areas

to improve, planning methods of improvement and taking action. Only by considering what is best over time, not just what is best for today, can the manager be most effective in optimizing the utilization of his resources (Bennett, 1978b). Determining what is best over time requires planning. The two basic steps of planning are predicting conditions that are expected in future periods and setting a course of action based on these conditions. Forecasting is the process of predicting future conditions.

To plan future staffing levels, the workload of the cost center or department must first be forecasted. The manager can project workload for future pay periods or years using the workload volume data reported on the RUMS reports. Staffing requirements for these periods can then be calculated using the workload projections and the productivity standards. Forecasting can also be applied to more detailed work load data to investigate patterns in demand by hour of the day, shift, and day of week. The projections that result from these types of analyses can point out ways in which staff scheduling patterns can be improved.

CONCLUSION

The fact that work environment is continually changing means that productivity standards require revision as time passes. Productivity standards are time requirements based on work systems and methods. Thus, when systems change, the productivity standards should also change. Periodic review of the standards will assure that the standards accurately reflect the cost center or department's work methods on a continuous basis.

Changes occur when methods are improved, eliminated, combined, or automated. A change in a department's responsibilities may result from a modification of the department's purpose or from the addition or elimination of a department's function. When a change in the responsibilities of a department causes the addition, elimination, or change of a cost center, productivity standards have to be changed to correspond to the new structure of each effected cost center. The addition of new procedures or treatments should be reported so that the time spent performing these procedures is counted each pay period. During standard reviews, obsolete procedures should be eliminated.

As conditions within the health care environment change, management's information needs change. The advantage of the productivity standards and Resource Utilization Monitoring System (RUMS) in hospital is its ability to continually improve to provide new information as needs change. The hospital staff should comprehend that there is always a better way

to get things done. Discussing productivity improvement on an individual department basis provides an opportunity to explain each manager's role in achieving productivity goals and to learn more about the department's operations. The hospital management should specify penalties as well as incentives for superior performance to the staff. Without incentives and consequences policies in place and enforced, efforts to improve productivity will be ineffective.

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APPENDIX A

A. Header and Productivity Information

The header information consists of the followings:

1. Run Date: This is the date that RUM reports for pay period is printed.

2. Target Utilization: Target utilization is equal to the productivity % that a department should be striving for and realistically capable of reaching. Target utilization indices below 100% are set to take into consideration that some departments may be unable to realistically reach a productivity index of 100%. Target utilization is always 100% for departments whose standards are based on historical data and usually less for departments with engineered standards. This is because historical standards are developed based on the amount of time employees were at the hospital while a given volume of work was accomplished. It is realized that during that time there was down time and this is built into the standard. However, this is not true of engineered standards which only include the actual time required to accomplish each work task. Some departments may have unavoidable down time which may be due to shift coverage responsibilities, non-predictable workloads and others, hence by setting target utilization below 100% is to acknowledge these factors.

3. Variable hours per workload unit: When the calculation of standard is based on historical data the variable hours per workload unit represents the average time needed to complete a task one time. It is applied to procedures or tasks that can be counted. The standard Variable Hours per Workload Unit itself is not variable, but rather, the volume of work varies for each reporting period (Hunt and et al). Multiplying the variable hours per workload unit by the number of work units produced during a period yields the total time it should have taken to complete the work.

After a department's standards have been engineered the workload unit is called a Resource Value Unit (RVU). In this case, the number of RVU's is multiplied by Variable Hours per Workload Unit to convert the RVU's to earned variable hours. Earned variable hours include time for employee breaks. If a department's workload is difficult to measure or if the department is small, the workload volume may not be countable. In such a case, the department would have no variable standard, only a fixed standard.

4. Fixed standard: Fixed standard is when the volume of work is difficult to count or when the time to complete tasks varies little within each reporting period, a fixed-time value is determined and assigned to those activities (Hunt and et al). For example, the amount of time a transport aide spends on routine equipment cleaning is fairly constant and is independent of workload. This activity could be assigned a fixed standard.

5. Latest standard update: The latest standard update is the effective date of the last revision of either the variable or the fixed standard.

B. Data Audit Information

1. Total completed work units: There are two types of workload units; those based on volume counts and those based on RVU's. The type of workload unit which can be applied in measuring any department's work is dependent upon whether the standards have been calculated using historical data or whether they have been engineered. Historically based standards count work in activity volume such as the numbers of admissions, numbers of line items, and numbers of cases; while engineered standards count work in RVU's. Below each are explained;

(a) Workload Units for Departments with Historically Based Standards

The variable workload unit for historically based standards varies by department. The unit is could be selected according to the type of work the department does. For example, the cafeteria's primary purpose is to serve meals. Its unit of work, then, could be number of meals served. Other departments have workload units such as patient days, patient treatments, therapy modalities, patient visits, cases, or line items.

(b) Workings for departments with Engineered Standards

The variable workload unit is called an RVU in departments where engineered standards are in place. An RVU is a unit of time that is used to measure the amount of work performed by a department. Most often, 1 RVU equals 1 minute, 10 minutes, or 1 hour. The RVU total is calculated in the following manner: For each procedure done by the department, the average required time is multiplied by the number of that procedure completed during the pay period. The totals for each procedure are then summed to get total earned RVUs for the pay period.

