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Rapid proliferation of the TRIFOOD automated hospital food service system is occurring throughout the Department of Defense (DOD). A major system problem being experienced by managers at U.S.Army sites is that they have not been able to effectively apply the data generated by the TRIFOOD system to enhance their overall food service operations. This study uncovered the major fundamental problem that the sites have not been successfully implementing the system. An evaluation model was developed and used to evaluate the implementation status and data utilization of the TRIFOOD system at the U.S. Army sites in the greater Washington, D.C. area. The study discussed the potential patient care benefits that the TRIFOOD system could provide and measured where the sites were in relation to realizing these benefits. The key to success of the TRIFOOD system was viewed as timely system implementation with the effective and efficient flow of generated data into useful information. The findings of this study revealed that the management of U.S. Army hospital food service operations in the greater Washington, D.C. area has not been significantly enhanced by the TRIFOOD system.

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A CRITICAL EVALUATION OF THE
TRIFOOD AUTOMATED FOOD SERVICE SYSTEM

A Graduate Management Project

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

Captain Linda L. Rowbotham, SP

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Abstract

Rapid proliferation of the TRIFOOD automated hospital food service system is occurring throughout the Department of Defense (DOD). A major system problem being experienced by managers at U.S. Army sites is that they have not been able to effectively apply the data generated by the TRIFOOD system to enhance their overall food service operations. This study uncovered the major fundamental problem that the sites have not been successfully implementing the system. An evaluation model was developed and used to evaluate the implementation status and data utilization of the TRIFOOD system at the U.S. Army sites in the greater Washington, D.C. area. The study discussed the potential patient care benefits that the TRIFOOD system could provide and measured where the sites were in relation to realizing these benefits. The key to the success of the TRIFOOD system was viewed as timely system implementation with the effective and efficient flow of generated data into useful information. The findings of this study revealed that the management of U.S. Army hospital food service operations in the greater Washington, D.C. area has not been significantly enhanced by the TRIFOOD system.

Chapter I - Introduction

The TRIFOOD automated hospital food service system is available in a growing number of U.S. Army hospitals. The system provides a large quantity of useful data to food service personnel and permits them to compute historical comparisons of this data to maintain or improve existing operations. Additionally with the TRIFOOD system, assigned personnel are capable of performing much more sophisticated analyses of food service operations than were ever possible prior to its implementation.

Conditions Which Prompted the Study

My study of the TRIFOOD automated hospital food service system is prompted by an identified need for a study to clarify the capabilities and to measure the benefits realization of this newly implemented system. A major concern of the Surgeon General and the Major Army Command (MACOM) dietetic consultants is how to best use the information available from the TRIFOOD system in evaluating food service operations. At the Medical Treatment Facility (MTF) level, the utility of the TRIFOOD generated data is not fully understood by food service managers. The Army Medical Specialists Corps (AMSC) managers and users have made a substantial time investment to implement the TRIFOOD system. The most immediate systems benefits have been realized in the functional area of ration accounting. The majority of the other areas require initially lengthy and complicated implementation

efforts that do not result in immediate rewards. For the TRIFOOD system to achieve continued success, ongoing training support and user-friendly information acquisition is essential at the facility level.

The success of the TRIFOOD automated food service system is not only a major concern of the AMSC, but also an important issue to all levels of command in the Army Medical Department (AMEDD). At Kimbrough Army Community Hospital, Fort George G. Meade, Maryland, the TRIFOOD system is currently being implemented in the Nutrition Care Division (NCD). This facility is the site of my residency training in Health Care Administration and through my research will benefit directly from the study. In the Washington, D.C. area, there are also many facilities that are implementing the TRIFOOD system which are at different stages in the process. I capitalized on this fact and examined each of the different facilities. I also had the support and guidance of the TRIFOOD Project Manager, Lieutenant Colonel Barbara B. McCarty at the Defense Medical Information Systems (DMIS) Office in Washington, D.C..

Problem Statement

Since January 1988, a rapid proliferation of the TRIFOOD automated system has occurred throughout U.S. Army hospital food service sites. The food service personnel at these facilities now have the ability to generate sophisticated food service data, but

they are not using the system to achieve its documented potential and to fully benefit from this valuable resource.

Literature Review

Researchers agree that effective and efficient use of information systems is critical to the success of healthcare organizations (Austin, 1989; Gross, 1990; & Toole, 1990). For example, Toole and Campbell (1990) contend that the purpose of automating is to position users as integral parts of the care delivery system. They believe that if each user is not accessing the information system, then the investment is wasted. In another recent article, Ummel and Dorenfest (1990) describe the familiar predicament facing many incoming health system Chief Executive Officers (CEOs) that they inherit information systems which cost too much and provide too little value or service. From a somewhat different perspective, Watlington (1989) points out that the benefits realization of an information system is dependent on the specific hospital's culture and their management's commitment to achieving results. She further attributes successful results to a careful systems implementation plan that must include realistic expectations that are achievable through user involvement. Gross (1990) also stresses management commitment by identifying an information management approach aimed at management involvement. He believes that to realize the promise of information technology, some things must change, and the first change occurring is a

growing commitment by CEOs to effective management and use of information.

In a 1989 article for <u>Health Progress</u>, Charles J. Austin, PhD lists five essential areas of CEO responsibility to ensure the effective use of information systems. These areas include strategic planning, information systems planning, user-driven focus, systems integration, and monitoring of results. Trotter (1990) expounds on the executive's key role in information systems management. He states that healthcare executives are much more accountable to the daily routines of the hospital, and as such they have to be more productive, answer numerous questions and address many more issues of quality. He believes that computers can help CEOs to justify, head-off and analyze problems. In other words, Tom Peters (1987) appropriately uses a quote by Jan Carlzon stating that "an individual without information cannot take responsibility; an individual who is given information cannot help but take responsibility".

The current literature clearly supports the argument that the amount of information management responsibility a CEO assumes can greatly influence an organization. Pollock (1990) focuses on this influence and discusses the necessity of changing the mindset of top executives. She quotes Mark Gross, a partner with the consulting firm of Ernst & Young, who believes that "top healthcare executives still look at information technology as a

way of processing necessary transactions of financial and administrative data and that they do not look at it as a way to enhance operations or as a fundamental way to improve the delivery of service". The CEO's concentration should target on getting the most from the information systems that do exist and are installed rather than looking for answers and future successes in new technologies (Zinn's Wish List, 1990). Trotter (1990) identifies two main criteria required to maximize the use of information systems. He cites one criteria as a serious commitment from upper management to the system and the other criteria as the need to invest heavily in the initial training of the new information management system. He advocates the importance of upper management's involvement in monitoring the system's usage and tracking who is asking for what and why. He contends that this approach provides a clue about who is realizing benefits from the information system and who is not.

