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Impact of Intensity of Nutrition Intervention Within Diagnosis-Related Groups

Alicia K. Mandel
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To the Graduate Council:

I am submitting herewith a thesis written by Alicia K. Mandel entitled "Impact of Intensity of Nutrition Intervention Within Diagnosis-Related Groups." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Dileep Sachan, Major Professor

We have read this thesis and recommend its acceptance:

Jane White, Jeannie Sneed

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Date May 24, 1990

IMPACT OF INTENSITY OF NUTRITION INTERVENTION WITHIN DIAGNOSIS-RELATED GROUPS

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Alicia K. Mandel

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DEDICATION

This thesis is dedicated to my husband who has been supportive, patient, loving, and objective throughout the process! The dedication would be incomplete without special appreciation to my mother who has always ecnouraged me to strive for excellence.

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Sincere appreciation is extended to my committee, Dr. Dileep Sachan, major professor, Dr. Jeannie Sneed, and Dr. Jane White for their professionalism and guidance. Special recognition is due Dr. Bill Sanders, Statistician, who was thorough, objective, and patient throughout the analytical phase.

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Acknowledgment is given also to Mrs. Sarah Lutton for her permission to utilize the care level classifications she and fellow researchers developed.

ABSTRACT

A retrospective study of 3,882 Diagnosis-Related Group [DRG] inpatients, of whom 828 received nutrition intervention, during the time period of January 1 through December 31, 1988, was conducted in a 240-bed acute-care, medical/surgical, community-based hospital. The purpose of the research was threefold: [1] to determine the intensity of nutrition intervention [i.e., total time required by a dietitian or dietitians' assistant for basic and non-basic care over the patient's entire length of stay [LOS], [2] to determine the number of DRG inpatients who received nutrition intervention along with the top Medical Disease Categories [MDCs] and DRGs, and [3] to explore the relationships among the timing and intensity of nutrition intervention, and LOS. The researcher classified each patient with nutrition intervention into one of four care levels as developed by Lutton, Baker, and Billman.

The results revealed that, as nutrition intensity [i.e., time] increased, a decline in LOS was evident from care level one [i.e., basic care] through care level three but not for care level four. Statistical significance among the care level means of the 24 MDC categories and 59 group-related, selected DRGs was noted. When the DRGs were classified as medical or surgical DRGs, nutrition intervention was 50 to 100% earlier for the medical DRGs.

This research provided a basis for [1] evaluating the time intensity required within specific DRGs, [2] determining the component of care that could be delegated to dietetic technicians, and, [3] potentially, assessing clinical staffing requirements based on care levels, time, and type of DRG.

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CHAPTER 1

INTRODUCTION

The 1983 implementation of the Medicare Prospective Payment System [PPS] has catapulted the health care industry into an era of unprecedented financial and administrative change. The PPS radically departs from the cost-based Medicare system adopted eight years before (1-8). Now, 24 Major Diagnostic Categories [MDCs] containing 477 Diagnosis-Related Groups [DRGs] have been established to define a fixed reimbursement amount payable to hospitals. The reimbursement amount, predicated exclusively on the discharge diagnosis of the patient, does not indemnify the hospital facility based on medical billings, but modifies the billed amount to conform to the Federal Government's prescribed payment applicable to the primary diagnosis.

The rationale for revamping medical repayments was spurred by a report from the Congressional Budget Office projecting deficits in the Hospital Insurance Fund [Medicare-Medicaid] of $400.9 billion by the year 1995. Within four months following this report, Congress enacted Prospective Payment System legislation.

Proponents for control of health care costs gained popularity several years prior to enactment. Spending, such as the following example, evidenced the need for scrutiny of what had grown to be reason for national concern. From 1967 to 1987, hospital

room rates increased by more than 450%, while outlays for Medicare Part A increased from $3 billion to $45 billion (1). At the forefront of the march for reins on escalating medical expenditures was the state of New Jersey, where, in 1980, the country's first state-wide DRG system was implemented (3).

Hospital facilities, faced with conforming to a new set of federal guidelines, modified their business strategies accordingly. Switching from a charge to a cost orientation was proceeded by hospitals attempting to integrate clinical and financial information systems within and between individual facilities and the Federal Government (6,9). The Health Care Financing Administration [HCFA] established three mechanisms to achieve this integration: [1] promotion of research on the outcomes of care, [2] linkage of Medicare inpatient and outpatient information with data files from private payers, and [3] development of a uniform clinical data set based on information provided by Peer Review Organizations (9).

The emphasis on cost containment and analysis within the hospital environment escalated at administrative levels and filtered down to staff areas in terms of more tightly controlled budgets and improvements in operating efficiency. Highlighted by this internal examination of functionality was the heretofore lack of documentation in critical areas by auxillary health care professionals, such as clinical dietitians and nurses (10-13).

In clinical nutrition, efforts to define costs have been gaining momentum (14-22). As accounting systems that relate

clinical and financial information evolve, the complicated task of segregating what are now combined departmental costs into component costs [i.e., clinical nutrition services versus patient and employee food services] will be greatly simplified. This itemized identification of expenses will enhance dietetic research by detailing the cost/benefit of nutrition intervention.

The American Dietetic Association [ADA] (23) and Rinke and Berry (11), identified the importance of research within the profession of dietetics. Rinke and Berry (11) stated:

> a shift in emphasis from academic and research settings to the practice settings may also have significant and multiple long-term payoffs in terms of the provision of high-quality medical care, clinical relevance, and cost-containment. Practitioners occupy the best positions to identify the researchable trends, patterns and occurrences that ultimately influence the cost and quality of medical care.

This poignant message was reiterated in an extensive literature review by Disbrow (24).

The ADA Ambulatory Nutrition Care Research Committee (23) noted that:

> clinical dietitians must be able to justify their services by documentation of *both* process and outcome . . . Documentation of care must be routine, both in terms of outcome of improved client health shown by specific indicators and/or improved knowledge and in terms of process of the services, including both time requirements and costs of delivery.

CHAPTER 2

LITERATURE REVIEW

As healthcare professionals enter an era of "competition" for patients, research has become a more integral component of the "justification" process. This aspect is readily apparent not only in clinical nutrition but also in areas such as nursing (6). Thus, this review of literature highlights the main reasons why clinical dietitians must be involved in research, the direction of nursing research in terms of costs of clinical services and patient outcomes, and the bi-dimensional approach of clinical nutrition research.

IMPETUS FOR RESEARCH

In light of limited health care dollars, monitoring accountability in clinical nutrition services is necessary for survival (24-26). Momentum in clinical productivity research and refinement of nutrition care standards is evidenced by the increasing number of publications addressing these issues. Overall, there are four predominant reasons for continuing research in clinical nutrition: [1] the necessity of linking nutrition support to patient outcomes and cost savings; [2] the need to separate clinical costs for subsequent calculation into the PPS reimbursement rates; [3] the importance of identifying the

intensity or acuity of nutrition care for incorporation into the PPS severity of illness index; and, [4] the necessity of documenting the provision of the most cost-effective and cost-beneficial nutrition care.

First, there appears to be broad consensus that the interrelationships of diet, nutritional status, and eating habits directly influence health status (27,28). However, responsibility for documentation of the positive outcomes of nutrition intervention and communication of these results to government officials and consumers rests with the profession (27). Underlying the documentation must be nutrition care standards that are not only explicit and measurable but that also provide a reasonable level of quality care (24,29-37). Yet, Adamow and Clipper (38) stated that "despite scientific evidence linking nutrition support to improved therapeutic outcomes, none of the studies defines these outcomes in terms of cost, length of stay [LOS], and resource utilization."

Second, PPS combines services of clinical dietitians in the bed charge (36,38). Separation of explicit costs and benefits for clinical nutrition services is mandatory to provide realistic parameters for HCFA through the Prospective Payment Assessment Commission [ProPAC]. ProPAC is charged with recalibrating the DRG reimbursement rates at least every four years (39-41). In his summary of the costs and benefits of nutrition services, Disbrow (24) stated, "no conclusion can be drawn at this time about what it costs to provide nutrition services in either the outpatient or the

inpatient setting." However, the nursing profession has aggressively researched the proportion of nursing costs and clinical outcomes in overall patient care and provides impetus and guidelines for clinical dietitians (42-62).

A nursing study conducted by Mowry and Korpman (50) included 240 patients in five DRG categories over a period of one year in a 425-bed acute-care facility in a Los Angeles suburb. The purpose of the research was to examine the variations in acuity levels [i.e., degree of nursing resource use] within a DRG category and the relationship between acuity level and LOS through the use of the St. Luke's [Phoenix, AZ] Hospital Medical Center Patient Classification system. The DRGs selected were Transurethral Prostatectomy [DRG 336], Gastrointestinal Disorder [DRG 182], Diabetes [DRG 294], Nonradical Hysterectomy [DRG 355], and Lens Operating Procedure [DRG 39]. After averaging acuity points for three shifts and converting this data to full-time equivalents [FTEs] for each day, the mean FTE requirement per day for each patient in each DRG category for the entire LOS was determined. The results demonstrated no significant correlation between LOS and either acuity or nursing labor costs in any of the DRGs examined. Their recommendation included the utilization of a patient classification system, along with appropriate outcome criteria, as a basis for establishing nursing mix per standard activity per DRG, thus, insuring nursing's "appropriate portion of increasingly scarce revenues."

In 1986, Marchette and Holloman (47) reported the results of data from 1983 medical records of 500 patients at Mt. Sinai Medical Center. Stratified random sampling was utilized to select groups of 100 patients for five common primary discharge diagnostic categories at the medical center: arteriosclerotic heart disease, myocardial infarctions, congestive heart failure, cerebral vascular accident, and asthma. The purpose of the study was to:

> determine the extent to which patients' length of stay in an acute care hospital was related to [1] the number of areas [nutrition, medication, activity, psychosocial, and physical] of nurses' discharge planning, [2] the timing of nurses' discharge planning, [3] whether patients received discharge planning by social workers, [4] timing of social workers' discharge planning, [5] admission day of the week, [6] discharge day of the week, [7] discharge destination, [8] age, [9] gender, and [10] diagnosis.

Two findings demonstrated the relationship between nurses' discharge planning and LOS. First, there was a decrease of 0.8 days LOS for every area of discharge planning that was completed by the nurse. Second, a strong relationship existed between the timing of the discharge planning and LOS. Factors impacting the second finding were uncertainty regarding prognosis, discharge arrangements, and destination.

Another interesting aspect of this study was the strong relationship between discharge planning intervention by a social worker and an increase of 7.6 days LOS. This relationship may be

explained by the assumption that additional post-discharge home assistance or long-term care facility placement was necessary. Again, postponement of the request for intervention by the social worker was associated with an increase of 0.8 day of hospitalization.

Although initially hypothesized that the admission and discharge day of the week impacted LOS, that was not substantiated by the data. Admission to a long-term care facility was generally associated with a 10-12 day increase in LOS, attributable to the unavailability of a bed in the long-term care facility.

Increasing age was associated with longer LOS while gender was unrelated to LOS. There was no significant relationship between diagnosis and LOS; however, the DRGs selected may have affected this finding.

These researchers concluded that the variables of age, discharge to long-term care facilities, and discharge planning by the social worker were significantly positively correlated with LOS, when diagnoses were ignored or compared, and when each diagnostic group was analyzed separately. Significant correlation, for the extent of nurses' discharge planning and LOS, was substantiated only in the cerebral vascular accident category. The correlational design of the research only permitted the identification of the effect between variables, not among the variables.

Sovie et al. (59) reported results of data from 24,879 patients representing 218,182 patient days during July 1, 1982 to June 30, 1983. The purposes of this study were to identify the nursing classification of patients associated with various DRGs; to determine the average nursing care hours required per category of patient classification by unit, service, and DRG; and to develop, implement, and evaluate a nursing budgetary system that combined DRGs and nursing classification of patients as predictors of nursing resource utilization. Although the investigators searched for a predictable pattern of nursing acuity of patients assigned to the same DRG, the conclusion was that DRGs did not display homogeneity from a nursing acuity perspective. Research by Mowry and Korpman (50) also supported this finding.

Third, the DRG payment system has been criticized for its lack of homogeneity in illness severity (13,25,63-67). Although direct and indirect costs encompass tangible and intangible aspects (2,4,27,68), intensity or acuity of care is usually defined in terms of the total time for patient care (14,16,17,19, 22,30,44,45,47,50-53,59-61,69-72). Gould (17) stated that failure to demonstrate and document worthiness of dietetic services has resulted in inappropriate staffing ratios in hospitals. Measurement of productivity developed by industrial management engineers and utilized to allocate dietitians' time, based on either number of beds or patient days, do not accurately reflect the scope of clinical practice (16). Staffing decisions result from activities

required, time required, and frequency of the activity (69). Time data must be representative of clinical activity over time, not simply an isolated observation (16).

Fourth, to hinder proliferation of non-nutrition professionals into the area of nutritional care, clinical dietitians must evaluate not only the effectiveness but also the profitability of their services (26,36,73-79). Integrity of the profession will be enhanced by reimbursement from third-party payers (20,21,26,36,80-83). Additionally, clinical dietitians have a responsibility to assist in the documentation of the role of nutrition in co-morbidities or complicating conditions (25). As defined by HCFA, a co-morbidity is a condition that existed at the time of hospital admission that causes at least one extra day of hospitalization. A complicating condition is similarly defined, but the condition develops or arises during the hospital stay (5,15). Identification of patients at nutritional risk and subsequent documentation [or lack thereof] of malnutrition impacts the hospital's revenue (10,38,78,84-95). Christensen (85) reported that 68 of 110 patients identified through screening, and subsequently discharged with malnutrition as a secondary diagnosis, generated an additional $16,428 for the hospital. When averaged over an entire year, the revenue increased to more than $200,000.

In addressing the implications of DRGs, Haschke (96) stated:

> As forces increase the pressures of competition, the question can be asked: "Can dietitians provide quality nutrition services more cost effectively than other health practitioners?" The answer to this question is important as physicians, nurses, and pharmacists increase the delivery of nutrition services as part of their practice. Control of quality nutrition services will be determined by who takes the initiative to justify and to market these services.

Haschke (97) reiterated that "the development of an effective marketing plan for the profession of dietetics will require marketing research to determine the understanding and attitudes of consumers about dietitians." In the 1984 Study Commission on Dietetics: A New Look (98), the committee reported that "dietitians are not widely recognized by the public as those qualified by education or training to provide the necessary expertise in the field." Thus, it is imperative to document and publicize the impact of nutrition services provided by the Registered Dietitian utilizing effective marketing techniques (99).

CLINICAL NUTRITION RESEARCH

Productivity and Nutrition Standards of Care

Two main avenues of clinical nutrition research have evolved: one in productivity or time distribution and another in refinement

of nutrition standards of care. Thus, this review of literature assumes a bi-dimensional, chronological approach beginning in 1982 and is restricted to inpatient settings. Previous research is succinctly summarized by Gould (17).

