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**THE EFFECTS OF PARTNER IN PRACTICE MODEL ON COSTS  
AND PATIENT SATISFACTION**

by

**YUPIN AUNGSUROCH**

**Submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy**

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**Frances Payne Bolton School of Nursing  
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\*We also certify that written approval has been obtained for any proprietary material contained therein.



# THE EFFECTS OF PARTNER IN PRACTICE MODEL ON COSTS AND PATIENT SATISFACTION

Abstract

by

YUPIN AUNGSUROCH

This quasi-experimental pretest-posttest study determined the effects of the Partner in Practice model (PIP) on costs and patient satisfaction and the changes in these effects over time. The PIP was started on a medical unit in January 1997. Registered nurses and unlicensed patient care assistants volunteered to work in partnerships. Their work schedules remained relatively consistent over the study period.

Data were collected from three time periods: pre-implementation (6 months prior to implementing PIP), interim (3 months after implementing PIP), and post-implementation (4-9 months after PIP implementation). The sample of costs was taken from departmental expense reports. Average costs (nursing personnel salary costs, costs/patient care day, and costs/discharge), workload and nursing clinical hours were investigated. Patient satisfaction was measured by a facility-designed patient satisfaction questionnaire. A total of 194 questionnaires was used. To test group differences, t test and ANOVA were utilized.

Findings indicated that there were no significant differences in costs between the pre-implementation and post-implementation periods (t test,  $p > .05$ ). Over three

time periods, the pattern of change in costs was non-linear (F test,  $p > .05$ ). Possible explanations include the need for and adequacy of the number of RNs, the use of unplanned PRN nursing hours, patient characteristics, and the cost definitions used.

The PIP effected patient satisfaction during the study period ( $t = -2.25$ ,  $p = .03$ ). After PIP implementation, patient satisfaction was statistically increased, but with little actual difference among means ( $F = 3.06$ ,  $p < .05$ ). The pattern of change in patient satisfaction was non-linear. Two items showing marked change and predictably sensitive to PIP were “Promptness of nursing staff to answer call light” and “Frequency of nursing staff checking patient.” The effect of PIP on patient satisfaction was not modified by the demographic characteristics of patients, except for status as a first time patient. Lastly, patient satisfaction did not differ by patients’ demographic characteristics.

This study provides nurse administrators with knowledge regarding the effects of PIP on costs and patient satisfaction. Costs and patient satisfaction are not significantly influenced by PIP. However, there was also no indication of negative effects from PIP.

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CHAPTER 1  
STATEMENT OF PROPOSAL

Background

Change in Health Care Economics

Budgetary constraints have precipitated a restructuring of the nursing care delivery system in hospitals. Nursing administrators are faced with an increased need for cost containment and must search for appropriate models of care delivery. Nursing care delivery systems need restructuring and their effectiveness evaluated. A number of practice models have been introduced in an effort to improve working conditions and the quality of care (Zander, 1988; Sherman, 1990; Moye, 1991; Vaughan, Fottler, Bamberg, & Bleyney, 1991; Troup & Rushing, 1992; Christensen & Bender, 1994). The Partners in Practice Model (PIP) is one such model (Manthey, 1992).

The rise in medical care expenditures has been a major concern during the past 20 years. Despite concerted efforts to control these costs, however, expenditures continue to soar. In 1990, health care accounted for 12.4 percent of the gross national product (GNP) in the United States, an increase of four percent since 1980 ( U.S. Department of Commerce, 1991). At the current growth rate, spending on health care will nearly double by the year 2000, rising from \$650 billion to \$1.9 trillion, nearly 20 percent of the GNP (Thorpe, 1992).

Several factors have dramatically escalated health care costs. According to Robinson (1991), in the last decade several elements have converged to mandate the need for restructuring health care delivery. These elements include rising costs and changing customer expectations.

Consequently, health service organizations are adapting to the demands of quality care and budgetary concerns. Organizational changes may effect modifications in the practice patterns of nurses or changes in the job assignments and responsibilities of other professionals within the organization. This changing environment has resulted in an array of nursing care delivery models designed to assure quality of care, enhance patient satisfaction, and improve cost containment. Some of the models include paired practice (Sherman, 1990; Manthey, 1992), case management (Zander, 1988; Guiliano & Proirier, 1991), patient-focused care (Troup & Rushing, 1992), cross-training (Brider, 1992; Vaughan, Fottler, Bamberg, & Blayney, 1992), and product line management (Moye, 1991). The challenges of future health care delivery require updated training in nursing care delivery systems and predicting future trends, allowing for flexibility and the expansion of traditional nursing models.

#### Effect on Hospitals

In 1993, an estimated \$326.6 billion was spent on hospital care (Levit et al., 1994). Of this, salaries and benefits comprised approximately four out of every five dollars spent. Nursing, as the largest component of the hospital labor force, makes up a major portion of the budget of any hospital (Parsons, Scaltrito, & Vondle, 1990). Typically, nursing payroll costs represent 50% of the total labor budget (Reitz, 1985;

McClure, 1989) and range from 20% to 30% of total institutional costs (Wilson, Prescott, & Aleksandrowicz, 1988). Nursing costs are thus frequent targets for cost-efficiency strategies which might contribute to the financial stability of hospitals (Barrett, 1989; Sandella, 1990; Manss, 1993).