Military hospital commanders are experiencing the trials of management involvement associated with the rapid proliferation of medical information systems (MIS) throughout the military healthcare environment. Like a CEO, they need to determine the benefits and successes of the information systems deployed for use in their facilities. One such system is the TRIFOOD automated hospital food service system that is being installed in a growing number of Army hospitals. Historically, Army hospital commanders

have relied on the Nutrition Care Division (NCD) Chiefs to keep them informed about food service operations. Now, commanders are looking to the NCD Chiefs for information regarding the TRIFOOD system.

Food service literature contains little information about evaluating and improving food service information management systems. In a recently published article, Bender and Matthews (1989) address this issue and provide an evaluation model for computer food service management systems. They report that the evaluation factors leading toward a successful system include user satisfaction, performance that relates to strategic plans, assessing characteristics of information and its use, and having a committee rather than an individual conduct the evaluation. The future of the TRIFOOD computer system rests on the evaluation of these factors. Many hospital commanders and NCD Chiefs believe that the system is not achieving its documented potential and that their sites are not fully benefiting from this valuable resource.

Purpose

The purposes of this study are (a) to evaluate the data utilization and benefits realization of the TRIFOOD system in the greater Washington, D.C. area, (b) to establish criteria for the military hospital food service application of generated data from

the TRIFOOD system, and (c) to develop an implementation strategy

to assist sites in the implementation and future utilization of

the TRIFOOD system.

Chapter II - Methods and Procedures

Initially, a research review of historical TRIFOOD

documentation maintained at the Defense Medical Systems Support

Center (DMSSC), VA and the Defense Medical Information Systems

(DMIS) office, D.C. was conducted. Time was not only spent going

through files to extract data pertaining to the project but also

used for querying the system dietitians on the implementation

status of the TRIFOOD system.

The design of this research project was a systems analysis of

the TRIFOOD automated food service system in the greater

Washington, D.C. area. The Army sites evaluated included: Fort

George G. Meade (FGGM), MD; Walter Reed Army Medical Center

(WRAMC), D.C.; and Fort Belvoir, VA. These sites were chosen

based on their close proximity to my residency site and their

varying stages of TRIFOOD system implementation.

To evaluate the data utilization and benefits realization of

the TRIFOOD system in the greater Washington, D.C. area, I

developed an evaluation model that focused on four aspects of

application. The model addressed: 1) to what extent the TRIFOOD

system was used on a daily basis, 2) for what general purposes the

TRIFOOD system was used, 3) to what extent the expected system

benefits were realized, and 4) to what extent additional system

benefits were realized. To support this model, an evaluation tool

was developed that consisted of twenty-five questions. These

questions are listed in Appendix A. Questions one through four

focused on the issue of daily use. An important aspect of the

daily use was not only the frequency of use but also the number of

users, the number of locations the system could be accessed and

used from and the role of the users. The definition of users was

broadened to include those individuals who not only participated

in input but also the supervisors that utilized the data generated

by the system. Questions five through twenty-five incorporated

the expected benefits uncovered during the research review in

order to measure what a site had achieved in relation to what was

expected to be achieved. Evaluation techniques included personal

interviews with the senior command and staff personnel and

personal observation of the system's uses and data applications at

each of the sites.

Using the data gathered from the evaluation phase, a

comparison analysis was conducted to identify trends in TRIFOOD

system's data use and application. Based on the interpretation of

these results, an implementation strategy was developed to assist

sites in the implementation and future utilization of the TRIFOOD

system.

Chapter III - Results

The initial research review at the DMSSC and the DMIS office

uncovered some important information about the TRIFOOD system.

An implementation manual had been written and distributed by the

DMIS office to the TRIFOOD sites. It states that TRIFOOD is a

very comprehensive management information system and because it is

so comprehensive, it is impossible to begin using all of the

TRIFOOD capabilities immediately after the system is installed.

The purpose of the implementation manual was to provide site

personnel with step-by-step procedures to phase in the operation

of the various TRIFOOD capabilities. In its summary, the manual

advises the sites to examine all of the available TRIFOOD

functions, reports and displays and to determine their

applicability to their organization. It cautions that only sites

can determine the capabilities they want to use and only they can

determine how these capabilities can be best put to use to benefit

their organization.

TRIFOOD capabilities can be described under the four

functional headings of Patient and Meal Control, Food Service

Management, Nutritional Services, and General Dietary Data.

Within Patient and Meal Control, the user can maintain or display

individual patient data and generate related reports. Appendix B

lists the Patient and Meal Control functions. In Appendix C, the

Food Service Management functions are listed. By accessing Food

Service Management, the user can accomplish purchase planning,

purchase order entry, inventory maintenance, production planning,

recipe demand forecasting, food operations management, and ration

accounting. For Nutritional Services, the user can work with the

nutrient database, nutritional analysis, or nutritional

assessment. Appendix D outlines these functions. The heart of

the TRIFOOD system can be found in the General Dietary Data.

Under this heading, the user finds the foundation module, menu

planning, and general utilities. Appendix E lists the functions

of each.

Prior to the installation of the TRIFOOD system at various

U.S. Army sites, a workload survey was conducted by the DMIS

office. The workload statistics used for TRIFOOD automated data

processing sizing of the three evaluated sites was copied from the

DMIS files. Appendix F shows these statistics. Based on this

workload information, equipment requirements for site

configuration had been determined. Table 1 consolidates the

equipment requirements for site configuration pertaining to the

three sites. The reported status of the TRIFOOD system

implementation at the three sites was also maintained in the DMIS

files. Table 2 contains this information and the annual funding

requirements. Additional site specific information will be

included in the discussion chapter.

Table 1

Site Configuration

	FGGM	Fort Belvoir	WRAMC
Equipment			
Workstation	4	6	12
File Server	1	1	1
Printer	3	4	8

Table 2

Implementation and Funding Status

	FGGM	Fort Belvoir	WRAMC
Menu	No	Yes	Yes
Inventory	?	Yes	Yes
Full Production	No	No	Yes
Nutritional Analysis	No	No	No
Patient Cardex	No	No	No
Annual Funding (FY91)			
Maintenance	$4544.84	$5206.02	$7330.46
Supplies	$3500.00	$3500.00	$5000.00
Training/Travel	$1000.00	$1000.00	$1000.00
Total	$9044.84	$9706.02	$13330.76

Other findings during the research review were the different
lists used to detail system benefits that have evolved since the
inception of the TRIFOOD system. From The Preliminary Economic
Analysis of the TRIFOOD System prepared by Arthur D. Little, Inc.
in 1984, the expected system benefits were used to develop the
evaluation tool. Table 3 and 4 list the expected quantitative and
qualitative system benefits, respectively.

Table 3

<u>Expected Quantitative System Benefits</u>

1. Food Cost Savings

2. Inventory Reductions

3. Personnel Savings

    a. Management and Financial Reporting

    b. Inventory Maintenance

    c. Service Management

    d. Clerical Assistance

    e. Menu Planning: Cost and Nutrition Analysis

    f. Patient Nutritional Analysis

Table 4

Expected Qualitative System Benefits

1. Improved quality of patient care because of more frequent nutritional analyses.

2. Improved quality of patient care because of an increase in the number of patients interacting with dietitians.

3. Facilitate the nutritional assessment of patients to favorably affect a patient's morbidity, mortality or length of stay.