Productivity or Time Distribution

Gould (17) developed and tested a methodology for collecting and evaluating time and cost data of nutrition activities. Five full-time Registered Dietitians maintained detailed time and activity records for four weeks, Monday through Friday. These activities and minutes per activity were categorized into direct-patient and non-patient contacts. Analysis of the data indicated that 10.2% of the dietitians' time was classified as direct-patient contact and 60.7% as non-direct, but patient related. Further grouping revealed that the dietitians were devoting 26.7% of their time on technician-related activities, 43.3% on dietitian-related activities, and 30% on miscellaneous duties. The cost of time per activity was also calculated. Gould identified three areas for further investigation: [1] cost-effectiveness and cost-benefit of nutrition counseling, [2] further refinement of standards of care based upon the results of this research, and, [3] additional analysis of the appropriate utilization of personnel within nutrition services departments.

McManners and Barina (22) reported that although expected compliancy levels with Joint Commission on the Accreditation of

Hospitals [JCAH] clinical criteria at St. Luke's Hospital was 75%, the actual performance was approximately 42%. After identification of five controllable variables, standards of dietetic care were developed and separated into four categories with time requirement estimations:

* menu production, with a total average time of 11 minutes per menu;
* basic care, with the previous 11 minutes plus 25 minutes;
* diet therapy, with 25 minutes of basic care plus 1.25 hours per patient, and;
* metabolic support, with a total time requirement of three hours, 45 minutes per identified patient.

Non-productive time, defined as time not available for patient care [i.e., breaks, lunch, travel time, vacation, sick time, holidays] averaged 19%.

Subsequently, intensity of care per type of patient and prioritization were considered. Finally, floor assignments were predicated on the number of total hours required for care rather than the number of patients. Within two years of the initial stage of this study, compliancy with the clinical criteria increased to 86%.

DeHoog (30) reported the classification of patients into moderate and high-risk categories with respective assignments to dietetic technicians and clinical dietitians. The Medical Records

Department assisted with the identification of the DRG groups of patients at nutritional risk by providing the following information: [a] DRG that received nutrition intervention, [b] the ten major DRGs that received nutrition intervention, [c] percentage of patients that received nutrition care, [d] length of stay, [e] age, [f] sex, and [g] nursing units of the patients. Coding permitted differentiation of dietetic technician versus clinical dietitian interventions. Relative value units [RVUs] of 0.1/10 minutes were used to document productivity. This study established the following RVUs for initial activities within the assessment of high-risk patients: screening 0.05, data gathering/chart review 0.15, nutritional history/diet history evaluations 0.20, developing nutrition care plan 0.15, charting 0.05, and consultation [M.D., R.N., others] 0.80. DeHoog concluded that:

> these values can be decreased or increased depending on the population mix or complexity of the assessment program. RVUs allow for reasonable estimations of staffing needs [e.g., the number of clinical dietitians per high-risk patient, the number of dietetic technicians needed per moderate-risk patient, and the number of dietary aides needed for patients receiving basic care]. RVUs can provide documentation of productivity and justification for a fee-for-service.

To date, the most extensive time study was conducted by Hernandez (18) and Shanklin (71) at the Texas Woman's University. One-hundred and fifty-seven clinical dietitians from 50

randomly selected Texas hospitals, ranging in capacity from 100 to 1000 beds, were surveyed. The criterion was a minimum of one full-time clinical dietitian. Data collection instruments were based on results of studies by Gould (17) and Martin (100); the response rate was 94.2% [49 hospitals]. Training sessions were conducted at each facility by Shanklin. After one day of preliminary data collection, the participants collected data for one week. All of the patient-related activities had large standard deviations. Group nutrition counseling and education required a mean time of 45.03 minutes; community service/education, 33.93 minutes; family nutrition counseling and education, 30.53 minutes; individual nutrition counseling and education, 25.44 minutes; and, comprehensive nutrient intake analysis 20.9 minutes.

Using Lutton's (101) care level classifications, the clinical dietitians' time was distributed as follows: 17.07 % in care level one, 35.43% in care level two, 30.4% in care level three, and 17.1% in care level four. For level one, the mean time for menu preparation was 14.08 minutes, nutrition care evaluation and reassessment 12.54 minutes, and preliminary screening 10.41 minutes. Care level two averaged 11 minutes on activities such as nutrition history consultation, comprehensive nutrition assessment, nutrition care planning, nutrition care follow-up, menu preparation, and diet calculation. Time documentation for care level three revealed that 16.7 minutes were spent for comprehensive nutritional assessment, 13.44 minutes for nutrition history consultation, and 13.37 minutes for nutrition care planning.

The in-depth nutritional activities in care level four required 20.35 minutes for comprehensive nutrient intake analysis, 19.06 minutes for diet calculations, 16.54 minutes for comprehensive nutritional assessments, and 14.71 minutes for nutrition care planning.

Hernandez (18) analyzed the relationship between time required to perform various activities, diet orders, and care levels and found that significantly more time was spent performing comprehensive nutritional assessments [care level four] for patients with diets that were modified in mineral or protein content, or more than two diet restrictions. In care levels three or four, additional time was required for nutritional care planning when the diet order was a diabetic diet modified in mineral content or texture and/or consistency. Patients with diabetic, fat, carbohydrate, or texture/consistency modifications required more time for individual counseling and education in care levels two and three.

Overall, patient-related activities accounted for 50.64% of the clinical dietitians' time. Gould (17) reported 43.3%. Functions in care levels two and three encompassed 35.43% and 30.40%, respectively.

Gobberdiel (16) developed a clinical dietetic staffing model that incorporated the number of clinical activities performed and the average amount of time required to perform these functions and correlated them to patient needs predicated on diet orders and diagnoses. Clinical activities were categorized as basic

[clerically-oriented tasks] and in-depth [clinically-oriented tasks]. A weighted diet order census was the basis for calculation of labor requirements to meet basic nutrition care. To determine patient census per category, the average number of patients per DRG was utilized and, then, grouped into 24 MDCs. Further grouping of MDCs by average number of minutes per day for in-depth care resulted in the establishment of five patient diagnosis categories. A mathematical formula incorporating the weighted diet order census and patient census by diagnosis more accurately projected total labor requirements.

In 1986, Ford (102) reported the results of a one year retrospective study at Yale New Haven Hospital [YNHH] that utilized the "Yale New Haven Hospital Nutritional Classification and Assessment Manual." The uniqueness of this manual was the elimination of the necessity for determining staffing needs based on detailed task assignments and estimated time requirements and its ability to evaluate clinical nutrition activities according to standardized criteria, independent of patient diagnosis or assigned medical service. In this manual, "staffing patterns evolved around dominant acuity levels of nutritional care."

Throughout the year, only those admissions with a LOS longer than three days were considered for clinical nutrition intervention [CNI] which was defined as "documented nutrition care provided and charted in the patient's medical record." Seven defined nutritional risk factors and four acuity levels insured a consistent measurement system among diverse nursing units.

Huyck and Fairchild (32) reviewed 375 medical records during March and April, 1984, at YNHH and matched them with discharge DRG classifications provided by the medical records department. Three-hundred and sixty-two charts were included in the final review. The YNHH Nutritional Classification and Assessment manual was the standard clinical guideline. When the DRGs were grouped by MDCs, the five major categories were diseases and disorders of the digestive system [MDC 6], respiratory system [MDC 4], circulatory system [MDC 5], endocrine, nutritional, and metabolic diseases and disorders [MDC 10], and diseases and disorders of the skin, subcutaneous tissue, and breast [MDC 9]. Four of the classifications, MDC 4, 5, 6, and 10 were also the largest in the Beno (103) study. Differences may reflect variations in hospital populations or specialties.

Further delineation of time utilization was reported by Huyck and McNamara (19) at Mt. Sinai Hospital, a 379-bed urban teaching hospital. Thirty-three percent of the time was devoted to the use of medical records, 22% to patient visitation, 16% to calculations, 15% to other patient care, and 7% each to food service coordination and non-patient care.

Thirty-one Registered Dietitians, providing direct clinical services in seven Florida area hospitals, participated in a three-week study (14) in which 3,827 patients were seen. Nutrition care activities were divided into basic services, hospital visits and reassessments, initial consultation, screening to rule-out malnutrition, and other services. DRGs were analyzed if

50 or more observations were noted. In descending order, the DRGs were: diabetes [#294], heart failure and shock [#127], circulatory disorder [#122], specific CVA [#14], transient ischemic attack [#15], chronic obstructive pulmonary disease [#88], pulmonary edema [#87], angina pectoris [#140], chest pain [#143], nutrition and miscellaneous [#296], simple pneumonia, pleurisy [#89], esophagitis [#182], cardiac arrhythmia [#138], gastrointestinal hemorrhage [#174], and medical back problems [#243]. Categorized by number of patients, in descending order, the main MDCs were MDC 5 [circulatory system], 4 [respiratory system], 6 [digestive system], 1 [nervous system], 10 [endocrine, nutritional and metabolic systems], 8 [muscular, skeletal and connective tissue], 7 [hepatobiliary system and pancreas], and 11 [kidney and urinary tract].

Research conducted by Meyer and Olsen (104) was designed to "identify and measure the impact of variables likely to influence productivity of the clinical dietitian in a general health care environment." The sample included 283 dietitians in 40- to 1200-bed hospitals nationwide who were employed by two major foodservice contract companies. This productivity measurement incorporated the aspect of "service" into the model. Heretofore, studies were based on measures adopted from manufacturing. The model that more precisely explained productivity was related to the non-productive aspects of the job description and the hours spent in non-patient care divided by the total hours worked.

> The non-patient care model measured the time spent away from the patient care activities rather than the time spent in patient care. The model of activities non-productive to the job description measured the productivity based on the performance of activities more appropriately performed by other personnel . . .
>
> . . . . . .
>
> The reason that the "non-patient care" model and the "non-productive to the job description" model produce better measures of productivity for the clinical dietitian is related to the definition of service and the fact that the clinical dietitian performs a service-related job. The performance of a service job involves a sequence of service transactions. These transactions are heterogeneous and are simultaneously produced and consumed in an information-processing transaction between the employee and the consumer. Each transaction is different due to the backgrounds of the individuals involved.

In the direct patient care category, individual diet instructions accounted for the largest amount of work time. Recording in medical records encompassed 83% of the time in the indirect patient care category while supervision of support personnel was the highest task activity in the non-patient care area.

Meyer and Olsen (104) categorized 33 tasks into three groups: direct patient care, indirect patient care, and non-patient care. Subsequently, each component was designated as high, moderate, and low time intensity. Four patient care levels were defined. Basic care was the provision of meal service only. Intermediate

care was a diet instruction with a single nutrient restriction. Advanced-intermediate care included a diet instruction with more than one nutrient restriction while in-depth care encompassed intensive nutrition support.

Analysis of time expended by 283 clinical dietitians revealed that ten hours or less per week were spent in direct basic care by 93% of the survey respondents, direct intermediate care by 92%, direct advanced-intermediate care by 88%, and direct in-depth patient care by 94%. Indirect care time percentages were 86%, 94%, 83%, and 88%, respectively. A major implication from this study was that clinical dietitians were continuing to perform tasks that could be delegated appropriately to less highly skilled employees.

Nutrition Standards of Care

> In the course of a lifetime a person's nutritional status and nutritional needs will change. They will reflect the individual's environment and his or her phase in the life cycle. Because an individual is changing, the health care, including the nutritional care, must also be dynamic. Nutritional care is the process of meeting a person's changing nutritional needs. The type of care depends on the presence of disease or potential disease, on the environment, and on the state of growth and development of the individual. The nutritional care process is the assessment of

> the individual's nutritional status, the identification of nutritional needs or problems, the planning of objectives of nutritional care to meet these needs, the implementation of nutritional activities, including education, necessary to meet the objectives, and the evaluation of the nutritional care (105).

To meet the challenge of ever-changing medical complexity and managerial justification of cost and measurable outcomes, dietitians have [and are continuing] to standardize not only time requirements but also acuity levels [i.e., care levels] of patient care. Edmundson (77) recommended a three-pronged approach: establishment of levels of care, assessment of productivity from a time perspective, and evaluation of quality and appropriateness of services with reallocation of duties as indicated.

Efforts to assure quality care gained momentum with the establishment of Professional Standards Review Organizations [PSROs] in 1972 (35). Ometer and Oberfell (35) described a three-step model of care levels. The identification phase entailed a patient interview and initial screening of the medical record by a dietetic technician within 24 hours of the patient's admission. Within 72 hours of admission, the dietitian completed an assessment that included assignment to one of three care levels. Planning, implementing, and evaluating the process were components of step three.

After the initial implementation of the standards of care, two areas required further refinement: [a] the development of more

"succinct criteria for defining levels two and three within the model and for training dietitians for greater consistency in the assignment of levels"; and [b] more effective communication between dietitians and dietetic technicians as the role of the technician expanded.

In 1982, the American Dietetic Association (69) published guidelines for clinical dietetic staffing. Patient-specific nutritional care activities were categorized into patient assessment, nutrition care plan development and implementation, patient counseling, evaluation and referral, and medical record entries. The activities were grouped into basic, intermediate, and in-depth care levels. Two-hundred and forty-six clinical dietitians, employed in hospitals with greater than 500 beds, provided data in the following areas:

> time estimates for the completion of patient-specific nutrition care activities; time estimates for non-patient-specific nutritional care and related activities, and; characteristics of the facility, the practitioner's background, and the practitioner's workload that affected the amount of time spent performing the activities of interest to the study.

The data revealed an inverse relationship between the level of care provided and the frequency of occurrence. Variables such as type of administrative management, patient census, teaching versus non-teaching hospitals, number of beds, average LOS, number of clinical dietitians, percentage of patients on modified

diets, types of patients, education level of the dietitians, length of work experience, and employment status [i.e., full-time versus part-time] had minimal impact on time utilization.

Lutton et al. (101) expanded the care levels in the ADA Clinical Dietetic Staffing Kit to four levels. Acceptance of the care levels was founded on 90% agreement in care level assignment of 42 plans and a subsequent verification of 198 patients with 86% accuracy. Eighty-five percent was the critical acceptance point. A retrospective study of 30 DRGs revealed that the clinical care did not correlate with one level only. Other factors such as preadmission nutritional status and extent of illness were involved. Levels of care were not identifiable by using DRG, diagnosis, diet order, or nursing acuity level individually. The least valuable predictor was the nursing acuity level.

A decision tree for nutritional assessment was developed at the University of Kansas Medical Center (31) to effectively integrate the use of high-risk diagnoses/problems and clinical judgment. Components of the decision tree included albumin <3.5 gms/dl, weight <ideal body weight, weight loss >10% in the past six months, poor intake > five days, triceps skinfold $\leq$15th percentile, actual protein/calorie intake < estimated needs, and other disease-specific indicators of malnutrition.

Christensen and Gstundtner (29) designed research to determine the appropriateness of using the modified diet order as a primary indicator for nutrition intervention. A prospective chart review of 500 medical records confirmed the hypothesis that there

was no significant difference [$p \leq 0.05$] in the prevalence of malnutrition between patients receiving routine diets and those receiving modified diets. Malnutrition was defined as serum albumin $\leq$ 3.5 gms/dl and/or Total Lymphocyte Count $\leq 1500/mm^3$.

