A METHODOLOGY FOR DEVELOPING HOSPITAL STANDARDS

by

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(ABSTRACT)

A methodology for developing hospital standards is comprised of components having characteristics of several hospital systems including the cost accounting system, the budget process, and staffing assessments. The methodology is developed for labor, supply, and equipment standards. The cost accounting system requires standards for variable labor, fixed labor, variable supplies, fixed direct other supplies, and fixed direct equipment for cost allocation purposes. Outside of the cost accounting system, variable labor and fixed labor standards are required for determining workload assessment for staffing studies and evaluation of hospital projects. Both perspectives of standards requirements are incorporated into this methodology for developing hospital standards.

A consistent approach for developing standards establishes a foundation for a Standards Maintenance System and the basis for analysis. Because standards are systematically developed according to this methodology, maintenance of standards is more efficient and routine. When standards are current and accurate, integrity of standards is maintained and system outputs derived from standards are meaningful and easily interpreted. This methodology also permits standards information to be instrumental in analysis of labor, relationships among standards, and potential process improvements. The use of standards in a Standards Maintenance System becomes a tool for analysis across departments within the hospital and for eventual comparative analyses across hospitals.

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Chapter 1

INTRODUCTION

Throughout its existence at Georgetown University Hospital, the department of Management Systems has developed and used standards to provide hospital administration with valuable staffing and financial performance information. The use of standards is a primary tool in most management decisions such as department staffing assessments, fiscal year budgeting, and selection of hospital projects. Standards are developed for two reasons and from two different perspectives. Standards are developed either to conform with the cost accounting system and/or to determine total workload requirements for a hospital department.

The cost accounting system views all hospital departments as cost centers and focuses on control and management of costs within the cost centers. Cost centers are either classified as direct or indirect cost centers. Departments producing billable services such as procedures and tests for patients are considered "direct" cost centers while others are "indirect" or support cost centers. Examples of direct and indirect cost centers are in Figure 1.

Direct Cost Center	Indirect Cost Center
Radiology-Diagnostic	Fabric Care Center (Linen)
Radiology-CAT Scan	Budget & Reimbursement
Clinical Lab-Coagulation	Environmental Services
Clinical Lab-Chemistry	Management Systems
Same Day Surgery-General	Payroll Office
Chemotherapy	Medical Records
E.K.G.	Social Work
Nursing Units	Mail & Messenger Service

Figure 1 Cost Centers

The units of service (procedures, tests) produced and controlled within a direct cost center are called "intermediate products" and are mapped to one or more charge codes in the patient billing system. The grouping of procedures, services, and items (charge codes) into definable intermediate products follows several methodologies. First, an intermediate product can be defined by a very high volume and/or cost of procedures/tests. Sometimes intermediate products which are supplies are assigned by cost intervals. Intermediate products which are supplies occur in cost centers such as Pharmacy and Materials Management Center. Intermediate products are also determined by procedures/tests with the same or similar standards and equipment use. And intermediate products can be determined solely by the nature of the test or procedure. It may be important to isolate unique procedures/tests for tracking and cost accounting purposes.

Once intermediate products are established, cost standards are developed for each intermediate product. Nine cost types, when applicable, are modelled for each cost center: Variable Labor, Variable Supplies, Variable Other, Fixed Direct Labor, Fixed Direct Equipment, Fixed Direct Facilities, Fixed Direct Other, Variable Indirect, and Fixed Indirect. Cost types and categories for an example department are illustrated in Figure 2.

Clinical Lab - Chemistry Cost Types and Categories

Cost Type	Category No.	Description
VL		Variable Labor
VS		Variable Supplies
	1	Reagent Rentals
	2	Variable Supplies-Other
FDL		Fixed Direct Labor
	1	Supervision
	3	Secretarial/Clerical
	5	Staff Constant Functions
FDE		Fixed Direct Equipment
	1	Historical Depreciation
	2	Blood Gas Analyzers
	4	Technicon RA1000
	6	Yellow Iris-Urinalysis
	7	Dupont ACA Discr Analyzer
	8	Hitachi Chem Analyzer
FDO		Fixed Direct Other

Figure 2 Cost Type Categories

Budgets are determined and entered into the cost accounting system for each cost type in a cost center. Standard costs for each intermediate product are then calculated based on budgeted volume and relative value units (RVUs), i.e. standards. Thus, accurate standards for intermediate products need to be developed so that financial interpretation of the cost accounting information is meaningful.

In addition to developing and maintaining standards for the cost accounting system, standards are also specifically developed to determine labor workload requirements for a departmental staffing study or project evaluation. When a staffing study is performed in a department to determine total workload requirements, the cost center may or may not have intermediate products. In any case, standards are developed for all labor activities including intermediate product standards. For example, in a direct cost center the intermediate product variable labor standards

account for all of the variable labor requirements in the cost center but not all of the total labor requirements. In the cost center Endoscopy Suite, the intermediate product variable labor standards account for the all of the variable labor tasks. However, the variable labor standards only account for a portion of the total labor requirements. Management Systems studies the department to determine other labor tasks which are related to the department requirements but not included in the intermediate product variable labor standards. These tasks usually take the form of constant or fixed labor requirements. For the Endoscopy Suite, there are daily constant task standards which support the intermediate product procedures. These tasks are displayed in Figure 3.

Endoscopy Suite Daily Constant Tasks - Nursing

I. Beginning of Day (7:00 am - 7:30 am)

1. Start up Unit and Morning Report

II. End of Day (4:00 pm - 6:00 pm)

1. Strip and Stock

a. Laser Room
b. Room I
c. Observation Area
d. ER Cart
e. Wash Room
f. ERCP Cart

2. Count Narcotics

3. Transport Specimens

III. During the Day

1. Call patients and brief on next day's schedule

2. Other phone calls

3. Clean scopes (50% of volume)

Figure 3 Constant Labor Tasks

Thus standards developed in this department relate to total labor

requirements: Variable labor associated with the intermediate products (procedures) and fixed labor from the Nursing fixed tasks.

Standards are the foundation for measuring systems such as Productivity Monitoring and cost accounting systems. If standards are not accurate and up to date, then the information that these measuring systems generate is not very meaningful. Thus, the accuracy of standards is critical when measuring the financial performance and labor requirements of a department. Changes in technology and protocol affect standards from year to year. Maintaining the validity of standards is an arduous task due to several fundamental shortcomings of the current standards maintenance system:

1. There is no uniform procedure for developing standards nor is there a defined list of task categories into which standards are divided.
2. There is no central database containing details of how and when standards were developed.
3. There is no easy or efficient means of passing study developed standards into the annual budget setup process due to inconsistencies between developing standards for the cost accounting system and for the departmental study.

These shortcomings have lead to several problems in maintaining and updating standards. First, the method of developing and storing standards in the Management Systems department leads to a limited means of updating standards quickly. Because there is no uniform or consistent approach to developing standards in terms of generic component definitions, standards cannot be updated by just reviewing components. Currently the engineer developing standards does so by individual style and approach. If standards components were developed in a more uniform fashion, the need to repeatedly study the entire standard would be eliminated. Instead, only

affected or changed components of the standard would need to be restudied. For example, in Endoscopy Suite, intermediate product "Upper G.I. 1st Half Hour" consists of setup time, procedure time, and clean up time. The Endoscopy Suite has just purchased a new piece of equipment which affects the setup time for this procedure. If the standard for this intermediate product is developed by components, only the setup time standard needs to be updated. Standards developed by components also create the possibility of developing nonnegotiable standards and hospital-wide standards for particular activities which are common to many departments.

Another shortcoming is that the current methodology for developing standards is limited to institutional memory. The developer of the standard may be the only individual who understands the methodology employed in developing the standard. When it is time to update the standards, the engineer who developed the standards may not be present to explain the approach for developing them. Again, because there is no consistent methodology for developing standards, the only evidence of how the standard was developed may be a final report without enough detail to explain the methodology.