### Nursing Care

Nursing is not exempt from cost-containment issues that impact quality of care. In 1978, a classic study by the Division of Nursing defined four categories of nursing care: direct patient care, indirect patient care, unit-related care, and personal (cited in McCloskey, Bulechek, Moorhead, & Daly, 1996). The American Nurses Association (1996) defines direct care as all nursing care activities that assist the patient in meeting basic human needs; and indirect care as all patient care activities that are necessary to support patients and their environment. Similarly to McCloskey, Bulecheck, Moorhead, and Daly (1996), the nurse's role is divided into two categories, direct care and indirect care. In direct care, the nurse is a provider of patient care. In indirect care, or integrated care, the nurse is a manager of patient care.

There is some indication that nurses must devote significant amounts of time to activities that could be accomplished by others at a lower labor cost. The ineffective use of time and labor costs by the RN have been cited by Hamm-Vida (1990), Hendrickson, Doddato, and Kovner (1990), and Prescott, Phillips, Ryan, and Thompson (1991). In a study of 800 hospitals, the Hay Group, a national consulting firm, reported that 52% of a nurse's time is spent performing tasks that do not require a professional level of knowledge or skill (Hay Group, 1989; McKibbin, 1989).

Prescott, Phillips, Ryan, and Thompson (1991) reviewed eight studies conducted between 1966 and 1988 which reported the percentage of nursing time in each of these categories based upon observer-determined work sampling methods. These studies demonstrated that hospital nurses spend approximately one-third of their time in direct patient care, one-half in indirect and unit management (combined), and about 14 to 17 percent in personal care.

Hendrickson, Doddato, and Kovner (1990) assessed time allocation to various activities by RNs according to shifts, services, and days of the week in six special units of a tertiary care teaching facility. Each activity was observed and calculated. Results show that nurses spend 31% of their time on direct care, 45% on indirect care (included 11% charting, 10% preparing therapy, 9% participating in shift activities, 8% interacting with other personnel, 3% checking physician's orders, and 4% other miscellaneous clinical activities). Non-clinical activities accounted for 10% of their time (4% paper work, 3% communication, and 3% supplies). The 13% spent in miscellaneous activities included meals, breaks, and personal conversation. Nurses spent only 31% of their time on direct care and the remaining 69% on other activities. Not all of these activities related to the patient. The authors recommended three strategies to decrease time spent on unnecessary activities, which include 10% of non-clinical activities, 10% on preparing therapy, and 3% on communication. One of these strategies is the use of support personnel.

Mayer's study (1992) compared nursing time expenditure with other health care staff. This study observed all registered nurses (RNs), licensed practical nurses



(LPNs), and medical assistants working in a very large (100,000 prepaid patients, 7 separate office sites, 25 nursing stations, and over 150 primary providers) multispecialty HMO group practice located in California. Mayer found that, for all categories of personnel, the percentage of time for direct care was 20%, indirect care was 39%, unit-related care was 21%, and personal was 20%. Registered nurses spent the least amount of time on direct care (1% as compared with 25% for medical assistants) and the most amount on indirect care (59% as compared with 31% for medical assistants).

A cross-disciplinary mix of nursing staff has been developed to deliver nursing care more efficiently. Prescott's (1993) study of staff mix demonstrated that nursing staffing level (nurse-to-patient ratio) and skill mix (percentage of RNs) make a difference in the outcomes of hospitalized patients. By reducing mortality rates, length of stay, costs, complications, and increasing patient satisfaction and patients' readiness and ability to function upon discharge, nurses not only contribute to hospital cost containment, but also to the quality of hospital services. By decreasing the number of RNs and the nursing skill mix, hospital labor costs, as a percentage of total hospital expenditures, has declined (AHA, 1991-1992). Hartz et al. (1989) examined the relationship between the percentage of RNs and hospital mortality rates. The results show that a higher percentage of RNs and higher staffing level decreased mortality rates.

Moreover, nurse staffing level, skill mix and unit size also influence nursing labor costs. Glandon, Colbert, and Thomasma (1989) studied a subset of Medicus

Systems Corporation's National Comparative Data Base. Sixty two U.S. hospitals, 392 medical and surgical nursing units were studied over the three-month period of March to April in 1987. Nursing care delivery models and the percentage of nursing care delivered by RNs was measured. The four nursing care delivery models included Team, Modular, Total Patient Care, and Primary Care Models. Nursing costs investigated included total nursing labor costs per patient day, RN labor costs per patient day, and total nursing costs per unit of work load. These nursing costs comprised only salary and benefits for nursing personnel providing direct patient care. Indirect nursing costs associated with administration and management of the units were excluded. The results showed that nursing care delivery model, staff mix, and unit size each have a significant influence on nursing costs per patient per day. Small primary care units with a high proportion of registered nurses are the most expensive. The authors did not, however, analyze the differences in the quality of care which may have existed, and consequently did not suggest which model of nursing care delivery may be best. It is clear, however, that in the effort to reduce inefficient time use and maximize effective staff mix, the redesign of nursing care delivery systems offers great potential for maintaining quality of care and cost reduction.

### Nursing Redesign

The movement to restructure nurses' work with the use of unlicensed assistive personnel (UAP) began in the mid-1980s. The use of UAP in care delivery models has been supported by the Joint Commission on Accreditation of Health Care Organization

(JCAHO, 1992) and the Tri-Council for Nursing (1990) consisting of four member organizations (the American Nurses Association, the National League for Nursing, the American Association of Colleges of Nursing, and the American Organization of Nurse Executives). Regarding the use of UAP, the JCAHO has made the following statement: "If nursing staff members have insufficient time to provide nursing care to patients because of other assigned non-nursing duties, the hospital needs to examine the sufficiency of its patient care support services and take appropriate actions" (JCAHO, 1992, pp. 42-43).