4. Less opportunity for fraud, waste, and abuse, because of more timely and accurate management data.

5. Improved management of the Food Service Department because reports will be more complete and accurate, enabling personnel to make more effective management decisions.

6. Increased compliance with military department regulations.

7. Reduction in transcription and computation errors in inventory records and purchase orders.

8. Increased patient and diner satisfaction because of the reduced chance of shortages of preferred food.

9. Increased patient satisfaction because of improved preparation, quality, or kind of food served.

10. Increased job satisfaction of all food service personnel because of the elimination of tedious, monotonous, and repetitive clerical tasks.

(table continues)

11. Increased job satisfaction of dietitians because of more involvement with professional rather than procedural activities.

12. Increased job satisfaction of the food manager because of more timely and accurate management reports and inventories.

Another good source for understanding TRIFOOD capabilities and benefits was a briefing prepared by the DMIS office. The briefing covered capabilities and associated benefits in data base, menu planning, purchasing and inventory, production, ration accounting and clinical dietetics. For data base, one TRIFOOD capability was that each site was given a "starter" file containing subsistence items from the Federal Supply Catalog, recipes from the Armed Forces Recipe File, and nutrient data from Michigan State University. Additionally, the file was augmented by beta site data. The benefits of this capability were that it improves standardization of data and decreases time to load the data base. Another TRIFOOD capability was local versus central control of the data base. In the past, sites that had automated food service support relied on the hospital's centralized computer room to provide data base management. The benefits associated with local versus central control were that it not only increases flexibility and timeliness, but also increases the NCD's ability to manage responsibility and to work independently.

The menu planning portion revealed two TRIFOOD capabilities. The first capability was to calculate costs and nutritional contents of menus. The associated benefits were that this capability eliminates manual calculations, ensures menus meet cost and nutritional constraints and that it supports a la carte operations. The second capability was to print food code worksheets, dining room menus, and patient select menus. The major benefit of this capability was to eliminate manual typing and production of these documents.

Three TRIFOOD capabilities were cited in the area of purchasing and inventory. One capability was to calculate order quantities and to print purchase orders. The benefits of this capability were to eliminate manual calculations and preparation of purchase orders, to improve accuracy of orders and reduce over or under stock resulting in less in inventory and less waste or spoilage. Another capability was to calculate kitchen requisition quantities and to print requisitions. This capability eliminates manual calculations and preparation of requisitions and also improves accuracy of requisitions and reduces waste. The third capability associated with purchasing and inventory was to maintain records and print usage and costs reports. The three benefits of this capability were discussed. The first benefit was to reduce time for users to maintain inventory records since they need only input exceptions to planned receipts and issues. The

second benefit was to eliminate manual calculations and preparation of usage and cost reports. The last benefit was to improve accuracy and timeliness of reports.

The TRIFOOD capabilities in the production function were to forecast menu item demand and production quantities, to yield adjust recipes, and to print production reports. The benefits were listed as to improve accuracy of forecasts and reduce waste, to eliminate manual adjusting of recipes, to improve accuracy of yield adjustments resulting in less waste and improved menu item products, and to improve management of labor and material. In ration accounting, the one capability that was listed was to accept input of headcount data, perform calculations, and print ration accounting reports. The benefit of this capability is to eliminate manual calculations and preparation of reports.

The DMIS briefing also outlined five TRIFOOD capabilities in clinical dietetics. They included the following capabilities: to accept input of patient information and maintain cardex, to print diet rosters, to print nourishment labels and nourishment production lists, to perform patient intake analysis, and to assist in performed nutritional assessments. The associated benefits of these capabilities were that the patient input could be used for other system functions, they reduce time to maintain diet rosters and to perform nutritional assessments, they eliminate manual preparation of nourishment documents, and they

eliminate manual calculations and improve accuracy of patient intake analysis.

During the interview phase, data was collected at each of the sites for further evaluation and comparison analysis. Staff members at each site were advised that the information gathered from their site would be studied objectively and ethically to ensure that the rights of the individuals and organizations were protected. Each site answered the same questions from the evaluation tool. A summary of the results from each site follows.

In the evaluation interview, the Chief, NCD at FGGM provided the following information. He stated that the TRIFOOD system is not being used on a daily basis for NCD operations at FGGM. Four workstations are available for use, but only one is being used on a regular basis. This one workstation is located in the main office. Two other workstations are in the kitchen and the last workstation is in the supply room. The site manager is the Chief, NCD and he is the most frequent user of the system. Other users are the cost accountant, the supply clerk, as well as the officers and non-commissioned officers assigned to the division.

The Chief, NCD at FGGM felt that there was command support of the TRIFOOD system. He stated that since the September 1989 implementation of the TRIFOOD system at FGGM, the facility/ operational costs have not been reduced. FGGM is not using forecasting from the TRIFOOD system, nor are they using recipes

generated from the TRIFOOD system. The Chief, NCD indicated that they are using a portion of the inventory module of the TRIFOOD system. With March 1991 as an initial baseline, he plans to have the cost accountant post a periodic inventory for April and May 1991. He hopes that by June or July 1991 she will be inputting a perpetual inventory into the TRIFOOD system. FGGM has not been generating the inventory reports and therefore are unable to use them to control spoilage or reduce pilferage. They also do not price menus using the TRIFOOD system. All factors considered, the Chief, NCD does not currently view the TRIFOOD system as enabling him to have more accurate control of food costs.

In response to questions eleven through twenty-five, the Chief, NCD at FGGM provided all negative responses. He stated that the TRIFOOD system has never been fully implemented.

At Fort Belvoir, the Chief, NCD provided the following responses to the evaluation interview. She stated that the TRIFOOD system is being used on a daily basis for some aspects of NCD operations. Six workstations are available for use. One workstation is located in the Chief's office and another is in the cost accountant's office. Two other workstations are in the Production and Service Branch (P&SB) as well as one in the supply room. The last workstation is in the Clinical Dietetics Branch (CDB). The site manager is the cook foreman of the NCD. The most frequent user of the system is the cost accountant. Other users

include the Chief, NCD, Chief, CDB, the cook foreman, the supply clerk and the non-commissioned officers assigned to the division.

The Chief, NCD at Fort Belvoir felt that there was command support of the system. She stated that she does not know if facility/operational costs have been reduced since the October 1987 beta test-site implementation of the TRIFOOD system at Fort Belvoir. She explained that she would not routinely focus on the management of these costs. She indicated that Fort Belvoir is not using forecasting from the TRIFOOD system. However, they are using recipes generated from the TRIFOOD system. By using these recipes, the Chief, NCD believes she is provided with more accurate calculations of ingredients for portions, but she does not know for certain if these calculations have resulted in reduced costs.