Another shortcoming is that there is no centralized location for maintenance of standards such as review of standards, updating standards, and for performing any type of comparative analyses. Prompting for standards development is usually in the form of a departmental staffing study. After a study is completed, the methodology and results are recorded in a paper report. This system does not provide an effective medium for analyzing or comparing standards across cost centers and departments. A centrally located system with data manipulation capabilities provides the medium for standards analysis. A centralized

system also provides a means of forecasting labor requirements from changes in intermediate product volumes and/or standards. Occasionally, the Budget Department requests Management Systems to assess staffing needs based on changes in volumes or standards in a relatively quick turnaround time. However, because a manual filing system of reports does not allow for an easy and quick assessment, more resources than necessary are expended to perform this analysis. A centrally located standards environment will also stimulate new comparative analyses within the Management Systems department so that Management Systems can become more proactive with staffing evaluations.

In order to develop a centralized Standards Maintenance System for Georgetown University Hospital Management Systems department, there must first be a sound foundation of standards development. This foundation must consist of a uniform and consistent approach to developing standards. Below are the objectives which were achieved in order to develop this foundation:

1. Designed a uniform procedure for developing labor standards with standard component categories.
2. Designed a methodology which is applied to labor, supplies, and equipment standards.
3. Designed a methodology which promotes analysis across departments of standards components.
4. Designed a methodology in which the outputs support the cost accounting system in the form of standards per cost type, cost center, charge codes, job class, and fixed direct labor definitions.
5. Developed a methodology which is maintainable and will allow for ease into a database system.

There are several ingredients which make this methodology successful for implementation. First, this methodology for developing standards promotes

consistency across all hospital departments. Consistency enables a more accurate and meaningful interpretation of hospital systems which depend on standards. Secondly, this methodology develops an integrity among standards. Incorporated in the integrity of standards is how standards are developed and how they are maintained. And lastly, standards are developed to accommodate the output formats of the cost accounting system, the budget process, and the Standards Maintenance System. Thus, the calculation of standards is performed once and applied to each of these systems without individual customization.

Chapter 2

LITERATURE REVIEW

The idea of developing standards, especially labor standards, is not a new concept in the health care industry. However, developing hospital standards according to a standard industry approach is a new idea. The manufacturing industry has been able to adopt a uniform approach to standards development via industrial engineering techniques and use of standard data. There are two reasons to explain why the manufacturing industry has been able to develop and use a uniform approach to developing standards while the health care industry has not been as able to easily make the transition. First, the center of most hospital processes is the human being, not a manufactured part. Surgical procedure and patient-centered process labor standards cannot be as easily calculated as the manufacturing procedures used to develop standard data. Standard data for manufacturing a part is systematically calculated based on the knowledge of given inputs such as type of material, type of equipment, speed, feed, etc. The human element presents the variable input condition for calculating hospital standard data. For example, a patient's condition can affect the set-up and procedures times for an Electrocardiogram (EKG) test. One patient will be cognizant and fully cooperative during the procedure while a confused and uncooperative patient will influence the procedure length. Thus, the health care industry has not entirely adopted

standard data as a normal operating procedure for establishing hospital standards. Secondly, the presence and role of Industrial engineering in health care is not as common as it is in Manufacturing. Health care organizations have Industrial Engineering or Management Engineering department sizes ranging from 0 to 10 engineers. For hospitals which do not have a Management Engineering department, the Budget department may assume the responsibility for developing and maintaining standards. Therefore, there is a significant population of hospitals which are unfamiliar with Industrial engineering concepts. This fact creates an environment which makes it difficult to have a standard industry approach when health care as a whole is not knowledgeable of Industrial engineering applications.

"There has been much debate about appropriate standards, and most [health care] organizations have not formally implemented any, but the mentality has been that a standard is appropriate and, once reached, needs no improvement" (Marszalek-Gaucher and Coffey, 1991, p. 121). When a standard approach to developing labor standards does not exist, there is no standard or efficient method for updating and improving standards. If standards are developed with specific category definitions, improving standards occurs by analyzing the components of workload. When developing standards is not a formal program, Marszalek-Gaucher and Coffey offer a list of selected sources of comparative hospital standards that are available to develop labor standards. Marszalek-Gaucher and Coffey state that these standards "are often appropriate for identifying potential opportunities for improvement, but they are occasionally used inappropriately, as in setting goals without any method for achieving them" (Marszalek-Gaucher and Coffey, 1991, p. 211). The comparative

standards offered are listed below.

1. MONITREND reports medians of many criteria for hospitals of different sizes, case-mix intensities, and teaching affiliation.

2. Resource Monitoring System (RMS) gives measured standards for activities of several hospital departments.

3. Methods Time Measurement (MTM) can be used to develop predetermined elemental times that can be summed to develop activity standards.

4. The Joint Commission on Accreditation of Healthcare Organizations gives standards related to practice and processes in hospitals, nursing homes, and other organizations.

5. Proprietary standards are available through most consulting companies working in the healthcare industry.

These standards are used inappropriately when they are used without verifying how the methodology for developing standards correlates with your hospital's methodology. Many institutions perform the exact same tests and procedures but execute them in different ways. Therefore, in order to use the comparative standard data appropriately for a certain procedure or test, it must be verified that the comparative standard was developed in a manner that is consistent with the way the hospital performs the procedure or test.

Two sources of comparative hospital standards which are used in hospitals are the Resource Monitoring System (RMS) and the College of American Pathology (CAP) Workload Recording Method for laboratory. RMS provides engineered standards for common activities in certain hospital departments. The RMS system offers a methodology for calculating workload requirements for a department by providing a worksheet which applies the RMS procedure standards to the hospital's procedure volume. The

worksheets and key variable labor standards for each labor center have been developed using industrial engineering work measurement techniques. The CAP laboratory standards provide a coding system for identifying most laboratory procedures, indicate what items should be counted, and give the unit value for each. The unit value is the number of minutes of technical, clerical, and aide time required to perform all activities in order to complete the defined procedure once. From the unit value data, workload requirements for each laboratory section can be calculated in the same manner as the RMS. "The [CAP] program provides interlaboratory comparative data by standard section for laboratories that subscribe to the service. Such comparisons cannot be made for laboratory sections that differ greatly in test mix from other laboratory sections whose mix closely fits the standard section definition" (1990 CAP Laboratory Workload Recording Method, p. 1). Caution is advised for using comparative standards because these standards are developed on a department level. The intermediate product groupings in laboratory departments and other hospital departments may differ from hospital to hospital. Because the intermediate product structure is the basis for all measurement, standards need to be developed on the intermediate product level. Test mix may cause the intermediate product structure to vary from institution to institution. When there is a uniform approach to developing standards, comparisons can be made across hospitals regardless of procedure/test mix differences. A limitation to using the RMS and CAP standards is how to update and maintain these standards when a part(s) of the process changes. There needs to be an efficient way to update standards without performing laborious research to determine how these standards were developed. RMS and CAP standards should be used as a reference base for learning about the department, i.e. typical procedures

and activities which occur in that department.

Because comparative standards have limitations in their use in hospital and cost accounting systems and for subsequent comparison across institutions, labor standards need to be developed in a consistent approach which would allow for each hospital's procedural differences but still accommodate comparison relevance. Labor workload or cost per unit values derived from standards could be compared across institutions by a category type such as travel time, procedure time, supervisory time, and clerical time. From Creating the Future of Health Care Education, (Ulschak, 1988) discusses the classic approach to developing a productivity system which entails the following steps.

1. Review past performance by identifying the key functions in a department.
2. Collect data. A formal approach to collecting data is management engineering which uses time and motion study.
3. Set standards. Standards are estimates of the time work should take. There are two options for determining standards. One is to collect data for a significant period of time; another is to collect data for a short period of time and project an estimate.
4. Measure actual achievement. Once standards are in place, one can measure performance.

A methodology for "setting" standards is not offered when Ulschak states that the current problem with productivity systems is that "there are no set standards for health care education, which means that there is no way to measure back and forth between health care institutions" (Ulschak, 1988, p. 95).

The ability to compare standards among hospital departments and across

hospitals will stimulate analysis for updating and improving standards. Without a continuing effort to update standards, a productivity report will gradually lose its impact. "The quickest way to lose a manager's confidence is to allow bad data to go into a productivity report" (Cowan, 1984, p. 81). Standards must be carefully monitored to ensure accuracy and relevancy. But for "carefully" monitoring standards there is a tradeoff of accuracy versus the time expended to maintain the standards when standards are developed to be maintained.