With hospital and nursing administrators searching for the model of care delivery that would maximize quality of care and simultaneously control costs, the addition or substitution of less expensive nursing personnel is quickly gaining popularity (Sherman, 1990) and a number of nursing care delivery models have arisen. A 1990 survey of 782 hospitals conducted by the American Hospital Association (AHA) reported that 97% of hospitals were using some kind of UAP in providing either direct clinical care or unit support work (Merker, Cerda, & Blank, 1991).

Institutions concerned with keeping costs down and with survival within an environment of regulation and competition are also concerned with maximizing patient care. As hospitals examine their systems of nursing care delivery, they are evaluating the effectiveness of traditional roles of professional nurses in caring for patients (Lengacher, Patricia, Mabe, Kent, & Allred, 1995). However, it will not be possible to reduce the number of nurses needed to provide hospital care unless substantial changes are made in the organization and delivery of non-nursing services.

Charns and Schaefer (1983) discussed the importance of work that supports the provision of care. They classify the work of health professionals in three categories: (a) direct work which directly contributes to the well-being of patients; (b) management work which maintains the alignment between the organization and its environment; and (c) support or indirect work which supports both direct work and management work. The discussion shows that many technical tasks could be delegated easily and appropriately to an aide or nursing assistant and thus free the RN to focus on professional responsibilities. The nurse delegates an activity to an unlicensed individual and transfers the responsibility for the performance of the activity while retaining accountability for the overall care (Charns & Schaefer, 1983; ANA, 1996).

Prescott, Phillips, Ryan, and Thompson (1991) recommended that nursing services could be delivered more efficiently if the institution were to do the following: (a) develop assistive personnel; (2) develop new types of workers to provide non-clinical support services to nurses; (3) implement labor-saving technologies; and (4) restructure the roles of RNs. Redesigning patient care delivery is vital to the quality of care delivered and has resulted in the development of new nursing practice models that use some form of “nursing support personnel.” Nursing support personnel, assistive personnel, nurse extenders, and unlicensed assistive personnel are some of the generic terms used to refer to the various clinical and non-clinical jobs that augment nursing care (Eastaugh, 1990; Gardner, 1991; Merker, Cerda, & Blank, 1991; Barter, McLaughlin, & Thomas, 1994; Wilson, 1994).

As the name implies, nurse assistants may perform clinical activities delegated by the registered nurse, non-clinical unit activities, or some combination of the two (ANA, 1996). In a review of the literature concerning nurse extenders, Lengacher and Mabe (1993) categorized four major types of nursing practice models found in a 5-year literature review: (1) traditional extender models, involving nurse or unit assistants; (2) nontraditional extender models, including student interns, corpsmen and various technicians who require extra training; (3) traditional extenders in a partnership model, with nursing assistants and LPNs in patient care with RNs; and (4) nontraditional extenders in a partnership model, utilizing patient care technicians and critical care technicians.

One of the earliest pioneering models is Manthey's Partners in Practice model (PIP) (Manthey, 1992). The model supports and assists registered nurses practicing within a primary nursing partnering model through the employment of appropriately skilled patient care technicians, linking a nursing support person with a registered nurse (RN) (Manthey, 1992, 1988; Christensen & Bender, 1994). Under the PIP system, each RN is "partnered" with a nursing support person and the pair then work as a dyad on a consistent basis (Manthey, 1989; Powers, Dickey, & Ford, 1990). The same nurse and nursing partner consistently work together, jointly caring for a group of patients. The RN and support person or patient care assistant then develop a pattern of work, become familiar with each other's abilities and preferences, and are able to develop stable and efficient work patterns. Such partnerships have been created with

LPNs, NAs, hospital-trained technicians, or nurses who have not yet passed the licensing examination (Manthey, 1992, 1988).

Three major objectives of the PIP are (a) increased patient satisfaction, (b) the enabling of RNs to practice primary nursing, and (c) enhanced recruitment and retention. The Partners in Practice model is an attempt to use non-registered nurse workers without the fragmentation of care that has characterized team nursing in the past (Sherman, 1990). Decreased personnel cost is another objective of the PIP. Powers, Dickey, and Ford (1990) reported that the RN:patient ratio increased from 1:4 to 1:6 from pre-implementation to post-implementation UAP. At Boston University Medical Center (BUMC), three units that implemented the UAP in 1989 showed a lower average hourly wage compared with units not using this model (Garfink, Kirby, Bachman, & Starck, 1991).

Factoring for the lower average hourly wage of nurse assistants, costs per hour may decrease over time for those using the nurse extender model as opposed to those using the traditional model. This decrease is due, in part, to the addition of more nurse assistants and the reduction of RNs on the hospital units (Lengacher et al., 1993). It is also due to the relative increases in salaries between 1989 and 1990: Salaries for nursing assistants increased 11.5% and patient care technician (PCT) salaries increased 6.2%. In contrast, RN salaries during the period increased by 17.4%.

Although this new model, PIP, is being implemented to develop efficient and cost effective nursing care (Manthey, 1992), often it is implemented without examining its effects on the quality of care. Outcome measures that are sensitive to

important variations of nursing practice are crucial to understanding the impact of care delivery restructuring (Bostrom & Zimmerman, 1993). The use of the Partner in Practice model (PIP) is growing and calls for the evaluation of outcomes and impact on care delivered by nurse extenders. A major concern that has evolved from this review is that, not only has this new model for the delivery of nursing care not been closely evaluated, but also the precise costs of using nurse extenders has not been established.

### Purpose and Significance

Because nurses are the primary component of patient care providers, the restructuring of nursing care is one of the most challenging issues for the future of health care. The quality of care and the cost-effectiveness of health care currently have become basic expectations (Kramer, 1990; Stricklin, 1993; Christensen & Bender, 1994; Larabee, 1995).