For inventory maintenance, the Chief, NCD at Fort Belvoir answered that they are using the inventory module of the TRIFOOD system. By generating and analyzing the inventory reports, she feels she is able to use the reports to control spoilage and reduce pilferage. She stated that pilferage has been reduced because of more consistent review for highlighting discrepancies of "book" versus actual inventory. She decided that physical inventories should be conducted two times each month instead of only once at the end of month. By using the inventory reports generated, she was able to get the budget under control shortly

after she was assigned to Fort Belvoir and is now able to maintain this control.

At Fort Belvoir, they do not price menus using the TRIFOOD system. Interestingly, the Chief, NCD stated that they do use the system for menu and recipe costing. She has directed that the system be used extensively for cost averaging of grouped food items to prepare for a la carte implementation. She does not currently view the TRIFOOD system as enabling her to have more accurate control of food costs, but with the implementation of an a la carte operation this may change.

In response to question eleven, the Chief, NCD at Fort Belvoir felt that there has been a minor reduction in the time required for personnel to maintain inventories. She provided negative responses to questions twelve and thirteen because without generating procurement documents or daily worksheets from the TRIFOOD system, a reduction in the time required to prepare these reports can not be realized. The answers to questions fourteen through seventeen were also negative because the system is not being used for nutritional analyses and assessments. Responses for questions seventeen through twenty were positive. The Chief, NCD at Fort Belvoir stated that there is less opportunity for fraud, waste, and abuse because of more timely and accurate management data. She believes the management of the NCD has improved because of more complete and accurate reports that enable

her and her management staff to make more effective management decisions. She also believes that compliance with military regulations has increased because she is able to better manage the NCD within budget. She further noted that transcription and computation errors have been greatly reduced in inventory records. She hopes that a similar reduction will also occur with the use of system generated purchase orders.

At Fort Belvoir, no increases in patient or diner satisfaction have been directly reported due to the implementation of the TRIFOOD system. This is not the case for job satisfaction of some NCD personnel. While an increase in job satisfaction of food service personnel has not been attributed to the elimination of tedious, monotonous, and repetitive clerical tasks by using the TRIFOOD system, an increase in job satisfaction of dietitians has been attributed to the TRIFOOD system because the dietitians are able to be more involved with professional rather than procedural activities. The job satisfaction of the cook foreman has also increased because he has more timely and accurate management reports and inventories.

At WRAMC, the Chief, Directorate of Nutrition Care provided the following responses to the evaluation interview. She stated that the TRIFOOD system is being used on a daily basis for Directorate operations. She asserted that the TRIFOOD system is not designed for a hospital like WRAMC. Twelve workstations are

available for use. Four workstations are located in the computer
support section and three workstations in the Clinical Dietetics
Branch. A single workstation is located in each of the following
five areas: the Chief, P&SB office, the cost accountant's office,
the supply room, the servery section, and the quantity food
production section. The site manager is a military dietitian
assigned to the P&SB. Many individuals frequently use the system.
Users include the officers and non-commissioned officers assigned
to the Directorate, as well as many of the civilian employees.
The most frequent users are individuals assigned to the computer
support section and the site manager.

The Chief, Directorate of Nutrition Care at WRAMC felt that
there was command support of the system. She stated that since
the July 1988 implementation of the TRIFOOD system at WRAMC, the
facility/operational costs have been reduced. She discussed that
WRAMC is using forecasting from the TRIFOOD system, but she does
not attribute the reduced facility/operational costs to improved
forecasting. In fact, actual observation of the computer support
section uncovered that manual not automated forecasting was being
used. They are however using recipes generated from the TRIFOOD
system. By using these recipes, the Chief of the Directorate
believes that she is provided with accurate calculations of
ingredients for portions, but she does not attribute these
calculations to reduced costs. She explained that prior to

TRIFOOD system implementation at WRAMC a computerized system was already being used that accurately calculated ingredients.

For inventory maintenance, the Chief of the Directorate answered that they are using a portion of the inventory module of the TRIFOOD system. She stated that they are not using an automated perpetual inventory at WRAMC and that they do not plan to convert to this procedure. She sees no potential in the TRIFOOD system for controlling spoilage and reducing pilferage. She also stated that they have not reached the point of inventory maintenance where consistent review for highlighting discrepancies of "book" versus actual inventory can be performed using the TRIFOOD system.

At WRAMC, they do periodically price menus using the TRIFOOD system. The Chief of the Directorate stated that pricing menus has become much easier with the TRIFOOD system. She feels that she does have more accurate control of food costs because pricing menus has become easier. She views the TRIFOOD system as one of many factors enabling her to have more accurate control of food costs. She stated that this control has resulted in an overall reduction of facility/operational costs.

In response to question eleven, the Chief of the Directorate at WRAMC felt that there has been no reduction in the time required for personnel to maintain inventories. Likewise, there has been no reduction in the time required for personnel to

prepare procurement documents because WRAMC is not using this application of the system. In contrast, there has been a significant reduction in the time required for personnel to prepare daily worksheets because all the reports are generated at night by the system. The answers to questions fourteen through sixteen were negative since the system is not being used for nutritional analyses and assessments. Responses were positive for questions seventeen through twenty. The Chief of the Directorate stated that there is less opportunity for fraud, waste, and abuse because of more timely and accurate management data. She believes the management of the Directorate has improved because of more complete and accurate reports that enable her and her management staff to make more effective management decisions. For example, they use the Menu Analysis Report to ensure variety in menu planning. She also believes that compliance with military regulations has increased because she is able to better manage the Directorate and the monthly Health Services Command report is always on time. She further noted that transcription and computation errors have been greatly reduced in inventory records.

At WRAMC, no increases in patient or diner satisfaction have been directly attributed to the implementation of the TRIFOOD system. This is not true for job satisfaction of some Directorate personnel. An increase in job satisfaction of food service personnel has been linked to the elimination of tedious,

monotonous, and repetitive clerical tasks by using the TRIFOOD

system to generate cook's worksheets and inventory reports. An

increase in job satisfaction of dietitians has been linked to the

TRIFOOD system because the dietitians are able to be more involved

with professional rather than procedural activities such as

material management and computer support. The job satisfaction of

the cook foreman has not increased. The Chief of the Directorate

feels that the TRIFOOD system was not designed to manage the three

diverse delivery methods of conventional, cook-chill, and

cook-freeze that WRAMC operates. She strongly believes that WRAMC

requires an unique system that is designed to meet their needs.

Chapter IV - Discussion

Each of the three sites evaluated in this project represent a different stage of the proliferation of the TRIFOOD system in Army Medical Treatment Facilities (MTFs). Fort Belvoir was a beta site for the system, but has not achieved full implementation. WRAMC was in the second group of facilities to receive the system and of the three sites has accomplished the most success with its TRIFOOD implementation. FGGM was one of the facilities in the third group to receive the system. Upon my July 1990 arrival at FGGM, I found that the system was not being used and that its hardware was being stored in a supply room. Changes have occurred and the current NCD staff at FGGM is making great strides to implement the system, but the results of their efforts are far behind those achieved at the other two sites.