In order to make updating standards more simple, labor standards need to be divided into parts. On developing standards, (Suhm, 1974, p. 4) states to "observe each of the activities performed, including travel times, etc. At times it may be necessary to break the activity into parts since the whole activity may not be done at one time or at least we may not be able to observe it that way." For developing standards in parts, there must be a systematic methodology for breaking a process into parts. The more systematic, the more logical the process for updating and interpreting standards. An industrial engineering technique used for developing standards which divides work into distinct activities is work sampling. This technique is commonly used to determine workload requirements and labor standards for Nursing. (Tolbert, 1984) discusses how the work sampling technique is used to determine Nursing workload requirements. In 1979 Southwest Community Health Services conducted a staffing study in their multi-hospital system. This task was accomplished by the data collector recording, at set intervals of time, what activities were occurring on the nursing unit. About 200 nursing activities were analyzed to determine staffing requirements by determining the frequency of a certain activity. If activity A occurs 10% of the time for a certain

patient acuity level, then this 10% can be converted into required time for that activity. This approach is used for developing standards for acuity levels by summing the respective activity definition workload. The work sampling technique is usually limited to Nursing because it is difficult to directly measure workload by a time study. The work sampling approach of measuring workload by category type can also be applied to the non-nursing departments. Another output which is derived from the work sampling technique is the general analysis of the types of work activities performed by hospital personnel. From (Torgersen, 1959, p. 199) a conclusion drawn from a work sampling analysis performed on a Private Nursing unit and a Clinical Nursing unit was that "the registered nurse, either by choice or necessity, performs too much unprofessional work or work that could and should be performed by auxiliary personnel". It was also discovered that the registered nurse expends a large amount of time performing patient records keeping and verbal briefings on patients' conditions. At this point, the analyst can determine why the registered nurse performs these activities and if there are alternate ways of distributing workload. A methodology for developing standards by activity categories will permit similar analyses of workload distribution.

As mentioned above, work sampling is a methodology for developing standards by breaking workload into activity categories. (Shafer, 1986, p. 82) states "that cost accounting requires a consistent, methodical approach to standard-setting that produces thorough documentation as well as reasonable standards that are accepted by department personnel, finance, and administration. The particular standard desired may vary from hospital to hospital. Accordingly, the engineer's role in standard development will vary. The engineer should help the hospital select the

type of standard most appropriate to its needs and resources." Management engineers with experience in productivity monitoring know that standards need revisions from time to time as policies, procedures, organization, technology and/or layout change. Engineers can provide valuable assistance in designing routine procedures to ensure that such changes trigger appropriate re-evaluation of standards, especially labor and supply standards.

An industrial engineering technique which incorporates a consistent approach to standard-setting is the flow process chart. The flow process chart divides the tasks that make up an activity or operational process into category types: operation, paperwork, transportation, storage, delay, and inspection. "The flow process chart is especially valuable in recording hidden costs, such as distances traveled, delays, and temporary storages. Once these nonproductive periods are highlighted, the analyst can take steps for improvement" (Niebel, 1982, p. 28). Hospital processes are different from manufacturing processes, so in order to transfer this methodology to health care processes, more appropriate category types must be selected. Once health care category types are selected, attention may be focused on nonproductive activities.

Once a system is established for developing standards, consideration must be given to the structure of hospital departments. (Rueckert, 1986) discusses how standards should be developed in relation to three fundamental hospital departmental groupings: Revenue, Non-revenue, and Nursing. For revenue generating departments the starting point for establishing standards is at the intermediate product level. It is at this level where required work for the department is defined. Non-revenue

generating departments do not have intermediate products, so the nature of the work activities is not enumerated as in a revenue department. Thus, a uniform method for measuring hospital standards must consider non-revenue departments in addition to revenue generating departments. Nursing has traditionally been classified separately from the other departments in a hospital. Nursing standards have been developed by acuity level and according to the work sampling methodology which is seldom used in other hospital departments. Rueckert sites that it is important to provide coordination between all department methodologies if accuracy and credibility are to be realized. Thus an overall hospital approach must be established to developing standards for Nursing and all other hospital departments.

When there is no standard approach for developing and maintaining hospital standards, the focus for developing standards is on the product or the calculated standard instead of the process which derived the calculated standard. The methodology used to calculate standards is developed on the process level so that an exact procedure for calculating the standard is established. Implementing a standard methodology for developing hospital standards provides several benefits. First, the task of updating and maintaining standards becomes more efficient because every aspect of how the standard is calculated and what components the standard consists of is understood. Instead of evaluating the entire standard for maintenance purposes, only pertinent parts of the standard need to be reviewed. Secondly, in addition to using standards for determining labor requirements or cost per unit information, standards or parts thereof become an analysis tool for improving standards and processes which generate standards. And lastly, a standard procedure for developing

standards allows for procedural differences in health care processes among hospital departments and across health care institutions for comparison and measurement purposes. The literature that is available regarding the development of hospital standards addresses labor standards. From this literature search methodologies for developing supply and equipment standards do not exist. A solution methodology for determining a standard approach for developing hospital standards must consider a combination of the fundamental department differences and the differences among the types of standards desired such as labor standards, supply standards, and equipment standards.

Chapter 3

SOLUTION METHODOLOGY

The lack of uniformity in developing hospital standards has lead to several disadvantages in maintaining standards. Because standards are currently developed in a manner consisting of different methodologies employed by management engineers, standards maintenance cannot be performed in a consistent and efficient manner. The establishment of a uniform approach to standards development must incorporate the characteristics of several hospital systems: Staffing/Workload assessments, the cost accounting system, and the budget preparation process. Another aspect which must be incorporated into the methodology for developing standards are database characteristics for the eventual Standards Maintenance System. The methodology for developing standards is the foundation for the Standards Maintenance System. Once standards are developed with a consistent approach, the use of standards in a central location allows for analyses such as comparisons of labor requirements, "what if" scenarios, and process improvements.

To develop a methodology for developing hospital standards, the cost accounting system, Management Systems procedures, and the potential database components are incorporated into the methodology developed here. The nature of developing standards must be determined within the hospital

structure. Specifically, the type of standard and its relationship within the department is determined by the structure of the cost accounting system. The most basic division among hospital departments is the presence of intermediate products. A department with intermediate products is classified as a direct department while an indirect department does not contain billable services or intermediate products. Direct departments have different requirements from the cost accounting system than the indirect departments. Intermediate products exist in the form of tests, procedures, or supplies. Direct departments have cost accounting standards associated with them consisting of labor, supply, and equipment standards. The purpose of the standards in the cost accounting system is for allocation of the budget to each cost type (labor, supply, and equipment) among the intermediate products. Because Indirect departments do not have intermediate products, there is no mechanism for budget allocation and thus no need for cost accounting standards. However, Management Systems must assess labor workload requirements in these departments for Staffing studies. For example, departments such as Medical Records and Materials Management do not offer billable services but do have measurable labor associated with them. Both of these departments have labor frequencies associated with the department which is the basis of variable labor measurements. Medical Records activities such as Coding and Initial Analysis are directly proportional to the amount of patient records which must be processed. As the number of patients fluctuates, so do Medical Records activity requirements. Nursing Unit supply needs are inventoried daily (7 days per week) by the personnel in Materials Management. By measuring the time required to inventory and stock each Nursing Unit a portion of the workload requirements for the Materials Management department can be determined. Thus, even though Indirect departments do not contain countable services billed by the

hospital to the patient, labor standards can be determined and are incorporated into the standards development methodology.

Another aspect which affects standards development is the nature of fixed labor standards. There are two elements for determining fixed labor standards. These requirements stem from two perspectives: the cost accounting standards associated with the intermediate products, and fixed labor requirements associated with each job class in a department. The cost accounting system needs fixed labor standards for allocating costs to the intermediate products. When calculating the budgeted Full Time Equivalents (FTEs) for each department, the fixed labor requirements for each job class must be determined. Variable labor time standards already serve the dual role of the standard for the intermediate products and variable labor requirements for specific job classes.

The purpose of standards in the cost accounting system is for allocation of labor, supply, and equipment costs to the intermediate products. These standards are required for Direct departments. The purpose of standards in Staffing studies and project evaluations is for determining labor requirements. These labor standards are required for Direct as well as Indirect departments. Therefore, regardless of department status, there must be a methodology for developing labor standards as well as a methodology for developing supply and equipment standards.