DeHoog (106) reported three levels of specifically assigned nutrition care: basic, performed by dietary aides; moderate nutritional risk, managed by dietetic technicians, and; high nutritional risk, handled by clinical dietitians. The screening process and assignment to appropriate personnel was completed within 48 hours of admission. Specific criteria for categorization were elucidated.

Hines Veterans Administration Hospital presented five priority levels of care (107). An important component of the screening and assessment process was the coding of nutritional deficiencies by the International Codes of Disease [ICD-9-CM] #260 [kwashiokor], #261 [nutritional marasmus], and #262 [other types of severe protein-calorie malnutrition]. The documentation of malnutrition as a co-morbid or complicating condition increased revenues by $34,392 within one year.

SUMMARY OF THE LITERATURE

As the dietetic profession encountered increasingly scarce revenues in hospitals, research in clinical nutrition evolved into two main thrusts -- productivity and nutrition care standards. With the possible exception of McManners and Barina (22), this

review of literature revealed that time studies related to the PPS had been limited to only a portion of the patient's entire LOS. Therefore, the need to evaluate total clinical time in terms of the entire LOS, as well as the necessity of identifying the proportion of Medicare patients who received nutrition intervention, became evident. These areas were explored in the subsequent chapters of the present study.

CHAPTER 3

PURPOSE OF THE RESEARCH

The purposes of this research were to: [1] measure the use of inpatient nutrition care resources in terms of clinical dietitians' and dietitians' assistant's time and in terms of type of activities over the patient's entire length of stay [LOS] and, [2] determine the percentage of patients with nutrition intervention who were discharged under the Prospective Payment System [PPS]. Definitions of terms in the study are provided in Appendix A. Relationships among the variables of nutritional care level, time, LOS, and timing of nutrition intervention were determined.

RESEARCH QUESTIONS

1. Was there a positive relationship between nutritional care level classification and LOS within MDC categories?
2. Was there a difference between LOS with nutrition intervention and LOS without nutrition intervention within selected DRGs?
3. Did LOS decrease as intensity of nutrition intervention increased?
4. What was the relationship between the timing of

nutrition intervention by a dietitian or dietitians' assistant and LOS within DRGs?

LIMITATIONS OF THE STUDY

The research was a case study conducted at a 240-bed, non-profit hospital in Nashville, Tennessee. The timing and/or intensity of nutrition intervention is influenced mainly by the practices of physicians. Additionally, nursing practices impact auxillary patient care. Through standards of care for nutritional screening [Appendixes B, C, D, E], the clinical staff frequently communicate with physicians and nurses regarding patient care and, thus, obtain direct physician orders for intervention. However, non-basic nutrition intervention remains physician-driven.

The clinical dietitians review the screening forms that have been completed by the diet writers daily and initiate basic care and contact the physicians for orders to perform non-basic care as indicated. This screening process is applicable to all patients and is not diagnosis-related. The completion of the screening process by the dietitians or diet writers is controlled by seven factors: [1] availability of the chart for review, [2] availability of lab results, [3] availability of patient, family member, or significant other for a brief interview secondary to test/surgery schedules, [4] patient's medical condition as relevant to the provision of information, [5] staffing limitations and workload of Nutrition

Services diet office personnel, dietitians' assistant, and clinical dietitians, [6] patient census, and [7] LOS. General nutritional screening by diet writers was approved by the Medical Staff in May, 1987. Within the past year (1989), the maximum three day allowance was re-evaluated due to alterations in lab results reporting that decreased the time allotment to two days. Additionally, a case study research design limits the generalization of results but may serve as a model for other hospitals in analyzing usage and distribution of clinical time and intensity of nutrition intervention.

CHAPTER 4

METHODOLOGY

Nashville Memorial Hospital is a non-profit, community-based, general medical/surgical acute care, 240-bed hospital. The Nutrition Services Department, directed by a Registered Dietitian, reports to one of the six Vice-Presidents. The food production area is supervised by the Assistant Director who has a B.S. degree in hotel/restaurant management. The inpatient and outpatient areas, including the diet office, are supervised by the Head Clinical Dietitian, a Registered Dietitian, and are components of the Nutrition Services Department. The two inpatient clinical dietitians, with equivalent work experience, do not have managerial, diet office, menu preparation, or trayline responsibilities. Their schedule is Monday through Friday. Under the auspices of the Head Clinical Dietitian, a B.S. degree employee is responsible for the direct management of the diet office personnel and provides assistance to the clinical dietitians. During the research period, this employee was minimally available to assist the inpatient dietitians with patient care. Staffing of the clinical dietitians was stable throughout the study.

SAMPLE

The retrospective sample consisted of 3,882 DRG inpatients of whom 828 received nutrition intervention during the time period of January 1 through December 31, 1988. Approval of the study by the Human Subjects Research Review Committee at the University of Tennessee, Knoxville, [Appendix F] and by the appropriate administrative personnel at Nashville Memorial Hospital [Appendix G] was obtained.

PILOT TEST

The data collection format was pilot tested on 20 medical records with applicable daily clinical activity forms [Appendix H] with selected definitions [Appendix I] and DRG/MDC reports using Lotus 2.01 to compile the data. The preliminary data collection process was refined by reorganization of the order of the columns and categorization of diet instructions.

DATA COLLECTION

All data were extracted by the researcher from inpatients' medical records, DRG and MDC reports, and the dietitians/dietitians' assistant's daily clinical activity forms. The clinical code descriptions [Appendix J], adapted from the ADA Nutrition Services Payment System (108,109), have been

in use since March, 1985. Care levels were assigned by the researcher using a modification of Lutton's classification in level one to categorize the patient's entire LOS [Appendix K]. Care level one was considered to be commensurate with the screening process and miscellaneous activities as defined in Appendix A. Care level zero [0] was used to designate those patients who did not receive nutrition intervention from a dietitian or dietitians' assistant. The data collected were the medical record number, admission/discharge date, age, sex, discharge DRG and MDC, number of post-admission days for initial nutrition intervention by a dietitian or dietitians' assistant, total time for patient care [basic and non-basic, Appendix L], types of clinical activities per patient, DRG LOS, and actual LOS.

Reliability of care level one through four classifications was determined by taking a random sampling of 100 previously classified patients and reclassifying them. A reliability of 98% resulted. During the sampling of these 100 charts, a two to three percent descrepancy between the DRG obtained from the DRG/MDC reports and the discharge DRG report on the patients' charts was noted. Further investigation indicated that the two possible sources of this descrepancy were initial coding errors, or, more predominantly, a change in the discharge DRG secondary to a request from the hospital to HCFA for approval of reclassification of the patient based on extenuating circumstances. Therefore, to

verify the accuracy of the assigned DRG obtained from the DRG/MDC reports, approximately 700 of the 828 charts were reviewed and corrections made as indicated.

DATA ANALYSIS

Descriptive statistics including frequencies, means, and standard deviations for age, LOS, and time as well as percentages of time were completed using the SAS System (110). Research questions one and two were analyzed by one-way analysis of variance [ANOVA] procedures (111-114). The relationship among LOS, intensity of nutrition intervention, and the timing of nutrition intervention was explored. The level of statistical significance was set at $p < 0.05$.

CHAPTER 5

RESULTS AND DISCUSSION

SAMPLE DESCRIPTION

The participants in this study consisted of 3,882 inpatients discharged under Medicare. There were approximately one out of four more females than males [Table 1]. The mean age of both sexes exceeded 70, with the women being older than the men.

MEDICAL DISEASE CATEGORIES

Table 2 illustrates the ranking of the MDCs [Appendix M] according to the total number of DRG inpatients. Additionally, the percentage of total patients that received nutrition intervention within an MDC is provided. The top ten MDCs for discharges, irrespective of nutrition intervention, were: [5] Diseases and disorders of the circulatory system, [8] Diseases and disorders of the musculoskeletal system and connective tissue, [1] Diseases and disorders of the nervous system, [4] Diseases and disorders of the respiratory system, [6] Diseases of the digestive system, [11] Diseases and disorders of the kidney and urinary tract, [9] Diseases and disorders of the skin, subcutaneous tissue and breast, [7] Diseases and disorders of the hepatobiliary system and pancreas, [12] Diseases and disorders of the male reproductive system, and

Table 1. Mean Age of All Patients Across All Care Levels[a] [0-4] by Sex.

Sex	Number	Percent	Mean Age
Female	2143	55.2	74.1± 9.75
Male	1738	44.8	71.7± 9.99

[a] Appendix K:
Care Level:
0 = No Nutrition Intervention.
1 = Basic Screening and miscellaneous activities.
2 = Oncology assessments, neurological consultations, diet instructions with 1 restriction, nutrient intake analysis.
3 = Diet instructions with ≥ 2 restrictions; assessments/ consultations for ≥ 2 diet restrictions.
4 = Enteral and parenteral nutrition.

± Standard Deviation.

Table 2. Medical Disease Categories [MDC] Rankings by Number of Total Patients Discharged Under Medicare With Percentage of Nutrition Intervention [NI] Within a MDC.

Rank	MDC	MDC Descriptions	Number of Patients	Percent of Total Patients With NI Within an MDC
1	5	Diseases & Disorders of the Circulatory System	776	18.4
2	8	Diseases & Disorders of the Musculoskeletal System and Connective Tissue	584	9.0
3	1	Diseases & Disorders of the Nervous System	488	26.0
4	4	Diseases & Disorders of the Respiratory System	477	26.0
5	6	Diseases of the Digestive System	446	27.6
6	11	Diseases & Disorders of the Kidney & Urinary Tract	168	32.0
7	9	Diseases & Disorders of the Skin, Subcutaneous Tissue and Breast	122	13.0
8	7	Diseases & Disorders of the Hepatobiliary System and Pancreas	117	22.0
9	12	Diseases & Disorders of the Male Reproductive System	108	12.0
10	10	Endocrine, Nutritional & Metabolic Diseases & Disorders	92	49.0
11	17	Myeloproliferative Disorders	92	32.6
12	24	Other	58	43.0
13	21	Injuries, Poisonings and Toxic Effects of Drugs	57	22.8
14	2	Diseases & Disorders of the Eye	52	0.0
15	18	Infectious and Parasitic Diseases	52	27.0
16	3	Diseases & Disorders of the Ear, Nose, and Throat	47	8.5
17	16	Diseases & Disorders of Blood & Blood Forming Organs	45	17.7
18	19	Mental Diseases and Disorders	33	18.2
19	23	Factors Influencing Health Status & Other Contacts with Health Services	32	3.0
20	13	Diseases & Disorders of the Female Reproductive System	31	10.7
21	20	Alcohol and Substance Abuse	3	0.0
22	14	Pregnancy, Childbirth and the Peurperium	1	0.0
23	22	Burns	1	100.0
24	15	Newborns and Other Neonates with Condition Originating in Perinatal Period	0	0.0

[10] Endocrine, nutritional and metabolic diseases and disorders. Analysis of the same MDCs for percentage of nutrition intervention revealed that five of these MDCs, 1, 4, 6, 10, and 11, were in the top ten MDCs in both categories. Previous research by Huyck and Fairchild (32) and Beno (103) confirms this finding of the top MDCs [1, 4, 5, 6, 10, and 11] in relation to nutrition intervention. Blackburn and Himberg (14) reported the most frequent MDCs as [in descending order] 5, 4, 6, 1, 10, 8, 7, and 11.

LENGTH OF STAY

Figure 1 and Table 3 designate the mean actual LOS by care levels across all MDC/DRGs. Of physician-ordered intervention, patients grouped as care level four comprise only 2.6% of all DRG inpatients, while their mean actual LOS is more than 130% and 180% longer than care levels two and three, respectively. This percentage implies that care level four inpatients [as a result of their increased LOS] could have greater exposure to nutrition intervention. The data provide support of this, by evidencing that in excess of 50% more time is spent with this care level, from the standpoint of purely non-basic care, than is spent with care level two, and in excess of 40% more time than is spent with care level three. Interestingly, the LOS of care level one inpatients is longer than either care levels two or three; although, [on average] nutrition intervention time is longer for care levels two and three than for care level one. This is inconsistent with the relationship

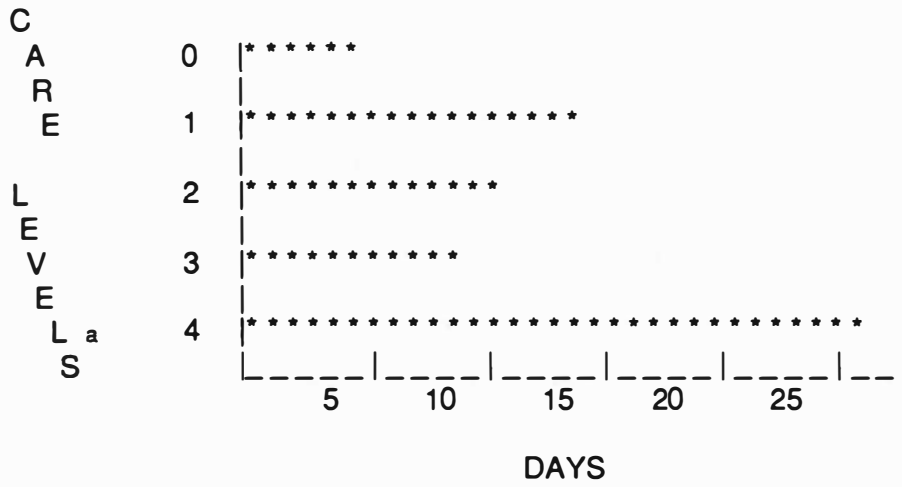

Figure 1. Mean of Actual Length of Stay[b] [LOS] by Care Level.

[a] Care Level
0 = No nutrition intervention.
1 = Basic screening and miscellaneous activities.
2 = Oncology assessments, neurological consultations, diet instructions with 1 restriction, nutrient intake analysis.
3 = Diet instuctions with ≥2 restrictions; assessments/ consultations for ≥2 diet restrictions.
4 = Enteral and parenteral nutrition.

[b] From day of admission to discharge.

Table 3. Mean of Actual Length of Stay[a] [LOS] by Care Level[b] [0-4].

Care Level	Frequency	Percent	Mean LOS
0	3054	78.7	6.5 ± 4.44
1	360	9.3	14.7 ± 10.99
2	210	5.4	11.5 ± 11.51
3	159	4.1	9.5 ± 6.23
4	99	2.6	26.7 ± 18.58

[a] From day of admission to discharge.
[b] Appendix K.
± Standard Deviation.

of LOS and nutrition intervention mentioned for care level four. The explanation of this apparent inconsistency relates to care levels two, three, and four being physician-ordered intervention of dietitians, whereas care level one is not physician-ordered. This finding may indicate that the clinical staff were involved in the more complex cases, although measurement of the severity of illness was beyond the scope of this study. Further discussion regarding time distributions and nutrition intervention appears later in this text.

