REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 1999	FINAL REPORT(07-94 to 07-99)

4. TITLE AND SUBTITLE

A Diagnosis Related Group Costing Method

5. FUNDING NUMBERS

6. AUTHOR(S)

Major Nathaniel Todd, MSC

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Reynolds Army Community Hospital
4301 Mow-Way Road
Fort Sill, Oklahoma 73503-6300

8. PERFORMING ORGANIZATION REPORT NUMBER

24-99

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL
BLDG 2841 MCCS-HRA US ARMY-BAYLOR PROGRAM IN HCA
3151 SCOTT RD SUITE 1412
FORT SAM HOUSTON TEXAS 78234-6135

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This study reviewed five methods of cost accounting to examine a diagnosis-related group costing method at Reynolds Army Community Hospital. The five cost accounting methods reviewed were: (1) traditional or conventional cost accounting; (2) the Military Health Service's Medical Expenses Performance Reporting System (MEPRS); (3) activity-base costing; (4) standard cost profiles and standard treatment protocols; and (5) microcosting. Microcosting and Cleverley's standard cost profiles provided the structure for this study. Microcosting is the process of closely examining the actual inputs or resources consumed by a particular patient or service. Standard cost profiling is a job order costing approach. Standard cost profiles identify the fixed, variable, direct, and indirect costs of producing a service unit. The study concludes that the utilization of microcosting provides additional information that is useful in understanding the actual costs associated with a specific DRG. This study also concludes that microcosting in the present military medical cost accounting environment, while time consuming, provides a much better appreciation of the departmental resources used or consumed by each service-unit.

14. SUBJECT TERMS

Cost Management, Microcosting, Medical Expenses Reporting System (MEPRS)
Standard Treatment Profiles, Standard Treatment Protocals

15. NUMBER OF PAGES

78

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
N/A	N/A	N/A	UL

U.S. Army-Baylor University Graduate Program in Healthcare Administration

Graduate Management Project

A Diagnosis Related Group Costing Method

Presented In Partial Fulfillment of the Requirements for

The Master's Degree in Health Administration

By

Major Nathaniel Todd

TRICARE Management Activity, Falls Church, Virginia

June 1999

ACKNOWLEDGMENTS

I would like to thank my family, particularly my sons Nathaniel, Lifus and John for their support during the time I conducted this study. I would also like to thank Doctor Karin Zucker, Lieutenant Colonel Bret Walker, Colonel Lee Briggs, Ms. Rene Pryor, and Lieutenant Commander Elaine Ehresmann for their mentorship and commitment to my completing this paper and requirements for the Master of Health Administration Degree in the Army-Baylor Program; Colonel David Crandall, Lieutenant Colonel Richard Holmes, Colonel (Retired) Johnny Conners, Lieutenant Colonel (Retired) Larry Leahy and Lieutenant Colonel (Retired) Richard Schroeder for their mentorship; and the staff members at Reynolds Army Community Hospital for their commitment to excellence and continuous quality improvement. I thank God for all things.

ABSTRACT

The implementation of enrollment-based capitation and the shift of the military health system to managed care are refocusing the efforts of health care managers. Medical treatment facility commanders are shifting from an emphasis on workload accounting to an emphasis on wellness, prevention, and cost management. Capitated budgeting requires health care managers in both the military and civilian sectors to understand cost and cost management.

This study reviewed five methods of cost accounting to examine a diagnosis-related group costing method at Reynolds Army Community Hospital. The five cost accounting methods reviewed were: (1) traditional or conventional cost accounting; (2) the Military Health Service's Medical Expenses Performance Reporting System (MEPRS); (3) activity-base costing; (4) standard cost profiles and standard treatment protocols; and (5) microcosting. Microcosting and Cleverley's standard cost profiles provided the structure for this study. Microcosting is the process of closely examining the actual inputs or resources consumed by a particular patient or service. Standard cost profiling is a job order costing approach. Standard cost profiles identify the fixed, variable, direct, and indirect costs of producing a service-unit.

As extracted from MEPRS using the customary, average-full-cost approach, the cost at Reynolds of treating DRG 183 in FY1997 was $1,566. With the assistance of an experienced MEPRS analyst, data of this nature was accessible in approximately one day. In contrast, microcosting to the patient level resulted in a spectrum of cost ranging between $446 and $1968. For any individual patient then, Reynolds' actual cost could have been $402 more, or $1,120 less, than the MEPRS projection currently used for decision-making. The average patient-level cost incurred in the sample was $923. While this sample was too small for confident generalization, it would appear that treating a patient for care categorized under DRG 183 costs the MTF $643 less than was projected.

The study concludes that the utilization of microcosting provides additional information that is useful in understanding the actual costs associated with a specific DRG. This study also concludes that microcosting in the present military medical cost accounting environment, while time consuming, provides a much better appreciation of the departmental resources used or consumed by each service-unit.

TABLE OF CONTENTS

Introduction

Background

The implementation of enrollment-based capitation (EBC) and the shift of the military health system (MHS) to managed care are refocusing the efforts of health care managers. Medical treatment facility (MTF) commanders are shifting their focus from an emphasis on workload accounting to an emphasis on wellness, prevention, and cost management. Similar emphasis on costs is occurring in the civilian health care industry (Chan 1993). Managed care and health care reform make cost accounting essential to health care management (Finkler 1994). Capitated budgeting requires health care managers in both the military and civilian sectors to understand costs and cost management.

This paper explores a microcosting method to more accurately identify a diagnosis-related group (DRG)[1] cost. This study demonstrates how understanding DRG-cost information can help improve managers' decisions on whether to treat patients within the military health system or to refer them out for care to the managed care support contractor's network of providers.

[1] A DRG is defined as an inpatient classification that relates demographic, diagnostic, and therapeutic characteristics of a patient's length of stay to the amount of resources consumed (Coventry at al 1995)

Cost control management provides the tenets for health care managers to understand DRG and product line costs. Understanding, managing, and controlling costs per unit of service are vital under EBC, as MTF commanders will assume greater risk for the health care costs of an enrolled beneficiary than under the present user-population method of funding.

The regionalization of the MHS, the implementation of managed care, and the transition to EBC will all require that the management of Department of Defense (DoD) health care facilities to understand and analyze both product line and DRG cost.

Conditions Which Prompted the Study

Reynolds Army Community Hospital (Reynolds) at Fort Sill, Oklahoma, shares parts of its beneficiary catchment area with the 82nd Medical Group, Sheppard Air Force Base (Sheppard) at Wichita Falls, Texas; the 97th Medical Group, Altus Air Force Base, Altus, Oklahoma; and the 72nd Medical Group, Tinker Air Force Base, Oklahoma City, Oklahoma. Opportunities for resource sharing and joint ventures among the facilities are examined quarterly by the respective commanders at TEXOMA[2]/Region 6, Northern Tier (hereafter Northern Tier) strategic planning sessions. In 1994, the 82nd Medical Group was given the mission to analyze "right sizing," and

[2] TEXOMA is an informal alliance of the facilities in the northern section, called the Northern Tier, of TRICARE Region 6.

perform analyses to compare surgical procedure costs at the MTFs at Sheppard and at Fort Sill (Hooper 1994). The Deputy Commander for Administration at Sheppard outlined the study requirements in his memorandum to Lieutenant Colonel Bev Blessing, TRICARE Region 6 (Hooper 1994).

During strategic planning sessions in December of 1995, the Reynolds Executive Committee outlined a strategic initiative to maximize utilization of health care resources in TEXOMA. Similar analyses were conducted during the TEXOMA joint strategic sessions that included representation from military MTFs in the Northern Tier, local health care facilities in the Lawton/Fort Sill community, and the Department of Veteran Affairs medical facility in Oklahoma City. Service lines identified for possible resource sharing included surgical/specialty services and mental health services. A direct result of these sessions was the assignment of an Air Force orthopedic surgeon to Reynolds in order to leverage supplemental care costs in the Northern Tier. The assignment of the orthopedic surgeon was made with the understanding that the surgeon would perform services for facilities and patients outside Reynolds' catchment area.

Reynolds' comptroller noted that, without a good understanding of costs, this sharing could have a tremendous adverse impact on Reynolds'

resources. The impact on supplies and ancillary support for those patients outside of the Reynolds catchment area would need to be examined.

EBC provides for an average cost reimbursement with little understanding of actual cost of resources consumed. Therefore, resources consumed by patients outside Reynolds' catchment area required analysis and understanding so that the cost of those resources could be determined and reimbursement requirements within the context of EBC established. The need to identify (a) resources consumed in treating patients associated with a particular DRG and (b) reimbursement requirements is a compelling reason for closely examining DRG costs and for developing a method that can be used at MTFs with similar challenges.

Statement of the Problem

With current cost estimates widely accepted as inaccurate, the management problem in this study is to review and explore a costing method to more accurately show the cost of treating patients within specific DRG categories.

Literature Review

Review of cost management literature revealed copious information on cost accounting and ample literature on health care accounting and costing methods. The literature examined for this study centered around five

areas: (a) traditional or conventional cost accounting; (b) the MHS's Medical Expense Performance Reporting System (MEPRS); (c) activity-based costing; (d) standard cost profiles and standard treatment protocols; and (e) microcosting.

Traditional, or conventional, cost accounting has provided cost information for decision-making throughout all industries. In traditional cost accounting, three stages of cost allocation are used to determine the standard full-cost per-service-unit (Chan 1993). The same is true in the MHS where MEPRS, which is based on the tenets of traditional cost accounting methods, is used for decision-making and costs analysis.

Stage 1 consists of the allocation or assignment of direct costs to the appropriate cost center, e.g., department, division, or product lines. Direct costs, such as salaries, supplies, and equipment are clearly identifiable or traceable to the product or service-unit. Cost factors such as custodial services and administrative overhead are less easily traced and tend to be indirect costs (U.S. DoD 1995). Stage 2 involves reallocating direct costs from one cost center to another. An example of this is the allocation of expenses due to care provided by physicians on ward rounds. Those expenses are initially assigned to an outpatient clinic and are only thereafter allocated to an inpatient code. Stage 3 involves allocating indirect costs to

products or services. A good example of such an indirect cost is that involved in housekeeping, which is allocated to department level (in most cases), based on the square footage occupied. This traditional allocation method assigns costs with little relevance to cost drivers[3].

The DoD developed MEPRS[4] accounting system accumulates and reports expenses, manpower, and workload performed within DoD fixed medical facilities. MEPRS defines a set of functional work centers, applies a uniform performance measurement, prescribes a cost assignment method, and obtains reported information in a standard format (U.S. DoD 1995). All activities and associated activities within, or related to, a MTF fall into a hierarchical coding structure in one of the following MEPRS functional categories: A-inpatient care, B-ambulatory care, C-dental care, D-ancillary services, E-support services, F-special services, or G-medical readiness (U.S. DoD 1995).

Categories A-inpatient care, B-ambulatory care, C-dental care, F-special services, and G-medical readiness are considered final operating accounts (U.S. DoD 1995), which means expenses identified against these

[3] A cost driver is an activity that causes costs to be incurred (Finkler 1994). "Cost drivers" have a cause-effect relationship (Chan 1993) associated with the product being produced. They are key to the concepts of activity base accounting.

[4] MEPRS provides managers with a framework for responsible accounting of functional activities that may cross organizational lines (U.S. DoD 1995). Current cost accounting procedures used by the MHS are based on the MEPRS.

accounts are at their final accumulation point and are not distributed. Categories D-ancillary services and E-support services are intermediate accounts (U.S. DoD 1995), as they provide service or support to other areas within the MTF. Therefore, the associated expenses are reassigned to other operating accounts.

The reassignment of intermediate operating expenses to the final operating expense accounts is known as "step down." The "step down" uses a performance factor ratio to distribute costs. Categories D and E accounts have a numerical identifier fixing their order in the step down sequence. Based on this sequence, E accounts such as base operations, laundry, housekeeping, administration, etc. are stepped down to the D accounts, which in turn are stepped down to the final operating accounts. After expenses are fully assigned, the operating accounts have been assigned their full cost and the intermediate operating expense accounts contain zero dollar balances. The final expenses associated with A, B, C, F, and G accounts represent full costs, both direct and indirect.