As more and more hospitals utilize techniques of work restructuring to reduce their operating budget, nursing departments will be dramatically effected. To meet today's needs for quality of care and cost containment, the PIP is being implemented on a limited basis in many facilities, including University Hospitals of Cleveland (UHC), Cleveland, Ohio. The development and implementation of the PIP raises many questions and issues, especially as reflected by care delivery indicators, such as quality, cost and patient satisfaction. Measuring the effects of the new patient care delivery model on quality, cost, and patient satisfaction is critical to survival and the continued

use of the model. To evaluate the effects of this change, a quality monitoring study of cost and patient outcomes that examines the differences among pre-implementation, interim, and post-implementation of this model is needed.

This study is concerned with the effects of the new PIP model. With the goal of cost control and upholding the standard of care maintenance, PIP was implemented on a unit at University Hospitals of Cleveland (Lerner Tower 7). The specific focus of this study was to investigate the effects of the PIP on the outcomes of costs, patient satisfaction with nursing care, and changes in these effects over time (pre-implementation; interim; and post-implementation of the model) on the specified unit. Ultimately, a demonstration of lower costs and higher levels of patient satisfaction could lead to implementation in other units or other hospitals.

One of the greatest influences in improving quality of services is the incorporation of accurate patient satisfaction data into clinical and management information systems (Nelson & Niederberger, 1990). Bostrom and Zimmerman (1993) indicated that outcome measures are needed to understand the impact of care delivery restructuring that (a) are sensitive to variations in nursing practice and (b) can identify aspects of nursing care which are important to patients. By examining patient satisfaction, nurses can more completely evaluate the quality of nursing care provided and, in turn, the reasonableness of the costs of that care (Abramowitz, Cote, & Berry, 1987). Providing quality care is the primary goal of hospitals and nursing. Redesigns of nursing care delivery models should emphasize this goal. The impact of care or



quality of nursing care, especially on costs and patient satisfaction with nursing care, should be investigated.

**CHAPTER 2**  
**LITERATURE REVIEW**

**Conceptual Framework**

The Outcomes Model for Health Care Research (Holzemer, 1994) provides the framework for this study (see Figure 1). This model focuses on the interactions and linkages among inputs, processes, and outcomes at the levels of the client, the provider, and the setting. This model extends the work of Donabedian (1966) who identifies three components in the evaluation of quality of care: structure, process,

	Inputs	Processes	Outcomes
Client			
Provider			
Setting			

**Figure 1.** The outcomes model for health care research (Holzemer, 1994)

and outcome. Structure, which is equivalent to “input” of care, is defined as “the relatively stable characteristics of the providers of care, of the tools and resources they have, and of the physical and organizational settings in which they work” (p. 81). Structure of care includes four dimensions: the human resources, physical equipment, administrative arrangement, and the finances that are needed to provide care.

Process of care is defined as “a set of activities that goes on within and between practitioners and patients” (p. 79). Process can also be defined as normative behavior. Process in quality of nursing care could be the activities of nurses in demonstrating their knowledge to patients and the degree to which nurses conform to patient expectations. Donabedian (1982) divides processes of care into two domains: the technical and the interpersonal. Technical care (science of care) is the application of any science or technology in managing a health problem. Technical performance depends on “the knowledge and judgment used in arriving at the appropriate strategies of care and on skill in implementing those strategies” (p.54). On the other hand, interpersonal care (art of care) refers to “the management of the social and psychological interaction between client and practitioner” (p.55). The conduct of the interpersonal process must meet individual and social expectations and standards of care (Donabedian, 1996). However, Donabedian (1987, 1996) believes that patients are the paramount consideration in defining the quality of interpersonal care but not technical care.

Patients are the ultimate authorities in defining the criteria of good care in the interpersonal relationship dimension of nursing care. Therefore, the patient's assessment, reflected by their satisfaction with care is an important measure of the interpersonal dimension of nursing care. This study proposes to investigate patient satisfaction at the interpersonal relationship aspect.

The outcome of care is referred to as "a change in a patient's current and future health status and the improvement of social and psychological functions that can be attributed to antecedent health care" (Donabedian, 1980, p. 82). Donabedian (1980) suggests that the outcome approach to quality assessment can provide an integrative and inclusive measure of the quality of the program because many factors that contribute to quality are reflected by the outcome approach. Donabedian (1988) defined quality as the result of assessing structure, process, and outcome of health care. The definition of quality in health care has expanded to include the expectations and opinion of patients, their representatives, and society (Widtfeldt, 1992).

Donabedian (1996) further summarizes several functions of outcome measures. First of all, outcomes can be used as indirect measures of process of care because process is much more difficult to capture. Outcomes also provide a link between process and outcome if the monitoring system is measuring what it is supposed to. In other words, obtaining information regarding patient satisfaction with nursing care is one method to evaluate the outcomes of nursing care. Patient satisfaction, as an indicator of quality, is considered one of the outcomes of care. An expression of satisfaction is the patient's judgment of the quality of care, particularly

as it concerns the interpersonal process that might differ between nursing care delivery systems, such as PIP and traditional models.

According to Donabedian (1980, 1996), these are somewhat limited definitions. Closs & Tierney (1993) and Holzemer (1994) extended these definitions by adding a vertical axis that consists of the three constituents generally involved in a health care encounter: the client, the provider, and the setting. The term “client” includes both individuals and aggregates of society. The client may be an individual, a family, a school, or an entire community. The broader term “providers” refers to traditional health care providers (e.g., physicians, nurses, and social workers), non-traditional healers, and other trained community workers. The term “setting” denotes the formal and informal organizations in which the delivery of health care services takes place (Holzemer & Reilly, 1995, p.48).