The number of inpatients classified in care level one approximates the combined number of inpatients in both care levels two and three. Although this does not imply a relationship, some patients classified in care level one may have been grouped in care levels two, three, or four if the physician had ordered dietetic intervention. Additionally, some patients in care level zero may have been grouped into other care levels. Based on the categorization of the number of inpatients within each care level, the data indicate that four out of five of these inpatients were not channeled for nutrition intervention beyond the basic screening performed by the diet writers.

With few exceptions, all DRGs are grouped into major medical and surgical services offered by the hospital. Because of this division, services can be used to partition clinical intervention by care level. It is by care level, and the medical/surgical division that Figure 2 illustrates the relationship of the actual LOS to the day of nutrition intervention. Intervention was initiated within

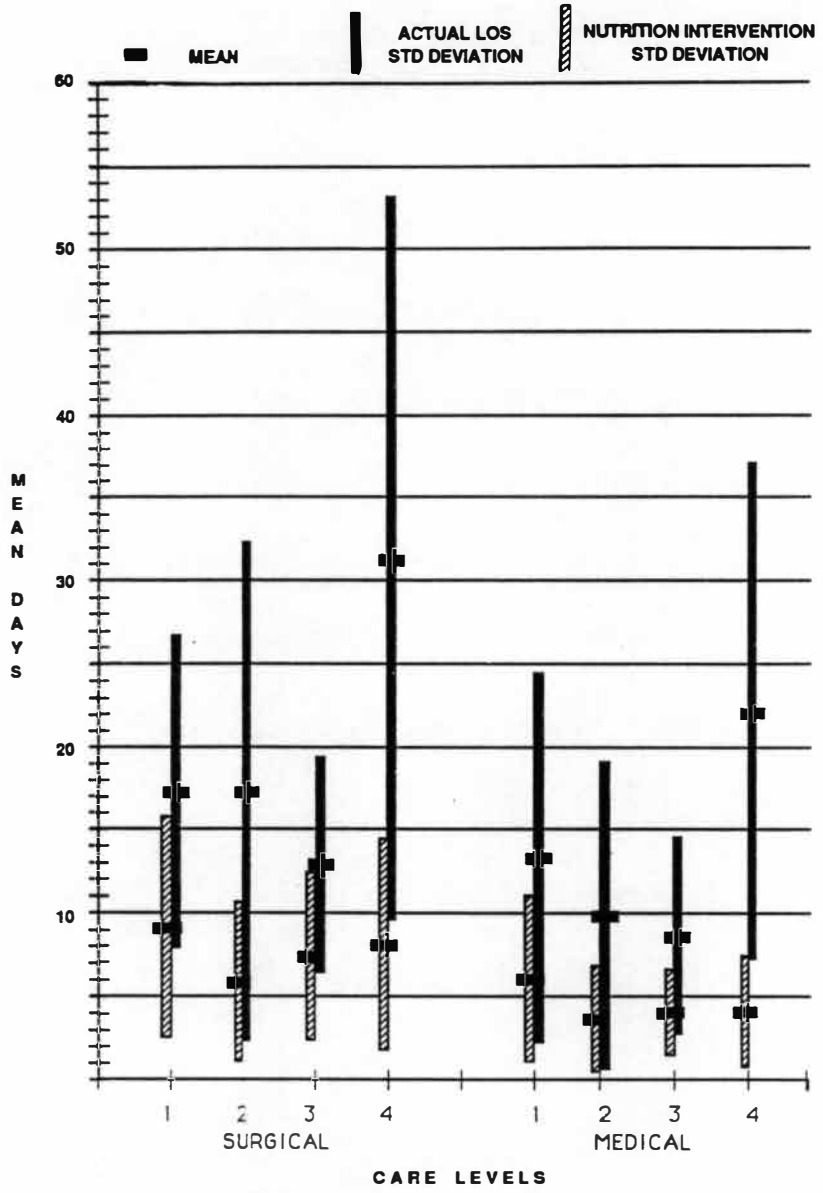

Figure 2. Mean Actual Length of Stay[a] [LOS] and Day of Nutrition Intervention [NI] Across Care Levels 1-4[b] for Surgical and Medical Diagnosis-Related Groups [DRGs].

[a] From day of admission to discharge.
[b] Appendix K.
± Standard Deviation.

Surgical:	Care Level 1	LOS 17.40±9.53	NI 9.19±6.70
	Care Level 2	LOS 17.08±15.00	NI 5.85±4.79
	Care Level 3	LOS 12.88±6.49	NI 7.29±4.96
	Care Level 4	LOS 31.35±21.72	NI 7.96±6.16
Medical:	Care Level 1	LOS 13.06±11.06	NI 5.97±5.04
	Care Level 2	LOS 9.76±9.22	NI 3.72±3.23
	Care Level 3	LOS 8.60±5.87	NI 4.10±2.65
	Care Level 4	LOS 22.11±14.93	NI 4.02±3.28

three to four days in the medical DRGs across care levels two, three, and four. For the surgical DRGs, intervention was 50 to 100% later for the same care levels. Although not shown in this figure, but noteworthy, is that surgical stay days comprised 37.5% of total inpatient days, and that 30.4% of all inpatients were classified as surgical.

The deviation length of stay [DEV LOS] was defined as the difference between the governmental projected LOS and the actual LOS. The DEV LOS [Table 4] mean was tested for statistical significance across the care levels [0-4] by a one-way ANOVA [Table 5]. Only those MDCs that reflected a statistical significance are reported in this table. Within the 11 MDCs, care level four was statistically significant in seven MDCs, while care levels zero and one were each significant for differences in the means among the care levels in three MDCs.

Fifty-nine group-related DRGs [Appendix N] that met the criteria of $\geq$ 15% nutrition intervention were selected for further analysis in research question two. The ANOVAs for the DEV LOS and actual LOS are summarized in Tables 6 and 7. Compared means for DEV LOS and actual LOS by care level [0-4] are listed in Table 8. Care levels zero, three, and four were statistically significant [$p < 0.05$] for differences in the means among the care levels.

Using this ANOVA of selected DRGs to assess the top ten DRGs, the DEV LOS for DRGs 14 [cerebrovascular disorders], 294 [diabetes], 296 [nutrition and metabolic disorders], and 320 [kidney and urinary tract infections] were not statistically significant

Table 4. Deviation Length of Stay[a] [DEV LOS] Mean by Care Level[b] [0-4] for Selected Medical Disease Categories[c] [MDCs].

Care Levels Within Specified MDCs	Deviation Least Square Mean
MDC 1	
0	-0.034 ± 0.320*
1	5.313 ± 0.878
2	5.285 ±1.092
3	3.385 ±1.360
4	17.222 ±1.130*
MDC 4	
0	1.089 ± 0.378*
1	7.010 ± 0.865
2	7.858 ± 1.399
3	5.154 ± 1.978
4	13.379 ± 1.906*
MDC 5	
0	1.082 ± 0.219*
1	7.169 ± 0.699
2	8.626 ± 1.021
3	3.675 ± 0.794
4	7.575 ± 2.751
MDC 6	
0	0.252 ± 0.397
1	4.447 ± 1.010
2	1.839 ± 1.207
3	1.141 ± 1.732
4	18.169 ±1.558*
MDC 9	
0	0.399 ± 0.427
1	5.871 ± 1.663
2	0.375 ± 1.797
3	-0.750 ± 3.112
4	27.500 ± 4.400*

Care Levels Within Specified MDCs	Deviation Least Square Mean
MDC 10	
0	-0.038 ± 0.998
1	5.868 ± 2.063
2	1.950 ± 2.420
3	2.024 ± 1.493
4	14.940 ± 3.060*
MDC 11	
0	0.239 ± 0.818
1	8.974 ± 1.681
2	2.285 ± 2.762
3	6.486 ± 2.334
4	48.250 ± 5.043*
MDC 13	
0	-0.357± 0.705
1	17.150 ± 2.639*
2	-1.200 ± 3.733
3	0
4	0
MDC 18	
0	0.389 ± 1.154
1	5.063 ± 2.514
2	8.525 ± 3.556
3	0
4	25.500 ± 5.028*
MDC 19	
0	-1.456 ± 1.089
1	16.800 ± 5.656*
2	-0.850 ± 4.000
3	0.467± 3.266
4	0
MDC 21	
0	0.577 ± 0.472
1	6.894 ± 1.108*
2	0.583 ± 1.809
3	-0.500 ± 2.216
4	0

± Standard error of measurement.
* Statistically significant ($p<0.05$).
[a] The difference between the Governmental projected length of stay and the actual length of stay.
[b] Appendix K.
[c] Appendix M.

Table 5. ANOVA Summary for Deviation Length of Stay[a] [DEV LOS] for Selected Medical Disease Categories[b] [MDCs] Across All Care Levels[c] [0-4].

Source of[d] Variation	SS[e]	df[f]	MS[g]	F[h]	p>F[i]
MDC 1					
Between	9109.425	4	2277.356	61.57	0.0001*
Within	17865.346	483	36.989		
Total	26974.771				R^2=0.338[j]
MDC 4					
Between	4550.512	4	1137.628	22.36	0.0001*
Within	24017.690	472	50.885		
Total	28568.202				R^2=0.159
MDC 5					
Between	3719.880	4	929.970	30.72	0.0001*
Within	23340.052	771	30.272		
Total	27059.932				R^2=0.137
MDC 6					
Between	6755.914	4	1688.979	33.11	0.0001*
Within	22494.239	441	51.007		
Total	29250.153				R^2=0.231
MDC 9					
Between	914.288	4	228.572	11.80	0.0001*
Within	2265.905	117	19.367		
Total	3180.193				R^2=0.287
MDC 10					
Between	1195.660	4	298.915	6.38	0.0001*
Within	4074.403	87	46.832		
Total	5270.063				R^2=0.227
MDC 11					
Between	8147.411	4	2036.853	26.70	0.0001*
Within	12433.944	163	76.282		
Total	20581.355				R^2=0.396

Table 5. (continued)

Source of[d] Variation	SS[e]	df[f]	MS[g]	F[h]	p>F[i]
MDC 13					
Between	576.043	2	288.022	20.67	0.0001*
Within	390.139	28	13.934		
Total	966.182				R^2=0.596[j]
MDC 18					
Between	1422.918	3	474.306	9.38	0.0001*
Within	2427.187	48	50.566		
Total	3850.105				R^2=0.370
MDC 19					
Between	325.789	3	108.596	3.39	0.0310*
Within	927.813	29	31.994		
Total	1253.602				R^2=0.260
MDC 21					
Between	280.414	3	93.471	9.52	0.0001*
Within	520.476	53	9.820		
Total	800.890				R^2=0.350

a The difference between the Governmental projected length of stay and the actual length of stay.
b Appendix M.
c Appendix K.
d Difference among means between all care levels; difference between means within each care level.
e Sum of Squares.
f Degrees of freedom.
g Mean Square.
h Calculated F Value.
i Probability of obtaining value > calculated F by chance alone.
j Explained variance.
* Statistically significant ($p<0.05$).

Table 6. ANOVA Summary for Deviation Length of Stay[a] [DEV LOS] for Selected Diagnosis-Related Groups[b] [DRGs] Across All Care Levels[c] [0-4].

Source of[d] Variation	SS[e]	df[f]	MS[g]	F[h]	p>F[i]
Between groups	26068.234	62	420.455	9.25	0.0001*
Within groups	84344.834	1855	45.469		
Total	110413.068				R^2=0.236[j]
DRG	5503.513	58	94.889	2.09	0.0001*
Care level	20564.721	4	5141.180	113.07	0.0001*
DRG	7172.304	58	123.660	2.72	0.0001*
Care level	20564.721	4	5141.180	113.07	0.0001*

a The difference between the Governmental projected length of stay and the actual length of stay.
b Appendix N.
c Appendix K.
d Difference among means between all care levels; difference between means within each care level.
e Sum of Squares.
f Degrees of Freedom.
g Mean Square.
h Calculated F Value.
i Probability of obtaining value > calculated F by chance alone.
j Explained Variance.
* Statistically significant (p<0.05).

Table 7. ANOVA Summary for Actual Length of Stay[a] [LOS] for Selected Diagnosis-Related Groups[b] [DRGs] Across All Care Levels[c] [0-4].

Source of[d] Variation	SS[e]	df[f]	MS[g]	F[h]	p>F[i]
Between groups	45133.756	62	727.964	16.01	0.0001*
Within groups	84344.835	1855	45.469		
Total	129478.591				R^2=0.349[j]
DRG	24569.034	58	423.604	9.32	0.0001*
Care level	20564.721	4	5141.180	113.07	0.0001*
DRG	13328.048	58	229.794	5.05	0.0001*
Care level	20564.721	4	5141.180	113.07	0.0001*

a From day of admission to discharge.
b Appendix N.
c Appendix K.
d Difference among means between all care levels; difference between means within each care level.
e Sum of Squares.
f Degrees of freedom.
g Mean Square.
h Calculated F Value.
i Probability of obtaining value > calculated F by chance alone.
j Explained Variance.
* Statistically significant (p<0.05).

Table 8. Deviation Length of Stay[a] [DEV LOS] and Actual LOS[b] Mean by Care Level[c] [0-4] for Selected Diagnosis-Related Groups[d] [DRGs].

Care Level	DEV LOS Least Square Mean	Actual LOS Least Square Mean
0	0.0798 ± 0.286*	7.666 ± 0.286*
1	6.334 ± 0.484	13.920 ± 0.484
2	4.987 ± 0.618	12.574 ± 0.618
3	1.790 ± 0.718*	9.376 ± 0.718*
4	15.555 ± 0.859*	23.141± 0.859*

a The difference between the Governmental projected length of stay and the actual length of stay.
b From day of admission to discharge.
c Appendix K.
d Appendix N.
± Standard error of measurement.
* Statistically significant ($p<0.05$).

among any of the top ten DRGs. However, comparison of the actual LOS indicated that DRG 410 [chemotherapy] was statistically significant from all other DRGs within this top ten grouping.

TIME FOR NUTRITION INTERVENTION

Table 9 summarizes the mean time and standard deviations for the variables assessment, consultation, instruction, intake analysis, and monitoring across all MDCs/DRGs, with the frequencies of these activities enumerated in Table 10. The non-basic care in level one is explained by two factors: [1] the initiation of non-basic care that was not completed secondary to the patient's changing medical status, and/or [2] a request for verbal recommendations for patient management from a nurse rather than a physician. Basic care is reported in Tables 11 and 12. Across all care levels, a non-basic activity, consult, more nearly approximated the mean within its own activity than did any of the other care levels approximate their respective means. According to frequency of activity, the combined non-basic and basic care time means for care levels one, two, three, and four, were 22.9 minutes, 30.1 minutes, 40.6 minutes, and 63.9 minutes, respectively.