Recent graduate studies have examined cost analysis using the MEPRS traditional costing process (Watkins 1995; Lane 1993), which steps down expenses based on a DoD sequence code. These studies conclude that

MEPRS provides for very little identification of variable cost[5], sunk cost[6], and relevant cost[7] for decision-making. Though Watkins suggests that MEPRS data is potentially misleading, she states that "estimating differential cost in military hospitals using full cost data" such as MEPRS "is better than having no estimates at all (1995)."

In contrast, activity-based costing (ABC) is described as an approach that determines the cost of products by using multiple overhead allocation bases that directly relate to the activities i.e. the cost drivers, that generate overhead costs (Finkler 1994).

Dowless (1997) indicates that healthcare organizations are becoming interested in the ABC method because of its potential to improve resource management and thereby maximize efficiency. Some specific applications of ABC in healthcare are found in articles by Asadi and Baltz 1996, Ramsey 1994, and Chan 1993. Chan suggests that ABC can be applied in the healthcare sector, using the patients themselves as unique products (Chan 1993). According to Ramsey, the principles of ABC can be used in the analysis of processes, procedures such as DRGs, utilization review, clinical pathways, and patient acuity systems (Ramsey 1994, Udpa 1996).

[5] Variable costs are those costs that vary in direct proportion to patient volume.
[6] Sunk costs are costs that already have been incurred and will not be affected by future actions.
[7] Relevant costs are only those costs that are subject to change as a result of a decision.

ABC systems emphasize activity[8]-analysis and cost drivers in order to promote critical understanding and measurement of costs (Ramsey 1994). An example provided by Ramsey is an analysis of activities associated with surgical procedures in the operating room. The activities performed in the operating room include inputs of medical personnel (e.g., surgeons, anesthesiologists, and nurses), the use of technology (e.g., patient monitoring equipment, and life support equipment), and the use of surgical supplies (e.g., latex gloves, gauze pads, and bandages). An analysis of the activities provided an opportunity to examine how well the activity was performed (Ramsey 1994).

ABC can also be integrated with utilization management. Its activity-analysis process can help identify and eliminate non-value-added activities and processes that contribute to, or cause, utilization problems (Ramsey 1994). ABC systems improve the decisions made regarding case mix, procedure utilization, pricing, and marketing by providing a more accurate understanding of both cost and cost drivers (Ramsey 1994).

Product costing requirements for both internal and external customers have centered around two concepts: process costing and job-order costing. MEPRS and, to some extent, ABC use some of the concepts of process

[8] Ramsey defines an activity as a process that causes work to be performed within an organization.

costing, which is based on broad averages of costs over a large volume of units of service (Finkler 1994). Job order costing directly associates the specific resources used for each job with that particular job (Finkler 1994).

William O. Cleverley's standard cost profile and standard treatment protocol[9] are two examples of job order costing concepts. The concepts proposed by Cleverley are gaining wider acceptance (Finkler 1994). Standard cost profiles identify the fixed, variable, direct, and indirect costs of producing each service-unit (Cleverley 1992). Cleverley's article, "Product Costing for Health Care Firms" gives a two-stage framework for his proposed production process for health care firms (Appendix B). The production process is the consumption of specific service-units in the treatment of a patient (Cleverley 1992).

In stage one, service-units, a basic measure of the item being produced (e.g. pathology procedures, nursing care units of service, and dietary meals produced by nutritional services) are identified, as is cost per service unit. Service-unit cost is identified from departmental resource requirements used in the production of the service-unit. In stage two, inputs (i.e., service-units, or resources, required in the treatment of a patient) are identified and a standard treatment protocol is produced. Examples of such

[9] A standard treatment protocol is the set of intermediate products or service units consumed by a patient in each product line (Finkler 1994).

inputs include nursing hours, IV solutions, and ancillary procedures (Finkler 1994).

According to Cleverley, the difference between direct and indirect service-units is important, not only in the development of standard cost profiles, but also, in the development of standard treatment protocols. Direct service-units must be identified when standard treatment protocols are defined: however, indirect service-units need not be specifically identified, although some estimated cost is often required (Cleverley 1992). The inputs or service-units of Cleverley's standard treatment protocols include medical personnel (e.g., surgeons, anesthesiologists, and nurses), operating room technology (e.g., patient monitoring equipment, and life support systems), and surgical supplies (e.g., latex gloves, gauze pads, and bandages). The service units are in most cases directly traceable to the product being costed. These service-unit inputs provide for more accurate costing than does the MEPRS costing processes.

Microcosting is the process of closely examining the actual inputs consumed by a particular patient or service (Finkler 1994). Microcosting is comprised of three components: data collection/entry, cost modeling, and cost analysis (Lerner 1985). Costs generally explored in microcosting are direct costs. These costs are clearly and directly associated to the object

being microcosted and would not be incurred if it were not produced. Using the microcosting method provides a more accurate understanding of direct cost.

The cost information generated by microcosting is far superior to that generated by other costing methods used for decision-making (Finkler 1987). This is due to the accuracy of cost data provided by the detailed analysis conducted using the microcosting method.

Wayne M. Lerner, William L. Wellman, and David Burik used microcosting techniques to price hospital units of services at Rush-Presbyterian-St. Luke's Medical Center, Chicago Illinois. Lerner and colleagues suggest that microcosting allows for consolidation of efforts, for more uniform and cost-effective reporting (1985). They also suggest that the use of a standard model, with defined inputs such as direct labor, materials, departmental overhead, and allocated cost, results in the cost of products having less input variability across departments. However, microcosting tends to be costly and is most efficiently used for special studies (Finkler 1992).

Purpose

This paper will demonstrate the practical use of microcosting by applying it to one DRG. It will also demonstrate whether microcosting

provides more information than does MEPRS in understanding the cost components of a DRG.

In addition, at the conclusion of the project, Reynolds will have a tool to examine costs incurred by DRG, to analyze the resources consumed in clinical pathways, and to implement strategies to ensure quality care is delivered efficiently. Further, the methods used in this study may benefit other MTFs where management requires a more complete understanding of costs in the decision-making process.

Methods and Procedures

Management must know what it costs to produce a service unit and what service units are needed to treat a given patient (Cleverley 1987). To provide this information this paper explored the alternate hypothesis (Ha): utilization of microcosting will provide added information in understanding actual costs of a specific DRG as compared to the MEPRS cost data. The null hypothesis (Ho): utilization of microcosting will not provide added information for understanding actual cost of a specific DRG as compared to MEPRS cost data.

For this study, the concepts of microcosting and Cleverley's Standard Costing Model were employed in a patient-level approach to deriving a DRG cost. Data collection, analysis, and validation involved departmental

personnel and analysts from the business office at Reynolds (Lerner, Wellman, Burik 1985).

To develop the information needed for The Cleverley Model this study adapted a microcosting method similar to one outlined by Finkler in 1987. Finkler suggested the following steps be used in microcosting: (a) preparation of detailed flowcharts; (b) description of the worksteps involved in each flowchart step; (c) development of data collection instruments and a sampling plan; (d) measurement of personnel time, disposables, and depreciation for each workstep, and (e) assignment of dollar costs for the resources consumed in each of the worksteps.

The specific method used in this study, hereinafter described in detail, included: (a) identification of the DRG to be studied; (b) development of flowcharts showing all worksteps; (c) creation of a data collection instrument; (d) development of a cost profile and the calculation of resources used cost; and (e) assignment of service-unit costs.

Pareto charts[10] of general surgery dispositions, coded in FY1994, for Reynolds and Sheppard were used to identify the DRG to be studied. The charts were based on the Retrospective Case-Mix Analysis System-Open

[10] A Pareto chart is a special form of vertical bar graph, used to determine which problems to solve in what order. A pareto chart helps direct attention and efforts to the truly important problems. Studies imply that one generally gains more by working on the tallest bar than tackling the smaller bars (GOAL/QPC, 1988)

System Environment (RCMAS-OSE)[11] workload for both facilities' surgical departments. This focused attention on the DRG 183, which represented the most significant amount of workload.

A detailed flowchart was developed after observing several patients' episodes of care for the selected DRG. The flowchart identified all the activities constituting the production process and the worksteps involved in providing the care under investigation. Staff members in each department affected were interviewed to verify its accuracy (Finkler 1987). See example flowchart at Appendix C.

Then, after review of the standard inpatient data records for the selected DRG, a data collection instrument (cost sheet) was constructed to capture resources consumed in the delivery of care for dispositions associated with it. (See example cost sheet Appendix D.) The amount of resources consumed by each service-unit was measured using the microcosting techniques of empirical observation, review of inpatient records, and review of management and departmental records (Lerner 1985). The cost of the service-units was determined by summing the cost category inputs required.

[11] RCMAS-OSE is one of two DoD sources of disposition data used in workload calculations. Dispositions available are derived from the Standard Inpatient Data Record (SIDR) and represent the number of dispositions based on completed patient records.

A cost finding team then reviewed the service-units (e.g., supplies, equipment, and materials) for which costs were to be examined. A standard cost profile was then developed for each service-unit to quantify personnel time, materials, and other inputs. An example is at Table 6, which shows the labor, supplies, and associated indirect costs for pathology service-unit # 1 (hematology).

Labor requirements were then calculated based on variable and fixed components. For the purposes of this study variable and fixed staffing were assumed to be 30 and 70 percent respectively. These percentages are consistent with those used in calculating incremental cost pricing in accordance with the EBC methodology used in the MHS. The fixed and variable designation for assigning labor cost based on EBC methodology was determined by a joint Health Affairs/Services Pricing Workgroup.

TABLE 6

STANDARD COST PROFILE FOR Pathology SU # 1 Hematology

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Technologist GS-10 15 min	0.08	0.18	$24.80	$ 1.86	$ 4.34	$ 6.20
Direct Material						
Glass slide	1	0	$0.05	$0.05	0	$0.05
Tube	1	0	$0.13	$0.13	0	$0.13
Needle	1	0	$0.24	$0.24	0	$0.24
Analyzer/Reagent	1	0	$1.90	$1.90	0	$1.90
Department Overhead	0	1	$0.02	0	$0.02	$0.02
Allocated Cost						
Housekeeping	0	1	$0.16	0	$0.16	$0.16
Plant Operation	0	1	$0.85	0	$0.85	$0.85
Administration	0	1	$0.86	0	$0.86	$0.86
Total			$29.01	$ 4.18	$ 6.23	$ 10.41

Assignment of service-unit costs to the standard treatment protocol was then completed. (See example at Appendix E.) Costs for each standard treatment protocol were determined by summing the resources consumed in the service-units under study.

Cleverley suggests that at a minimum, a meaningful cost study should include identification of direct labor (by classification), supplies, and equipment. This study included Cleverley's suggested components as well

as departmental overhead and allocated costs for housekeeping, plant operation, and administration.

Finally, the cost data derived through microcosting was compared with MEPRS cost information. The researcher then conducted a subjective assessment of the data provided by the two costing methods. The purpose of the assessment was to determine whether the microcosting method would provide any added cost information to decision-makers. Criteria used to compare the methods were: (a) time required to get the cost data; (b) accuracy in identifying relevant cost; (c) identification of direct cost; and (d) accuracy of the actual cost figures.

Results

Microcosting was found to provide useful information on the resources consumed in treating a patient diagnosed within DRG 183. Through added appreciation of the usefulness of cost data in decision-making, the study also proved beneficial to both the researcher and the department chiefs associated with the study.

As extracted from MEPRS using the customary, average-full-cost approach, the cost of treating patients whose conditions were categorized by DRG 183 at Reynolds in FY1997 was $1,566. Accessing these data took an experienced MEPRS analyst approximately one day. In contrast,

microcosting to the patient level resulted in a spectrum of cost ranging from $446 to $1968 (Tables 20-24). For any individual patient then, Reynolds' actual cost might have been $402 more, or $1,120 less, than the MEPRS projection which was being used for decision-making. The average patient-level cost incurred in the sample was $923. While this sample was too small for confident generalization, it would appear that treating a patient whose diagnosis was categorized by DRG 183 costs the MTF $643 less than was then projected.

Although this research improved the knowledge of service-units' costs in 11 departments, the approximately 2640 person-hours required are clearly an unacceptable investment for short-range decision-making. Microcosting may, however, remain useful for strategic decision-making. To a large extent, this depends on the cost appreciation and experience of key personnel.

This researcher found the best understanding of costs and their use in decision-making in the departments of pathology, radiology, nutrition care, and nursing. The managers in these areas already had an appreciation of cost management, which added to their ability to identify detailed costs in their service-units. Other managers were not as familiar with cost issues nor did they appreciate the value of cost data in decision-making and

management. The efforts needed to educate these managers and gain their confidence resulted in major difficulties in identifying product costs and greatly extended the time required to complete this project.