Standards are also developed using a methodology which parallels the goals of Management Systems procedures and the Standards Maintenance System. Managements Systems is currently developing a standard protocol for performing a Staffing study in a hospital department. By developing a standard protocol, Management Systems and the hospital departments have a

consistent understanding of how workload is measured and thus, how standards are developed. In addition to promoting a mutual understanding, Management Systems's methodology for developing standards becomes more accepted since the approach is consistent across all hospital departments. Once differences among the departments are identified, a structure for studying a department is constructed which incorporates the characteristics for developing labor, supply, and equipment standards. This structure applies to initial department studies and subsequent standards updates. The structure for studying a department is referred to as the Standards Update Project Outline which is listed in Figure 4. Within this framework, especially in Step #2 Data Collection, the methodology for developing standards is applied. During the Data Collection phase, data is collected relative to the standard methodology for developing hospital standards. Because the procedure for developing standards has already been established, calculating standards during the study is a simple matter because the methodology is outlined before calculation of standards is initiated. Thus, no new methodologies are developed during the course of the study.

The ultimate goal regarding standards for the Management Systems department is the development of a Standards Maintenance System which will encompass hospital standards as well as information related to the standards development such as job class, machine, charge code, frequency, intermediate product, source of standard, and date standard was developed. The methodology for developing standards must be consistent with the goals of the Standard Maintenance System. Specifically, standards are developed in a format which will accommodate the database setup. According to the Standards Update Project Outline and the Standards Maintenance System, standards are developed relative to the task level or charge code first.

Standards Update Project Outline

1. Detailed Workload Review

   a. Labor tasks
   - Identify labor tasks through interview(s).
   - Structure labor tasks to form the Detailed Workload List.
     - structure fixed tasks
     - structure variable tasks
   - Obtain approval of Detailed Workload List from Dept.

   b. Supply standards
   - Identify supplies used by department which vary with volume.
   - Identify supplies used by department which are fixed.

   c. Equipment standards
   - Identify the equipment on the Equipment Depreciation schedule.

2. Data Collection

   a. Collect volumes of tasks by time of day and by day of week.
   b. Labor time by task.
   c. Determine relationships between supplies and the tasks.
   d. Determine relationships between equipment use and tasks.

3. Analysis

   a. Development of time standards (fixed and variable).
   b. Structure of Intermediate Products.
   c. Determination of utilization factor.
   d. Staffing analysis (dist. of workload/scheduling).
   e. Development of supply standards (fixed and variable).
   f. Development of equipment standards.

4. Recommendations

   a. Intermediate Product structure
   b. Fixed and Variable time standards
   c. Utilization factor
   d. Fixed and Variable supply standards
   e. Equipment standards
   f. Other (process improvements, scheduling, etc)

Figure 4 Project Outline

Then, once charge codes are combined into an Intermediate Product structure, the standards are rolled up to correspond to the intermediate product.

Once the cost accounting structure, Management Systems's procedures, and the Standards Maintenance System are analyzed relative to standards requirements, a complete methodology for developing standards is determined. The methodology developed here for determining standards falls into three divisions: Labor Standards, Supply Standards, and Equipment Standards.

Labor Standards

Labor requirements are divided into variable and fixed tasks. Variable activities are directly associated with the main processes and functions of the department. These activities vary directly and proportionally to volume. Fixed labor requirements do not vary with volume. Fixed labor requirements are usually activities associated with the department level. The word "fixed" does not imply that the requirements do not change, but rather the fixed requirements do not change as a result of volume. Over time with overall shifts in volume, though, fixed requirements will change also.

Variable Labor/Fixed Labor

Currently, labor standards have generally been developed as a lump figure without differentiating between the different labor activities of which the standard is composed. When developing standards, especially variable, the type of activities associated with the test/procedure must be distinguished and may even involve different job classes. For example, the labor standard for a Craniotomy/Pituitary procedure in the Inpatient

Operating Room incorporates set up and procedure time for the RN and clean up time for the Suite Attendant. When standards are developed into one lump figure, it is difficult to update the standard without having to restudy the entire standard. Because Direct and Indirect departments require workload assessment and standards development, all labor activities which occur in these departments must be considered when developing a methodology for developing labor standards. The methodology for developing labor standards incorporates the classification of labor activities into categories of standard terminology across all hospital departments. These labor categories are developed into the "Library of Terminology."

LIBRARY OF TERMINOLOGY (Variable and Fixed Labor)

CLEAN
any type of cleaning activity which includes general housekeeping, emptying trash, equipment cleaning, and cleaning a room after a surgical procedure.

CLERICAL
any type of clerical/secretarial activity which includes typing, Word processing, filing, entering billing information, data entry, crediting medications, film library duties, and posting/scheduling activities.

CLINICAL
an activity directly interacting with a patient which involves patient care in Nursing, a procedure, a treatment, or test. A clinical activity is in direct relation with a charge code. Clinical activities include OR surgical procedure, EKG, Radiology exam, physical therapy treatment, respiratory therapy treatment, dialysis, endoscopy procedure, anesthesia administration, cardiology test, and direct patient care administered by Nursing.

COMMUNICATION
an activity which involves oral and written communication about a procedure performed or a patient's status. Communication activities include oral communication (telephone and in person), review with a physician, charting, writing a report, and completing a log.

INVENTORY
any activity relating to the maintenance of inventory supplies. Inventory activities include taking inventory (counting), stocking supplies, ordering supplies, routine picking of supplies from central department (Materials Management, Linen department).

MAINTENANCE/REPAIR
any maintenance activity, preventive and unplanned. Maintenance/Repair activities include general engineering maintenance and repair, and preventive maintenance on equipment.

QC/INSPECTION
an activity of machine calibration or checking equipment and supplies for certain measurements. These activities include laboratory QC, calibration of equipment, checking oxygen tanks for Respiratory Therapy, checking for expiration dates on pharmacy drugs and the crash cart supplies, and narcotics counts on the Nursing unit.

SETUP/PREP
the activity of setting up equipment, supplies, and a room before the procedure, treatment, or test is started. Setup/Prep activities include preparations before running a lab test, picking supplies for a surgical case, setting up a room, and preparing equipment for a procedure (lithotripter tank).

TECHNICAL
a patient indirect activity or process which supports patient activity but does not incur as a direct charge to the patient. Technical activities consist of department activities including a lab test, processing food in Dietary, processing film in Radiology, scanning EKG tapes, operating machinery, and filling a drug order in Pharmacy.

TRANSPORT
an activity of traveling with patients, and supplies. The purpose of the travel activity is for delivering or transporting patients and goods. Transport activities include mail delivery, linen distribution, supply distribution, dietary tray delivery, pharmacy exchange cart transport, patient transportation, stat med delivery, lab specimen delivery, delivering results or medical records to the Nursing unit, and delivering inventory to locations.

TRAVEL
traveling which must be performed from the central department to a patient location in order to perform a patient activity. Travel activities include traveling to perform an EKG, a respiratory therapy treatment, to withdraw blood, portable Radiology procedure, and any type of rounding activity.

MACHINE TIME (SUBCATEGORY)
machine time is where the operator is idle while a machine is running as part of the test or procedure. Machine time is a subcategory of Clinical or Technical since machine time may occur during one of these tests or procedures. Machine time examples include time when the EKG machine is running, and time when laboratory equipment is running.

Examples of how these labor categories are implemented for given variable labor (charge code) and fixed labor activities are given below.

A. (Variable labor) Procedure: EKG

Tasks
1. Travel to patient location - TRAVEL
2. Prepare EKG machine (enter patient info) - SETUP/PREP
3. Attach leads from machine to patient - CLINICAL
4. Run the EKG machine - CLINICAL/MACHINE TIME
5. Disconnect leads from patient - CLINICAL
6. Transmit results - COMMUNICATION
7. Travel to next location - TRAVEL

B. (Variable labor) Procedure: Fetal Echocardiogram

Tasks
1. Setup machine - SETUP/PREP
2. Fetal ECHO procedure - CLINICAL
3. Clean up - CLEAN
4. Billing - CLERICAL
5. Review with physician - COMMUNICATION

C. (Fixed labor) Activities for Suite Attendant in Operating Room

Tasks
1. Damp dust and line containers - CLEAN
2. Fill buckets - SETUP/PREP
3. Stock work room with wrappers - INVENTORY
4. Stock locker room with scrubs - INVENTORY
5. Inventory - INVENTORY
6. Material inspections - QC/INSPECTION
7. Stock sterile core - INVENTORY
8. General cleaning - CLEAN
9. Emptying trash - CLEAN

Once labor is classified into separate activities, time standards are attached to the activity. For variable labor the time standards for each activity are summed and then applied to a volume to calculate variable labor requirements for each activity. For fixed direct labor the time standards are summed to calculate the fixed labor requirements for the specific job class. By developing standards according to these categories two benefits are realized. First, standards maintenance is improved by allowing a more efficient update process by evaluating components of the

standard. Secondly, the analysis function is improved by allowing for comparison of the labor expended across labor categories for a department or across departments.