When analyzing the data in terms of mean total time per patient [Table 13], rather than by frequencies of activities, the means changed to 27.5, 51.4, 90.7, and 212.9 minutes for care levels one, two, three, and four, respectively. Viewing the

Table 9. Mean Nutrition Intervention Time in Minutes for Non-basic[a] Care Across All Diagnosis-Related Groups [DRGs] by Care Levels[b] [1-4].

Care Level	Assess[c]	Consult	Instruct	Intake	Monitor
1	0	30.0 ± 0.0	15.0 ± 7.1	5.0 ± 0.0	21.1 ± 12.4
2	27.2 ± 11.5	27.9 ± 11.1	28.6 ± 13.2	46.7 ± 23.2	35.7 ± 54.1
3	64.0 ± 42.0	26.7 ± 9.4	52.0 ± 24.0	23.0 ± 6.3	28.3 ± 25.2
4	50.7 ± 36.6	38.5 ± 19.7	38.2 ± 23.6	74.6 ± 97.7	124.1 ± 172.2
All	36.6 ± 27.2	33.2 ± 16.8	44.4 ± 23.9	55.9 ± 67.6	64.7±119.7

[a] Appendix A.
[b] Appendix K.
[c] Appendix J.
± Standard Deviation.

Table 10. Frequency of Non-basic[a] Care Across All Diagnosis-Related Groups [DRGs] by Care Levels[b] [1-4].

Care Level	Frequency of Non-basic Activities**					
	Assess[c]	Consult	Instruct	Intake	Monitor	Total
1	0	1	2	1	63	67
2	73	48	66	23	42	252
3	5	9	152	4	25	195
4	39	60	11	21	82	213
All	117	118	231	49	212	727

[a] Appendix A.
[b] Appendix K.
[c] Appendix J.
** Indicates number of activities, not number of patients.

Table 11. Mean Nutrition InterventionTime in Minutes for Basic Care[a] Across All Diagnosis-Related Groups [DRGs] by Care Levels[b] [1-4].

Care Level	Misc.	Screen
1	24.4 ± 29.2	22.8 ±18.3
2	23.8 ± 21.8	32.3 ± 21.1
3	26.6 ± 21.2	23.4 ±12.7
4	42.0 ± 56.0	32.4 ± 34.1
All	28.4 ± 34.7	25.3 ± 21.4

a Appendixes A and L.
b Appendix K.
± Standard Deviation.

Table 12. Frequency of Basic Care[a] Across all Diagnosis-Related Groups [DRGs] by Care Levels[b] [1-4].

Care Level	Frequency of Basic Activities#		
	Misc.	Screen	Total
1	121	244	365
2	51	46	97
3	68	23	91
4	62	47	109
All	302	360	662

a Appendixes A and L.
b Appendix K.
# Indicates number of activities, not number of patients.

Table 13. Mean of Total Nutrition Intervention Time in Minutes for Non-basic[a] and Basic Care[b] by Care Level[c] [1-4] Per Patient.

Care Level	Patients	Mean Total
1	360	27.5 ± 29.0
2	210	51.4 ± 49.2
3	159	90.7 ± 54.9
4	99	212.9 ± 229.6

a Appendix A.
b Appendixes A and L.
c Appendix K.
± Standard deviation.

graduation of minutes across care levels in both of these analyses is supportive of research question three, i.e., that actual LOS is expected to decrease as the intensity [i.e., total time] increases. Although the LOS did decrease as the mean time of nutrition intervention increased, this condition was not evident in care level four. In ascending order, by care levels [one through four], LOS was 14.7, 11.5, 9.5, and 26.7 days [Table 3, pg.38]. Care level four consumed more time, but LOS increased. This finding may be reflective of the composition of the group, indicating a greater severity of illness, and consequently requiring the utilization of enteral and parenteral support.

From the perspective of time spent within an activity, the activity of monitoring dominated [irrespective of category of care] representing more than a quarter of all time spent for all care levels [Table 14]. Viewed by the percentage of time spent within each care level, monitoring was still the predominant activity, accounting for 46% of all non-basic time [Table 15]. By category of care, non-basic accounted for two-thirds and basic one-third of total time [Table 16]. Basic care was more evenly distributed in relation to time spent by activity [Table 17]. The difference in miscellaneous and screening, as a percentage of time spent within its own category of care was 5%. This percentage reduced to 1% when these two activities were compared with all activitites, both basic and non-basic.

Tables 18 through 21 present total time for non-basic and basic nutrition intervention classified by care levels. Figure 3

Table 14. Percentage of Non-basic[a] Nutrition Intervention Time in Minutes Spent Across All Diagnosis-Related Groups [DRGs] by Care Levels[b] [1-4].

Care Level	Non-basic					
	Assess[c]	Consult	Instruct	Intake	Monitor	Total
1	0.0	0.1	0.1	0.0	2.5	2.7
2	3.8	2.5	3.6	2.0	2.9	14.8
3	0.6	0.5	15.0	0.2	1.3	17.6
4	3.8	4.4	0.8	3.0	19.4	31.3
Total	8.1	7.5	19.5	5.2	26.1	66.4

a Appendix A.
b Appendix K.
c Appendix J.

Table 15. Percentage of Non-basic[a] Nutrition Intervention Time in Minutes Spent Within Each Care Level[b] Across All Diagnosis-Related Groups [DRGs].

Care Level	Non-basic					
	Assess[c]	Consult	Instruct	Intake	Monitor	Total
1	0.0	2.2	2.2	0.4	95.3	100
2	25.5	17.2	24.3	13.8	19.3	100
3	3.5	2.6	85.3	1.0	7.6	100
4	12.0	14.1	2.6	9.5	61.9	100
Total	10.2	9.0	28.6	6.2	46.0	100

a Appendix A.
b Appendix K.
c Appendix J.

Table 16. Percentage of Basic[a] Nutrition Intervention Time in Minutes Spent Across All Diagnosis-Related Groups [DRGs] by Care Level[b] [1-4].

Care Level	Basic		
	Misc.	Screen	Total
1	5.6	10.6	16.2
2	2.3	2.8	5.1
3	3.4	1.0	4.5
4	5.0	2.9	7.8
Total	16.3	17.3	33.6

a Appendixes A and L.
b Appendix K.

Table 17. Percentage of Basic[a] Nutrition Intervention Time in Minutes Spent Within Each Care Level[b] Across All Diagnosis-Related Groups [DRGs].

Care Level	Basic		
	Misc.	Screen	Total
1	34.8	65.2	100
2	44.9	55.1	100
3	77.1	22.9	100
4	63.1	39.6	100
Total	55.0	45.0	100

a Appendixes A and L.
b Appendix K.

Table 18. Total Nutrition Intervention Time in Minutes Spent for Non-basic[a] Care Across All Diagnosis-Related Groups [DRGs] and Care Levels 1-4[b].

Care Level	Non-basic					
	Assess[c]	Consult	Instruct	Intake	Monitor	Total
1	0	30	30	5	1330	1395
2	1983	1340	1890	1073	1500	7786
3	320	240	7906	92	708	9266
4	1978	2312	420	1567	10177	16454
	4281	3922	10246	2737	13715	34901

a Appendix A.
b Appendix K.
c Appendix J.

Table 19. Frequency of Non-basic[a] Care Actitivies Across All Diagnosis-Related Groups [DRGs] and Care Levels 1-4[b].

Care Level	Frequency of Non-basic Activities[#]					
	Assess[c]	Consult	Instruct	Intake	Monitor	Total
1	0	1	2	1	63	67
2	73	48	66	23	42	252
3	5	9	152	4	25	195
4	39	60	11	21	82	213
	117	118	231	49	212	727

a Appendix A.
b Appendix K.
c Appendix J.
# Indicates number of activities, not number of patients.

Table 20. Total Nutrition Intervention Time in Minutes for Basic[a] Care Across All Diagnosis-Related Groups [DRGs] and Care Levels 1-4[b].

Care Level	Basic		
	Misc.	Screen	Total
1	2957	5551	8508
2	1214	1488	2702
3	1811	538	2349
4	2604	1523	4127
	8586	9100	17686

a Appendixes A and L.
b Appendix K.

Table 21. Frequency of Basic[a] Care Activities Across All Diagnosis-Related Groups [DRGs] and Care Levels 1-4[b].

Care Level	Frequency of Basic Activities#		
	Misc.	Screen	Total
1	121	244	365
2	51	46	97
3	68	23	91
4	62	47	109
	302	360	662

a Appendixes A and L.
b Appendix K.
# Indicates number of activities, not number of patients.

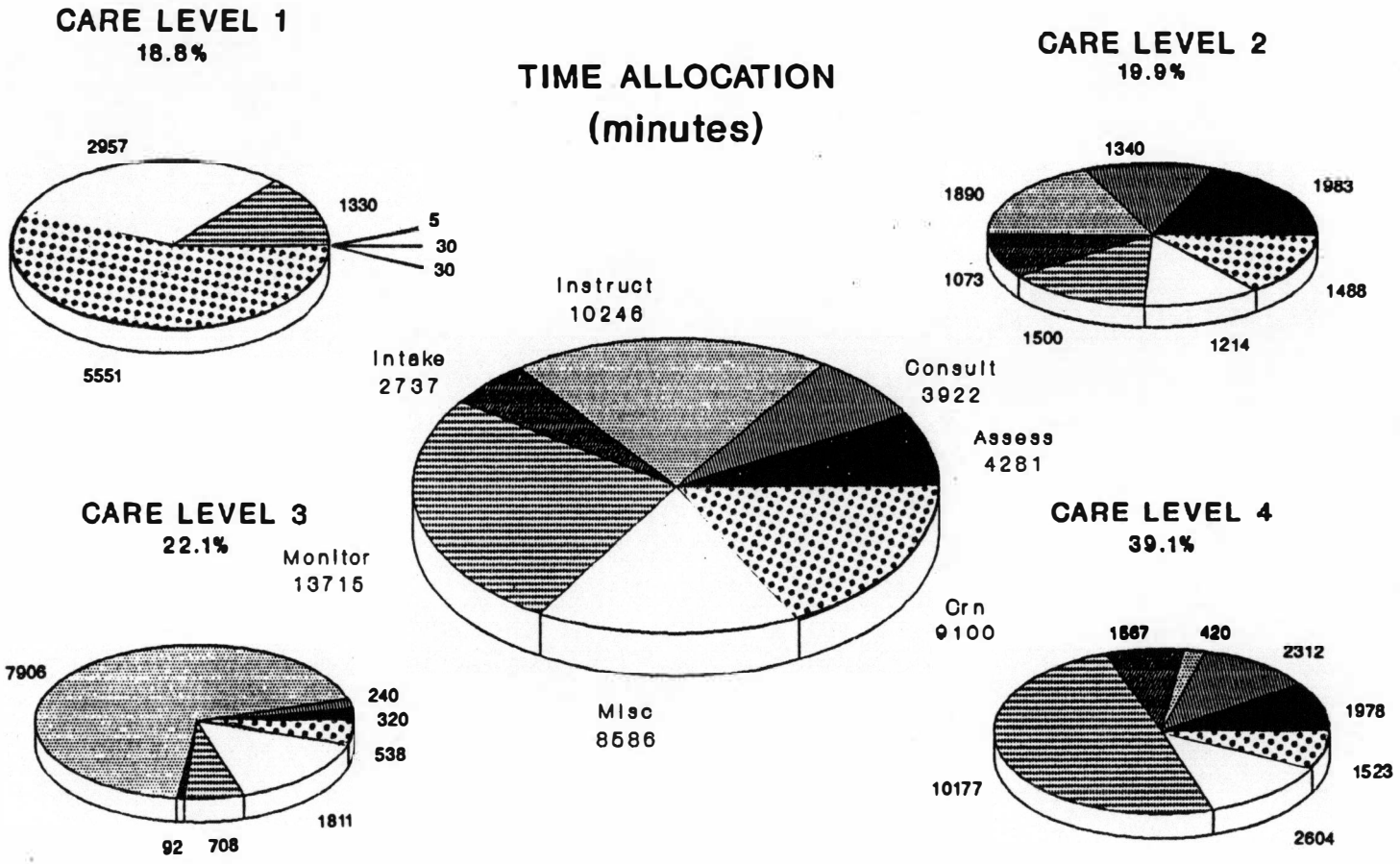

Figure 3. Total Nutrition Intervention Time in Minutes for Non-basic[a] and Basic[b] Care Across All Diagnosis-Related Groups [DRGs] and Care Levels 1-4[c].

[a] Appendix A.
[b] Appendixes A and L.
[c] Appendix K.

graphically illustrates the time distribution by care level. When grouped according to those patients receiving only non-basic care, or basic care, or a combination [Table 22], the number of patients were 274, 293, and 261, respectively.

Even greater scrutiny of patients within DRGs is accomplished by focusing on the top ten DRGs evidencing nutrition intervention. When ranked by number of patients with nutrition intervention, the top ten DRGs [Table 23] were Cerebrovascular Disorders [14], Heart Failure and Shock [127], Simple Pneumonia [89], GI Procedures [148], Digestive Disorders [182], Chemotherapy [410], Kidney/Urinary Tract Infections [320], Diabetes [294], Craniotomy [1], and Nutritional Disorders [296]. These DRGs comprised more than a third [35.5%] of all patients with nutrition intervention. The top ten DRGs without nutrition intervention are listed in Table 24. When segregated on the basis of "with" nutrition intervention and "without" nutrition intervention, four DRGs, 14 [Cerebrovascular], 89 [Pneumonia], 127 [Heart Failure and Shock], and 182 [Digestive Disorders], were common to both categories. This is explained by the large number of inpatients classified in care level zero [i.e., without nutrition intervention], as well as in care levels one through four [i.e., with nutrition intervention]. For comparison, DRGs 14 [Cerebrovascular] and 294 [Diabetes] were among the top ten in Beno's study (103) while DeHoog (15) listed DRGs 127 [Heart Failure and Shock], 182 [Digestive Disorders], 296 [Nutritional Disorders], and 410 [Chemotherapy] among the top ten with nutrition intervention.

Table 22. Number of Patients According to Non-basic[a], Basic[b], and Combination Nutrition Intervention Across All Diagnosis-Related Groups [DRGs].

Care Level[c]	Non-basic	Basic	Combination
1	36	293	31
2	134	0	76
3	81	0	78
4	23	0	76
	274	293	261

a Appendix A.
b Appendixes A and L.
c Appendix K.

Table 23. Top Ten Diagnosis-Related Groups [DRGs] With Nutrition Intervention [NI] Ranked by Number of Total Patients Within the Respective DRG and Average Number of Diagnoses for Patients With and Without Nutrition Intervention.

Rank	DRGs With NI	Description	Total Percent With NI	Average Number of Diagnoses With NI	Average Number of Diagnoses Without NI
1	14	CVA	38%	6.7	6.0
2	127	Heart Failure/Shock	30%	8.3	6.8
3	89	Penumonia	31%	8.0	6.6
4	148	GI Surgery	67%	7.5	9.2
5	182	Misc. GI Problems	28%	7.8	7.3
6	410	Chemotherapy	35%	4.2	4.2
7	320	Kidney/UT Infections	42%	8.8	7.3
8	294	Diabetes Age>35	63%	6.2	7.3
9	1	Craniotomy	56%	6.3	3.6
10	296	Nutrition Disorders	60%	8.8	8.0

Table 24. Top Ten Diagnosis-Related Groups [DRGs] Without Nutrition Intervention Ranked by Number of Total Patients Within the Respective DRG.