Discussion

Overview

When examining the quality and outcome of patient care, commanders and departmental managers need a solid understanding of the factors of production in healthcare delivery. This study is a step in that direction. It explored the cost of direct resources (e.g., labor), indirect resources (e.g., housekeeping) and overhead to provide better information about the cost of treating patients with conditions associated with DRG 183. This DRG, # 183 (Esophagitis, Gastroenteritis, & miscellaneous digestive disorders age >17 without complications), was selected for study because the RCMAS-OSE identified it as having the highest number of dispositions (102) for general surgery during FY1995 at Reynolds, and the fourth highest number of dispositions (19) at Sheppard.

An analysis of observed patient flow and a review of 10 inpatient treatment records provided the data used to determine service-unit resources consumed in the delivery of care captured as DRG 183 at Reynolds. The records reviewed constitute 10 percent of dispositions in DRG 183 Reynolds

experienced in fiscal year 1995. Cost-sheets were developed from our review of the inpatient charts. The cost-sheets present relevant service-unit resources used in the treatment categorized by of DRG 183 by six providers at Reynolds. Tables 1-19 present standard cost profiles for those service-units. The tables present variable costs, fixed costs, and total costs for each service-unit. The costs examined for each service-unit included, labor, materials and supplies, department overhead and indirect allocated costs.

Departmental overhead, housekeeping, plant operation, and administration costs were provided by the Chief, MEPRS from reports developed specially for this study. Costs identified as departmental overhead included the cost of travel, training, equipment purchased, outside contracting (e.g. rental costs), contract equipment maintenance and miscellaneous contracts.

In this study only three areas of allocated costs were assigned; housekeeping, plant operations and administration. Other costs, identified in the MEPRS report, that could have been considered for allocation were other supplies (administrative), central material section expenses, depreciation, supplemental care, and managed care administration-- which in most cases are sunk costs and have very little direct or indirect traceability to DRG 183. Using just three allocated costs understates overall cost to some degree, but

accurately developing the other costs would have been exceedingly time consuming and expensive. A judgment was made that their inclusion would not have improved the cost information significantly enough to justify the extra effort.

Housekeeping cost was extracted from the MEPRS report in the janitorial expense line. Plant operation included allocated expenses reflected in the MEPRS report from logistics, medical maintenance, and laundry. Administration cost included the allocated expenses of general administration and base operations.

MEPRS identified departmental units (activities) such as actual occupied bed days, raw procedures and clinic visits. These units were used to allocate departmental overhead. The associated overhead costs were divided by these units in order to calculate and assign overhead service-unit costs. (See Table 31, below.)

TABLE 31

Calculation of allocated department overhead service-unit cost for plant operations

Cost Center	Expenses Plant Operations	MEPRS Identified Unit	Units	Department Overhead Service-Unit Cost Plant Operations Expenses/Units
2 West AAXA	$ 45,812	Occupied bed days	4,003	$ 11.44
Pathology DBA Lab	$ 314,920	Raw Procedures	371,437	$ 0.85
General Surgery BBAA	$ 22,528	Clinic Visits	4,921	$ 4.58

Direct labor costs for military salaries were taken from the Uniform Chart of Accounts personnel utilization system standard military pay table. Civilian salaries were based on the middle step of the grade of the staff member identified by the department manager as most likely to do the task of interest in performance of the service-unit. Thirty percent was then added for the cost of benefits.

Labor was divided into 15-minute increments. For example, if a GS10 technologist spent 15 minutes in support of a procedure, that was reflected as 25 percent of an hour. In Table 6, the unit cost (one-hour) of a GS10 technologist is shown as $24.80. The variable labor cost was calculated by multiplying [.25 (labor unit) X .30 (variable unit cost allocation from EBC) X $24.80 (hourly rate) = $1.81]. The fixed labor cost was calculated by multiplying [.25 (labor unit) X .70 (fixed unit cost allocation from EBC) X $24.80 (hourly rate) = $4.36]. The total cost of labor in support of this procedure was calculated by adding the variable labor cost of $1.80 plus the fixed labor cost of $4.36, which equaled a total labor cost of $6.20. If an individual spent 30 minutes in support of a task the labor unit was calculated as [.50 (labor unit) X .30 (variable unit cost allocation from EBC) X $24.80 (hourly rate) = $3.72]. This cost information provided the input for calculating the service-units and the cost

of treatment rendered by the six providers treating patients for conditions associated with DRG 183.

Tables 1 through 19 present the standard cost profiles associated with DRG 183 at Reynolds. Below is a list of those tables with their titles.

Table 1. Nurse Services SU #1 (Preoperative Nursing Care/Preadmission)

Table 2. Nurse Services SU #2 (Ward Nursing Care)

Table 3. Recovery Room SU #1

Table 4. Pharmacy SU #1 (IV)

Table 5. Pharmacy SU #2 (Prescription)

Table 6. Pathology SU #1 (Hematology)

Table 7. Pathology SU #2 (Chemistry)

Table 8. Pathology SU #3 (Urinalysis)

Table 9. Pathology SU #4 (Biopsies)

Table 10. Radiology SU #1 (Acute Abdominal Series)

Table 11. Internal Medicine SU #1 (Electrocardiograph)

Table 12. Anesthesia SU #1

Table 13. Physician SU #1 (Outpatient Preoperative)

Table 14. Physician SU #2 (Inpatient)

Table 15. Physician SU #3 (Outpatient Postoperative)

Table 16 Operating Room SU #1

Table 17 Emergency Room SU #1 (ER Visit Abdominal Pain)

Table 18 Transcription SU #1

Table 19 Dietary Department SU #1 (Liquid Meal)

Costing Service Units

Tables 1 and 2 present standard cost profiles for nursing service-units. These service-unit costs were developed from an interview with the Head Nurse, 2 West, and from observation of care performed on Reynolds' medical /surgical and same-day surgery ward.

The Head Nurse identified the direct labor on service-unit #2 as being a registered nurse, a licensed practical nurse, and a nurse's aid. For microcosting purposes, she further distinguished direct labor resources consumed into active duty and civilian components, as personnel of both categories staffed the ward. She estimated total registered nurse hours for DRG 183 to be 60 minutes per a 24-hour period. Of that, she estimated 45 minutes would be delivered by an active duty first lieutenant (02) and the other 15 minutes by a civilian GS10. The unit cost rate was calculated as $27.58 for a first lieutenant and $25.67 for a GS10 civilian nurse. This example shows the detailed cost information available through microcosting. Using this information the manager could gain unit cost efficiencies by realigning staffing shifts.

In the initial concept, the Workload Management System for Nursing (WMSN) was to be used to identify nursing cost. After discussion with the Head Nurse, however the researcher discovered that WMSN provided

aggregate nursing care hours by acuity but did not provided the detailed, service-unit direct costs needed. The microcosting method employed in this study provided individual direct labor costs by nursing category; thereby improving cost information for decision-makers. It was also noted that WMSN does not provide staffing requirements for same day surgery or for the observation ward. In the MHS evolution into TRICARE and managed care, reporting of services provided through same day surgery is important, and WMSNs will have to be modified to identify appropriate staffing requirements if it is to be an effective staffing tool.

Nursing service personnel provided data on direct material resources consumed in the treatment of DRG 183 patients on the ward. Departmental overhead and allocated costs for the nursing service-unit were extracted from MEPRS.

Preoperative (nursing service-unit #1) inputs were identified by observation and an interview with the preoperative staff nurse. Preoperative departmental overhead and associated allocated costs are identified in MEPRS code DFB97. Departmental overhead was found to be inconsequential.

The recovery room head nurse estimated the time a patient stayed in the recovery room and the breakdown of nursing assets devoted to the

patient while there. Table 3 presents the standard cost profile for the recovery room service-unit. The recovery room service-unit incurs variable costs of $16.59, fixed costs of $46.32, and total service-unit costs of $62.91.

Costing of pharmacy service-units was difficult. At the time of this study, pharmacy management proved to be less familiar with, and less appreciative of, microcosting procedures than were managerial personnel of any other department. Though direct labor is consumed in producing a pharmacy service-unit, in this case the staff pharmacists did not agree to include labor requirements as a resource input because they thought it to be inconsequential.

Tables 4 and 5 show standard cost profiles for pharmaceutical service-unit # 1 (IV) and # 2 (prescriptions). Pharmacy service-unit # 1 identified a total cost of $3.15, of which $2.74 was departmental overhead and allocated costs. Pharmacy service-unit #2 identified a total cost of $3.03. In the aggregate, the labor cost for IV and prescription filling may be minuscule, but it is still important for departmental managers to recognize labor as a resource input in the production of departmental products.

Tables 6, 7, 8 and 9 provide standard cost profiles for pathology service-units. Developing the standard cost profiles for pathology proved to be straightforward. The laboratory manager provided detailed information

about processes and labor and material requirements. He had experience with development of the Composite Health Care System and had been involved in cost requirement procedures for a local VA/DOD reimbursement agreement.

Table 10 presents the radiology-service unit. In developing the radiology service-unit cost sheet, the manager focused on technician-time requirements for the procedure.

Table 11 shows the standard cost profile for an electrocardiograph. Internal Medicine service-unit #1 (electrocardiograph) unit costs were developed from an interview with the technician that performs the procedure. The total cost identified was $110.34, of which $96.66 is departmental overhead and allocated cost using the internal medicine clinic MEPRS code. Further examination of departmental overhead and allocated cost showed that "electrocardiograph" is a separate clinic code in MEPRS and the internal medicine clinic overhead and allocated cost should not be used to assign departmental overhead or allocated costs.

Table 12 presents the standard cost profile for anesthesia. The researcher determined that including anesthesia costs in the operating room neglected to include preadmission anesthesia costs and the significant

overhead costs of the anesthesiology department. Table 12 shows these costs as inputs when required in treating patient diagnosed as DRG 183.

Tables 13, 14, and 15-show standard cost profiles for physician, outpatient, ward, and post-operative care. These costs are associated with those DRG 183 surgical procedures in which an endoscopic procedure was performed. Family practice physician service-unit costs for DRG 183 not requiring an endoscopy were not calculated for this study. In hindsight, these would have been useful to capture full cost and to compare the best outcomes and resource utilization.

The Chief, Department of Surgery noted that three preoperative outpatient visits were normally conducted before a patient's surgery. These were: an initial 15-minute appointment; a 60-minute appointment to take the history and conduct a preoperative physical; and a 15-minute appointment within 24 hours of surgery to see if there had been any changes in the patient's health. As shown in Table 14, a physician usually spends 15 minutes conducting the actual endoscopic procedure. Table 15 presents the physician postoperative standard cost profile. This involves two visits: one 15-minute visit on the ward to talk to the patient and family after the procedure, and a 15-minute follow-up appointment in 15 to 20 days.

MEPRS identified no departmental overhead associated with the department of surgery inpatient services (e.g., TDY, equipment purchased, equipment rental payments, contract equipment, or other miscellaneous contracts). These costs (Tables 13 and 15) were shown as departmental overhead against the general surgery outpatient clinic. Direct labor costs were calculated based on the hourly rate of an 0-6 physician. The records reviewed for this study indicate that 38 percent of the evasive procedures conducted were performed by an 0-6 surgeon. An 0-4 conducted 37 percent of the procedures and two 0-5s conducted 25 percent of the procedures, two of the records reviewed related to non-invasive services. The researcher chose to use the higher labor cost for this study to reflect the projected future-staffing grade in the department of surgery at Reynolds.

The surgical suite, or operating room, cost is generally one of the most difficult to determine (Dieter 1987). Table 16 shows the standard cost profile for the operating room service-unit. In this study, operating room service-unit costs included a variable cost of $52.23, fixed cost of $54.67, and total average service-unit cost of $106.91. The Chief, Operating Room Nurse provided 60 minutes as the approximate operating room time for procedures associated with DRG 183. The staffing typically required for performance of a colonoscopy (the procedure usually associated with DRG

183) is an anesthetist, an operating room nurse, and an operating room technician. The operating room nurse and the anesthetist recommended that cost attributed to a preadmission anesthetist be identified as a resource input to the operating room service-unit costs. The researcher initially agreed but found, as he completed analysis of the cost data that this method neglected significant overhead costs identified by MEPRS code DFA97. It also left out the direct labor costs of the anesthetist for consultation in the preadmission process. These concerns resulted in the development of Table 12, (anesthesiology) service-unit #1.