This study has been designed to use the selected variability of inputs, processes, and outcomes for the client, the provider, and the setting from Holzemer’s Outcomes Model (Holzemer, 1994) and to state the relationship of some of the model’s components. Holzemer and Reilly (1995) defined this process as variation research. By definition, variation research is “the information system used by providing an array of potential variables, to provide measures of the variability inherent in these variables, and to assist with the study of the linkages of these variables” (p.47). Each component of this model can be defined as follows:

*Client/Inputs:* Patient information is related to the concept of client/inputs.

Patients who are entered into a health care system bring a complex of personal

characteristics, cultural values and beliefs, social support networks, personal strengths, and concerns and needs. They vary in their levels of well-being, functional status, and quality of life (Holzemer & Reilly, 1995, p.48). Sociodemographic factors, such as level of education, ethnicity, income per capita, disability rates, and unemployment rates, also vary (Wennberg, 1990; McLauphin, Thomas, & Barter, 1995).

*Client/Processes:* The client/processes realm refers to the client's self-care activities or personal health habits (Holzemer & Reilly, 1995, p.48). Longo (1993) used the term "patient practice variation" to refer to "individual responsibility for one's life style relative to health, prevention and illness, and disease in which the influence of patient's practices may directly or indirectly impact on resource utilization and immediate or long-term outcomes" (p. YS83).

*Client/Outcomes:* Patient outcomes are defined as mortality, complications, and measures of utilization such as length of stay and readmission rates (Holzemer & Reilly, 1995, p.48). Outcome concepts at the patient level are defined as the patient's perceptions, including patient well-being, discomfort, disability, and dissatisfaction, and quality of care indicators, such as patient satisfaction, length of stay, and incidence of complications (Lohr, 1988; Johnson, Gardner, Kelly, Maas, & McCloskey, 1991). Outcomes also include physical status, psychosocial status, social status, behavior, knowledge, symptom control, quality of life, home functioning, family strain, goal attainment, safety, and resolution of nursing diagnosis (Lang & Marek, 1992).

*Provider/Inputs:* Provider/inputs includes the technical competence and the interpersonal skills of the provider (Holzemer & Reilly, 1995). Technical competence involves “the knowledge, skills, and judgement of the provider” ( Lohr, Yordy, & Thier, 1988; Donabedian, 1996, p.54). The interpersonal dimensions of care are considered as “the art of care” (Donabedian, 1996, p.54). Examples of health care provider variables are level of experience, specialty certification, level of education, and personal characteristics (Weingarten, Agos, Tankel, Sheng, & Ellrodt, 1993; Holzemer, 1994).

*Provider/Processes:* Critical paths, care maps, standardized care plans, and clinical practice guidelines are strategies in the processes of care. The standardized care plans for patients used in a variety of settings can be the means to examine the effectiveness of nursing care and to compare patient outcomes within and between health care settings (Holzemer & Reilly, 1995).

*Provider/Outcomes:* Provider/outcomes includes provider satisfaction, provider intent to stay or leave, and level of ongoing education that demonstrates continued competence (Holzemer & Reilly, 1995).

*Setting/Inputs:* Setting/inputs refers to values, attitudes, and beliefs of the organization, as well as available resources, including financing, equipment, number and type of providers, size, ownership status, customers, average volume of services, facility type, and environmental and health conditions of communities. Information and documentation systems, staff mix, staffing levels, professional practice models,

and patient acuity levels are also included (Holzemer & Reilly, 1995). A nursing care delivery system is a concept belonging to the “setting/inputs” category.

*Setting/Processes:* Setting/processes includes the actual implementation of total quality improvement principles. Setting/processes also involves strategic planning, the implementation and evaluation of policies and procedures, governing activities, evaluation of operational systems, decision making and organizational interventions (Holzemer & Reilly, 1995), communication patterns among providers and different departments (Knaus, Draper, Wagner, & Zimmerman, 1986; Holzemer & Reilly, 1995).

*Setting/Outcomes:* Patient satisfaction, provider turnover, morbidity, mortality, malpractice rates, costs of care and readmission rates are included as aggregate forms of outcomes. Personal costs, supply costs, development costs, and profit margin are included in cost of care (Holzemer & Reilly, 1995).

Variation research focuses on the linkage between differences of the outcome model's variables. The key concept in variation research is control for input, processes, and outcomes (Holzemer & Reilly, 1995). Berwick (1991) used the terms intended and unintended variation to distinguish between variation based on reason and variation that was not anticipated. Intended variation is planned variation, introduced for a specific reason and is often the result of guided judgement. Unintended variation results from unplanned variation in the process of delivering health care. Unintended variation erodes quality and reliability in the delivery of health care services, which results in wasted resources (Berwick, 1991, p. 1220).



The theoretical framework for health care and for this study is different from studies in the industrial arena. Recently, the fields of economics and management have begun to differentiate services from goods. Literature regarding the design of service organization (Mills, 1986), management service (Czepiel, Solomon, & Surprenant, 1985), and employee participation (Shaw, 1978) clearly describe phenomena familiar to nursing care. According to Bateson (1985) and Mills (1986), clients participate in their service. The client acts upon his/her understanding of the contract based on social roles. Client input is directed toward maximizing satisfaction that is defined as the after-usage evaluation of service (Day, 1977). Clients often need education to participate in service or to choose the goals (Blackman, 1985; Lovelock, 1985). The concept of service gives clients control over their own personal process and outcomes. Service encounters are purposeful (Czepiel, Solomon, & Surprenant, 1985), but are limited in scope with client and provider roles. Additionally, the goals of the client/provider relationship are concrete and pre-defined, whereas the goals of the patient/nurse are subjective and co-created within the relationship.