Rank	DRG	Description
1	243	Medical Back Problems
2	15	Transient Ischemic Attacks & Precerebral Occurrences
3	14	Specific Cerebrovascular Disorders Except TIA
4	127	Heart Failure and Shock
5	96	Bronchitis and Asthma Age >17 with cc [complicating condition]
6	215	Back and Neck Procedures without cc
7	89	Simple Pneumonia and Pleurisy Age >17 with cc
8	125	Circulatory Disorders Except AMI with Catheter without Complex Diagnosis
9	182	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders Age >17 with cc
10	214	Back and Neck Procedures with cc

Similar agreement was evident in Blackburn and Himberg's (14) research by DRGs 14 [Cerebrovascular], 89 [Pneumonia], 127 [Heart Failure and Shock], 182 [Digestive Disorders], 294 [Diabetes], and 296 [Nutritional Disorders].

In terms of MDC groupings for the DRGs with the ten highest levels of nutrition intervention, there were greater than three times the number of patients in DRG 14 [Cerebrovascular] than in DRG 1 [Craniotomy], both being classified in MDC 1 [Nervous System]. This difference translates into 44 patients. In comparison, MDCs 6 [Digestive System] and 10 [Endocrine, Nutritional, and Metabolic Diseases and Disorders], also with two DRGs each [in the top ten nutrition intervention classifications], differed within their own MDC by only three and four patients, respectively. Although there were patient number variations in the care levels within the DRGs, comparison of the number of discharge diagnoses for patients with nutrition intervention versus those patients without intervention reflected a trend toward a greater number of diagnoses for those patients with nutrition care [Table 23]. In terms of total time per patient, for the top ten DRGs, the means for non-basic and basic care are found in Table 25. Once again, monitoring was the most time-intensive non-basic activity, with mean time spent in the top ten DRGs being 986.1 minutes. Within only basic activities, miscellaneous, with mean time totaling 828.0 minutes, led the category.

Table 26 provides the total average time [of basic and non-basic care categories] spent with each patient in the top ten

Table 25. Mean Non-basic[a] and Basic[b] Nutrition Intervention Time in Minutes Spent for the Top Ten Diagnosis-Related Groups [DRGs] Across All Care Levels[c] [1-4].

			Non-basic						Basic		
DRG	DESCRIPTION	Patients	Assess[d]	Consult	Instruct	Intake	Monitor	Total	Misc.	Screen	Total
1	Craniotomy	19	0.0	77.9	45.0	146.0	57.8	326.7	95.0	37.1	132.1
14	CVA	63	57.5	90.4	146.3	70.0	107.2	471.4	101.8	91.4	193.2
89	Pneumonia	34	47.5	65.0	95.0	40.0	68.2	315.7	73.1	20.4	93.5
127	Heart Failure/Shock	41	145.0	31.7	88.1	35.0	132.5	432.3	67.7	69.5	137.2
148	GI Surgery	28	71.3	65.0	91.3	36.7	281.7	546.0	57.6	73.9	131.5
182	Misc. GI Problems	25	27.5	150.0	76.6	0.0	167.0	421.1	87.5	47.0	134.5
294	Diabetes age>35	22	0.0	30.0	51.2	0.0	55.0	136.2	66.3	57.0	123.3
296	Nutrition Disorders	18	53.0	72.5	60.0	199.3	37.5	422.3	170.0	195.0	365.0
320	Kidney/UT Infections	22	27.5	42.5	75.7	64.0	54.2	263.9	69.0	61.0	130.0
410	Chemotherapy	22	28.4	0.0	0.0	0.0	25.0	53.4	40.0	20.0	60.0
Total		294	457.7	625.0	729.2	591.0	986.1	3389.0	828.0	672.3	1500.3

a Appendix A.
b Appendixes A and L.
c Appendix K.
d Appendix J.

Table 26 . Mean Non-basic[a] and Basic[b] Nutrition Intervention Time in Minutes Spent for the Top Ten Diagnosis-Related Groups [DRGs] Across All Care Levels[c] [1-4].

MDC[d]		DRG		Patients	Non-basic	Basic	Total
1	Nervous	1	Craniotomy	19	42.7	25.1	67.8
		14	CVA	63	39.2	19.1	58.3
4	Respiratory	89	Pneumonia	34	14.9	18.7	33.6
5	Circulatory	127	Heart Failure	41	39.0	20.4	59.4
6	Digestive	148	GI Surgery	28	93.9	21.7	115.6
		182	Misc. GI	25	41.0	11.8	52.8
10	Nutritional	294	Diabetes age > 35	22	45.2	26.3	71.5
		296	Nutrition Disorders	18	54.8	43.9	98.7
11	Kidney/UT	320	Kidney/UT Infections	22	31.8	20.1	51.9
17	Myeloproliferative	410	Chemotherapy	22	25.7	2.7	28.4
Total				294	41.8	20.2	62.0

[a] Appendix A.
[b] Appendixes A and L.
[c] Appendix K.
[d] Medical Disease Category.

DRGs. The most time per patient [on average] was spent with DRG 148 [GI Procedures] patients -- 115.6 minutes [Figure 4]. Interestingly, DRG 182 [Digestive Disorders], which is included in the same MDC grouping [6] as DRG 148, varies from the latter by more than 50%. No inference is intended by these obviously discrepant averages, as the differences could be due to the composition of the inpatients, medical practice patterns, and/or patients' response to treatment. But, this finding is supportive of the previously mentioned lack of homogeneity of DRGs/MDCs (13,15,63-67).

Due to differences in methodology and time spans, only a few comparisons can be made with previous research related to patient nutrition intervention studies. McManners (22) conducted an 18 month time study that defined basic care as requiring a mean time of 25 minutes. The present research found a frequency-based average of 26.7 minutes across all care levels. Additionally, McManners reported 3.75 hours for metabolic support activities. At this research site, care level four, with a mean of 50.7 minutes for assessment, 38.5 minutes for consultation, 74.6 minutes for intake analysis, and 124.1 minutes for monitoring, had an average of 4.8 hours [non-basic care only] for parenteral and enteral nutrition support activities.

Hernandez's (18) study may be compared to this study when mean times for counseling, diet history, pattern calculations, documentation, and care planning are considered. A diet instruction averaged 69.7 minutes in the Hernandez study.

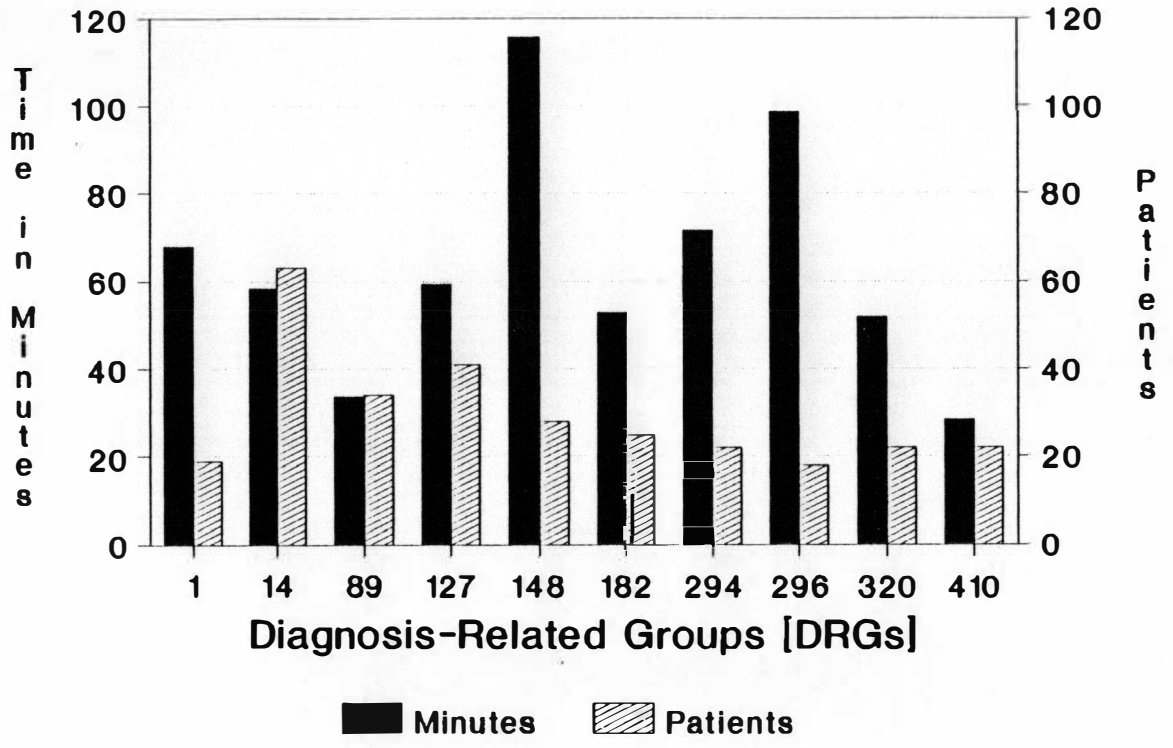

Figure 4. Mean Total Non-basic[a] and Basic[b] Nutrition Intervention Time in Minutes Spent for the Top Ten Diagnosis-Related Groups [DRGs] Across All Care Levels[c] [1-4].

[a] Appendix A.
[b] Appendixes A and L.
[c] Appendix K.

Combination of means from Gould's (17) study for diet instruction and counseling individuals [11.58], diet history [9.91], calculations [4.3], reading medical records [5.87] and recording in medical records [7.48] totaled 39.14 minutes for activities associated with a diet instruction. ADA (69) reported the mean of patient counseling [#14 in the ADA categorization] to be 43.5 minutes, evaluation [#15] 15.08 minutes, calculations [#9] 20.11 minutes, and medical record entries [#20] 10.5 minutes, to equal 89.19 minutes. If patient assessment activities such as a thorough medical record review [#2 and 3] and in-depth interview [#4 and 5] of the patient's lifestyle are included, this figure would increase to 147.6 minutes. McManners (22) reported 75 minutes for a diet instruction. The mean time for a diet instruction in the present study was 44.4 minutes, inclusive of all associated activities.

In the ADA report (69), components of patient assessment [#2, 3, 4, 5], calculations [#9], and medical record entries [#18] totaled 102.11 minutes. In comparison to the present research, this figure is close to the summation of the means, 101.3 minutes, for nutritional assessment [36.6 minutes] and monitoring [64.7 minutes], or for the summed means of consultation [33.2 minutes] and monitoring [64.7 minutes], i.e., 97.9 minutes.

If the care level focus is directed exclusively to physician-ordered nutrition intervention care levels, i.e., defined as levels two through four, the preponderance of total time across all care levels and activities is captured. Only 18% of total care time is not included [Table 13, pg. 50]. By category of care,

physician-ordered nutrition intervention did not replicate the two-thirds, one-third total time breakout evident in care levels one through four. Instead, the percentages grew more divergent, with 80% of total time dedicated to non-basic and only 20% being devoted to basic care. The most inpatient care time required of a single Medical Disease Category in these same care levels was MDC 6 [Digestive Disorders], at 21.2%. Of the total care time devoted to this MDC, the activity of monitoring consumed slightly more than half. MDC 5 [Circulatory System] ranked as the second most time intensive MDC for this range of care levels, evidencing 15.7% of total basic and non-basic time. Surprisingly, the activity of instruction was the same proportion to MDC 5 as was monitoring to MDC 6. Together, these activities accounted for 56.5% of the total time for care levels two through four; or, stated differently, these two activities were greater than 70% of all the non-basic time. Ironically, MDC 5 also evidenced the highest percentage of time committed to basic activities screening at 1.5% and miscellaneous at 2.7%. Combined, miscellaneous and screening time for MDC 5 represented more than one-fifth [21.1%] of all basic time.

CHAPTER 6

SUMMARY AND RECOMMENDATIONS

A retrospective study of 3,882 Diagnosis-Related Group [DRG i.e., Medicare] inpatients, of whom 828 received nutrition intervention, during the time period of January 1 through December 31, 1988, was completed. Using care levels developed by Lutton et al. (101), the researcher classified the 828 patients into one of four care levels based on the types of nutrition activities recorded on the daily clinical activity forms, and documented in the medical records by the clinical dietitians or the dietitians' assistant. If there were no nutrition intervention by a dietitian or dietitians' assistant, the patient was classified into care level zero [0]. Aggregate times were compiled for seven activities during the patient's entire length of stay [LOS]. The seven activities were categorized into non-basic care [i.e., assessment, consultation, instruction, intake analysis, and monitoring] and basic care [i.e., miscellaneous and screening]. Transit time, vacations, and other non-patient-related times were not considered. Reliability of the classifications was determined by reclassifying a random sampling of 100 previously classified patients to determine agreement; a 98% reliability resulted.

Within the population, the average age of both males and females exceeded 70 years. The top ten Medical Disease Categories [MDCs] and DRGs with nutrition intervention were congruent with other research.

The mean actual LOS for care levels one through four were 14.7, 11.5, 9.5, and 26.7 days, respectively. For those patients who did not receive nutrition intervention beyond the admission screening by the diet writers [i.e., care level 0], the actual LOS was 6.5 days. A one-way ANOVA was used to test for statistical significance between the DEV LOS [actual LOS minus the governmental projected DRG LOS] means. Statistical significance [$p<0.05$] was evidenced by care level four in seven MDCs, while care level zero and one were each significant in three MDCs. ANOVAs for the actual LOS and DEV LOS were created for 59 selected, grouped DRGs that met the criteria of $\geq$ 15% nutrition intervention. The results indicated that care levels zero, three, and four were statistically significant among the means.

When DRGs were segregated into medical and surgical classifications, the data showed that physician-requested nutrition intervention was initiated sooner in the medical DRGs. Within three of the care levels [i.e., two, three, and four] the mean day of nutrition intervention was day four in the medical DRGs. Intervention for the surgical DRGs was 50 to 100% later for the same care levels.

In terms of time, for the top ten MDCs and DRGs, MDC 6 [Digestive System] and DRG 148 [GI Procedures] were the most

time-intensive. Analysis of the mean data of combined basic and non-basic care per patient was 27.5, 51.4, 90.7, and 212.9 minutes for care levels one through four, respectively; when viewed as averages by frequency of activity rather than per patient, the times were 22.9, 30.1, 40.6, and 63.9 minutes accordingly. The mean times of 27.5 minutes and 22.9 minutes for basic care [i.e., care level one] were similar to previous reports (22). The distribution of non-basic time over all the DRGs was 66.4% and 33.6% for basic care.

Parenteral and enteral nutrition, contained within care level four, required an average of 4.8 hours of non-basic care [frequency based]. The composite time for both non-basic and basic activities for the physician-ordered care [i.e., levels two through four] consumed 82% of the total time for all MDC/DRGs.