As the anesthesiology department is managed separately from the surgical suite or operating room, a less-detailed costing method might not have identified the preadmission anesthetist cost or the significant overhead associated with anesthesiology. This is also a good example of the detailed cost analysis input and relevant cost information provided by a microcosting method.

The Chief Operating Room Nurse provided staffing requirements and a detailed list of the supplies and material used for a colonoscopy. Costs associated with the surgical suite represent 38 percent of the budget of the department of nursing. This knowledge gained will provide the business

office an opportunity to better assist the operating room manager in development of the operating room budget.

Of the 10 records reviewed, several showed that patients had been admitted through the emergency room, which compelled the researcher to examine emergency room visit costs. The emergency room service-unit is very complex. Table 17 presents the standard cost profile for emergency room service-unit. Emergency room service-unit costs identified did not include other patient visit costs associated with ancillary procedures, such as x-rays or blood or urine tests. The costs identified for emergency room visits were direct labor, material, departmental overhead and allocated costs. The emergency room visit reflected one of the highest service-unit costs. When a patient, whose diagnosis was later categorized by DRG 183, was admitted through the emergency room, emergency room service-unit costs added $180 to the cost of treatment.

Table 18 shows the standard cost profile for transcription. This service-unit cost proved to be the simplest, with only labor costs assigned. The service-unit costs were developed from an interview with the lead transcriptionest. MEPRS allocated costs associated with transcription were allocated to the Patient Administration and were not reflected in the

microcosting service unit cost, but were allocated to the cost of DRG in the MEPRS full cost approach.

Table 19 shows the standard cost profile for the nutritional care service-unit (liquid meal). The costing data provided by the Chief, Nutrition Care were very detailed and looked at per unit cost of very small units, such as preparing juice, broth and/or lemon packet. The variable cost of the liquid meal was only $1.19. The allocated fixed costs were identified as $9.33, or 89 percent of the cost of the meal. This study considered the liquid meal, because those patients with diagnoses associated with DRG 183 usually were on a liquid diet.

Developing Standard Treatment Protocols

After calculating service-unit costs, the researcher rolled-up service-unit costs into standard treatment protocols for the 10 dispositions reviewed. Those costs are captured in Tables 20-29 which present detailed differential costs associated with treating patients whose diagnoses were categorized within DRG 183. This identification of the differential costs of treating these patients (i.e., DRG 183) at Reynolds represents one of the single most significant strengths of a microcosting method.

Using MEPRS data, the average cost for DRG 183 at Reynolds was calculated to be $1566. As previously stated, microcosting resulted in

patient-level costing ranging from $446 to $1968. The average cost for DRG 183 under the microcosting method costs is $923.

The lowest standard treatment protocol cost using the microcosting method in this study is shown in Table 20 (provider A, treating a DRG 183 patient by conducting a patobiliary scan), which shows total costs of $448.50, variable costs of $76.50 and fixed costs of $371.90. The highest standard treatment protocol costs are shown in Table 24 (provider B, treating a DRG 183 patient diagnosed with viral enteroclitis), which shows a total cost of $1.968, of which the variable costs are $364.20 and the fixed costs are $1,603.80.

The standard treatment protocol tables (Tables 22, 23, 25, and 26) also show those DRG 183 procedures requiring operating room service-units. Tables 24, 27, and 29 show DRG 183 treatment protocols requiring emergency room service-units. The treatment protocal costs identified with a microcosting method provide relevant data to conduct an infinite number of analyses involving costs, practice patterns, quality outcomes, and clinical pathways.

Table 30 is a matrix of findings supported by this study. It compares the useful information provided by the microcosting method to the cost information provided by MEPRS. The identification of relevant costs and

the accuracy of the cost information are strengths of the microcosting method and weaknesses of MEPRS. Time required in getting the cost data is the strength of MEPRS and the weakness of the microcosting method. Both methods have relative strengths in providing useful information in the identification of direct costs.

The matrix shows the types and potential usefulness of cost information provided from the two methods. Criteria used were: (a) time required to get the costing data; (b) identification of relevant decision-making variable costs; (c) identification of direct costs; and (d) accuracy of costs. The results indicate that microcosting provided additional information useful in understanding costs and cost drivers in the delivery of care at Reynolds.

Table 30 Comparison of Microcosting and MEPRS costs information.

Table 30	Time required to get costing data	Identification of relevant costs	Identification of direct costs	Accuracy of costs	**Value**
Microcosting	-	+	+	+	**2+**
MEPRS	+	-	+/-	-	**1-**

Conclusion

This application of microcosting resulted in three beneficial outcomes. First, the technique provided useful cost information on the resources actually consumed in treating a patient diagnosed within DRG 183. Secondly, the process helped the facility identify practice pattern differences among treating physicians. Finally, data provided by this research added to departmental managers' understanding of their costs.

Although MEPRS does not provide as accurate and detailed a DRG cost as does microcosting, it does provide more expeditious information. This is important in management decision-making where time is of the essence. The process of costing out DRG 183 using MEPRS data at Reynolds required approximately one day by an experienced MEPRS analyst. In contrast, the microcosting method followed in this study required much more time and effort. Although some gain in efficiency is to be expected, it is estimated that replicating the process with another DRG would require between two and four weeks and more than 1,100 person-hours.

MEPRS calculated the full cost of treating DRG 183 in FY1997 to be $1566. The microcosting method resulted in a patient-level DRG 183 cost range between $446 and $1968 (Tables 20 and 24). These costs differ from

the MEPRS calculated figure by $1118 and $402 respectively. The costs differ between the two methods because MEPRS takes the customary, average-full-cost approach, while the microcosting method takes a more patient-level cost approach.

Cost information is of value only as it aids in the managerial decision-making process (Horngren 1977). The timing of the decision to be made and the degree of accuracy required will be determining factors in deciding which method to use. This study of microcosting methods proved to be time-consuming, labor intensive, and more frustrating than using the full cost method of MEPRS. While the study proved beneficial to both the researcher and the department chiefs by increasing their knowledge of service-unit costs in eleven departments, the length of time required is clearly unacceptable for short-range decision-making. The microcosting method may, however be useful for long-range (12 to 24 months) strategic decision-making.

Recommendations

MEPRS should continue to be used at MTFs for short-range decision-making (less than six months). In longer-range strategic decision-making (e.g., that required to decide whether to continue a product line within an

MTF or outsource it to the managed care contract provider network) the use of microcosting would be beneficial.

Information gained from the microcosting process can be used in the development of clinical pathways and standard treatment protocols and to assist in measuring the quality and cost effectiveness of outcomes.

As a final note, this study was overly broad in that it attempted to microcost several departments' service-unit costs. I recommend that microcosting studies conducted in the future be limited to an individual department's service-units.

TABLE 1

STANDARD COST PROFILE FOR NURSE SERVICES SU# 1 Preoperative Nursing Care/Preadmissions

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Registered Nurse GS10 (30 min)	0.15	0.35	$ 25.67	$ 3.85	$ 8.98	$ 12.84
License Practical Nurse E5 (15 min)	0.075	0.175	$ 18.41	$ 1.38	$ 3.22	$ 4.60
Clerk GS 4 (15 min)	0.075	0.175	$ 13.75	$ 1.03	$ 2.41	$ 3.44
Direct Material						
Soap Material	2		$ 0.05	$ 0.10	$ -	$ 0.10
Specimen Cup	1		$ 0.05	$ 0.05	$ -	$ 0.05
Department Overhead			$ -		$ -	$ -
Allocated Cost						
Housekeeping		1	$ 0.05	$ -	$ 0.05	$ 0.05
Plant Operation		1	$ 0.14	$ -	$ 0.14	$ 0.14
Administration		1	$ 0.12	$ -	$ 0.12	$ 0.12
Total			$ 58.24	$ 6.41	$ 14.92	$ 21.34

TABLE 2

STANDARD COST PROFILE FOR NURSE SERVICES SU# 2 Ward Nursing Care

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Registered Nurse 02 (45 min)	0.225	0.525	$ 27.58	$ 6.21	$ 14.48	$ 20.69
Regisered Nurse GS10 (15 min)	0.075	0.175	$ 25.67	$ 1.93	$ 4.49	$ 6.42
License Practical Nurse E5 (90 min)	0.45	1.05	$ 18.41	$ 8.28	$ 19.33	$ 27.62
License Practical Nurse GS05 (30 min)	0.15	0.35	$ 15.38	$ 2.31	$ 5.38	$ 7.69
Nurse Assistant (60 min)	0.3	0.7	$ 13.75	$ 4.13	$ 9.63	$ 13.75
Direct Material						
IV	3		$ 3.15	$ 9.45	$ -	$ 9.45
2x2	2			$ -	$ -	$ -
Band Aid	1			$ -	$ -	$ -
Emesis Bisen	1		$ 0.05	$ 0.05	$ -	$ 0.05
Foam Slippers	1		$ 0.10	$ 0.10	$ -	$ 0.10
Department Overhead		1	$ 0.13	$ -	$ 0.13	$ 0.13
Allocated Cost						
Housekeeping		1	$ 17.71	$ -	$ 17.71	$ 17.71
Plant Operation		1	$ 11.44	$ -	$ 11.44	$ 11.44
Administration		1	$ 68.69	$ -	$ 68.69	$ 68.69
Total			$ 202.06	$ 32.45	$ 151.28	$ 183.73

TABLE 3

STANDARD COST PROFILE FOR Recovery Room Service SU # 1

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Registered Nurse 02 (45 min)	0.225	0.525	$ 27.58	$ 6.21	$ 14.48	$ 20.69
Registered Nurse GS10 (15 min)	0.075	0.175	$ 25.67	$ 1.93	$ 4.49	$ 6.42
License Practical Nurse GS05 (30 min)	0.15	0.35	$ 15.38	$ 2.31	$ 5.38	$ 7.69
Direct Material						
IV	1			$ -		
Nasal can	1		$ 4.70	$ 4.70	$ -	$ 4.70
O2 Mask	1		$ 1.45	$ 1.45	$ -	$ 1.45
Department Overhead		1			$ -	
Allocated Cost						
Housekeeping		1	$ 5.12	$ -	$ 5.12	$ 5.12
Plant Operation		1	$ 8.01	$ -	$ 8.01	$ 8.01
Administration		1	$ 8.84	$ -	$ 8.84	$ 8.84
Total			$ 96.75	$ 16.59	$ 46.32	$ 62.91

TABLE 4

STANDARD COST PROFILE FOR Pharmacy SU # 1 IV

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Direct Material						
Lacted Ringer	1		$ 0.41	$ 0.41	$ -	$ 0.41
Department Overhead		1	$ 0.07	$ -	$ 0.07	$ 0.07
Allocated Cost						
Housekeeping		1	$ 0.07	$ -	$ 0.07	$ 0.07
Plant Operation		1	$ 2.28	$ -	$ 2.28	$ 2.28
Administration		1	$ 0.32	$ -	$ 0.32	$ 0.32
Total			$ 3.15	$ 0.41	$ 2.74	$ 3.15

TABLE 5

STANDARD COST PROFILE FOR Pharmacy SU # 2 Prescription

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Direct Material						
Zantac	1		$ 0.05	$ 0.05		$ 0.05
Ant Acid (30mg)	1		$ 0.24	$ 0.24		$ 0.24
Department Overhead		1	$ 0.07	$ -	$ 0.07	$ 0.07
Allocated Cost						
Housekeeping		1	$ 0.07	$ -	$ 0.07	$ 0.07
Plant Operation		1	$ 2.28	$ -	$ 2.28	$ 2.28
Administration		1	$ 0.32	$ -	$ 0.32	$ 0.32
Total			$ 3.03	$ 0.29	$ 2.74	$ 3.03

TABLE 6

STANDARD COST PROFILE FOR Pathology SU # 1 Hemotology

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Tecnologist GS-10 15 min	0.08	0.18	$24.80	$ 1.86	$ 4.34	$ 6.20
Direct Material						
Glass slide	1		$0.05	$0.05		$0.05
Tube	1		$0.13	$0.13		$0.13
Needle	1		$0.24	$0.24		$0.24
Analyzer/Reagent	1		$1.90	$1.90		$1.90
Department Overhead		1	$0.02		$0.02	$0.02
Allocated Cost						
Housekeeping		1	$0.16		$0.16	$0.16
Plant Operation		1	$0.85		$0.85	$0.85
Administration		1	$0.86		$0.86	$0.86
Total			$29.01	$ 4.18	$ 6.23	$ 10.41