The original intent of this project was to evaluate the data utilization of the TRIFOOD system in the greater Washington, D.C. area and to establish criteria for the military food service application of the data generated from the TRIFOOD system. However, the three sites studied do not have a problem applying TRIFOOD generated data to their food service operations, but rather have a more fundamental problem in reaching the stage of implementation where they are actually generating data. This implementation problem is a significant obstacle to the realization of system benefits at the three sites.

Through observation and feedback at the three sites, the study revealed that the DMIS implementation manual was not being used. The implementation manual provides an excellent timeline for implementation that has not been achieved by the evaluated sites. As explained in the implementation manual, the ration accounting and nutritional care functions can be implemented totally independent of other functions. All three sites are using the ration accounting capabilities of the TRIFOOD system to generate the monthly Health Services Command Report of Nutrition Care Activities. Of the nutritional care functions, only Fort Belvoir is attempting to use the patient cardex capability with none of the sites using nutritional analysis or nutritional assessment. This documented lack of use reflects the failure of the sites to achieve system benefits that directly enhance the quality of patient care. As stated previously, the TRIFOOD system is capable of many clinical dietetics functions. A major intended benefit of the implementation of the TRIFOOD system was that quality of patient care would be enhanced as a result of improved access to more complete patient information on which to base nutritional care decisions. An additional benefit was that TRIFOOD would liberate the clinical dietetics staff from many of the clerical tasks and allow them to participate more actively as members of the health care delivery team. The realization of these benefits should be a strong incentive for implementation of these

functions, but the study revealed that the emphasis of management was in the production functions at all three sites.

The implementation manual points out that the TRIFOOD functions dealing with inventory, purchasing, menu planning, and production are all interrelated. It guides the user as to which functions must be completed before others can be implemented. The keys to successful implementation of these functions are careful proofing and correcting of vendor, commodity and recipe files, as well as accurate entering, processing and proofing of menu data. The manual also suggests that the sites maintain inventory records for one month prior to implementing the other interrelated functions.

By comparing the results of the evaluation process, I found that all three sites were using the inventory function of the TRIFOOD system. Fort Belvoir generates inventory reports to manage subsistence trends on specific item usage and to control inventory costs. Only FGGM plans to use the perpetual inventory capability of the system which provides for a perpetual inventory level maintained on all subsistence. All sites are currently using a periodic inventory in which they enter the actual physical inventory counts of subsistence items using the physical inventory worksheet and then allow the TRIFOOD system to calculate the total dollar value of the inventory. This generated data is printed on an Inventory Valuation Report. None of the sites are "copying"

data from the manually prepared purchase orders and issue

documents, therefore requiring the continued use of manual

inventory records. By omitting this function, the sites are

unable to note discrepancies between physical count, system count,

and manual records. The short term benefit of accurate inventory

valuation reports is achieved through physical inventory

procedures, but the long term benefits of tighter subsistence

control with reduced ordering errors, overages, shortages, waste,

and theft are not being fully realized because of partial use of

this function.

The majority of the data generated by the TRIFOOD system

is related to a facility's menu. The study revealed that the menu

is a major area of concern at the three sites. Only WRAMC has

completed the original menu planning implementation tasks and is

using the TRIFOOD system to generate associated production

documents. They are generating these documents from night batch

jobs and using this information to perform daily operations. Fort

Belvoir had previously accomplished this task, but their NCD staff

decided to switch to a la carte operations and to implement a new

procedure for menu simplification under the guidance of the DMIS

office. The objectives of this new menu simplification procedure

are to produce a TRIFOOD food code worksheet similar to the

original manual document, to include dining hall menu items on the

food code worksheet, to provide a single point for maintenance on

dining hall and patient menus, and to simplify forecasting by eliminating multiple serving sizes. The switch to this procedure has resulted in a implementation set back for Fort Belvoir, but it has been more widely accepted by the staff than the initial menu planning procedures. The Chief, NCD at Fort Belvoir perceives that more benefits can be achieved by using a procedure that users can relate back to previous management documents and practice.

Interestingly, the Chief, NCD at FGGM is strongly opposed to the menu simplification process. He believes that by using this procedure many of the system benefits in the nutritional care function will not be realized. He explained that menu simplification requires that all diet menus be deleted and only one menu pattern remain activated. Without these diet menus, patient select menus cannot be generated. These deletions would also prohibit the nutritional analysis capabilities of the TRIFOOD system. He agrees that the procedure will help to expedite the implementation of the production functions of NCD activities, but at the overall expense of the clinical functions. Based on his convictions, FGGM is working towards menu planning implementation in a different manner than Fort Belvoir. They are currently reviewing the TRIFOOD generated menu catalog report and inputting appropriate changes to their menu cycle. Both implementation approaches are correct, but neither site can achieve WRAMC's level of TRIFOOD system success in menu planning until this process is

accomplished. The evaluation showed that WRAMC has realized the documented system benefits for menu planning. They are able to calculate the cost and nutritional content of their cycle menu, as well as generate the documents associated with daily food service operations.

The use of forecasting in the production function is another important stage of the implementation process. The study revealed that FGGM and Fort Belvoir were not using this function and that WRAMC was partially using it. By inputting production forecasts and initiating the daily running of night production batch jobs, the TRIFOOD system generates production reports such as yield-adjusted recipes and inventory issue documents. Both WRAMC and Fort Belvoir are using the system's yield-adjusted recipes and find them to be more accurate than manually extended recipes. FGGM has not begun using these recipes because they have not coded site specific recipes into their data base or proofed those recipes that already are in the starter file. WRAMC is generating recipes during the night because they are able to input production forecasts into their menu cycle and allow the system to complete daily batch jobs. According to the implementation manual, night batch jobs will, based on the facility's menu, automatically yield adjust all of the recipes for a given day's production and generate the production reports. Fort Belvoir, on the other hand can not generate the recipes in this manner because they have not

completed menu planning implementation. Instead, they must access selected recipes, input the desired yields and then print the yield-adjusted recipes. Despite similar outcomes, this procedure at Fort Belvoir is more manpower extensive and time consuming than the one used at WRAMC.

An important difference between WRAMC and the other two evaluated sites is the existence of a computer support section within the Directorate of Nutrition Care. The computer support section is primarily responsible for the implementation and maintenance of the TRIFOOD system. Fort Belvoir and FGGM are smaller organizations than WRAMC and therefore are not staffed with this type of support. The evaluation findings suggest that this difference impacts on the success of the system. WRAMC definitely benefited from a dedicated computer support section that was able to manage the major changes in the organization and direct the flow of TRIFOOD generated information to the appropriate users. Fort Belvoir and FGGM have struggled with existing staffing to accomplish these tasks.

Additionally, a major problem facing the three TRIFOOD implementation sites has been the turnover of key management personnel. At Fort Belvoir, the Chief, NCD has changed three times over four years. At WRAMC, several dietitians have worked with the system and have become familiar with its applications only to leave or change assigned duties. At FGGM, the Chief, NCD

has changed twice within a year and there had been a critical shortage of enlisted personnel. This problem has prevented full implementation of the system at all three sites.