Although the actual LOS decreased as the intensity of nutrition intervention [i.e., total time] increased in care levels one through three, this decline was not evident in care level four. This finding may be reflective of the composition of the group [i.e., enteral/parenteral nutrition] and may indicate a greater severity of illness. Although measurement of illness was beyond the scope of this research, overall nutrition intervention across all care levels within the top ten DRGs generally occured with those patients who had a higher number of discharge diagnoses; however, this finding does not necessarily imply a cause and effect relationship. Additionally, the instruction component of the non-basic care may not contribute directly to a decreased LOS in

the hospital setting. Measurement of long-term outcomes after discharge was not a component of this research, but is of vital importance.

This case study revealed several areas that require further refinement and research in clinical nutrition. First, although the American Dietetic Association (69) attempted to standardize clinical nutrition terminology in regard to types of activities in 1982 and, again, in 1984 (108) and 1985 (109), consistency of this terminology was lacking within the literature that was reviewed. Therefore, accurate comparisons among the data were difficult. Concensus of terminology would greatly enhance future research, permit improved comparisons of data, and provide clarification to third party payers.

Second, although care level definitions were more consistent from study to study, none of the research was linked to a severity of illness index. Some studies did correlate care level and nutritional status. A higher care level may not always be associated with a greater degree of illness. Utilization of the severity of illness criteria as published by the Health Care Financing Association [HCFA] or another recognized index, along with nutritional status, would provide another method to assess the impact of nutrition intervention.

Third, diet instructions have minimal relationship to LOS. This activity must be segregated to accurately assess the effect of nutrition intervention on LOS.

Fourth, improved data collection and analysis are necessary. In recent years, much progress has been made in the area of administrative clinical nutrition. However, integration of clinical and financial information is mandatory (6). Data collection by Medical Disease Categories [MDCs] has little utility for clinical dietitians. As evidenced by the present research, specific DRG information more accurately summarizes time and care level distributions and may better project clinical labor requirements. However, the findings of this study must not be interpreted as "standards" because staffing is dependent upon the characteristics of the patient population, hospital specialties, physician practice patterns, skills of the dietitians, and the availability of qualified dietetic support personnel. Although lack of homogeneity within the DRGs was supported by the findings in this study, provision of clinical data on a per DRG basis that is linked to a severity of illness index will enhance the Prospective Payment Assessment Commission's [ProPac] efforts to evaluate the true impact of nutrition intervention. Most importantly, facilitation of clinical nutrition research in practice settings will require terminology, care level classifications, and data collection processes that are easy to use on a daily basis.

As the Medicare DRG system of reimbursement enters its seventh year, its ramifications remain far reaching. The most significant impact has been the abbreviation of the hospital length of stay days (33,65,115). With less severely ill patients being diverted from inpatient to outpatient settings, the trend has

been toward admission of more severely ill individuals as inpatients (115). Additionally, the increasing average age of the population [i.e., >65] may create a larger group of high-cost medical users for hospitals (116).

With further Medicare payment reductions being considered (117-120) and more intensive nation-wide scrutiny demanding quality care for fewer dollars (99,121-122), medical professionals are facing unprecedented challenges. Dwindling reimbursement sources have created an era of competition for survival among healthcare professions (74,123-126), as well as redistributing work responsibilities (58). Cost-effective, cost-beneficial clinical nutrition services that can measure and document health outcomes (24,99,127), utilize time efficiently (77), develop practice standards that will link severity of illness to the PPS system (119), and maintain accountability (128,130-132), will prevail.

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APPENDIXES

APPENDIX A

DEFINITIONS OF TERMS

CARE:

Basic care is composed of screening and miscellaneous activities. Miscellaneous activities include documentation of the nutritional content of supplements and tube feedings when nutritition intervention is not requested, food preferences, menu and/or nourishment changes, taste tests, and diet pattern calculations for inpatient use.

Non-basic care consists of nutritional assessments, consultations, nutrient intake analyses, diet instructions, and monitoring of progress beyond basic care.

CLINICAL DIETITIAN:

A Registered Dietitian that meets the requirements of the Commission on Dietetic Registration and provides clinical services.

DIAGNOSIS RELATED GROUPS [DRGs]:

A governmental listing of 477 groupings used to classify the primary discharge diagnosis of patients and to establish the Medicare reimbursement rate to hospitals.

DIET WRITER:

A non-degree employee who has been trained by Registered Dietitians to write regular and modified menus using patterns, check trayline, perform nutritional screenings, and process all computerized orders.

DIETETIC INTERN:

An intern that meets the requirements of the American Dietetic Association for Plan IV/V and is enrolled in an approved internship.

DIETITIANS' ASSISTANT:

An undergraduate degree employee who meets the eligibility requirements of the Plan IV/V of the American Dietetic Association.

INTENSITY:

Total amount of time as defined below.

DEFINITIONS OF TERMS

LENGTH OF STAY [LOS]:

Actual length of stay are the days of hospital stay from the date of admission until discharge.

Deviation length of stay [DEV LOS] is the difference between the governmental projected length of stay and the actual length of stay.

Governmental projected length of stay is the average number of days of admission for a specific DRG which has been established by the Health Care Financing Administration and ProPac.

MEDICAL DISEASE CATEGORIES [MDCs]:

Twenty-four major disease categories under which the 477 DRGs are classified.

RELATIVE COST WEIGHT:

A weighting factor used in determining reimbursement to a facility based on location [urban vs rural] and teaching/non-teaching affiliation.

RELATIVE VALUE UNITS:

Units of measure that can include direct and indirect costs or units of time.

TIME:

The total amount of clinical dietitians' and dietitians' assistant's time for direct and indirect inpatient care, charting, preparation of educational materials and/or diet patterns, computer usage for assessments or intake analysis, research for care management, and communication with other healthcare professionals regarding patient care plans. Transit and non-productive time [i.e., delay in obtaining charts or in interviewing the patient] was not included.

APPENDIX B

SCREENING MECHANISMS

Department: NUTRITION SERVICES **Section:**

Effective Date: December 14, 1985

Subject: Standards of Care: Mechanisms

Purpose: To provide a systematic approach to identifying patients who may need nutrition intervention.

Forms to be used: None.

Procedure:

1. Computerized diet list and messages.
2. Physician's order.
3. Discharge planning meetings.
4. Referral by personnel of Nutrition Services or Nursing Service.
5. Dietitian's rounds on floors.
6. Tube feeding and NPO records.

APPENDIX C

SCREENING CRITERIA

Department: NUTRITION SERVICE Section:

Effective Date: December 14, 1985

Subject: Screening Criteria

Purpose: To identify patients with high nutritional risk factors.

Forms to be used: None.

Procedure:

1. By diagnosis
   a. Acute or chronic renal disease
   b. Anemia
   c. Cancer
   d. Chronic obstructive pulmonary disease
   e. Comatose states
   f. Diabetes mellitus (uncontrolled and/or with complications
   g. Decubitus
   h. Dysphagia
   i. Gastrointestinal disorders (ie., chron's disease, malabsorption syndrome, pancreatitis, etc.)
   j. Hyper/hypo thyroidism
   k. Hypoglycemia
   l. Hypertension (uncontrolled)
   m. Liver disease
   n. Major surgery
   o. Malnutrition
   p. Multiple allergies
   q. Sepsis
   r. Trauma (ie., multiple fractures, burns, head injuries, etc.)
   s. Weight loss or obesity

2. By other factors
   a. NPO for 4 days (to be screened on 4th day)
   b. Clear liquid diet for more than 3 days (diet clerk to notify dietitian; noted from NPO records)
   c. Enteral or parenteral nutrition
   d. Complex nutritional prescription
   e. Hospital confinement extends more than 10 days
   f. Reported inadequate food/fluid intake
   g. Medications that are outlined in NMH drug/nutrient interactions policy

APPENDIX D

SCREENING STANDARD OF CARE

NMH Procedures	Department: NUTRITION SERVICES
Subject: STANDARDS OF CARE: SCREENING	Effective Date: 5/1/87

I. DIET WRITER'S RESPONSIBILITIES

A. Within 3 days of admission, using screening guidelines for diet writers, extract medical data from the inpatient chart and record on screening form.

B. Place original copy of screening form on chart in the progress note section by the 4th day of admission.

C. Give the yellow copy to the Dietitian's Assistant #1.

D. Record screening date in diet office cardfile.

II. DIETITIAN'S RESPONSIBILITIES

A. Rescreen patients 10 days after initial screen according to screening guidelines for dietitians.

B. For initial screens, record date in diet office cardfile.

III. DIETITIANS ASSISTANT'S RESPONSIBILITIES

A. Review screening forms for accuracy and initial prior to giving them to the dietitians.

B. Maintain number of screens completed and record of accuracy for each diet writer and review monthly with Head Clinical Dietitian.

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APPENDIX E

SCREENING FORM

NASHVILLE MEMORIAL HOSPITAL
NUTRITION SERVICES
SCREEN FOR NUTRITIONAL STATUS

Date __/___/__ Diet Order_____ Rescreen_____

Diagnosis _____

NUTRITIONAL INDICATORS

FRAME SIZE S M L

	ELEVATED	NORMAL	MOD. DEPLETED	SEVERLY DEPLETED
Ht._____ Wt._____				
IBW_____ %IBW_____				
Usual_____ %Usual_____				
LABORATORY				
Date:_____				
Hgb._____				
Date:_____				
Hct._____				
Date:_____				
(% Lymph____ x WBC____)x 10 = _____ TLC				
Date:_____				
Glucose_____				
Date:_____				
BUN_____				
Date:_____				
Serum Albumin_____				
Date:_____				
Triglycerides_____				
Date:_____				
Cholesterol_____				

NUTRITIONAL DATA

Current Appetite_____ %Meal Intake_____

Recent changes in weight_____

Diet Prior to Admission_____

Oriented to Menu Selection? Y N Food Preferences Noted? Y N

COMMENTS:_____

11/12/86 Screened By:_____

APPENDIX F

RESEARCH APPROVAL

THE UNIVERSITY OF TENNESSEE
KNOXVILLE

Office of the
Vice Provost
for Research

CRP #: 2960 A DATE: 03/27/89

Title: Impact of Intensity of Nutrition Intervention within DRGs (Diagnosis-Related Groups)

Mandel, Alicia
Nutrition & Food Sciences
182 Lancaster Drive
Franklin, TN 37064

Sachan, Dr. Dileep
Nutrition & Food Sciences
3018 Jessie Harris Bldg.
Campus

Dear Ms. Mandel:

The project listed above has been certified exempt from review by the Committee on Research Participation and is approved.

This certification is for a period ending one year from the date of this letter. Please make timely submission of renewal or prompt notification of project termination (see item #2 below).

The responsibilities of the project director include the following:

1. Prior approval from the Vice Provost for Research must be obtained before any changes in the project are instituted.

2. Submission of a Form D at 12-month intervals attesting to the current status of the project (protocol is still in effect, project is terminated, etc.).

We wish you success in your research endeavors.

Sincerely,

Edith M. Szathmary

Edith M. Szathmary
Coordinator of Compliances

cc: Dr. Betty Ruth Carruth
229 Jessie Harris Building
CRP file

Attachment: Copy of Form A

404 Andy Holt Tower/Knoxville, Tennessee 37996-0140/(615) 974-3466

APPENDIX G

RESEARCH SITE APPROVAL

NASHVILLE MEMORIAL HOSPITAL

EXECUTIVE OFFICES
612 WEST DUE WEST AVENUE
MADISON, TENNESSEE 37115
TELEPHONE (615) 865-3426

January 16, 1989

Dear Mrs. Mandel:

Your thesis proposal, as discussed and reviewed on January 14, 1989, has been approved.

If you need further assistance, please contact me.

I look forward to reviewing the findings of this research.

Sincerely,

William T. Sugg

William T. Sugg
Vice President
Clinical & Support Operations

WTS/dl

APPENDIX H

CLINICAL DAILY ACTIVITY FORM

Dietitian: ____________________

Date: __________

1. Nutritional Consult:
2. Nutritional Reconsult:
3. Assess.:
4. Reassess.:
5. Intake:
6. Counseling: I
7. Counseling: F
8. Counseling: G
9. Conference:
10. Prescription:
11. TF Preparation:
12. Instruction:
13. Reinstruction:
14.
15. Monitoring:
16. Program Screen:
17. Program: I
18. Program: G
19. Reports:
20. Materials:
21. Home Visit:
22. Misc:
23. CTC-Cardiac Treatment Center:
24. Communication with M.D.:
25. Communication with health professional:
26. Copy of diet - no instruction:
27. Diet office assistance:
28. Diet pattern calculations/snacks implementation:
29. Diet verification:
30. Dietetic Interns:
31.
32. Meeting:
33. Nourishments:
34. Phone-pt./family:
35. Progress note:
36. Research:
37. Screen:
38. Special project:
39. TF calculations:
40. TF content-chart:
41. Taste test:
42. Training employees:
43. Visit-Food preferences:
44. Visit:
45.

CODES	PATIENT'S NAME	DIET	PHYSICIAN	MATERIALS	TIME		AMOUNT	ENTERED		COMMENTS
					N/C	Charge		Date	Init.	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45										

APPENDIX I

SELECTED DEFINITIONS OF CLINICAL DAILY ACTIVITY FORM

Codes 1-13 and 15-22 are considered non-basic care while the remaining numbers, except 23, 30-32, 38, and 42, are classified as basic care; numbers 35 and 40 may be considered components of the documentation process of non-basic services.

N/C = non-chargeable [basic] time.

Charge = chargeable [non-basic] time.

27. Diet Office Assistance - dietitian or dietitians' assistant actually worked a position in the diet office or assisted them with a patient problem.

29. Diet Verification - clarification of a physician's order.

34. Phone patient/family - basic care to answer questions while patient was hospitalized or after discharge.

35. Progress note - SOAP note in medical record either as part of basic or non-basic care.

37. Screen - basic screening [refer to Appexndix E].

39. TF calculations - calculation of mixture directions for tube feeding for diet office personnel.

40. TF content-chart - charting of calories, protein, and free water content in medical record.

44. Visit - meal rounds, solving tray-related problems, or delivering special requests to patients.

APPENDIX J

CLINICAL CODE DESCRIPTION

NMH
Policy

Subject:	Department: Nutrition Services
ADMINISTRATIVE SERVICES: CLINICAL CODES (Description for Nutrition Services)	Effective Date: 2/85

9001 Nutritional Consultation: Consultation with patient/client to determine nutritional status that may include:

- A history of current life style habits, including nutrition, environment, exercise, and stress
- Evaluation of a specific health condition or specific problem (i.e., dysphagia, etc.), multiple systems problems, or protein and/or calorie malnutrition, including medical and nutritional histories, and, as appropriate, physicial examination, review of medical record(s), evaluation of appropriate diagnostic tests and procedures.
- Recommendations for nutritional intervention.