TABLE 7

STANDARD COST PROFILE FOR Pathology SU # 2 Chemistry

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Technologist GS-10 30 min	0.15	0.35	$ 24.80	$ 3.72	$ 8.68	$ 12.40
Direct Material						
Tube	1		$ 0.13	$ 0.13	$ -	$ 0.13
Needle	1		$ 0.24	$ 0.24	$ -	$ 0.24
Analizer/Reagent	1		$ 1.96	$ 1.96	$ -	$ 1.96
Department Overhead		1	$ 0.02	$ -	$ 0.02	$ 0.02
Allocated Cost						
Housekeeping		1	$ 0.16	$ -	$ 0.16	$ 0.16
Plant Operation		1	$ 0.85	$ -	$ 0.85	$ 0.85
Administration		1	$ 0.86	$ -	$ 0.86	$ 0.86
Total			$ 29.02	$ 6.05	$ 10.57	$ 16.62

TABLE 8

STANDARD COST PROFILE FOR Pathology SU # 3 Urinalysis

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Technologist GS-10 (15 min)	0.08	0.18	$24.80	$ 1.86	$ 4.34	$ 6.20
Direct Material						
Urine cup	1		$0.02	$0.02	$ -	$0.02
Dip stick	1		$0.02	$0.02	$ -	$0.02
Analizer/Reagent	1		$0.83	$0.83	$ -	$0.83
Department Overhead		1	$0.02		$0.02	$0.02
Allocated Cost						
Housekeeping		1	$0.16	$ -	$0.16	$0.16
Plant Operation		1	$0.85	$ -	$0.85	$0.85
Administration		1	$0.86	$ -	$0.86	$0.86
Total			$27.56	$ 2.73	$ 6.23	$ 8.96

TABLE 9

STANDARD COST PROFILE FOR Pathology SU # 4 Biopies

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Professional 0-6 15 min	0.08	0.18	$ 64.00	$ 4.80	$ 11.20	$ 16.00
Technician GS 7 90 min	0.45	1.05	$24.80	$ 11.16	$ 26.04	$ 37.20
Direct Material						
Slide	1		$0.02	$0.02	$ -	$0.02
Reagent Stain	1		$0.83	$0.83	$ -	$0.83
Fix	1		$0.83	$0.83	$ -	$0.83
Paraplane						
Department Overhead		1	$0.02	$ -	$0.02	$0.02
Allocated Cost						
Housekeeping		1	$0.16	$ -	$0.16	$0.16
Plant Operation		1	$0.85	$ -	$0.85	$0.85
Administration		1	$0.86	$ -	$0.86	$0.86
Total			$28.37	$ 12.84	$ 27.93	$ 40.77

TABLE 10

STANDARD COST PROFILE FOR Radiology SU # 1 Acute Abdominal Series

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total Cost
Direct Labor	0.3	0.7				
Professional Contract 15 min	0.075	0.175	$109.00	$8.18	$19.08	$27.25
Technician GS-6 30 min	0.15	0.35	$12.79	$1.92	$4.48	$6.40
Direct Material						
Film 14x17	4		$1.37	$5.48	$0.00	$5.48
Department Overhead		1	$1.16		$1.16	$1.16
Allocated Cost						
Housekeeping		1	$1.86		$1.86	$1.86
Plant Operation		1	$3.80		$3.80	$3.80
Administration		1	$5.97		$5.97	$5.97
Total			$135.95	$15.57	$36.34	$51.92

TABLE 11

STANDARD COST PROFILE FOR Internal Medicine SU# 1 Electrocardigraphy

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Technician (GS 06 15 min)	0.08	0.18	$ 16.36	$ 1.23	$ 2.86	$ 4.09
Physician (03 15 min)	0.08	0.18	$ 35.20	$ 2.64	$ 6.16	$ 8.80
Direct Material						
Electrodes	10		$ 0.07	$ 0.70		$ 0.70
Paper	2		$ 0.06	$ 0.12		$ 0.12
Department Overhead		1	$ 44.09	$ -	$ 44.09	$ 44.09
Allocated Cost						
Housekeeping		1	$ 23.81	$ -	$ 23.81	$ 23.81
Plant Operation		1	$ 8.38	$ -	$ 8.38	$ 8.38
Administration		1	$ 20.35	$ -	$ 20.35	$ 20.35
Total			$ 148.32	$ 4.69	$ 105.65	$ 110.34

TABLE 12

STANDARD COST PROFILE FOR Anesthsia SU # 1

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Physician 0-4 15 min	0.075	0.175	$ 40.28	$ 3.02	$ 7.05	$ 10.07
Direct Material			$ -	$ -	$ -	$ -
Department Overhead		1	$ 13.27	$ -	$ 13.27	$ 13.27
Allocated Cost						
Housekeeping		1	$ 1.50	$ -	$ 1.50	$ 1.50
Plant Operation		1	$ 16.97	$ -	$ 16.97	$ 16.97
Administration		1	$ 31.61	$ -	$ 31.61	$ 31.61
Total			$ 103.63	$ 3.02	$ 70.40	$ 73.42

TABLE 13

STANDARD COST PROFILE FOR Physician SU # 1 Outpatient Preoperative

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Physician 06 15 min	0.0750	0.175	$ 66.68	$ 5.00	$ 11.67	$ 16.67
Physician 06 60 min	0.3	0.7	$ 66.68	$ 20.00	$ 46.68	$ 66.68
Physician 06 15 min	0.075	0.175	$ 66.68	$ 5.00	$ 11.67	$ 16.67
Direct Material			$ -	$ -	$ -	$ -
Department Overhead		1	$ -	$ -	$ -	$ -
Allocated Cost						
Housekeeping		1	$ 3.37	$ -	$ 3.37	$ 3.37
Plant Operation		1	$ 4.57	$ -	$ 4.57	$ 4.57
Administration		1	$ 19.24	$ -	$ 19.24	$ 19.24
Total			$ 227.22	$ 30.01	$ 97.19	$ 127.20

TABLE 14

STANDARD COST PROFILE FOR Physician SU # 2 Inpatient

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Physician 06 15 min	0.075	0.175	$ 66.68	$ 5.00	$ 11.67	$ 16.67
Direct Material			$ -	$ -	$ -	$ -
Department Overhead		1	$ -	$ -	$ -	$ -
Allocated Cost						
Housekeeping		1	$ -	$ -	$ -	$ -
Plant Operation		1	$ 0.07	$ -	$ 0.07	$ 0.07
Administration		1	$ 114.61	$ -	$ 114.61	$ 114.61
Total			$ 181.36	$ 5.00	$ 126.35	$ 131.35

TABLE 15

STANDARD COST PROFILE FOR Physician SU # 3 Outpatient Postoperative

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Physician 06 15 min	0.075	0.175	$ 66.68	$ 5.00	$ 11.67	$ 16.67
Physician 06 15 min	0.075	0.175	$ 66.68	$ 5.00	$ 11.67	$ 16.67
Direct Material			$ -	$ -	$ -	$ -
Department Overhead		1	$ -	$ -	$ -	$ -
Allocated Cost						
Housekeeping		1	$ 3.37	$ -	$ 3.37	$ 3.37
Plant Operation		1	$ 4.57	$ -	$ 4.57	$ 4.57
Administration		1	$ 19.24	$ -	$ 19.24	$ 19.24
Total			$ 160.54	$ 10.00	$ 50.52	$ 60.52

TABLE 16

STANDARD COST PROFILE FOR Operating Room SU # 1

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Anesthetist O4 60 min	0.3	0.7	$ 40.28	$ 12.08	$ 28.20	$ 40.28
OR Nurse GS09 60 min	0.3	0.7	$ 22.52	$ 6.76	$ 15.76	$ 22.52
OR Tech GS05 60 min	0.3	0.7	$ 14.86	$ 4.46	$ 10.40	$ 14.86
Direct Material						
Steris Sterilant	1		$ 5.25	$ 5.25	$ -	$ 5.25
Steris Indicator	1		$ 0.06	$ 0.06	$ -	$ 0.06
Suction Tubing	1		$ 1.28	$ 1.28	$ -	$ 1.28
1Litter Normal Saline	1		$ 0.68	$ 0.68	$ -	$ 0.68
Suction Canister	1		$ 1.67	$ 1.67	$ -	$ 1.67
Anesthesia	1		$ 20.00	$ 20.00	$ -	$ 20.00
Department Overhead						
Allocated Cost						
Housekeeping		1	$ 0.05	$ -	$ 0.05	$ 0.05
Plant Operation		1	$ 0.14	$ -	$ 0.14	$ 0.14
Administration		1	$ 0.12	$ -	$ 0.12	$ 0.12
Total			$ 106.91	52.238	$ 54.67	$ 106.91

TABLE 17

STANDARD COST PROFILE FOR Emergency Room SU # 1 ER Visit (Abdomonal Pain)

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
LPN/91B/EMT (15 min)	0.075	0.175	$ 19.38	$ 1.45	$ 3.39	$ 4.85
Physician (15 min)	0.075	0.175	$ 43.49	$ 3.26	$ 7.61	$ 10.87
Registered Nurse (15 min	0.075	0.175	$ 35.20	$ 2.64	$ 6.16	$ 8.80
Physician (15 min)	0.075	0.175	$ 43.49	$ 3.26	$ 7.61	$ 10.87
LPN/91B/EMT (15 min)	0.075	0.175	$ 19.38	$ 1.45	$ 3.39	$ 4.85
Direct Material						
IV	2		$ 0.41	$ 0.82	$ -	$ 0.82
Angio cath Tray	1		$ 121.00	$ 121.00	$ -	$ 121.00
3 piece stop cock	3		$ 1.45	$ 4.35	$ -	$ 4.35
Department Overhead		1	$ 12.43	$ -	$ 12.43	$ 12.43
Allocated Cost						
Housekeeping		1	$ 0.45	$ -	$ 0.45	$ 0.45
Plant Operation		1	$ 0.18	$ -	$ 0.18	$ 0.18
Administration		1	$ 0.05	$ -	$ 0.05	$ 0.05
Total			$ 296.91	$ 138.24	$ 41.27	$ 179.52

TABLE 18

STANDARD COST PROFILE FOR Transcription SU #1

Cost category	Quantity Required Variable	Quantity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
Transcriptions GS5 (30 min)	0.15	0.35	$ 14.89	$ 2.23	$ 5.21	$ 7.45
Direct Material				$ -	$ -	$ -
Department Overhead						
Allocated Cost						
Housekeeping				$ -	$ -	$ -
Plant Operation				$ -	$ -	$ -
Administration				$ -	$ -	$ -
Total			$ 14.89	$ 2.23	$ 5.21	$ 7.45

No allocated cost identified in Transcriptionest due to Medical Expense Reporting System Constraints. Material Cost minuscule.