With WRAMC being the only evaluated site to successfully implement the production function and run batch processing jobs, the question of a site's data utilization can best be analyzed. Full production implementation not only generates inventory issue documents and yield-adjusted recipes, but also preparation planning and serving reports, pre-preparation withdrawal and delivery reports, ingredient labels, standing requisitions, random requisitions, advance preparation reports, and bulk nourishment lists and labels. This study evaluated the use of this generated data and found that the Directorate staff at WRAMC has effectively and efficiently incorporated the production planning reports into their daily operations. The study revealed three contributing organizational factors that lead to successful data utilization at WRAMC. They were timely implementation of key TRIFOOD functions, adequate training of the Directorate of Nutrition Care staff and the establishment of new standard operating procedures. Because WRAMC has not implemented all of the TRIFOOD functions, evaluation of the data utilization for purchasing and recipe demand forecasting could not be evaluated.

Using WRAMC as a model, the DMIS office has recently published two valuable tools to assist sites in establishing procedures and

utilizing generated data. One document is the TRIFOOD survival guide which was published in January 1991 and serves as a functional users manual for key applications of the TRIFOOD system. The other document is a schematic diagram that clearly links TRIFOOD generated reports with the NCD reports used in the past. Over the course of this project, I contacted the DMIS staff on the status of my research. Their focus was directed to the original problem addressed in my Graduate Management Project Proposal, namely that the food service personnel at TRIFOOD sites have the ability to generate sophisticated food service data, but they are not using the system to achieve its documented potential and to fully benefit from this valuable resource. I believe that this study prompted their immediate action in developing the TRIFOOD survival guide. The reaction at the sites to this guide was positive. The study revealed that the sites preferred receiving documented steps rather than starting from scratch and generating their own standard operating procedures. My original research intent was substantiated and achieved with the production of this document. I firmly believe that this kind of support and assistance greatly enhances implementation efforts, especially at sites with staffing constraints. I also found that the sites benefit immensely by sharing their success stories in the DMIS office's publication titled *Three Bean Salad*.

Even with the successful publication of the TRIFOOD survival guide which serves as a functional users manual, I feel this project evolved into another area of research. The questions of implementation and realizing system benefits were critically evaluated. This study revealed that the three evaluated sites achieved varying stages of implementation. The achievements did not correlate with dates of installation or the published timelines for site implementation. All three sites lacked an implementation strategy. The managers were using crisis management rather than long term strategic planning.

The following implementation strategy was developed to assist sites in the implementation and future utilization of the TRIFOOD system. This implementation strategy is a five phase plan that can be used in any size organization. It is designed to begin after the installation of the TRIFOOD system at a facility. The strategy is based on the premise that implementation of the TRIFOOD system is not solely the function of the Nutrition Care Division. The total organization must be involved in this dynamic process for successful implementation to occur.

The first phase is to identify goals. The process of identifying goals starts with the site's full comprehension of the TRIFOOD system's functions, capabilities, and expected benefits. Based on the different sites' unique needs and desired benefits, leaders must decide which functions are to be implemented.

Additionally, they must develop a solid timeline for implementation with fixed responsibility for each of these functions. Sites must also analyze existing procedures that will be replaced by the system and identify any constraints to system implementation. Individuals assigned responsibility must fully understand their roles, time commitments, and resources required for implementation. Goals should be documented in terms of long range implications and short-term action oriented objectives.

The second phase is to gain total organizational support. Sites need to attain commitment from the command, the hospital staff, and the NCD staff. An individual should be assigned the task of promoting the implementation strategy. This individual must be strongly committed to the project and feel that the TRIFOOD system will make a difference in the organization. She should provide briefings on the goals identified in phase one, as well as information seminars to various hospital groups. She should serve as a boundary spanner to bridge any communication gaps when assistance is needed and implementation problems arise. She should maintain a positive attitude at all times and focus on the parts of the organization that require additional assurance on the benefits of the TRIFOOD system implementation.

The third phase is to implement the TRIFOOD system using the implementation manual developed by the DMIS office. This manual contains an excellent checklist for system implementation and can

be adapted for use by any size NCD. During implementation, it is important that leaders identify any additional organizational support or assets that may be required to accomplish the mission such as additional personnel for transitional operations. The NCD is an ongoing operation that cannot close to implement an automated food service system, therefore, leaders must be open with the command on requests for assistance. The NCD must be prepared to justify the long term benefits of system implementation to the organization. The leaders must be sensitive to the fact that the command is managing scarce resources and weighing the benefits of each request to maximize the return on their investment. Thus, it is essential that the NCD promote the merits of this project and secure the required resources.

The fourth phase is a continuous public relations campaign until completion of the implementation project. This phase serves two major purposes. First, it maintains the total organizational support gained in phase two. Second, it serves as a mechanism to boast the accomplishments of the NCD staff. This recognition is essential for building esprit and a sense of purpose during a difficult implementation process. The focus should remain on the long term benefits that will be achieved with TRIFOOD system implementation.

The fifth phase is an evaluation of the implementation process. Sites must determine if they have achieved identified

goals and if they have met established milestones. They must reassess the objectives that they set in phase one and identify any obstacles or changes that may alter the success of the implementation process. Based on this evaluation, sites must map the future course of their implementation efforts to either continue as originally planned or to modify in response to organizational changes and demands.

The five phases of the implementation strategy outlined in this study offer a framework for NCD leaders to follow. The intent of the strategy is to enhance implementation efforts while encouraging leaders to work in concert with the command to achieve the organization's long term goals.

Chapter V - Conclusion

The rapid proliferation of the TRIFOOD automated food service system has occurred throughout U.S. Army hospital food service sites. The food service personnel at these facilities have the ability to generate sophisticated food service data. This study revealed the three evaluated sites have not implemented the system to achieve its documented potential and to fully benefit from this valuable resource. This study identified the major fundamental MIS problem facing hospital food service managers at U.S. Army facilities in the greater Washington, D.C. area. The evaluation model used for this study supported the contention that the food service managers are not realizing system benefits. By encouraging an implementation strategy at the facility level, the Army Medical Specialists Corps will succeed in implementing, discovering, and efficiently using the full capabilities of the TRIFOOD system and enhance current U.S. Army hospital food service operations that support patient care.

By evaluating the capabilities of the newly implemented TRIFOOD system, this study answered many questions asked by hospital administrators concerning the utility of the TRIFOOD system. Through improved data utilization and recipe costing capabilities, the TRIFOOD system will support the implementation of an a la carte food service system, which is desired by many. The results of this study impact the entire health care delivery

system as TRIFOOD interfaces with the Composite Health Care System (CHCS). The major outcome achieved through increased benefits realization of the TRIFOOD system will be enhanced patient care.

Chapter VI - References

A wish list for the 1990s. (1990). Computers in Healthcare. 11(3), 57-58.

