Administration

Standardizing Productivity Measurements For Nuclear Medicine

Mel Allen, David F. Preston, Ralph G. Robinson, Michael Feldkamp, and Alan McPherson

University of Kansas Medical Center, Kansas City, Kansas

We present a productivity measurement method that can be implemented in any nuclear medicine department and will provide significant benefits to the nuclear medicine manager. These include a comparable and consistent method of calculating producitivity information and accumulating data that can be used as a basis for calculating fiscal reports, including revenue generation, projecting future workloads, staffing requirements, etc. Measuring the productivity of a nuclear medicine facility is a difficult task. According to several national surveys, there is great variation in the way patient care workload is reported. Establishment of standards of productivity measurement in nuclear medicine departments should be developed. Productivity values or related measurements should be as complete and accurate as possible. Nuclear medicine managers and hospital administrators may wish to compare their current productivity measurements to hospitals of comparable sizes and staffing, but all the variables used to generate the figures should be calculated or derived by the same method or techniques. We base our productivity calculations on a procedure accounting method derived from the Current Procedure Terminology (CPT) Code Book, an established and accepted reference, by which many major health insurance companies determine reimbursement.

With ever increasing accountability demands, productivity measurement has become a very useful tool for nuclear medicine managers to justify either current or additional staffing needs. Comparing productivity of nuclear medicine facilities is a difficult task because widely accepted standards currently do not exist. Nuclear medicine managers are continuously asked to provide statistical information, which represents productivity to their facility administration. These physicians and administrators, as well as nuclear medicine managers, may wonder how their nuclear medicine laboratory compares with other nuclear medicine laboratories' productivity results. There are many different methods for calculating productivity (*1,2–5*). Therefore, comparing productivity measurements from one nuclear medicine department to another cannot be accurately done unless all variables and parameters used to calculate the final results are similar among departments. Differences in accounting for procedures may be the biggest problem faced in calculating productivity measurements and comparing results with other departments. Nuclear medicine department A may count a functional ^{131}I-OIH renal study as one procedure, while nuclear medicine department B may count it as 3–4 separate procedures (e.g., OIH renal study, technetium renal blood flow study, computer-assisted exam, and lasix washout). Therefore the actual volume of patients may be similar, but the number of procedures and productivity may vary greatly. By standardizing these counting/productivity measurements, we should be able to accurately compare results with other nuclear medicine departments.

Which procedure counting method is the best? There is debate on procedure accounting, and there are pros and cons for each argument. It may be more convenient and easier to account for procedures the way that nuclear medicine department A does, but that may not be as complete and accurate as breaking the procedures down into their individual components as nuclear medicine department B did. These counting methods are the foundation from which all productivity measurements are derived. Hospital administrators, department chairmen, and nuclear medicine professionals need this information to aid in rational allocation of scarce resources and in measuring nuclear medicine's impact on health care.

METHODS

There are a number of different methods for determining productivity levels, some of which require a great deal of in-depth statistical analysis such as queuing theory, Monte Carlo simulation, etc. For practical purposes, a simpler productivity method should be used. The first step in analyzing productivity should involve compiling a comprehensive list of every procedure performed in the department. There are two main philosophies in developingcharges and accounting for procedures. The first is one of simplifying the procedure

For reprints contact: Mel Allen, MBA, Division of Nuclear Medicine, University of Kansas Medical Center, Kansas City, KS 66103.