TABLE 19

STANDARD COST PROFILE FOR DIETARY DEPARTMENT, Liquid Meal SU# 1

Coat category	Variable	Quanity Required Fixed	Unit Cost	Variable cost	Average fixed cost	Average total cost
Direct Labor	0.3	0.7				
WG-03 15 min	0.075	0.175	$ 0.60	$ 0.05	$ 0.11	$ 0.15
WG-03 15 min	0.075	0.175	$ 0.60	$ 0.05	$ 0.11	$ 0.15
Direct materials						
Juice	1		$ 0.40	$ 0.40	$ -	$ 0.40
Iced Tea	1		$ 0.35	$ 0.35	$ -	$ 0.35
Broth	1		$ 0.15	$ 0.15	$ -	$ 0.15
Gelatin	1		$ 0.10	$ 0.10	$ -	$ 0.10
Diet Kit	1		$ 0.05	$ 0.05	$ -	$ 0.05
Lemon Packet	1		$ 0.05	$ 0.05	$ -	$ 0.05
Department Overhead		1	$ 0.86	$ -	$ 0.86	$ 0.86
Allocated Cost						
Housekeeping		1	$ 0.14	$ -	$ 0.14	$ 0.14
Plant Operation Administration		1	$ 8.12	$ -	$ 8.12	$ 8.12
Total			$ 11.43	$ 1.19	$ 9.33	$ 10.52

TABLE 20

STANDARD TREATMENT PROTOCOL, DRG # 183 Hepatobiliary Scan SDS
Provider A1

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total variable cost	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		0	$ 16.6	$ 46.3	$ 62.9	$ -	$ -	$ -
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		1	$ 0.3	$ 2.7	$ 3.0	$ 0.30	$ 2.7	$ 3.0
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	0	$ 12.8	$ 27.9	$ 40.8	$ -	$ -	$ -
Radiology	Acute Abdominal Series	1	$ 15.6	$ 36.3	$ 51.9	$ 15.60	$ 36.3	$ 51.9
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		0	$ 3.0	$ 70.4	$ 73.4	$ -	$ -	$ -
Physician	Outpatient	0	$ 30.0	$ 97.2	$ 127.2	$ -	$ -	$ -
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	0	$ 10.0	$ 50.5	$ 60.5	$ -	$ -	$ -
Operating Room		0	$ 52.2	$ 54.7	$ 106.9	$ -	$ -	$ -
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$ 1,209.9	$ 76.60	$ 371.8	$ 448.4

TABLE 21

STANDARD TREATMENT PROTOCOL, DRG # 183 Upper Endoscopy (SDS)
Provider A2

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		1	$ 16.6	$ 46.3	$ 62.9	$ 16.60	$ 46.3	$ 62.9
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	1	$ 12.8	$ 27.9	$ 40.8	$ 12.80	$ 27.9	$ 40.7
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		1	$ 3.0	$ 70.4	$ 73.4	$ 3.00	$ 70.4	$ 73.4
Physician	Outpatient	1	$ 30.0	$ 97.2	$ 127.2	$ 30.00	$ 97.2	$ 127.2
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	1	$ 10.0	$ 50.5	$ 60.5	$ 10.00	$ 50.5	$ 60.5
Operating Room		1	$ 52.2	$ 54.7	$ 106.9	$ 52.20	$ 54.7	$ 106.9
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$1,209.9	$ 185.30	$ 679.8	$ 865.1

TABLE 22

STANDARD TREATMENT PROTOCOL, DRG # 183 Upper Endoscopy (SDS)
Provider A3

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		1	$ 16.6	$ 46.3	$ 62.9	$ 16.60	$ 46.3	$ 62.9
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		1	$ 0.3	$ 2.7	$ 3.0	$ 0.30	$ 2.7	$ 3.0
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	2	$ 12.8	$ 27.9	$ 40.8	$ 25.60	$ 55.8	$ 81.4
Radiology	Acute Abdominal Series	1	$ 15.6	$ 36.3	$ 51.9	$ 15.60	$ 36.3	$ 51.9
Electrocardiograph		1	$ 4.7	$ 105.7	$ 110.3	$ 4.70	$ 105.7	$ 110.4
Anesthesia		1	$ 3.0	$ 70.4	$ 73.4	$ 3.00	$ 70.4	$ 73.4
Physician	Outpatient	1	$ 30.0	$ 97.2	$ 127.2	$ 30.00	$ 97.2	$ 127.2
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	1	$ 10.0	$ 50.5	$ 60.5	$ 10.00	$ 50.5	$ 60.5
Operating Room		1	$ 52.2	$ 54.7	$ 106.9	$ 52.20	$ 54.7	$ 106.9
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$1,209.9	218.7	$ 852.4	$1,071.1

TABLE 23

STANDARD TREATMENT PROTOCOL, DRG # 183 Upper Endoscopy
Provider B1

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		1	$ 16.6	$ 46.3	$ 62.9	$ 16.60	$ 46.3	$ 62.9
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	2	$ 12.8	$ 27.9	$ 40.8	$ 25.60	$ 55.8	$ 81.4
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		1	$ 3.0	$ 70.4	$ 73.4	$ 3.00	$ 70.4	$ 73.4
Physician	Outpatient	1	$ 30.0	$ 97.2	$ 127.2	$ 30.00	$ 97.2	$ 127.2
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	1	$ 10.0	$ 50.5	$ 60.5	$ 10.00	$ 50.5	$ 60.5
Operating Room		1	$ 52.2	$ 54.7	$ 106.9	$ 52.20	$ 54.7	$ 106.9
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$1,209.9	$ 198.10	$ 707.7	$ 905.8

TABLE 24

STANDARD TREATMENT PROTOCOL, DRG # 183 Vival Enterocolities
Provider B2

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	0	$ 6.4	$ 14.9	$ 21.3	$ -	$ -	$ -
Nursing Services	Ward Nursing Care	5	$ 32.5	$ 151.3	$ 183.7	$ 162.50	$ 756.5	$ 919.0
Recovery Room		0	$ 16.6	$ 46.3	$ 62.9	$ -	$ -	$ -
Pharmaceuticals IV		0	$ 0.4	$ 2.7	$ 3.2	$ -	$ -	$ -
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	3	$ 4.2	$ 6.2	$ 10.4	$ 12.60	$ 18.6	$ 31.2
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	0	$ 2.7	$ 6.2	$ 9.0	$ -	$ -	$ -
Pathology	Biopsies	0	$ 12.8	$ 27.9	$ 40.8	$ -	$ -	$ -
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		0	$ 3.0	$ 70.4	$ 73.4	$ -	$ -	$ -
Physician	Outpatient	0	$ 30.0	$ 97.2	$ 127.2	$ -	$ -	$ -
Physician	Ward	5	$ 5.0	$ 126.4	$ 131.4	$ 25.00	$ 632.0	$ 657.0
Physician	Post Operative	0	$ 10.0	$ 50.5	$ 60.5	$ -	$ -	$ -
Operating Room		0	$ 52.2	$ 54.7	$ 106.9	$ -	$ -	$ -
Emergency Room		1	$ 138.2	$ 41.3	$ 179.5	$ 138.20	$ 41.3	$ 179.5
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	15	$ 1.2	$ 9.3	$ 10.5	$ 18.00	$ 140.0	$ 158.0
Total			$ 344.1	$ 865.8	$1,209.9	$ 364.60	$1,604.2	$1,968.8

TABLE 25

STANDARD TREATMENT PROTOCOL, DRG # 183 Epigastric Distress SDS
Provider B3

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		1	$ 16.6	$ 46.3	$ 62.9	$ 16.60	$ 46.3	$ 62.9
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	0	$ 6.1	$ 10.6	$ 16.6	$ -	$ -	$ -
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	2	$ 12.8	$ 27.9	$ 40.8	$ 25.60	$ 55.8	$ 81.4
Radiology	Acute Abdominal Series	1	$ 15.6	$ 36.3	$ 51.9	$ 15.60	$ 36.3	$ 51.9
Electrocardiograph		1	$ 4.7	$ 105.7	$ 110.3	$ 4.70	$ 105.7	$ 110.4
Anesthesia		1	$ 3.0	$ 70.4	$ 73.4	$ 3.00	$ 70.4	$ 73.4
Physician	Outpatient	1	$ 30.0	$ 97.2	$ 127.2	$ 30.00	$ 97.2	$ 127.2
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	1	$ 10.0	$ 50.5	$ 60.5	$ 10.00	$ 50.5	$ 60.5
Operating Room		1	$ 52.2	$ 54.7	$ 106.9	$ 52.20	$ 54.7	$ 106.9
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$1,209.9	$ 212.30	$ 839.1	$1,051.4

TABLE 26

STANDARD TREATMENT PROTOCOL, DRG # 183 SDS Diagnoses Hiatal Hernia
Provider C

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total variable cost	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	1	$ 32.5	$ 151.3	$ 183.7	$ 32.50	$ 151.3	$ 183.8
Recovery Room		1	$ 16.6	$ 46.3	$ 62.9	$ 16.60	$ 46.3	$ 62.9
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	0	$ 6.1	$ 10.6	$ 16.6	$ -	$ -	$ -
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	4	$ 12.8	$ 27.9	$ 40.8	$ 51.20	$ 111.6	$ 162.8
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		1	$ 4.7	$ 105.7	$ 110.3	$ 4.70	$ 105.7	$ 110.4
Anesthesia		1	$ 3.0	$ 70.4	$ 73.4	$ 3.00	$ 70.4	$ 73.4
Physician	Outpatient	1	$ 30.0	$ 97.2	$ 127.2	$ 30.00	$ 97.2	$ 127.2
Physician	Ward	1	$ 5.0	$ 126.4	$ 131.4	$ 5.00	$ 126.4	$ 131.4
Physician	Post Operative	1	$ 10.0	$ 50.5	$ 60.5	$ 10.00	$ 50.5	$ 60.5
Operating Room		1	$ 52.2	$ 54.7	$ 106.9	$ 52.20	$ 54.7	$ 106.9
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	1	$ 1.2	$ 9.3	$ 10.5	$ 1.20	$ 9.3	$ 10.5
Total			$ 344.1	$ 865.8	$ 1,209.9	$ 222.30	$ 858.6	$ 1,080.9

TABLE 27

STANDARD TREATMENT PROTOCOL, DRG # 183 Intravenous Pyelogram
Provider D

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	0	$ 6.4	$ 14.9	$ 21.3	$ -	$ -	$ -
Nursing Services	Ward Nursing Care	2	$ 32.5	$ 151.3	$ 183.7	$ 65.00	$ 302.6	$ 367.6
Recovery Room		0	$ 16.6	$ 46.3	$ 62.9	$ -	$ -	$ -
Pharmaceuticals IV		0	$ 0.4	$ 2.7	$ 3.2	$ -	$ -	$ -
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	0	$ 4.2	$ 6.2	$ 10.4	$ -	$ -	$ -
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	0	$ 12.8	$ 27.9	$ 40.8	$ -	$ -	$ -
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		0	$ 3.0	$ 70.4	$ 73.4	$ -	$ -	$ -
Physician	Outpatient	0	$ 30.0	$ 97.2	$ 127.2	$ -	$ -	$ -
Physician	Ward	0	$ 5.0	$ 126.4	$ 131.4	$ -	$ -	$ -
Physician	Post Operative	0	$ 10.0	$ 50.5	$ 60.5	$ -	$ -	$ -
Operating Room		0	$ 52.2	$ 54.7	$ 106.9	$ -	$ -	$ -
Emergency Room		1	$ 138.2	$ 41.3	$ 179.5	$ 138.20	$ 41.3	$ 179.5
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	4	$ 1.2	$ 9.3	$ 10.5	$ 4.80	$ 37.3	$ 42.1
Total			$ 344.1	$ 865.8	$1,209.9	$ 219.00	$ 403.2	$ 622.2

TABLE 28

STANDARD TREATMENT PROTOCOL, DRG # 183 SDS Gastroenteritis
Provider E

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total /ariable cos	Total fixed cost	Total cost
Nursing Services	Preadmission	1	$ 6.4	$ 14.9	$ 21.3	$ 6.40	$ 14.9	$ 21.3
Nursing Services	Ward Nursing Care	2	$ 32.5	$ 151.3	$ 183.7	$ 65.00	$ 302.6	$ 367.6
Recovery Room		0	$ 16.6	$ 46.3	$ 62.9	$ -	$ -	$ -
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		2	$ 0.3	$ 2.7	$ 3.0	$ 0.60	$ 5.4	$ 6.0
Pathology	Hematology	1	$ 4.2	$ 6.2	$ 10.4	$ 4.20	$ 6.2	$ 10.4
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	0	$ 12.8	$ 27.9	$ 40.8	$ -	$ -	$ -
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		0	$ 3.0	$ 70.4	$ 73.4	$ -	$ -	$ -
Physician	Outpatient	0	$ 30.0	$ 97.2	$ 127.2	$ -	$ -	$ -
Physician	Ward	0	$ 5.0	$ 126.4	$ 131.4	$ -	$ -	$ -
Physician	Post Operative	0	$ 10.0	$ 50.5	$ 60.5	$ -	$ -	$ -
Operating Room		0	$ 52.2	$ 54.7	$ 106.9	$ -	$ -	$ -
Emergency Room		0	$ 138.2	$ 41.3	$ 179.5	$ -	$ -	$ -
Transcription	History,T	1	$ 2.2	$ 5.2	$ 7.4	$ 2.20	$ 5.2	$ 7.4
NCD SU #1	Meal Liquid	4	$ 1.2	$ 9.3	$ 10.5	$ 4.80	$ 37.3	$ 42.1
Total			$ 344.1	$ 865.8	$1,209.9	$ 92.40	$ 391.1	$ 483.5