Arthur D. Little, INC. (1984). Preliminary Economic Analysis of the TRIFOOD System (Report No. 0041-1-TRIFOOD-PEA). Cambridge, MA: Author.

Austin, C. J. (1989). The leading edge: Data systems can provide the tools needed to meet goals. Health Progress. 70(8), 52-54.

Bender, J. R. & Matthews, M. E. (1989). Development of an evaluation model for computer foodservice management systems. Journal of the American Dietetic Association. 10, 1465-1472.

Gross, M. S. (1990). Catalysts for change: A call for effective information management. Computers in Healthcare. 11(2), 42.

Peters, T. (1987). Thriving on chaos. New York: Harper & Row.

Pollock, E. (1990). Applications: How far have we come? Part II. Computers in Healthcare. 11(4), 24-26.

Toole, J. E. & Campbell, S. L. (1990). The decade takes shape: Computers in healthcare for the '90s. Computers in Healthcare. 11(3), 20-22.

Trotter, P. J. (1990). The metamorphosis of an industry. Computers in Healthcare. 11(2), 48-49.

Ummel, S. L. & Dorenfest, S. I. (1990). Complex information

systems options: How one CEO triumphed. <u>Healthcare Executive</u>.

<u>5</u>(1),25-29.

Watlington, A. G. (1989). Realizing systems benefits: One

planned step at a time. <u>Computers in Healthcare</u>. <u>10</u>(2),

32-36.

Appendix A

Evaluation Tool

PURPOSE: To measure where we are in relation to where we want to be!

Since the implementation of the TRIFOOD system at your facility,

1. Are using the TRIFOOD system on a daily basis?

2. How many workstations are in your facility and where are they located?

3. Who are the users of the system and who uses it the most frequently?

4. Does management and the command support the TRIFOOD system?

5. Have your facility/operational costs been reduced?

6. Are you using forecasting from the TRIFOOD System?

(If yes, Do you attribute any reduced facility/operational costs to improved forecasting?)

7. Are you using recipes generated from the TRIFOOD System?

(If yes, Does the system provide more accurate calculations of ingredients for portions?)

(If yes, Have costs been reduced because of more accurate calculations of ingredients required for portions?)

8. Are you using the inventory module of the TRIFOOD System?

(If yes, Are you using the inventory reports to control spoilage and reduce pilferage?)

(If yes, Has less spoilage of outdated inventory resulted in reduced costs and has pilferage been reduced because of more consistent review for highlighting discrepancies of "book" versus actual inventory?)

9. Are you pricing menus using the TRIFOOD System?

(If yes, Do you feel that pricing menus has become easier?)

(If yes, Do you have more accurate control of food costs, because pricing menus has become easier?)

10. Does the TRIFOOD System enable you to have more accurate control of food costs?

(If yes, Has this control resulted in an overall reduction of facility/operational costs?)

11. Has there been a reduction in the time required for personnel to maintain inventories?

12. Has there been a reduction in the time required for personnel to prepare procurement documents?

13. Has there been a reduction in the time required for personnel to prepare daily worksheets?

(If yes, Which ones are requiring less time to prepare?)

14. Has quality of patient care improved because of more frequent nutritional analyses?

15. Has quality of patient care improved because of an increase in the number of patients interacting with dietitians?

16. Does the TRIFOOD System facilitate the nutritional assessment of patients to favorably affect a patient's morbidity, mortality or length of stay?

17. Is there less opportunity for fraud, waste, and abuse, because of more timely and accurate management data?

18. Has the management of the Food Service Department improved because of more complete and accurate reports that enable the personnel to make more effective management decisions?

19. Has compliance with military department regulations increased?

20. Have transcription and computation errors in inventory records and purchase orders been reduced?

21. Has patient and diner satisfaction increased because of the reduced chance of shortages of preferred food?

22. Has patient satisfaction increased because of improved preparation, quality, or kind of food served?

23. Has job satisfaction of all food service personnel increased because of the elimination of tedious, monotonous, and repetitive clerical tasks?

24. Has job satisfaction of dietitians increased because of more involvement with professional rather than procedural activities?

25. Has job satisfaction of the food manager increased because of more timely and accurate management reports and inventories?

Appendix B

Patient and Meal Control Functions

Patient Cardex

1. Maintain or Display Individual Patient

2. Cardex Reports

    a. Patient Cardex Listing

    b. Patient Status Lists

    c. Patient Population Lists

    d. Nourishment Reports

    e. Patient Labels

3. Cardex Displays

4. Maintain/Display Patient Selections

5. Tally Patient Selections

6. Meal Selection Reports

7. Maintain Patient Orders by Station

Menu Scanning and Printing (not used)