Regarding the two perspectives of determining fixed labor standards, part of the cost accounting system requirements for fixed labor standards per job class have been addressed above. As part of the budget process the amount of fixed labor required for each job class must be determined. Above, the fixed labor tasks for some job classes are calculated by using the labor categories. Some job classes are 100% fixed so there is no need to use the labor categories. An aspect to the cost accounting system is the assignment of Fixed Direct labor description to the portion of labor which is fixed for every job class. Currently, there is no consistency from department to department in the classification of the Fixed Direct Labor descriptions. For example, in one department a secretarial position may be classified as "FDL 2 Secretarial/Clerical" while the same job class in another department is classified as "FDL 3 Clerical." The assignments and descriptions are too arbitrary to perform any type of meaningful analysis. As part of the methodology for developing labor standards, the definitions of the Fixed Direct Labor descriptions must be standardized across the institution. Upon analysis among all hospital departments, standard categories of Fixed Direct Labor (FDL) descriptions are developed and listed below.

FIXED DIRECT LABOR TYPE DEFINITIONS

FDL 1 - Administrative

This category has no subdivisions and is always a 100% fixed position. The type of position with this classification is a purely administrative position. Such positions include Department heads like Director of Medical Records, Administrator of Operating Rooms, Administrator of Clinical Laboratory, and other administrative positions like Assistant Department heads, Nursing Coordinators, etc.

FDL 2 - Supervisor/Manager

This primarily fixed position incorporates a variable labor capability. This working Supervisor is capable of performing benchwork, technologist type activities, or Nursing activities. Examples of such positions include Lab Managers, Nurse Specialist, Nurse Manager, Medical Records Supervisor, and Assistant Nursing Coordinator.

Of the fixed portion of this position, fixed requirements are divided into subcategories for the future Standards Maintenance System (Management Systems purposes):

- Personnel (interviews, annual review)
- Financial Management (timesheets, payroll, budgeting, purchasing)
- Administrative (staff scheduling, delegate tasks, policies, interaction with other departments)
- Education (seminars, conferences)

FDL 3 - Secretarial/Clerical

This is a fixed position which is dedicated to secretarial/clerical work. Examples include unit secretary, secretary, receptionist, posting and scheduling clerk, records clerk, and transcription clerk.

Of the fixed portion of this position, fixed requirements are divided into subcategories for the future Standards Maintenance System (Management Systems purposes):

- Communication (telephone, receptionist)
- Clerical (typing, billing, filing, computer work)

FDL 4 - Fixed Functions

This position is primarily variable but has required fixed activities which accompany the position. The labor categories discussed in the Library of Terminology are the subcategories of this Fixed Labor type.

FDL 5 - Fixed Direct

This position is a fixed position in a Direct department which does not fall under any of the other categories. These are technical positions which are not directly involved in the variable labor activities. Examples include GI Assistant in the Endoscopy Suite, Nurse Educator, Pharmacist, Senior Exercise Physiologist, etc.

FDL 6 - Fixed Indirect

This position is a fixed position in an Indirect department. Examples of these positions include Budget, Accounting, Management Systems, Payroll, Hospital Information Systems, Purchasing, Pastoral Care, Social Work, and Human Resources.

FDL 7 - Administrative Authorized

This position is authorized by Administration but shows no justification for an increase as deemed by Management Systems. An example consists of a department requesting a position when there is no change in volume or new process which creates new workload. If Administration approves the position against Management Systems's recommendation, then the fixed position is classified under this category. For example, if a position is transferred from one department to another by Administration against the recommendation of Management Systems, then the position is classified under FDL 7.

In order to develop variable labor and fixed labor standards, the information developed in the previous two sections must be transferred into standards which correspond with the cost accounting system. Because variable labor standards are developed relative to the intermediate products, the variable labor standards in the cost accounting system are directly transferred from what was developed during workload assessment. Fixed Direct labor standards must be developed by the job class perspective and also by the intermediate product perspective. In the previous section, fixed labor standards were developed by the job class. This information is used to determine fixed workload requirements in the department and for determining the budgeted FTEs per job class. Fixed labor standards must also be developed for each intermediate product for cost allocation purposes. Most fixed positions and portions thereof for the job classes are positions which operate on the department level. For example, Supervisors are responsible for the operation of the department, and thus responsible for all activities within the department or all the intermediate products. Also, the fixed room morning setup time for an RN is to support the operation of the department. Therefore, the most logical allocation to the intermediate products is by intermediate product volume. The standard for each intermediate product in the cost accounting system to distribute according to volume is equal to 1. Because the Fixed Direct labor descriptions are standardized, it is a straight forward

process of allocating the Fixed labor expenses to the appropriate intermediate products. As an exception, if there is an allocation of a fixed labor job class to a specific intermediate product, the system allows for this with the standard Fixed Direct labor descriptions.

The development of variable labor standards is by intermediate product, and the standards are easily transferred to the cost accounting system as time standard Relative Value Unit (RVUs). The development of fixed labor standards is primarily by job class in order to determine the fixed labor requirements for a department. As part of the methodology, fixed labor standards for the intermediate products in the cost accounting system are RVUs of 1 for each intermediate product. Thus, the fixed labor expenses are allocated by intermediate product volume. The development of standards for fixed labor according to the two methodologies serves both purposes of the cost accounting system in terms of allocation and the budget process.

Supply Standards

Like labor, supplies occur on a variable and fixed status. Variable supplies are consumed during tests and procedures and thus vary directly with volume. Fixed Direct Other are supplies which are used to support the operation of the department and do not vary directly with volume. Fixed Direct Other supplies, however, will vary over time with overall shifts in volume. Supply standards are developed specifically for the cost accounting system, so supply standards which are relevant for allocating these costs are developed for the intermediate products in the Direct departments.

Variable Supply Standards

There are two types of variable supplies: Patient chargeable supplies and Patient nonchargeable supplies. Patient chargeable items are supplies which are used during a test/procedure and are directly billed to the patient. Patient chargeable items are easily tracked and thus enable direct billing to the patient. Examples of such chargeable items include Intraocular Lens, Orthopedic prosthesis, IV solution bags, special surgical tray, catheters, etc. Patient chargeable supplies are usually costly items and therefore, desirable to bill individually from the main procedure or test. Because Patient chargeable supplies are billed separately from the test/procedure, these costs are not included in the cost allocation to the main test/procedure. Patient nonchargeable supplies are supplies consumed during the test/procedure which are not individually tracked or billed separately from the procedure. These items are usually of low cost and difficult to track. Examples of Patient nonchargeable items include surgical gloves, sutures, cotton gauze, and other low cost medical/surgical supplies. The use of these supplies is allocated back to the main test/procedure. Thus, relevant variable supply standards for Patient nonchargeable supplies must be developed for allocating the variable supply costs to the test/procedure. The methodology for developing variable supply standards represents how supplies are consumed among the intermediate products but not too complex for maintenance purposes.

The are two basic approaches for developing variable supply standards: a bottom-up approach or developing a Relative Value Unit (RVU) relationship. The bottom-up approach consists of specifically counting and measuring the amount of supplies which are used for a test/procedure. For example, to perform a Chem 7 lab test, the following items are used: 1 test tube, 3

drops of Reagent A, 2 drops of Reagent B, etc. This methodology is very exact but very time consuming and complex for maintaining year to year. The effort of input required for the bottom-up approach is much greater than another approach with relatively the same output. The preferred methodology developed here in terms of calculating standards and maintaining them is by determining an RVU relationship among the intermediate products. The RVU relationship must be meaningful and measurable from existing supply information. Because the hospital processes (test/procedure) have very different types of supplies and varying degrees of supply usage, there is no one RVU relationship to implement. The recommended methodology is to use an RVU relationship and develop it according to how supplies are consumed in the department among the intermediate products. For example, RVUs in Radiology are based on square footage of film used per test, RVUs in Operating Room based on preference card information, RVUs calculated based on a Resource Index developed by the technical manager, or RVUs calculated on an 80/20 relationship among the supplies used in that department. Regardless of what the RVU is based on, an RVU relationship is logically developed on consumption patterns and accurately distributes variable supply costs across the intermediate products in an easily maintainable fashion. It is important that the variable supply standards are accurate in terms of relativity between intermediate products but not necessary accurate in terms of specific values.