Prices in free markets are not fixed and based on the cost of producing the product, rather they fluctuate according to the supply and demand for the product. In health care, governmental and other contractual agreements regulate what care is reimbursed, regardless of the cost. Prices are fixed and increased revenues are achieved primarily through increased volume. Consequently, a health care strategy is not based on competitive pricing, but on additional or better services (Kunkle, 1990)

In industrial marketing, quality increases when cost is added (Alexander, Kaldenberg, & Kernig, 1994). In health care, we function in a context less responsive to market forces and more obedient to ethical and social imperative (Kunkle, 1990; Johnson & McCloskey, 1993). Health care includes not simply the contributions of professional providers, but contributions of patients and of their families as well. The acute care system does not take into account various related aspects of the patient's entire health picture, such as episode of illness, scope of responsibility, and efficacy of patient and families.

The relationship among patient problems, nursing interventions and patient outcomes has been the focus of several authors (Lang & Clinton, 1984; Marek, 1989; Lang & Marek, 1990; McCloskey, Bulechek, Moorhead, & Daly, 1990; McCormick, 1991; Holzemer, 1992; Holzemer & Henry, 1992), many of whom highlight the use of the system model. To study the effect of nursing interventions, Bailey (1988), for example, reported pre-implementation and post-implementation data of a prototypical model for computerized planning of nursing care. Both nurse and patient satisfaction with care increased, as did productivity and effective nursing care.

Holzemer and Henry (1991) examined four standardized nursing care plans for AIDS patients from four agencies with extensive experience in caring for AIDS patients. They found significant differences in language, conceptual clarity, and the level of complexity related to problem identification. These findings indicate that it is impossible to communicate effectively about nursing care without a consensus regarding patient problems (as inputs in the outcome model). In further work,

Holzemer and Henry (1992) focused on the problems, interventions, and outcomes in computer-supported and manually generated nursing care plans for AIDS patients. The sample, 74 male patients, was collected from an acute care hospital using manually generated care plans and from a facility using care plans developed on a Technicon (Technicon Medical Information System, Mountain View, CA) computer-supported system. These two groups were matched on the number of admissions and showed no differences. The link between type of care planning (manually generated care planning system vs. computer-supported care planning system) and patient outcome (functional status and patient rating of physical condition at hospital discharge) was examined. The study found no difference between the two systems which could be conceptualized either as provider/process or setting/process in the patient outcomes.

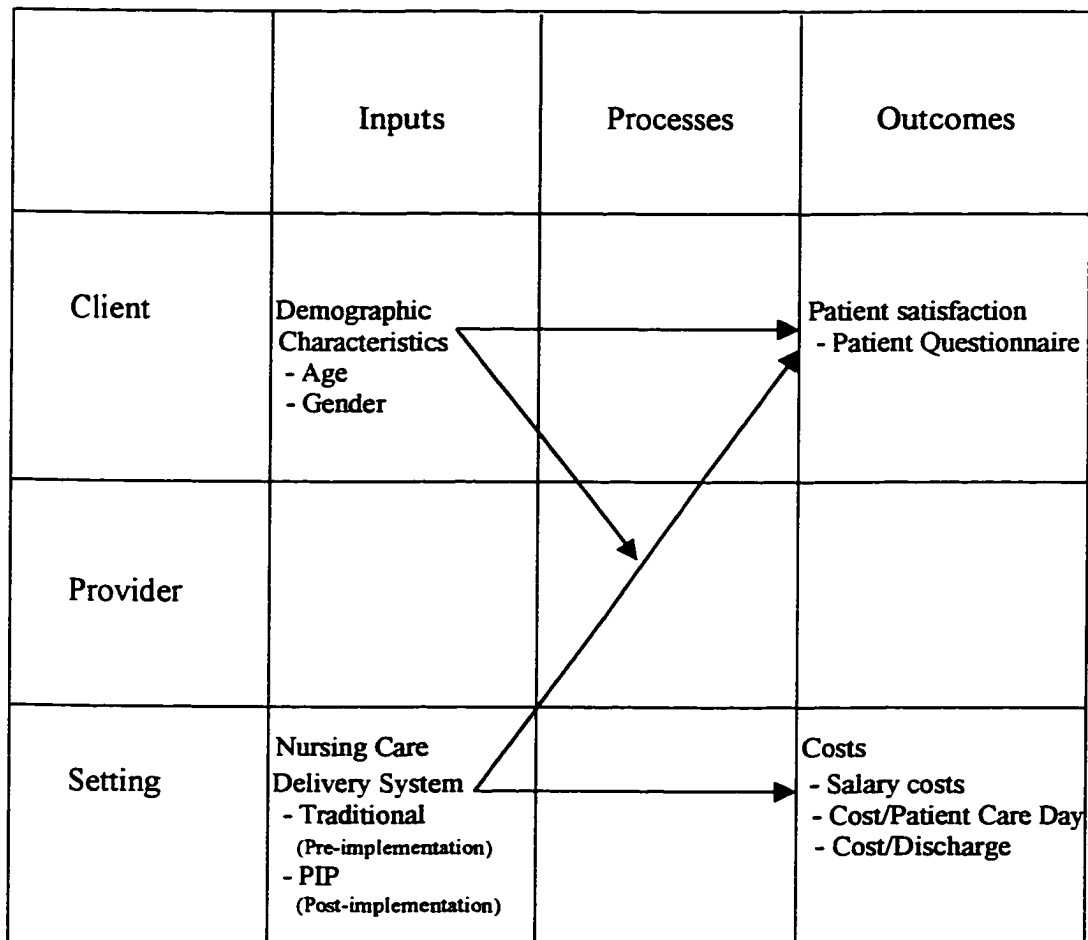
Henry, Holzemer, and Reilly (1994) studied the relationships between types of care-planning systems (manually generated, computer-supported, and standardized care planning systems) and patient outcomes in 89 hospitalized AIDS patients at three medical centers in San Francisco, California. There were no statistically significant differences in patient outcomes such as patient problems, patient self-rating of physical condition, and length of stay among the three care-planning systems. The authors concluded that these findings cannot be attributed to differences in patient populations because the patients selected were matched. There were differences among three care-planning settings in terms of the number of care plans and the number of activated problems on the care plans. However, the lack of a significant