TABLE 29

STANDARD TREATMENT PROTOCOL, DRG # 183 LOS (2 days) Dignoses Viral Gastroenteritis

Provider F

SU no	SU name	Quantity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total variable cost	Total fixed cost	Total cost
Nursing Services	Preadmission	0	$ 6.4	$ 14.9	$ 21.3	$ -	$ -	$ -
Nursing Services	Ward Nursing Care	2	$ 32.5	$ 151.3	$ 183.7	$ 65.00	$ 302.6	$ 367.6
Recovery Room		0	$ 16.6	$ 46.3	$ 62.9	$ -	$ -	$ -
Pharmaceuticals IV		1	$ 0.4	$ 2.7	$ 3.2	$ 0.40	$ 2.7	$ 3.1
Pharmaceuticals		0	$ 0.3	$ 2.7	$ 3.0	$ -	$ -	$ -
Pathology	Hematology	3	$ 4.2	$ 6.2	$ 10.4	$ 12.60	$ 18.6	$ 31.2
Pathology	General Chemistry	1	$ 6.1	$ 10.6	$ 16.6	$ 6.10	$ 10.6	$ 16.7
Pathology	Urinalysis	1	$ 2.7	$ 6.2	$ 9.0	$ 2.70	$ 6.2	$ 8.9
Pathology	Biopsies	0	$ 12.8	$ 27.9	$ 40.8	$ -	$ -	$ -
Radiology	Acute Abdominal Series	0	$ 15.6	$ 36.3	$ 51.9	$ -	$ -	$ -
Electrocardiograph		0	$ 4.7	$ 105.7	$ 110.3	$ -	$ -	$ -
Anesthesia		0	$ 3.0	$ 70.4	$ 73.4	$ -	$ -	$ -
Physician	Outpatient	0	$ 30.0	$ 97.2	$ 127.2	$ -	$ -	$ -
Physician	Ward	0	$ 5.0	$ 126.4	$ 131.4	$ -	$ -	$ -
Physician	Post Operative	0	$ 10.0	$ 50.5	$ 60.5	$ -	$ -	$ -
Operating Room		0	$ 52.2	$ 54.7	$ 106.9	$ -	$ -	$ -
Emergency Room		1	$ 138.2	$ 41.3	$ 179.5	$ 138.20	$ 41.3	$ 179.5
Transcription	History,T	0	$ 2.2	$ 5.2	$ 7.4	$ -	$ -	$ -
NCD SU #1	Patient Meal Day	12	$ 1.2	$ 9.3	$ 10.5	$ 14.40	$ 112.0	$ 126.4
Total			$ 344.1	$ 865.8	$ 1,209.9	$ 239.40	$ 494.0	$ 733.4

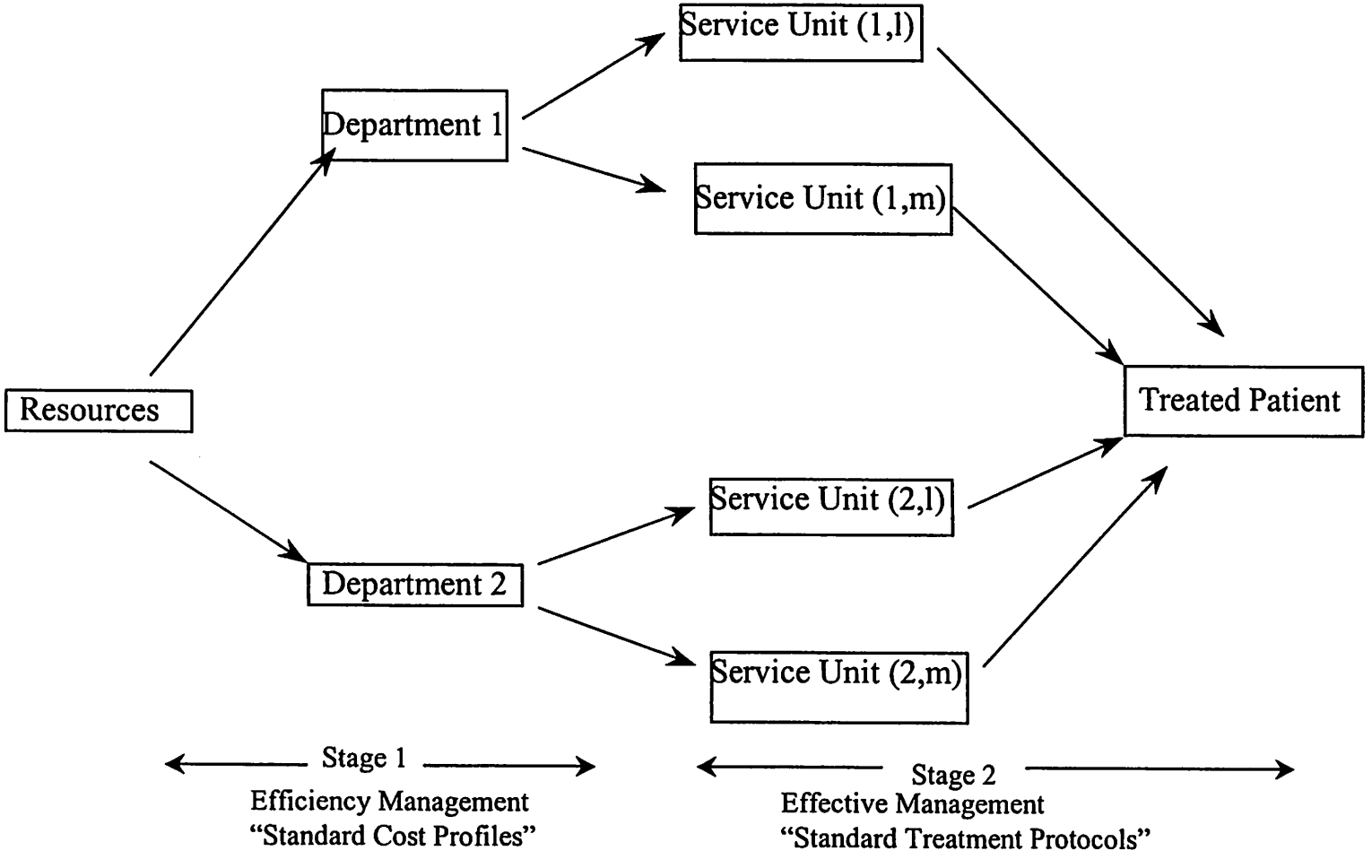
Table 30 Comparison of Microcosting and MEPRS costs information.

Table 30	Time required to get costing data	Identification of relevant costs	Identification of direct costs	Accuracy of costs	Value
Microcosting	-	+	+	+	2+
MEPRS	+	-	+/-	-	1-

TABLE 31

Calculation of allocated department overhead service-unit cost for plant operations

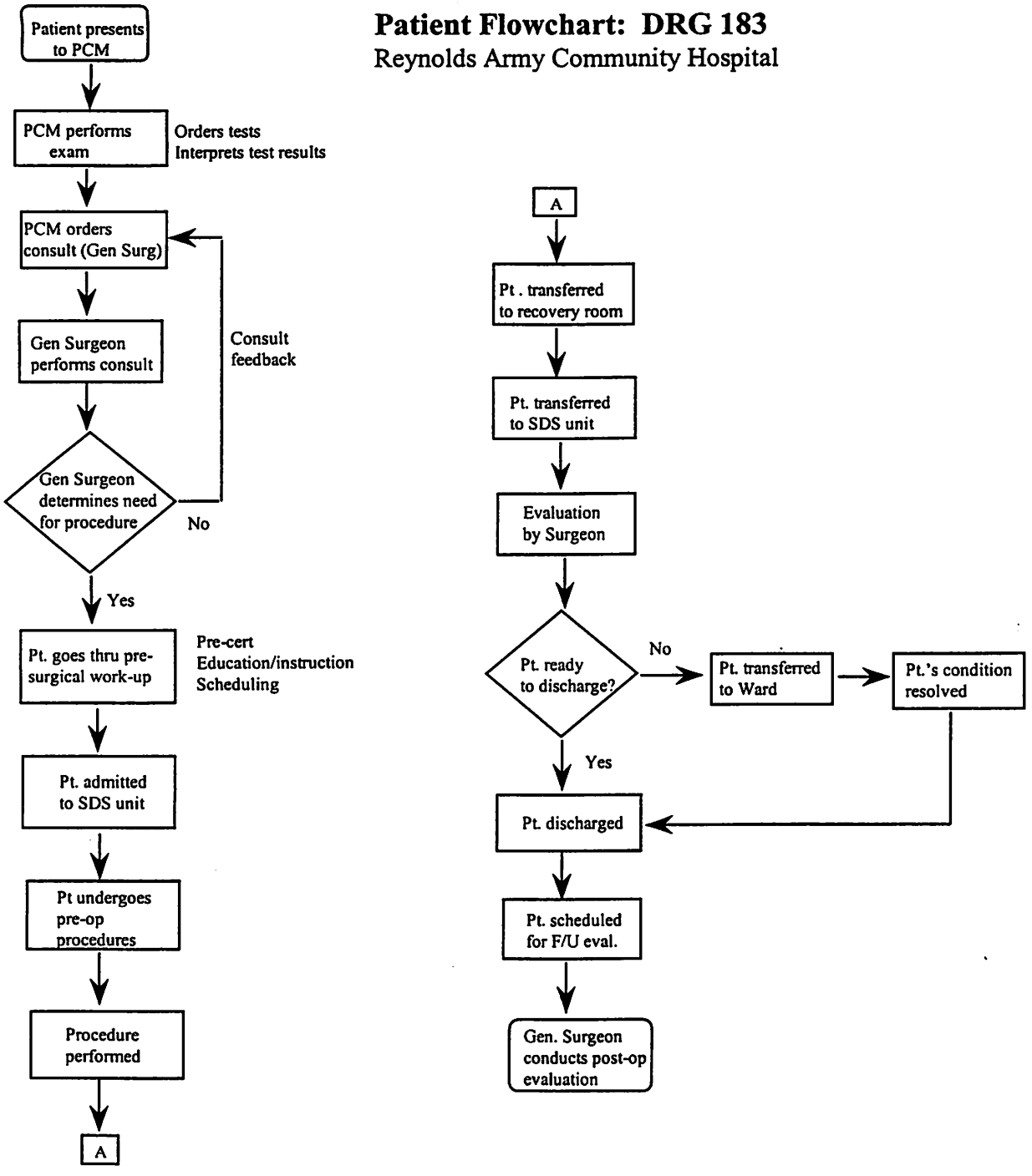
Cost Center	Expenses Plant Operations	MEPRS Identified Unit	Units	Department Overhead Service-Unit Cost Plant Operations Expenses/Units
2 West AAXA	$45,812	Occupied bed days	4,003	$11.44
Pathology DBA Lab	$314,920	Raw Procedures	371,437	$0.85
General Surgery BBAA	$22,528	Clinic Visits	4,921	$4.58



Taken from Product Costing For Health Care Firms
William O. Cleverley Health Care Management Reveiw 1987 page 43

Patient Flowchart: DRG 183

Reynolds Army Community Hospital



Standard Cost Sheet DRG # 183

Input Name (Service Unit)	Required Quantity	Unit Cost	Total Cost
Patient days of nursing services			
Preoperative Nursing			
Ward Care			
Postoperative Nursing			
Recorvery Room Service			
Pharmaceuticals			
IV			
Pathology			
Hematology			
General Chemistry			
Urinalysis			
Biopies			
Radiology			
Acute Abdominal Series			
Electrocardiograph			
Photograph			
Anesthesia			
Physician			
Outpatient Preoperative			
Inpatient			
Outpatient Postoperative			
Operating room			
Emergency Room			
Transcription			
Patient Meal			
Total Costs			