Fixed Direct Other Supply Standards

These supplies are nonvolume sensitive and consist of overhead type costs incurred by the department for operational expenses. Examples of Fixed Direct Other costs include telephone costs, lab coats, conference costs,

moving expenses, journal subscriptions and educational material, hardware/software, and food expenses. Fixed Direct Other costs can change with significant shifts in volume, but in general, these costs are incurred on the department level. Therefore, the most logical allocation to the intermediate products is by volume. The RVU for each intermediate product in the cost accounting system to distribute according to volume is equal to 1. In the case where a specific Fixed Direct Other expense is allocated to a specific intermediate product or a group of intermediate products, this factor is incorporated into the RVU relationships when the expense is significant. For example, Equipment Service contracts are included in fixed supply costs. When a contract exists for a piece of equipment which is used in only one intermediate product, the RVU of 1 for this intermediate product is adjusted upward (say 1.15) to account for the specific allocation. With this adjustment, the cost of this contract is not allocated to all the intermediate products, just the affected intermediate product. The adjustment of the RVU relationship will require some analysis of the amount of the service contract with respect to the remaining Fixed Direct Other expenses. But, in general, Fixed Direct Other supply expenses are allocated across the intermediate products by volume (RVU=1 for all intermediate products). As mentioned for variable supply standards, fixed direct other standards are accurate in terms of relativity between the intermediate products but not necessarily in terms of specific values.

Fixed Direct Equipment Standards

The Fixed Direct Equipment expenses in the cost accounting system are based on current depreciation costs (replacement value) of the capital equipment owned by the department. The accounting department keeps Depreciation Schedules of capital equipment for every department. In

order to develop Fixed Direct Equipment standards, the Depreciation schedule information must be used to develop RVUs among the intermediate products. The methodology for developing Fixed Direct Equipment consists of two steps. First, using the Depreciation Schedule assign the equipment to the intermediate products which may include assignment of one piece of equipment to multiple intermediate products. Secondly, a methodology to distribute depreciation costs from the equipment to the intermediate products is developed based on how the intermediate products use the equipment. This methodology is based on machine time for each intermediate product which determines a relativity between the intermediate products. Once costs are allocated from each piece of equipment to the intermediate products, the costs are summed for each intermediate product. RVUs are then calculated based on the sum of costs for the intermediate product to the total depreciation costs for the department. The RVU is combined with volume to determine accurate allocation by actual machine use by the intermediate products. Once the labor standards methodology is implemented, the machine time is easily obtainable from the standard terminology under which the variable labor standards are developed. Thus, Fixed Direct Equipment standards are calculated according to specific equipment allocation of depreciation costs to intermediate products and then by actual machine usage among the intermediate products for each piece of capital equipment to distribute those expenses.

The complete methodology for developing labor, supply, and equipment standards incorporates the requirements from the cost accounting system, staffing studies, Management Systems procedures, and the Standards Maintenance System. The methodology developed here is flexible to allow for routine maintenance and developed in an easily interpreted manner.

Chapter 4

RESULTS

To implement this methodology for standards development, standards are developed for a hospital department. The test example is a direct department within the Operating Room division called Endourology. The surgeries performed in this department fall into two basic categories: invasive and noninvasive surgical procedures involving the urinary system. The invasive surgical procedures are referred to as Transurethral Endourology procedures. These procedures are performed through the urethra with concentration on the urethra, bladder, and the kidney. The noninvasive surgical procedures are referred to as lithotripsy procedures. Lithotripsy is the process of breaking up bladder stones via external sound waves or breaking up kidney stones via underwater shock waves. In this Endourology department, the latter form of lithotripsy is performed. As mentioned above, this department is direct and has two types of surgical cases but four intermediate products. The intermediate products in this department are titled: (1) ESWL (lithotripsy) 1st Half Hour, (2) ESWL Additional Half Hour, (3) Transurethral Endourology 1st Half Hour, and (4) Transurethral Endourology Additional Half Hour. Because the department is direct, it requires standards for the five cost types: Variable labor, Fixed Direct labor, Variable Supply, Fixed Direct Other Supply, and Fixed Direct Equipment.

The Endourology cost center is a relatively small department and consists of the following labor (job classes):

1. 4410 Staff Nurse (Variable labor) - 4 FTEs
2. 4411 Assistant Nursing Coordinator (Fixed labor) - 1 FTE
3. 5896 Operations Control Clerk (Fixed labor) - 1 FTE
4. 7750 Suite Attendant (Variable labor) - 2 FTEs

Now that the intermediate products and department personnel have been identified, the methodology for developing standards can be applied to this department. The application of the methodology of standards development for this department requires modification due to the nature of the intermediate products, i.e. 1st half hour and additional half hour. The 1st half hour signifies the number of cases while the additional half hour is established for additional increments of the procedure for billing purposes. In terms of cost allocation, the additional half hour is directly dependent upon the initiation of the case or the 1st half hour. Therefore, the methodology for developing standards is slightly modified to accommodate this relationship but the basic fundamental premise of the methodology is still retained.

Variable Labor Standards

Currently in the Operating Room, a surgical information system and scheduler called Surgi-Server, records every procedure performed and the corresponding surgical information such as surgeon, nursing staff, case service, setup, procedure, and clean up times. Based on 6 months of Surgi-Server data, the following variable labor time standards were derived from the system for the Endourology intermediate products and categorized by the Library of Terminology definitions.

Endourology Intermediate Products

(1) ESWL 1st Half Hour

SETUP/PREP - 27.52 min (1 4410 Staff Nurse)
PROCEDURE - 30.00 min (1 4410 Staff Nurse)
CLEAN - 11.50 min (1 7740 Suite Attendant)

TOTAL = 69.02 min

(2) ESWL Additional Half Hour

PROCEDURE - 28.96 min (1 4410 Staff Nurse)

TOTAL = 28.96 min

(3) Transurethral Endourology 1st Half Hour

SETUP/PREP - 27.48 min (1 4410 Staff Nurse)
PROCEDURE - 30.00 min (1 4410 Staff Nurse)
CLEAN - 9.37 min (1 7740 Suite Attendant)

TOTAL = 66.85 min

(4) Transurethral Endourology Additional Half Hour

PROCEDURE - 27.75 min (1 4410 Staff Nurse)

TOTAL = 27.75 min

Table 1 Variable Labor Standards (Endourology)

	Time Standard (Minutes)			
Intermediate Product	Setup	Procedure	Clean	TOTAL
ESWL 1st Half Hour	27.52	30.00	11.50	69.02
ESWL Addl Half Hour	0.00	28.96	0.00	28.96
Trans Endo 1st Half Hour	27.48	30.00	9.37	66.85
Trans Endo Addl Half Hour	0.00	27.75	0.00	27.75

By applying volumes to these standards, labor requirements for the department are determined, and labor requirements by activity are also determined (Refer to Appendix A). The variable labor standards developed for the 4 intermediate products are directly transferred into the cost accounting system. Because the variable labor standards are also developed by the activity categories, the standards in conjunction with

the intermediate product volumes can be analyzed for percentage of workload in each category.

Fixed Direct Labor Standards

Of the four job class positions in this department, the Staff Nurse and Suite Attendant have variable labor and fixed labor requirements. The Assistant Nursing Coordinator and Operations Control clerk are 100% fixed positions. As stated in Chapter 3 Solution Methodology, there are two aspects to developing fixed labor standards: by the job class and by intermediate product. The standards developed by the job class are according to the Fixed Direct Labor definitions. The standards developed by intermediate product are according to the Library of Terminology categories and the cost allocation relationships.