charge to include one charge code for all components performed. The advantage of this method of grouping studies into one procedure code is that it is simple and very easy to use. The disadvantages are that it may be hard to charge or account for any additional procedures that are performed during the particular study or to credit the patient for components that were not performed during the procedure. The second method of accounting and charging is that of breaking a study down as previously mentioned into individual procedures performed based on the CPT Code Book (*2*). This method may require a little more work initially and is a little more complicated, but makes customizing the patient's charge much easier and is usually more accurate because it is based on the actual procedures performed. The Physician CPT Code Book (*2*) is a listing of descriptive terms and identifying codes for reporting medical services and procedures performed by physicians. This book is published by the American Medical Association with the purpose of providing a uniform language that will accurately designate medical diagnostic services and provide an effective and consistent means of nationwide communication among physicians, patients, and third parties. A CPT code number is required for reimbursement from most of the major third party providers. All nuclear medicine procedures fall into one or more of the descriptive categories found in the CPT Code Book. It may be advantageous to break these procedures down into their basic components for both productivity measurements and reimbursement considerations. For example, Hospitals A and B may perform the same procedure but Hospital A submits charge code (1) for a cost of $500.00, while Hospital B submits, for the same procedure, charge code (1) for a cost of $250.00, charge code (2) for a cost of $200 and charge code (3) for a cost of $50.00. A third party provider looking at Hospital A's charge for procedure (1) may not reimburse them at as high a rate as they would Hospital B since Hospital B's charge is much lower for the same exam. It is also possible that Hospital B might be reimbursed at a much higher rate for procedures (2) and (3), therefore making their total return higher than Hospital A for the same billed procedure.

DETERMINING PROCEDURE TIMES

The next major step in productivity determination is documenting the time it actually takes to do each procedure. Each procedure code should have an associated time. Time-motion studies are an invaluable and accurate method if done properly to determine procedure times. These time motion studies should be carried out for at least 1–2 mo (and preferably longer), depending on the procedure workload. This ensures that a good sampling of each procedure is timed, providing a good average time for each procedure. These times should include routine set-up and clean up time for each procedure. This time may have already been established and used in the cost justification for each procedure, and if so, may be used for productivity determination if it is still an accurate time for a specific procedure. There are published studies of average procedure times that can be used for comparison (*3*). The generally accepted units for recording time is minutes.

The next step is to determine the total number of each procedures performed in a particular time period. This can be accomplished in many ways such as on a day-to-day basis or monthly from automated computer data (e.g., management system information or billing data). Whichever method is used, one must ensure that all studies performed are accounted, including those not charged since productivity is based on work performed, not only work billed. At our facility, we are in the process of implementing a comprehensive management system that will automatically generate a monthly total procedure count. Although this is much easier and generally a more accurate method, it may not always be economically feasible. A manual daily counting method for procedures can be easily prepared in 10–15 min and quickly totaled each month.

PRODUCTIVITY CALCULATIONS

The first step in calculating productivity is to accurately determine the total number of *available* working hours during a given time period. (For our purposes, per year.) The number of total available working hours should be reflected as a base of 2,080/hours/tech/year (i.e., 40 hrs/wk × 52 wk/yr) minus any time that was not actually worked, such as vacation time, sick leave, holiday leave, or other time off (Fig. 1). This net value should be multiplied by the number of full-time employees (FTEs) available to reflect the total available working hours during that time period.

The next step is to determine the actual total hours worked for that same time period. This can be done by multiplying allocated time/procedure by the total number of procedures performed during this time period (Table 1). This figure is subject to the accuracy of individual time/procedure and procedure counting methods. Figure 2 shows a sample from our worksheet of total exams and time/exam. In this format,

Available Working Hours in FY '88		Hours/Tech/Year
40 hr/wk x 52 wk	=	2,080
Vacation time (728 hr used)*	=	−104
Sick Leave FY '88 (530 hr used)*	=	−76
Holiday Leave (11 days/yr/tech)	=	−88
Compensatory Time (573 hr used)*	=	−82
		1,730
1730 x 7 FTE	=	12,110
Total Hours Available FY '88	=	12,110 hr/yr

* Actual time used (not earned) for FY '88 (from Payroll Figures)

FIGURE 1. Figures used to determine total available hours during FY'88.

TABLE 1. Worksheet Format for Totaling Number of Exams and Time for Each Exam*

CPT Exam Code	Exam name	Procedure time (min)	FY '88 Totals Exam	FY '88 Totals Time units
78007	Total thyroid	105	30	3150
78000	Thyroid uptake	30	132	3960
78003	Thyroid washout	180	2	360
78010	Thyroid scan	45	166	7470

* This worksheet can be easily expanded to include procedure charges for use in budget calculations.

these figures can be easily used in many different ways. For example, average time/exam can be easily generated and used as a reference. Information regarding revenue generation can also be easily obtained by including procedure charge data in this format.