difference in patient outcomes shows that the three care-planning systems maintain equal levels of quality of patient outcomes. These studies demonstrate the need for further research on the connections among problems, intervention, and outcomes.

Relationships among the variables in the Outcomes Model for Health Care Research have been reported. For example, aspects of the socio-economic status of patients such as educational level, ethnicity, and income are significant determinants of the variation in discharge rates (McLauphin, Thomas, & Bater, 1989) and significant in treatment decisions (Fowler, Wennberg, & Timothy, 1988; Barry & Gibbons, 1990). Nursing literature has addressed the linkages between the nursing care delivery models and the client, provider, and setting outcomes as well as the relationship between the nursing care delivery model and patient outcomes. Outcome measures focused on effects on the patient outcomes of quality and length of stay (Grillo-Peck & Risner, 1995), patient satisfaction (Lengacher et al., 1996); setting outcome of costs; and provider outcome of nurse satisfaction (Lengacher et al., 1995; Lengacher et al., 1996).

This study focuses on the input and outcomes of the nursing care delivery model in the health care arena. The outcomes of costs and patient satisfaction are important not only as a summary at the end of care, but also as an evaluation of the process to advance the quality of care and, in turn, to evaluate the reasonableness of the costs of that care. Nursing care delivery models are conceptualized as setting/inputs. The outcomes of these models are costs (personnel salary costs, cost per patient care day, and costs per discharge) and patient satisfaction. Demographic

characteristics of patients, which are conceptualized as client/input, are treated as unintended variables that might effect patient satisfaction. In other words, both the model of care, PIP, a component of setting/input, and the demographic characteristics of the patients, a component of client/input, effect the outcomes of setting (costs) and patient (patient satisfaction). The conceptualization for this study is presented in Figure 2.



**Figure 2.** The theoretical framework

### Inputs: Nursing Care Delivery Models

The definitions of patient outcome measures has broadened from the traditional ones of mortality, morbidity, and disability to those that include quality of life, length of stay, health status, and patient satisfaction. In concept, patient care outcomes are the end results of treatment; outcomes are defined indicators that reflect the results of clinical practice; most particularly the implementation of nursing interventions in response to a nursing assessment (Hausmann & Hegyvary, 1977). Erkel (1993) and Prescott (1993) have reviewed substantial bodies of literature attesting to the impact of various practice models on patient care outcomes such as mortality, morbidity, length of stay, costs, use of services, and patient, staff, and physician satisfaction. The outcomes have been defined as quality of care. In other words, the common denominator in nursing services is the quality of care provided (Beyers, 1988; Holzemer, 1990). Beyers (1988) stated that “In the midst of variations in delivery systems, quality provides stability. Quality serves as the balance that demonstrated professional commitment to patient care” (p.68). Nursing depends on quality measures to ensure that the financial and organizational changes serve patients well.

Although quality of care is an important issue in nursing, it is not yet well defined. Donabedian (1968) reported that it was difficult to define quality of care, but it could be promoted by evaluating process and outcome variables. Lohr, Yordy, and Thier (1988) wrote “Implicit in the concept of quality of care is the idea that service should be provided in a cost-efficient and cost-effective manner” (p.17). Most

definitions of quality of care concern behaviors and technical skills. Merry (1987) defined quality of care as subjective aspects, such as the patient's perceptions of the degree of caring provided by the nursing staff. In this study, quality of care is defined by the patient who received nursing care.

According to Donabedian (1988), nursing has addressed structural aspects of care such as patient characteristics (Halloran, Patterson, & Kiley, 1987), staff:patient ratios, and the educational preparation of staff (Ethridge, 1991). Process studies have examined nurse-physician interactions, documentation methods, and a wide range of caregiver activities (Ethridge & Lamb, 1989; Hayes, 1994; Strasen, 1994). Measuring process and structure permit inferences about quality. The strength of the inference depends on the link between the process or structure of care and the outcome.

### Historical Models

Systems of nursing care delivery reflect social values, management ideology, and economic consideration (Stillwagon, 1989; Gardner, 1991). Eastaugh (1990) and Lin (1996) reported that in the evolution of nursing care delivery systems, hospital nursing has undergone a number of major organizational shifts, from functional nursing in the 1940's, to team nursing in the 1960's, and to primary nursing in the 1970's. Two of the current systems, team nursing and primary nursing, have evolved from functional nursing that characterized the delivery of nursing care in the early-to-mid 20th century (Shukla, 1983a; Ringl, 1994).

The functional nursing system of delivery emerged during World War II when the demand for patient care outstripped the supply of nurses. This system is

characterized by an assembly line approach to care, in which each staff member is assigned a set of tasks (Ringl, 1994; Krapohl & Larson, 1996). For example, an RN administers medications, an LPN obtains vital signs, and a nurse's aide provides patient hygiene and makes beds.