9002 Nutritional Reconsultation: Subsequent requests for consultative services during present admission.

9003 Nutritional Assessment: Assessment of the patient/client with a specific disease or problem, multiple diseases/problems, or protein and/or calorie malnutrition utilizing the guidelines established by the Nutrition Committee at Nashville Memorial Hospital.

This service may include:

- Nutritional history
- Evaluation of anthropometric data
- Evaluation of appropriate diagnostic tests and procedures

Recommendations for nutritional intervention will be made.

9004 Nutritional Reassessment: Subsequent requests for assessment during the present admission.

DATE REVISED:	
Submitted by: Alicia Mandel, R.D., Head Clinical Dietitian	Approved by: Phyllis Graham R.D.

CLINICAL CODE DESCRIPTION

NMH
Policy

Subject:	Department:
ADMINISTRATIVE SERVICES: CLINICAL CODES (Description for Nutrition Services)	Nutrition Services Effective Date: 2/85

9005 Nutrient Intake Analysis: Calculation of selected nutrient/energy intake, such as carbohydrate, protein, fat and kilocalories, or extensive nutrient/energy analysis. May be used to confirm a diagnosis.

9006 Nutritional Counseling: (Individual) Psychosocial counseling for an individual with emphasis on nutrition intervention and may include behavior modification. Analysis of reasons for behavior with psychological emphasis and determination of objectives for behavior change. This is an ongoing process (not a nutritional instruction).

9007 Nutritional Counseling: (Family) Psychosocial counseling for a family, with emphasis on nutrition intervention and may include behavior modification. Analysis of reasons for behavior with psychosocial emphasis and determination of objectives for behavior change. This is an ongoing process (not a nutritional instruction).

9008 Nutritional Counseling: (Group) Psychosocial counseling for a group, with emphasis on nutrition intervention and may include behavior modification. Analysis of reasons for behavior with psychosocial emphasis and determination of objectives for behavior change. This is an ongoing process (not a nutritional instruction).

9009 Nutritional Conference: Participation on treatment team for the purpose of delineation, implementation, and evaluation of nutritional management. (Example: Metabolic Support Team)

9010 Nutritional Prescription: Determination of appropriate enteral or parenteral formula to meet specific nutrient requirements. Requires calculation of specific formula composed of at least two (2) components.

DATE REVISED:	
Submitted by: Alicia Mandel, R.D., Head Clinical Dietitian	Approved by: Phyllis Gerdeman, R.D.

CLINICAL CODE DESCRIPTION

NMH
Policy

Subject:	Department: Nutrition Services
ADMINISTRATIVE SERVICES: CLINICAL CODES (Description for Nutrition Services)	Effective Date: 2/85

9011 Nutritional Preparation: Preparation and/or dispensing of proprietary supplements and defined formula products. Application may be provided by support personnel under the direct supervision of a registered dietitian.

9012 Nutritional Instruction: Instruction to provide guidelines or information in regard to disease, health care management, or nutrition. May include:
- Nutritional history
- Review of medical record(s)

9013 Nutritional Reinstruction: A review of guidelines or information previously provided in regard to disease, health care management, or nutrition from Nashville Memorial Hospital.

9015 Nutritional Monitoring: Follow-up of patient/client's progress. May include limited instruction or guidance or evaluation following initial visit.

9016 Nutritional Program Screening: Initial visit to assess individual member's eligibility in preparation for admittance to special programs.

9017 Nutritional Program: (Individual) Structured health care program for an extended period of time for individuals with conditions such as diabetes, hypertension, post-MI, depression, or hypometabolic states. May include wellness and fitness programs.

9018 Nutritional Program: (Group) Structured health care program in a group following screening, provided for a corporation or other entity, specifically designed for that group.

DATE REVISED:	
Submitted by: Alicia Mandel, R.D., Head Clinical Dietitian	Approved by: Phyllis Goodwin, R.D.

CLINICAL CODE DESCRIPTION

NMH
Policy

Subject:	Department: Nutrition Services
ADMINISTRATIVE SERVICES: CLINICAL CODES (Description for Nutrition Services)	Effective Date: 2/85

9019 Nutritional Special Reports: Includes legal, workers' compensation, insurance company forms and inquiries. Appropriate fees will be charged for completion of the requested reports. May include special projects (i.e., cycle menus, etc.).

9020 Nutritional Materials: Publications, books, manuals, pamphlets, or menus charged at cost plus handling.

9021 Nutritional Home Visit: Follow-up visit conducted in the home of the patient/client to provide appropriate nutrition guidance and intervention.

9022 Nutritional Misc: Unlisted nutrition service.

Refer to computerized information for additional FMS codes.

DATE REVISED:	
Submitted by: Alicia Mandel, R.D., Head Clinical Dietitian	Approved by: Phyllis Gradwin, R.D.

APPENDIX K

PATIENT NUTRITION CARE LEVELS

Table 1. Patient nutrition care level activities

care level	*patient assessment and evaluation*	*nutrition care plan*	*patient counseling, evaluation, and referral*	*medical record entries*
basic (level I)	1. Review patient's nursing admission notes (NAN) for basic data: reason for admission present height and weight recent weight change recent appetite change special diet at home. 2. Interview patient (meal rounds) for food preferences, allergies, intolerances, eating/feeding problems, and recent weight changes.	1. Take action to ensure that patient receives appropriate dietary regimen as planned (check diet roster and patient rand card, write/review menus and nourishments, and follow through on diet changes).	None	1. Enter brief note when patient is seen.
intermediate (level II)	level I plus: 3. Review patient's medical record for: laboratory data physical exam and history physician's admission notes medications prognosis other pertinent information. 4. Nutritional evaluation diet history and evaluation physical appearance present knowledge of rationale for and restriction of dietary regimen. 5. Follow up on initial assessment to include interview of patient to determine acceptance/tolerance of diet and to update initial interview data.	level I plus: 2. Determine patient's nutrient needs. 3. Confer with other health care team members to discuss nutrition care of patient if appropriate. 4. Prepare formal plan (nutritional needs/plans, nutrition education needs, and patient goals) for supporting an inpatient's dietary requirements. 5. Prepare formal plan for providing a patient with needed nutrition education following discharge.	1. Provide nutrition counseling for single restricted diets for the following patient outcomes: an understanding of diet rationale and food selection principles the ability to plan menus knowledge of food purchasing and preparation knowledge of how to follow diet when away from home knowledge of nutrition and food information sources available. 2. Evaluate patient's achievements in terms of the outcomes listed above. 3. Refer a patient who needs further nutrition education services after discharge to an appropriate source of such services.	level I plus: 2. Enter therapeutic diet confirmation inserts as appropriate. 3. Enter detailed nutrition care plan, including a summary of patient assessment. 4. Enter recommendation for nutrition intervention. 5. Enter notes relative to the diet counseling provided, including an evaluation of the patient's level of understanding. 6. Enter notes for follow-up referrals. 7. Enter chronological notes that document patient's routine progress.
advanced intermediate (level III)	levels I and II plus: 6. Assess patient needs and prescribe diet and/or recommendations as appropriate.	levels I and II plus: 6. Calculate and develop a menu pattern as appropriate. 7. Monitor patients with increased protein and caloric needs.	level II plus: 4. Provide nutrition counseling for multiple restricted diets and calculated diets with outcomes as listed in level II.	As in levels I and II
in-depth (level IV)	levels I, II, and III plus: 7. Follow-up on the initial assessment to include review of a patient's medical record for updated information. 8. In-depth assessment if appropriate (e.g., anthropometrics).	levels I, II, and III plus: 8. Present and discuss the nutrition care plan for patient's progress with the health care team. 9. Daily nutrient intake calculations if appropriate (other than diabetic intakes). 10. Monitoring of tube feedings and hyperalimentation for nutritional adequacy and nutrition-related problems.	As in levels II and III.	levels I, II, and III plus: 8. Enter notes documenting significant changes in a patient's nutritional status. 9. Calculate and enter daily nutrient intakes if appropriate.

Source: Lutton, S. E., Baker, M. M. & Billman, R. V. (1985) Levels of patient nutrition care for use in clinical decision making. Journal of the American Dietetic Association 85(7):849-851.

APPENDIX L

BASIC AND NON-BASIC CARE

NMH
Policy

Subject:	Department:
CLINICAL CODES ADMINISTRATIVE SERVICES: BASIC CARE (Definition)	Nutrition Services Effective Date: 3/19/85

The following services are included in the basic room and board fee:

- Provision of food, labor, and supplies to provide general and modified diets (guidelines for supplements, tube feedings, and special products are covered under other policies and procedures)

- Initial screening for Nutritional status or for the evaluation of the appropriateness of a diet order, including problems and recommendations in the medical record; diet confirmations.

- Service management, including development of standards for high-quality treatment and services, chart audits, accreditation reviews, nutrition care management (e.g., floor discharge planning meetings), inservice education, departmental administration, employee meetings, program-related conferences, continuing education for clinical/administrative staffs, and supervision.

- Obtaining and recording of food preferences.

- Diet pattern/tube feeding (one product only) calculations for nutritional management for hospital use (i.e., calculations for Vivonex in ¾ strength, half strength, etc.)

DATE REVISED:	
Submitted by: Alicia Mandel, R.D., Head Clinical Dietitian	Approved by: Phyllis Anderson

APPENDIX M

MEDICAL DISEASE CATEGORIES

1 Diseases and Disorders of the Nervous System
2 Diseases and Disorders of the Eye
3 Diseases and Disorders of the Ear, Nose, and Throat
4 Diseases and Disorders of the Respiratory System
5 Diseases and Disorders of the Circulatory System
6 Diseases of the Digestive System
7 Diseases and Disorders of the Hepatobiliary System and Pancreas
8 Diseases and Disorders of the Musculoskeletal System and Connective Tissue
9 Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast
10 Endocrine, Nutritional and Metabolic Diseases and Disorders
11 Diseases and Disorders of the Kidney and Urinary Tract
12 Diseases and Disorders of the Male Reproductive System
13 Diseases and Disorders of the Female Reproductive System
14 Pregnancy, Childbirth and the Peurperium
15 Newborns and Other Neonates with Condition Originating in Perinatal Period
16 Diseases and Disorders of Blood and Blood Forming Organs
17 Myeloproliferative Disorders
18 Infectious and Parasitic Diseases
19 Mental Diseases and Disorders
20 Alcohol and Substance Abuse
21 Injuries, Poisonings and Toxic Effects of Drugs
22 Burns
23 Factors Influencing Health Status and Other Contacts with Health Services
24 Other

APPENDIX N

SELECTED DRGS

MDC	DRG	
1	1	Craniotomy Except Trauma Age >17
	2	Craniotomy for Trauma Age >17
	5	Extracranial Vascular Procedure
	14	Specific Cerebrovascular Disorders Except TIA
4	75	Major Chest Procedures
	79	Respiratory Infections and Inflammations Age >17 with cc [complicating condition]
	80	Respiratory Infections and Inflammations Age >17 without cc
	82	Respiratory Neoplasms
	87	Pulmonary Edema and Respiratory Failure
	88	Chronic Obstructive Pulmonary Disease
	89	Simple Pneumonia and Pleurisy Age >17 with cc
	90	Simple Pneumonia and Pleurisy Age >17 without cc
	96	Bronchitis and Asthma Age >17 with cc
	97	Bronchitis and Asthma Age >17 without cc
5	110	Major Reconstructive Vascular Procedures without Pump with cc
	111	Major Reconstructive Vascular Procedures without Pump without cc
	113	Amputation for Circulatory System Disorders Except Upper Limb and Toe
	115	Permanent Cardiac Pacemaker Implant with Acute Myocardial Infarction [AMI] or Congestive Heart Failure [CHF]
	116	Permanent Cardiac Pacemaker Implant without AMI or CHF
	121	Curculatory Disorders with AMI and Cardiac Valve [CV], Compensated Discharged Alive
	122	Curculatory Disorders with AMI without CV, Discharged Alive
	123	Circulatory Disorders with AMI, Expired
	124	Circulatory Disorders Except AMI with Catheter and Complex Diagnosis
	125	Circulatory Disorders Except AMI with Catheter without Complex Diagnosis
	127	Heart Failure and Shock

SELECTED DRGS

MDC	DRG	
	138	Cardiac Arrythmia and Conduction Disorders with cc
	139	Cardiac Arrythmia and Conduction Disorders without cc
	141	Syncope and Collapse with cc
	142	Syncope and Collapse without cc
6	148	Major Small and Large Bowel Procedures with cc
	149	Major Small and Large Bowel Procedures without cc
	174	Gastrointestinal Hemorrhage with cc
	175	Gastrointestinal Hemorrhage without cc
	180	Gastrointestinal Obstruction with cc
	181	Gastrointestinal Obstruction without cc
	182	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders Age >17 with cc
	183	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders Age >17 without cc
7	195	Total Cholecystectomy with CDE with cc
	196	Total Cholecystectomy with CDE without cc
	197	Total Cholecystectomy without CDE with cc
	198	Total Cholecystectomy without CDE without cc
	203	Malignancy of Hepatobiliary System or Pancreas
	204	Disorders of Pancreas Except Malignancy
	205	Disorders of Liver Except Malignancy, Cirrhosis, Alcoholic Hepatitis with cc
	206	Disorders of Liver Except Malignancy, Cirrhosis, Alcoholic Hepatitis without cc
8	239	Pathological Fractures and Musculoskeletal and Connective Tissue Malignancy
10	294	Diabetes Age >35
	296	Nutritional and Miscellaneous Metabolic Disorders Age >17 with cc
	297	Nutritional and Miscellaneous Metabolic Disorders Age >17 without cc

SELECTED DRGS

MDC	DRG	
11	316	Renal Failure
	320	Kidney and Urinary Tract Infections Age >17 with cc
	321	Kidney and Urinary Tract Infections Age >17 without cc
17	410	Chemotherapy
18	416	Septecemia Age >17
21	449	Poisoning and Toxic Effects of Drugs Age >17 with cc
	450	Poisoning and Toxic Effects of Durgs Age >17 without cc
Other	468	Unrelated Operating Procedure to a Given MDC
	474	Respiratory System Diagnosis with Tracheostomy
	475	Respiratory System Diagnosis with Ventilator Support

VITA

Alicia K. Mandel earned a B.S. degree in Home Economics with a major in Foods and Nutrition at Belmont College in Nashville, Tennessee, where she graduated salutatorian. In 1974, a dietetic internship, accredited by the American Dietetic Association, was successfully completed at Vanderbilt University Medical Center.

Her professional work experiences include therapeutic nutrition, renal nutrition, and administration of a food service department in a long-term care facility. Clinical management, for the preceding seven years, has been her job responsibility as Nashville Memorial Hospital's Head Clinical Dietitian.

Professional activities have encompassed consulting in private practice, licensure, and legislation on a local, state, and national level. Previous local dietetic association offices held were vice-president and president, while the state responsibilities were as chairperson of the legislation committee and licensure liaison. She was honored as Outstanding Dietitian from the local district in 1985 and has served for several years as member on the Board of Directors of the Tennessee Chapter of the National Kidney Foundation.