Appendix C

Food Service Management Functions

Purchase Planning

    1. Maintain/Display Portion Forecasts

    2. Maintain/Display Standing Requisitions

    3. Maintain Onhand or Planning Factors

    4. Purchase Planning Displays

    5. Purchase Planning Reports

        a. Forecast Entry Reports

        b. Periodic Forecasted Commodity Requisitions/Costs

        c. Daily Forecasted Commodity Requisitions/Costs

        d. Suggested Commodity Orders

        e. Suggested Vendor Orders

        f. Vendor Price Ranking for Commodities

        g. Commodity Quote Sheet

Purchase Order Entry

    1. Maintain/Display Purchase Orders

        a. Create Purchase Order

        b. Create Suggested Purchase Order from Usage

        c. Open a Suggested Purchase Order

        d. Copy Standing Purchase Order

        e. Change Purchase Order

        f. Delete Purchase Order

        g. Receive Purchase Order

       h.   Review and Close Purchase Order

       i.   Receive and Close Purchase Order

       j.   Concurrent Purchase and Receipt

       k.   Purge Purchase Order

  2. Purchase Order Displays

  3. Purchase Order Reports

       a.   Purchase Order Status and Costs Reports

       b.   Purchase Order Detailed Review Reports

       c.   Purchase Order Expediting List

       d.   Vendor Performance

       e.   Purchase Order/Receipt Discrepancy

       f.   Print Purchase Order

Inventory Maintenance

  1. Maintain/Display Inventory

       a.   Receipts from Vendors

       b.   Rejected Vendor Receipts

       c.   Returns from Inventory to Vendor

       d.   Transfers Between Storage Areas

       e.   Adjustments for Spoilage

       f.   Inventory Adjustments

       g.   Physical Inventory Entries

       h.   Random Stock Issues

       i.   Planned Stock Issues

       j.   Returns to Stock

      k.   Planned Pre-Preparation Issues

      l.   Perpetual Inventory Worksheet

      m.   Change First In First Out (FIFO) Values

2.   Inventory Maintenance Displays

3.   Inventory Maintenance Reports

      a.   Inventory Guide

      b.   Purchasing Reference Book

      c.   Physical Inventory Worksheet

      d.   Inventory Valuations-Commodity Details

      e.   Inventory Valuations-Summary by Category

      f.   Spoilage and Adjustments

      g.   Commodity Cost and Usage

      h.   Stock Problem Exception

      i.   Commodity Cost Exception

      j.   Spoilage and Adjustment Exception

      k.   Perpetual Inventory Worksheet

4.   Periodic Reports

      a.   Periodic Ingredient Item Receipt and Issues

      b.   Daily Inventory Discrepancy

      c.   Physical Inventory Status

      d.   Inventory Issue Analysis

      e.   Inventory Issue Analysis Exception

      f.   Inventory Receipt Analysis

      g.   Inventory Receipt Analysis Exception

      h.   Issue Cost Summary

      i.   Purchase Cost Summary

      j.   Commodity Quantity and Cost Details

      k.   Inventory Balance Report-Cost Summary

Production Planning

   1. Maintain/Display Production Planning

      a.   Portion Forecasts

      b.   Requisitions

      c.   Bulk Nourishments

   2. Production Planning Displays

   3. Production Planning Reports

      a.   Portion Forecast

      b.   Daily Serving Plan

      c.   Preparation Planning

      d.   Advanced Preparation Planning

      e.   Pre-Preparation Delivery

      f.   Pre-Preparation Withdrawal

      g.   Production Recipe

      h.   Delivery Checklist

      i.   Withdrawal and Delivery List

      j.   Inter-Production Area Subassembly Transfer

      k.   Production Labels

      l.   Bulk Nourishment List

      m.   Bulk Nourishment Labels

n. Patient Nourishment Summary

Recipe Demand Forecasting

1. Maintain/Display Recipe Demand Forecasts

2. Recipe Demand Forecasting Reports

a. Menu Items Demand Forecast

b. Census History and Forecast

Food Operation Management

1. Maintain Actual Portions Served

a. Spreadsheet Entry for Routine Cycle

b. Menu Entry for Routine Cycle

c. Non-Menu Entry

2. Maintain Leftovers and Run-Out Time

3. Food Operations Management Displays

4. Food Operations Management Reports

a. Daily Production Cost

b. Food Production Cost Report-By Menu

c. Monthly Commodity Purchases

d. Monthly Consolidated Issues

e. Monthly Consolidated Budget

f. Forecast Variance

g. Cafeteria Pricing Suggestions

h. Cafeteria Pricing Comparisons

i. Estimated Cafeteria Cash Collections

Ration Accounting

1. Ration Record - 1833

2. Meals Served Record - 1833-1

3. Ration Source Worksheet - 1833-2

4. Patient Ration Calculation Worksheet

5. Daily Record of Hospital Food Service Operations-1836

6. Food Service Division Activities Report - 114

7. Census Monthly Reports

8. Census Yearly Reports

9. Monthly Close

Appendix D

Nutritional Services Functions

Nutrient Database

1. Display Nutrient Data

2. Add New Food to Database

3. Edit Nutrient Values

4. Recalculate and Store Recipe Nutrient Values

5. Nutrient Reports

   a. Report Nutrient Values

   b. Report Recipe Nutrient Composition

   c. Report Nutrient Standards

6. Search for Foods and Recipes

7. Define Evaluative Nutrient Comments

8. Define Nutrient Standards

9. Edit Nutrient Information

Nutritional Analysis

1. Individual Patient Analysis

   a. Patient Information

   b. Diet Orders

   c. Maintain Nutrient Standards

   d. Specify Patient Intake

   e. Nutritional Analysis Displays

   f. Nutritional Analysis Reports

2. Print Reports of All Patients

Nutritional Assessment

1. Nutritional Risk Screening

    a. Maintain/Display Patient Information

    b. Risk Screening Reports

2. Detailed Nutritional Assessment

    a. Maintain or Display Patient Data

    b. Nutritional Assessment Reports

3. Exchange Analysis

    a. Diabetic Exchanges

    b. General Exchanges

    c. Maintain Exchange Pattern Tables

Appendix E

General Dietary Data Functions

Foundation Module

1. Recipe, Commodity, Vendor and Menu Maintenance

2. Displayed Reference Books

3. Printed Reference Books

4. Recipe, Commodity, Vendor and Menu Searches

5. Recipe and Commodity Costing

6. Standard Diet Descriptions

Menu Planning

1. Basic Menu Planning (Dining Hall)

    a. Menu Specification

    b. Menu Content and Usage Reports

    c. Menu Planning Reports

    d. Simulated Menu Selection Analysis

2. Master Menu Planning (Patient)

    a. Maintain/Display Master Menu Data

    b. Report Master Menu Data

    c. Copy Master Menu Data

    d. Selectively Create Diet Menu from Master Menu

3. Menu Form Maintenance

General Utilities

1. Specify Batch Job

    a. Define Routine Weekly Schedule

      b.   Define Special Weekly Schedule

      c.   Define Master Menu Planning Run

      d.   Report Routine Weekly Batch Schedule

2.   Build Screens

3.   Maintain Tables

4.   Configure System

      a.   Set Operation Parameters

      b.   Set System Parameters

      c.   Select Modules in Use

5.   Maintain Nutrient Categories

6.   Maintain Nutrient Order

Set Security Levels

Appendix F

Workload Statistics Required for TRIFOOD ADP Sizing

1. Number of cycle menu changes per year.

FGGM	Fort Belvoir	WRAMC
2	1	1

2. Number of days within the menu cycle.

FGGM	Fort Belvoir	WRAMC
28	28	28

3. Number of recipes maintained in the facility's files.

FGGM	Fort Belvoir	WRAMC
1800	1500	2000

4. Average number of patient trays served per day.

FGGM	Fort Belvoir	WRAMC
135	170	1260

5. Average daily inpatient admissions.

FGGM	Fort Belvoir	WRAMC
8	23	53

6. Average daily outpatient visits.

FGGM	Fort Belvoir	WRAMC
8.5	26	34

7. Percent of inpatients on therapeutic diets to include patients
of clear liquids, full liquids and NPO.

FGGM	Fort Belvoir	WRAMC
13	45	49

8. Percent of outpatients receiving nutrient analysis.

FGGM	Fort Belvoir	WRAMC
85	10	0

9. Percent of outpatients a facility would like to provide nutrient analysis to if they had no restrictions in personnel and time.

FGGM	Fort Belvoir	WRAMC
100	25	100

10. Percent of outpatients receiving nutritional assessment.

FGGM	Fort Belvoir	WRAMC
85	100	100

11. Percent of outpatients a facility would like to provide nutritional assessment to if they had no limitations in time and personnel.

FGGM	Fort Belvoir	WRAMC
100	50	100

12. Total dollars of subsistence purchased in fiscal year 83.

FGGM	Fort Belvoir	WRAMC
164,406	289,015	1,468,322

13. Average monthly inventory dollar value.

FGGM	Fort Belvoir	WRAMC
12,800	14,998	113,098

14. Number of subsistence items in inventory.

FGGM	Fort Belvoir	WRAMC
396	382	562

15. General description and layout diagram of facility.

16. Unit manning document information for facility.