One must also determine and account for other required employee time which is not reflected in procedure times. These might include staff meetings, in-service education, instrumentation quality control, stocking, cleaning and maintaining rooms, etc. The total time for other duties should be added to the total hours worked for an accurate reflection of total hours worked (Fig. 2). These components for calculating productivity are in very basic terms and a very general format. These can be much more in depth and specific based on individual activities. The College of American Pathologists (CAP) Workload Recording Method is an excellent example of a somewhat more detailed staffing and productivity analysis (*4*). The end result is a total number of hours worked divided by the total number of hours available times 100 to give a relatively accurate productivity measurements in percent (Fig. 3).

Maintaining completely separate records for the in vivo and radioimmunoassay sections of your laboratory is highly recommended. By separating these sections, it is much easier for the nuclear medicine administrator to justify the need for additional personnel or equipment in a particular section. It may appear by looking at a combined total that no relative change has occurred if one area experiences significant growth while another area experiences a significant decrease in workload during the same time period. By identifying and reporting on each area independently, administrators can more efficiently allocate resources and project future trends.

DISCUSSION

A consistent method of accounting for procedures performed must be implemented and used in order to accurately compare and contrast results with other nuclear medicine departments. There are many productivity and staffing methods available, but all are based on the total number of procedures performed and may provide an unfair comparison with other hospitals if similar accounting techniques are not used. The American Hospital Association's Hospital Administrative Services (HAS) has published standard values for paid hours/procedure. This calculation of paid hours/procedure can be a valuable figure for administrators, but only if consistent procedure accounting methods are used (*5*).

CONCLUSION

As hospital administrators become more concerned with efficiency and productivity, nuclear medicine managers must be prepared to provide supporting documentation for their department's workload. As we have indicated, there also is a tremendous need to standardize workload accounting methods so that fair comparisons can be made from one medical center to the next. Although initially it may require more work from an administrative standpoint, breaking down studies into individual procedures based on the CPT Code Book will provide a much better accounting method for individual procedures and allow more flexibility in adapting to individual procedure charges. By using the CPT Code Book it becomes much easier to justify a group of procedures for a particular study. Until procedure counting methods are standardized, it will be difficult to directly compare one nuclear medicine department workload with others. Making

A. Technologist, Imaging
Total Imaging Time in FY '88 = 9,719
Total from Yearly Worksheet
B. Other Duties

1. Staff meeting/in-service education = 1 hr/wk/tech or 7 hr/wk × 50 wk/yr*	=	350 hr/yr
2. Instrumentation/QC = 45 min/day/tech or 5.25 hr/wk × 50 wh/yr*	=	262 hr/yr
3. Stocking/maintain clean room = 1 hr/day/tech or 7 hr/wk × 50 wk/yr*	=	350 hr/yr
		962 hr/yr

A (9719) + B(976) = 10,695 Total Hours Worked in FY88.

*52 wk/yr – 2 wk (11 days) of Holidays

FIGURE 2. (A)Total time for all exams performed in FY'88 and (B)Total technologist time spent on ancillary duties in FY'88.

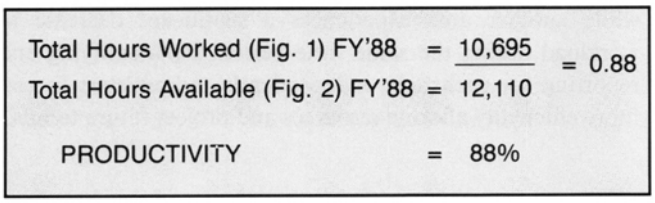

FIGURE 3. Productivity calculations expressed as a percent of total hours worked.

changes in a current workload recording method will usually cause a shift in final counts, which would make future results appear incongruous with previous results. Therefore if this is done, proper documentation should be provided to justify and explain this shift.

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