Appendix D

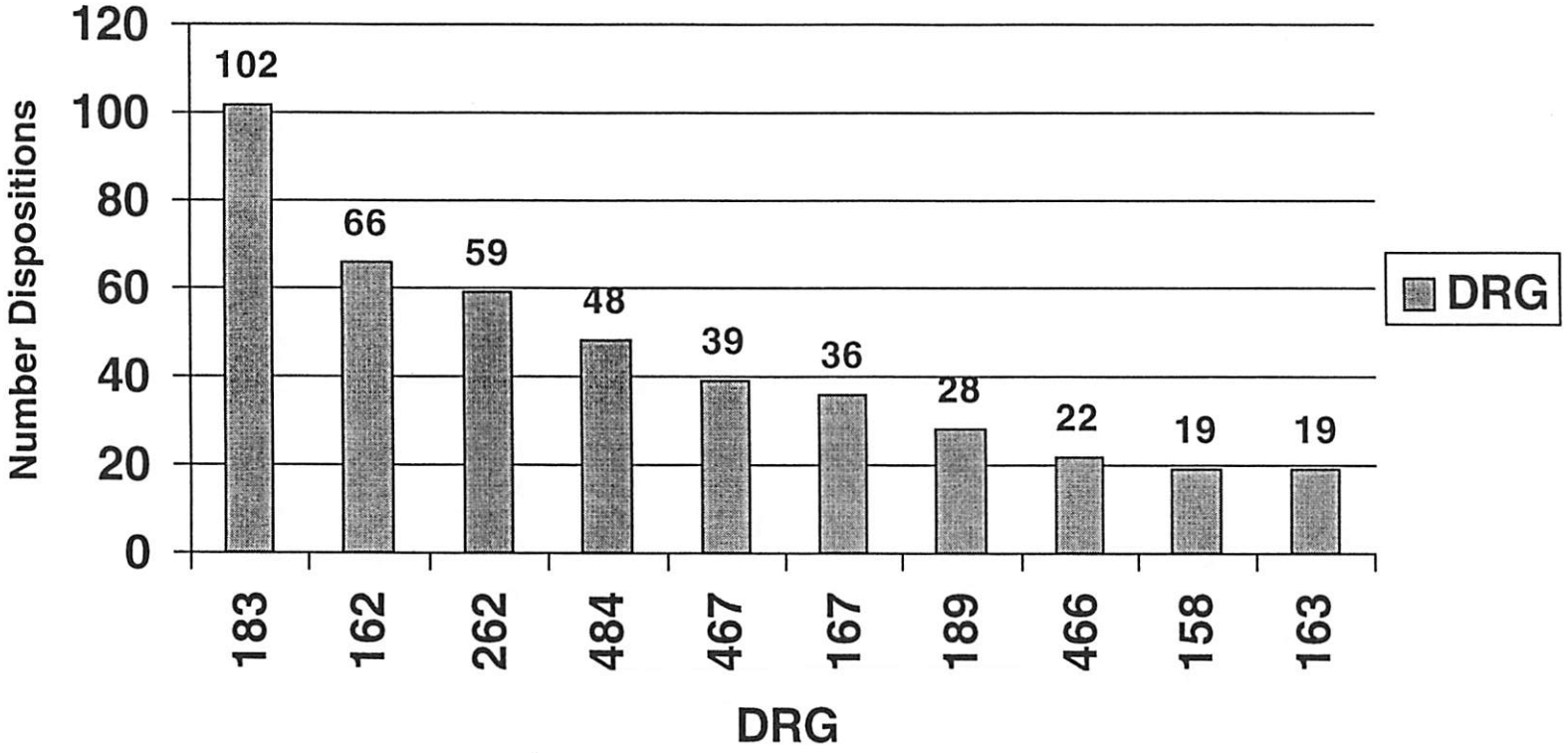
Format Taken From Figure 4 William O. Cleverly Ph.D CPA
Modern Health Care April 1984

APPENDIX E

STANDARD TREATMENT PROTOCAL, DRG # 183

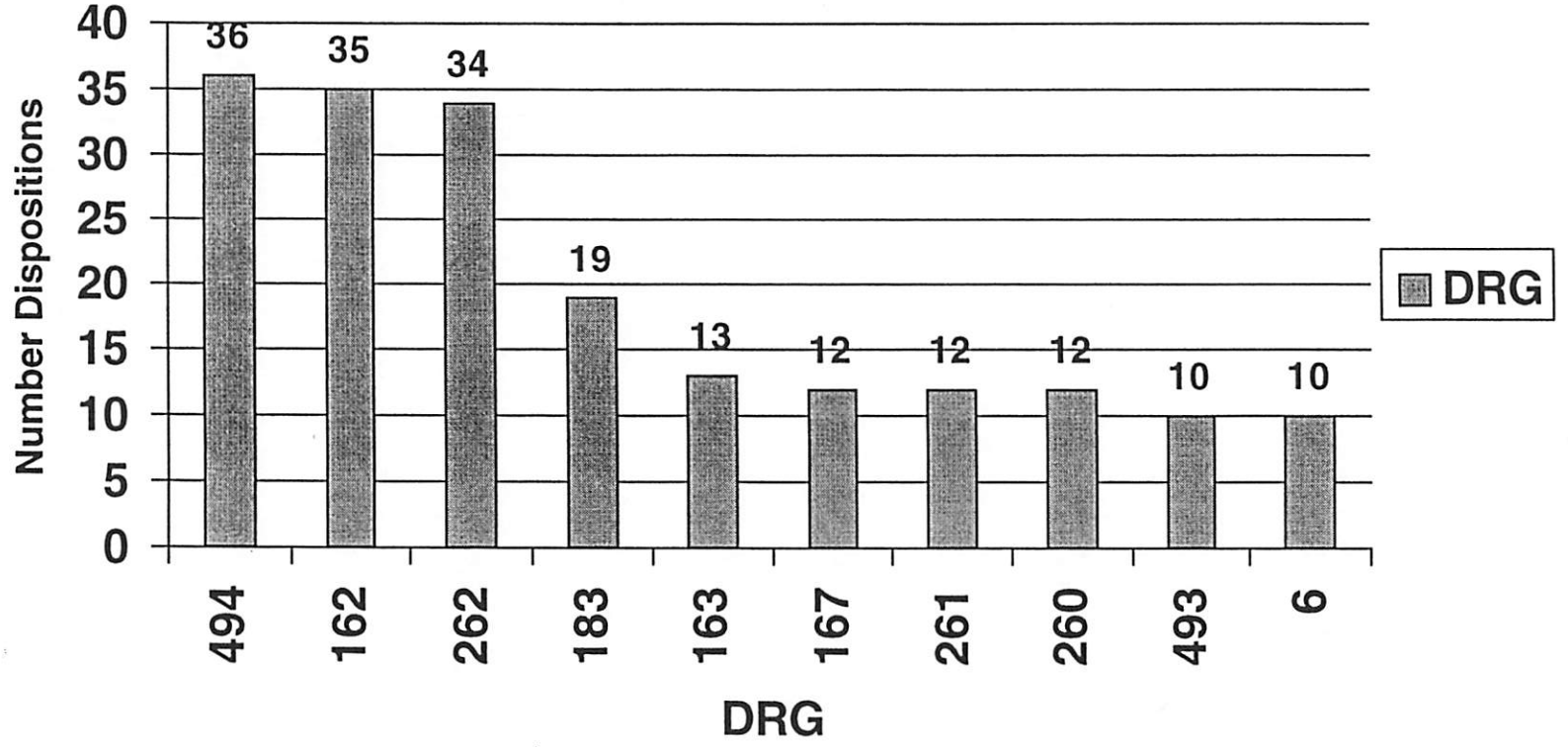
SU no	SU name	Quanitity	Variable cost/unit	Fixed cost/unit	Total cost/unit	Total variable cost	Total fixed cost	Total cost

Parato Chart
DRG Dispositions General Surgery Clinic (ABA)
Fort Sill



Appendix E

Parato Chart
DRG Dispositions General Surgery Clinic (ABA)
Sheppard



Appendix F

REFERENCES

Asadi, M.J. and Baltz, W.A. "Activity-based costing for clinical paths. An example to improve clinical cost and efficiency," Journal Social Health System 5 (2) 1996: 1-7

Bruns, William J. Jr., and Kaplan, Robert S. III Editors Accounting & Management Field Study Perspective. Boston: Harvard Business School Press, 1987

Chan, Yee-Ching L. " Improving hospital cost accounting with activity-based costing," Health Care Management Review 18 (1) 1993: 71-77

Cleverley, William O., "Cost accounting pins a value to DRGs," Modern Healthcare. 14 Apr 1984: 172-79

_____ "Product costing for health care firms," Health Care Management Review 12 (4) 1987: 39-48

_____. Essentials of Health Care Finance. Gaithersburg: Aspen Publishers, 1992.

Coventry, J et al, MHSS Workload Primer Reference Guide to MHSS Workload Measurement Terminology: Arlington: Systems Research and Applications (SRA) Corporation. 1995

Dieter, Bryan B., "Understanding the Hospital Cost Accounting Process," Hospital Cost Accounting Process 2 (2) July 1986: 1-6

_____. " The Identification of Surgical Services Costs," Hospital Cost Accounting Advisor 2 (8) January 1987: 1-5

Dowless, R.M., "Using activity-based costing to guide strategic decision making," Health Financial Management 51 (6) 1997:86,88,90.

Finkler, Steven A. "A Microcosting Approach," Hospital Cost Accounting Advisor," 2 (12) May 1987: 1-4

_____." Costing Out Nursing Services," Hospital Cost Management and Accounting, 1 (12) Mar 1990: 1-5

_____. Essentials of Cost Accounting for Health Care Organizations, Gaithersburg: Aspen Publishers. 1994.

_____. "Issues in Cost Accounting for Health Care Organizations," Gaithersburg: Aspen Publishers. 1994

_____. "Responsibility Accounting in a Dynamic Environment: Activity-Based Cost Management." Hospital Cost Management and Accounting 8 (7)
Oct 1996: 1-5

GOAL/QPC, The Memory Jogger A Pocket Guide of Tools For Continuous Improvement, 2ed, Methuen. 1988

Grossman, Zachary D. et. Al, Cost-Effective Diagnostic Imaging The Clinician's Guide, 3rd St Louis, Mo.: Mosby 1995.

Holmes, Richard L., Richard E. Schroeder, " ABC Estimation of Unit Costs for Emergency Department Services." Journal of Ambulatory Care Management, 19 (2) 1996: 22-31

Hooper, James J. Col, Memorandum "Right Sizing- Sheppard AFB Hospital" to Lt Col Bev Messings, TRICARE Southwest, Nov 94.

Horngren, Charles T., George Foster, Cost Accounting: A Managerial Emphasis. 7th ed. Englewood Cliffs, N.J.: Prentice Hall, 1991.

Horngren, C. Cost Accounting: A Managerial Emphasis. 4th ed. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

Lerner, M. Wayne et al. "Pricing Hospital Units of Service Using Microcosting Techniques," Hospital and Health Services Administration 30 Jan Feb 1985: 7-28

Lukens, W. "Activity-based costing, more accurate," OR Manager 13 (6) Jun 1997: 20-2.

Moorhead, John, MD. "Cost Accounting for Emergency Services," Hospital Cost Management and Accounting," 1 (2) May 1989: 1-7

Nackel, G. John at al., Cost Management for Hospitals. Rockville, Maryland: Aspen, 1987.

Payson, N.C. "Physician Productivity and Capitation: Living with the 'C' Word," Journal of Ambulatory Care Management, 12 (1) Feb 1989: 1-5

Ramsey, RH. 4th "Activity-based costing for Hospitals," Hospital and Health Services Administration, 39 (3) Fall 1994: 385-96

Schuneman, P., "Master the 'ABCs' of activity-based costing," Managed Care 6 (5) May 1997: 43, 48, 53.

Steimer, Thomas E., Activity-Based Accounting for Total Quality, Management Accounting Oct 1990: 39-42

Stiles R.A., Mick S.S., " What is the cost of controlling quality? Activity-Based cost accounting offers an answer. Hospital Health Services Administration, 42 (2) Summer 1997: 193-204.

Storfjell J.L. and Jessup, S., Bridging the gap between finance and clinical operations with activity-based cost management," Journal Nursing Administration 26 (12) Dec 1996: 12-7.

Udpa, Suneel, "Activity Based Costing for Hospitals," Health Care Management Review, 21(3) 1996: 83-96

Watkins, Kirsten F., A Differential Cost Study of Cardiothoracic Surgery at Wilford Hall Medical Center. Academy of Health Sciences (Army) Fort Sam Houston TX: Jun 95

U.S. Department of the Army, The Workload Management System for Nursing, Field Manual 8-501, Headquarters Department of the Army, Washington, DC, 1990

U.S. Department of Defense, Assistant Secretary of Defense for Health Affairs, DOD 6010.13-M Medical Expense and Performance Reporting System for Fixed Military and Dental Treatment Facilities, October 1995.