Job Class

1. 4410 Staff Nurse (FDL 4)
Activity:
A. Morning Room #1 Setup - SETUP/PREP
B. Morning Room #2 Setup - SETUP/PREP
C. End of Day Clean Up - CLEAN

2. 7740 Suite Attendant (FDL 4)

Activity:
A. Miscellaneous Trips - TRAVEL
B. Damp Dust - CLEAN
C. Fill Bucket - CLEAN
D. Lithotripter Bed preparation - SETUP/PREP
E. Sheet Packs - SETUP/PREP
F. ESWL Maintenance - MAINT
G. Inventory - INVENTORY
H. Evening clean up - CLEAN

3. 4411 Assistant Nursing Coordinator (FDL 2)

100% Fixed position
A. Personnel - 30% of time
B. Financial Management - 20% of time
C. Administrative - 40% of time
D. Education - 10% of time

4. 5896 Operations Control Clerk (FDL 3)

100% Fixed position
A. Communication - 35% of time
B. Clerical - 65% of time

The detail of how the fixed labor requirements are calculated into FTEs is listed in Appendix B. The summary below details how the FTEs are determined for each job class and the corresponding fixed labor definition.

Table 2 Fixed Labor Standards by Job Class (Endourology)

Job Class	FDL Description	FTE
4410 Staff Nurse	FDL 4	0.32
7710 Suite Attendant	FDL 4	0.74
4411 Asst Nsg Coord	FDL 2	1.00
5896 Operation Control	FDL 3	1.00

Intermediate Product

Initial fixed costs incurred by the department is dependent upon the number of cases. After an allocation is made initially to the case, then costs are allocated within the case to the 1st half hour and the additional half hour. In order to determine the RVUs for each intermediate product, actual fixed labor costs are allocated to the intermediate products based on volume (refer to Appendix C). The summary of the allocation results is summarized below.

Table 3 Fixed Labor Standards by Intermediate Product (Endourology)

	RVUs		
Intermediate Product	FDL 2	FDL 3	FDL 4
ESWL 1st Half Hour	1.00	1.00	1.00
ESWL Add Half Hour	1.00	1.00	1.00
Trans Endo 1st Half Hour	1.01	1.01	1.01
Trans Endo Add Half Hour	1.01	1.01	1.01

Variable Supply Standards

Surgical Preference Cards list the standard supplies which are used for the procedure and are usually preferred supplies by surgeon. The Supply Techs use this card to pull supplies for the procedure. During surgery, the preference card information is updated to reflect actual supply consumption. Currently, there is no preference card system installed in the Surgi-Server system. Therefore, there is no variable supply information readily available in the computer system. In place of readily supply usage information, the Technical Coordinator of the Operating Room Ancillary department estimated variable supply resource indices for the Relative Value Units. The index was developed according to the relative supply consumption of each case type. For example, if procedure A is given an index value of 1 and procedure B is given an index value of 2, it indicates that procedure B consumes twice the resources of procedure A. As a modification of the variable supply standards methodology, 50% of the costs are allocated to the 1st half hour and the other 50% allocated to the Additional half hour since the majority of supplies are consumed during the initiation of the case. The details of the variable supply standards calculation is given in Appendix D. The summary of the allocation results is summarized below.

Table 4 Variable Supply Standards (Endourology)

Intermediate Product	VS RVU
ESWL 1st Half Hour	0.00
ESWL Add Half Hour	0.00
Trans Endo 1st Half Hour	1.63
Trans Endo Add Half Hour	1.00

Fixed Direct Other Supply Standards

After analyzing the Fixed Direct Other supply expenses in this cost center, there are two Equipment Service contracts. Therefore, in addition to allocating the general fixed direct other costs by the case volume and then by the intermediate products by volume, the specific relative value of the Equipment Service Contract costs are incorporated into the RVUs. The details of the fixed direct other supply standards calculation is given in Appendix E. The summary of the allocation results is summarized below.

Table 5 Fixed Direct Other Supply Standards (Endourology)

Intermediate Product	FDO RVU
ESWL 1st Half Hour	1.34
ESWL Add Half Hour	1.34
Trans Endo 1st Half Hour	1.00
Trans Endo Add Half Hour	1.00

Fixed Direct Equipment Standards

After reviewing the Depreciation schedule for Endourology from the Accounting department, equipment depreciation costs were gathered for each procedure in Endourology. Because each piece of equipment had a one-to-one relationship with a case, allocation by machine time was not required. Regardless of 1st half hour or additional half hour, the equipment is equally allocated between the 1st half hour and the additional half hour. The details of the fixed direct equipment standards calculation is given in Appendix F. The summary of the allocation results is summarized in Table 6.

Table 6 Fixed Direct Equipment Standards (Endourology)

Intermediate Product	FDE RVU
ESWL 1st Half Hour	1.00
ESWL Add Half Hour	1.00
Trans Endo 1st Half Hour	2.00
Trans Endo Add Half Hour	2.00

Table 7 Endourology Standards Summary

Intermediate Product	Var Lab	Fix Lab	Var Supply	Fix Supply	Fix Equip
ESWL 1st Half Hour	69.02	1.00	0.00	1.34	1.00
ESWL Addl Half Hour	28.96	1.00	0.00	1.34	1.00
Trans Endo 1st Half Hour	66.85	1.01	1.63	1.00	2.00
Trans Endo Addl Half Hour	27.75	1.01	1.00	1.00	2.00

Chapter 5

CONCLUSION

The successful implementation and interpretation of the outputs of hospital systems such as the cost accounting system, financial performance reports, budget process, and staffing analyses depend upon the integrity of the hospital standards. In order to interpret and use the information generated from these systems, a methodology for developing standards which provides an understanding of how standards are developed, what the standards mean, and an ability to easily maintain standards has been established. When formulating this methodology, several objectives are desired. First, a uniform procedure for developing standards is established for labor, supplies, and equipment. Secondly, the methodology supports outputs from the cost accounting system in the form of cost type standards, cost center, job class, and Fixed Direct Labor definitions. Thirdly, the methodology promotes a maintainable system and will allow for an easy transition into the future Standards Maintenance System. And lastly, the methodology improves analysis functions across and within hospital departments.

The establishment of this methodology for developing the five types of hospital standards provides many benefits to the hospital. The standard methodology promotes consistency throughout the institution. Consistency

enables the more efficient operation and interpretation of hospital systems which depend on standards. Because this methodology is filtered throughout the hospital, uniformity among the various systems is achieved. A consistent approach creates a system which corresponds with the goals of the Standards Maintenance System.

Because standards are the foundation of the basic hospital systems, the integrity of the standards is mandatory. Incorporated in the integrity of standards is how standards are developed and how they are maintained. Standards are developed to accommodate the output format of the cost accounting system, the budget process, Management Systems's procedures, and the Standards Maintenance System. When the methodology for developing standards is employed, the process of maintaining standards is to follow the methodology. Once maintenance of standards becomes routine, the outputs generated from the basic hospital systems are consistent and accurate, and interpretation is meaningful.

As stated, because standards are developed by a standard methodology, the maintenance procedures are also standard. The standards update process becomes more routine and efficient in terms of time and resources. Because the labor standards are developed by activity components, there is a reduction of time spent restudying every component. Depending on the changes which have occurred within the department, some components are restudied while other components are validated. This methodology promotes routine maintenance which enables systems and analyses to remain relatively current.

The implementation of a standard methodology improves the analysis function across the hospital departments as well as analysis with other

institutions. In terms of hospital standards, Management Systems has never had the vehicle to offer any type of analysis, especially with labor. In a Standards Maintenance System, the potential for standards analysis includes comparison of categories of labor for particular job classes across departments, differences in labor components among intermediate products, differences among intermediate products in terms of supply and equipment use, "what if" scenarios, and detection of potential process improvements.

Implementation of this methodology in the example department, Endourology, addresses these benefits. The methodology for developing labor standards creates integrity and the basis for analysis. Because labor standards are developed by distinguishing activities by a labor classification method, it is very clear how the standard is developed and what is incorporated in the standard. The labor activity categories also allow for analysis by activity. The methodology for developing supply standards and equipment standards creates the foundation for consistency. Now, all hospital departments can develop standards in a consistent way. However, the validity of the methodology for calculating the RVUs for supply and equipment standards must be verified. Although the methodology is logical in theory, the outputs should be tested for accuracy during maintenance procedures.