By quantifying the work in time units, rather than volume counts, the differences in procedure lengths can be taken into account. For this reason, RVUs are more precise measures of work than units such as procedures, cases, or visits.

2. Hours earned: The hours earned is the hours that are required to complete the amount of work performed by a department during a pay period. It includes time for both fixed and variable activities.

$$Hours\ Earned = Fixed\ Hours\ Earned + Variable\ Hours\ Earned \quad (2)$$

OR

$$Hours\ Earned = \left(\left(\frac{Fixed\ Hours}{Workunit} \right) + \left(\frac{Variable\ Hours}{Workunit} \right) \right) \times \left(\frac{Workunits}{Pay\ Period} \right) \quad (3)$$

3. Hours worked: The hours worked is the total number of hours that were worked (including overtime) by a department during a pay period.

1. Hours targeted: The hours targeted is the total number of hours earned adjusted by the target utilization index to give an obtainable hours figure. (Hours targeted will equal hours earned when standards are based on historical data).

$$Hours\ Targeted = \frac{Hours\ Earned}{Target\ Utilization} \quad (4)$$

2. Variance: The variance is the difference between the hours worked and the target hours earned.

$$Variance = (Hours\ Worked - Hours\ Targeted) \quad (5)$$

6. Hours paid: The hours paid is the total number of worked hours plus benefit hours paid during a period.

$$Hours\ Paid = (Regular\ Hours + Overtime\ Hours + Benefit\ Time) \quad (6)$$

7. Hours overtime: The overtime hours is the total number of overtime hours worked during a period.

8. FTE worked, targeted, and paid: These statistics are the worked, targeted, and paid hour totals converted into Full-Time Equivalent (FTE) figures. The calculation is based on the relationship of 1 FTE = 80 hours per pay period.

$$FTE\ Worked, Targeted\ and\ Paid = \left(\frac{Hours\ Worked\ (Targeted\ or\ Paid)}{80\ Hours\ / Pay\ Period / Full\ Time\ Employee} \right) \quad (7)$$

9. BUDGETED FTE'S: The budgeted FTE's is the projected number of FTE's based on annual budget plans.

10. BUDGETED WORKUNITS: The budgeted work units are the procedures, cases, etc., projected for that pay period based on yearly budget plans.

C. Management Decision Information

11. % PRODUCTIVITY: This is the percentage of productivity that indicates how well the hours worked (input) in the department matched the amount of hours earned (output) for the pay period.

$$\% Productivity = \left(\frac{Earned\ Hours}{Worked\ Hours} \right) \times 100 \quad (8)$$

12. % BENEFITS (% Benefit Hours of Total Paid Hours): This the percentage that expresses the proportion of hours paid during a pay period for benefits. Benefit hours include vacation, sick, birthday, personal, and holiday time.

$$\% \text{ Benefits} = \left(\frac{(\text{Hours Paid} - \text{Hours Worked})}{\text{Hours Paid}} \right) \times 100$$

13. **% HOURS OF OVERTIME TO HOURS PAID:**
This is the percentage that shows the amount of paid hours that were paid as overtime.

$$\% \text{ Hours of Overtime to Hours Paid} = \left(\frac{\text{Hours Overtime}}{\text{Hours Paid}} \right) \times 100 \quad (10)$$

14. **HOURS TARGETED/WORKUNIT:** see following
HOUR WORKED/WORKUNIT: see following
HOURS PAID/WORKUNIT: see following
HOURS BUDGETED/WORKUNIT: see following

These are the actual number of hours (targeted, worked, paid, or budgeted) which were expended per work units).

$$\text{Hours Targeted per Workunit} = \left(\frac{\text{Number (Targeted, Worked, Paid or Budgeted) Hours}}{\text{Number of Workunits completed during the pay period}} \right)$$

15. **PAYROLL / WORKUNIT:** This is the amount of payroll expense per unit of variable work done during a pay period.

$$(9) \text{ Payroll per workunit} = \frac{\text{Total Payroll}}{\text{Number of Workunits}} \quad (12)$$

16. **NON-PAYROLL / WORKUNIT:** This is the amount of direct expense other than personnel naira paid per unit of work during a pay period.

$$\text{Non Payroll per Workunit} = \frac{\text{Non Payroll Direct Expenses}}{\text{Number of Workunits}} \quad (13)$$

17. **TOTAL COST/WORKUNIT:** This is the total direct expense per unit of work during a pay period.

$$\text{Total Cost Per Workunit} = (\text{Payroll per Workunit}) + (\text{Non Payroll per Workunits}) \quad (14)$$

18. **BUDGETED \$/WORKUNIT:** This is the annual budgeted direct expense divided by the projected number of work units.

$$\text{Budgeted $/Workunit} = \frac{\text{Annual Budgeted Direct Expense}}{\text{Projected Number of Workunits}} \quad (15)$$

19. **INCOME \$/WORKUNIT:** The amount of income received per unit of work for a pay period.

$$\text{Income per Workunit} = \frac{\text{Actual Income}}{\text{Workunits}} \quad (16)$$