As the Management Systems department at Georgetown University Hospital becomes more standardized in its approach to developing standards and standards procedures, benefits are realized within Management Systems as well as the rest of the hospital. Standards development will remain consistent in the Management Systems department with staff turnover. New interpretations of standards development are not continually being

introduced and thus eliminating complex and confusing standards documentation. The benefit to the hospital is that potential process improvements are discovered through analysis capabilities. The hospital departments as well as Management Systems expect consistency and a comprehensive understanding of how standards are developed and what they mean to the department.

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APPENDIX A

VARIABLE LABOR STANDARDS

Variable Labor Standards

Intermediate Product	FY9X Volume	Time Standard (Min) SETUP/PREP	PROCEDURE	CLEAN	TOTAL (MIN)	FTE SETUP/PREP	PROCEDURE	CLEAN	TOTAL FTE
ESWL									
1st Half Hour	610	27.52	30.00	11.50	69.02	0.15	0.17	0.06	0.38
Additional Half Hour	1016	0.00	28.96	0.00	28.96	0.00	0.27	0.00	0.27
Transurethral Endourology									
1st Half Hour	1207	27.48	30.00	9.37	66.85	0.30	0.33	0.10	0.73
Additional Half Hour	1972	0.00	27.75	0.00	27.75	0.00	0.50	0.00	0.50
						0.45	1.27	0.16	1.88

SETUP/PREP	PROCEDURE	CLEAN
23.94%	67.55%	8.51%

APPENDIX B

FIXED LABOR STANDARDS BY JOB CLASS

Fixed Labor Standards - Job Class

4410 Staff Nurse - FDL 4

Activity	Category Code	Time Std (Min) (A)	* Frequency (B)	Req'd Annual Time (Hr) (C=AxB)	FTE (D)	% FTE	
Morning Room #1 Setup	SETUP/PREP	60.00	1x/day	260	0.14	78.1%	SETUP/PREP
Morning Room #2 Setup	SETUP/PREP	45.00	1x/day	195	0.11		
End of Day Clean Up	CLEAN	30.00	1x/day	130	0.07	21.9%	CLEAN
* Endourology is open 5 days/week					0.32		

FDL 4 = .32 FTE

7710 Suite Attendant - FDL 4

Activity	Category Code	Time Std (Min) (A)	* Frequency (B)	Req'd Annual Time (Hr) (C=AxB)	FTE (D)	% FTE	
Miscellaneous Trips	TRAVEL	11.70	7x/day	354.90	0.19	25.7%	TRAVEL
Damp Dust	CLEAN	20.00	1x/day	86.67	0.05	27.0%	CLEAN
Fill Bucket	CLEAN	5.00	1x/day	21.67	0.01		
Evening Clean	CLEAN	60.00	1x/day	260.00	0.14		
Lithotripter Bed	SETUP/PREP	10.00	1x/day	43.33	0.02	4.1%	SETUP/PREP
Sheet Packs	SETUP/PREP	5.00	1x/day	21.67	0.01		
ESWL Maintenance	MAINT	25.00	3x/week	65.00	0.04	5.4%	MAINT
Inventory	INVENTORY	120.00	1x/day	520.00	0.28	37.8%	INVENTORY
* Endourology is open 5 days/week					0.74		

FDL 4 = .74 FTE

APPENDIX C

FIXED LABOR STANDARDS BY INTERMEDIATE PRODUCT

Fixed Labor Standards - Intermediate Product

Intermediate Product	FY9X Case Volume (A)	FY9X IP Volume (B)	% Case Volume (A%)	% IP Vol Per Case (B%)	% Weighted IP Vol (C=A%xB%)	% Per IP Unit (D=C/B)	RVU (E=D/MIN)
ESWL							
1st Half Hour	610	610	33.57%	37.52%	12.59%	0.0206%	1.00
Additional Half Hour		1016		62.48%	20.98%	0.0206%	1.00
Transurethral Endourology							
1st Half Hour	1207	1207	66.43%	37.97%	25.22%	0.0209%	1.01
Additional Half Hour		1972		62.03%	41.21%	0.0209%	1.01
	1817	4805	100.00%		100.00%		

FIXED LABOR STANDARDS BY INTERMEDIATE PRODUCT

APPENDIX D

VARIABLE SUPPLY STANDARDS

Variable Supply Standards

Intermediate Product	FY9X Case Volume (A)	FY9X IP Volume (B)	% Case Volume (A%)	Resource Index (C)	Index x Case Vol (D=AxC)	% Index x Case Vol (D%)	% Index (w/50% alloc) (E)	% Per IP Unit (F=E/B)	RVU (G=F/MIN)
ESWL									
1st Half Hour	610	610	33.57%	0	0	0.00%	0.00%	0.0000%	0.00
Additional Half Hour		1016					0.00%	0.0000%	0.00
Transurethral Endourology									
1st Half Hour	1207	1207	66.43%	1	1207	100.00%	50.00%	0.0414%	1.63
Additional Half Hour		1972					50.00%	0.0254%	1.00
	1817	4805	100.00%		1207				

APPENDIX E

FIXED DIRECT OTHER SUPPLY STANDARDS

Fixed Direct Other Supply Standards

Intermediate Product	FY9X Case Volume (A)	FY9X IP Volume (B)	% Case Volume (A%)	% IP Vol Per Case (B%)	% Weighted IP Vol (C=A%xB%)	% Per IP Unit (D=C/B)	RVU (E=D/MIN)	* Equip Contract (F)	Adjusted RVU (G=F/MIN)
ESWL									
1st Half Hour	610	610	33.57%	37.52%	12.59%	0.0206%	1.00	1.15	1.34
Additional Half Hour		1016		62.48%	20.98%	0.0206%	1.00	1.15	1.34
Transurethral Endourology									
1st Half Hour	1207	1207	66.43%	37.97%	25.22%	0.0209%	1.01	0.86	1.00
Additional Half Hour		1972		62.03%	41.21%	0.0209%	1.01	0.86	1.00
	1817	4805	100.00%		100.00%				

*

FDO $ Allocated to all IP	$127,349	
Equip Contract (ESWL)	$22,622	15.08%
	$149,971	

APPENDIX F

FIXED DIRECT EQUIPMENT STANDARDS

Fixed Direct Equipment - Depreciation Schedule

Equipment on Depreciation Schedule	IP Alloc	Deprec Cost	% Alloc
Calcutripter	ESWL	$903.00	20.35%
Telescope	Trans ENDO	$232.00	79.65%
Forceps, SM Fragment	Trans ENDO	$35.00	
Forceps, Grasping	Trans ENDO	$35.00	
Forceps, Biopsy	Trans ENDO	$35.00	
Telescope	Trans ENDO	$232.00	
30 Deg Telescope	Trans ENDO	$693.00	
Resectoscope	Trans ENDO	$180.00	
Ureterscope	Trans ENDO	$425.00	
Biopsy Instruments	Trans ENDO	$150.00	
Ureteropyloscope	Trans ENDO	$922.00	
Forceps, LG Fragment	Trans ENDO	$35.00	
70 MM Telescope	Trans ENDO	$462.00	
Resectoscope	Trans ENDO	$99.00	
		$4,438.00	

Fixed Direct Equipment Standards

Intermediate Product	IP Volume (A)	% IP Vol Per Case (A%)	% Case Dist (B)	% Equip Dist (C=A% x B)	% Per Unit (D=C/A)	RVU (E=D/MIN)
ESWL						
1st Half Hour	610	37.52%	20.35%	7.63%	0.0125%	1.00
Additional Half Hour	1016	62.48%		12.72%	0.0125%	1.00
Transurethral Endourology						
1st Half Hour	1207	37.97%	79.65%	30.24%	0.0251%	2.00
Additional Half Hour	1972	62.03%		49.41%	0.0251%	2.00
	4805					

Vita

Leigh Ann Wise was born to Robert A. Dyer, Jr. and Rixena D. Hargis in Roanoke, Virginia on February 6, 1966. She graduated from Cave Spring High School of Roanoke in 1984. She earned a Bachelor of Science degree in Industrial Engineering and Operations Research (IEOR) from the Virginia Polytechnic Institute and State University in May of 1988 and is seeking a Master of Science in Industrial and Systems Engineering (ISE) from that institution.