The 1960's innovation of team nursing set the experienced RN as a team leader working with nursing aides and LPNs to provide total care to an assigned group of patients (Sherman, 1990; Eastaugh, 1990; Bertram, 1994; Lin, 1996). The essence of team nursing is patient-centered nursing care. Team members of varying skill levels can contribute to nursing care. The team leader is expected to use a participative style of leadership in interactions with team members. The team leader coordinates and leads the team in assigning, delegating, planning and supervising care for each patient during a specific shift (Shukla 1983b; Bertram, 1994). Effective communication is essential to insure the continuity of nursing care. In 1988, an estimated 60% of hospitals were using team nursing on some of their units (Hay Group, 1989). Although functional and team nursing were implemented in an effort to increase efficiency and cost effectiveness, they have been criticized as being strictly task oriented (Lin, 1996), increasing fragmentation of care (Sherman, 1990), reducing the amount of direct nursing care provided by the RN, and having a lack of professional accountability (Sherman, 1990; Bertram, 1994; Krapohl & Larson, 1996; Lin, 1996).

Primary nursing became popular in hospitals during the 1970's as nursing focused on the need for autonomy and the evolution of a knowledge-based



professional practice (Aiken & Mullinix 1987; Eastaugh, 1990). Primary nursing involves decentralization of the nursing unit and the establishment of a responsible relationship between a nurse and the patient. In the primary nursing system, 24-hour responsibility and accountability for each patient is assigned to a single primary nurse. The primary nurse coordinates the plan of care throughout the hospitalization, and associate nurses carry out the plan in the primary nurse's absence (Shukla, 1983b; Bertram, 1994). Primary nursing has the advantage of improved continuity of care but carries the cost of a smaller number of patients per RN (Shukla 1983a).

Modular nursing which emerged in the 1980's is a method of care delivery that divides patients into small groups or modules (Magargal, 1987; Young, 1990). Modular nursing has also been referred to as "district nursing" because patients are generally grouped according to geographical location. Modular nursing fosters the need for a coordinator rather than a charge nurse role. The coordinator nurse is responsible for all patients and staffing and makes certain that each module has the information needed for smooth operation of the module. This co-ordinating nurse can also assist each module as necessary (Hartshorn, 1985). Benefits of modular nursing include easier nurse-patient assignments, improved productivity, and increased continuity of care. Modular nursing also fosters team work, which saves time when patients requires additional nursing assistance (Young, 1990).

It has been suggested that primary nursing is superior to both the team and functional systems of care with regard to autonomy of the nurse, professionalism, job turnover, and continuity of care (Manthey, 1980; Shukla, 1983b), but results of

studies of primary nursing are not conclusive (Giovanetti, 1986). While in some studies primary nursing has been associated with both a higher quality of care and reduced cost (Gardner & Tilbury, 1991; Hinshaw, Scofield, & Atwood, 1981), conflicting study results suggested that primary nursing is more costly and does not improve quality (Shukla, 1983b; Glandon, Colbert, & Thomasma, 1989)

Problems with primary nursing included nurses' dissatisfaction, lack of accountability, limited communication patterns or isolationism among the nurses, and lack of time for staff and patient education (Young, 1990). Modular nursing provides an alternative to the persistent problems of the primary nursing model (Bennett & Hylton, 1990). Nursing assistants provided the unit support for patient care and non-nursing functions. When nurses were consistently assigned to the same module, modular nursing was shown to increase the continuity and quality of care.

Although primary nursing does not require an all RN staff, the system became associated with a belief that the RN must be the sole care provider (Ringl, 1994). The idea of an all RN staff flourished in the 1980's (Glandon, Colbert, & Thomasma, 1989); from 1981-1987, the proportion of LPNs employed in hospitals decreased 23.5% and ancillary personnel decreased 12.1% (Prescott, Phillips, Ryan, & Thompson, 1991). This trend slowed as a result of the nursing shortage and higher RN salaries. In the late 1980's, delivery models that incorporate less expensive personnel began to re-emerge in response to increasing demands in hospitals and a decrease in available RNs (Manthey, 1989; Eastaugh & Regan-Donovan, 1990; Sherman, 1990; Young, 1990). In 1989, a nationwide survey conducted by the

American Hospital Association (AHA) reported that hundreds of hospitals were implementing "nurse extenders" and concluded that they were "an integral part of the patient care delivery structure" (Merker, Cerda, & Blank, 1991).

### Assistive Personnel

The nurse extender concept, as a substitute or complement to primary care nursing, has become increasingly well known since 1985 (Manthey, 1989; Eastaugh & Regan-Donovan, 1990). This concept became popular because the hospital sector experienced difficulty in finding a sufficient supply of RNs for primary nursing staffs (Eastaugh 1985). The nurse extender role promotes the use of Unlicensed Assistive Personnel (UAP) in which an individual works as a technical care assistant to an RN (Manthey, 1989). Nurses and UAP are capable of providing professional nursing care that is consistent with the concept of total patient care. Thus, the nurse extender model can enhance the profession and prevent the fragmentation of care. Because more caregivers are needed, the role of a nurse extender or UAP has developed with the direction of the nursing department. The nurse extender or UAP is now referred to as a "technical assistant or patient care assistant to an experienced RN," or as an "executive administrative assistant assisting the executive nurse" (Manthey 1989; McCarthy, 1989; Kalanek, 1992). For this study, a nurse extender or UAP refers to a nurse aide or patient care assistant (PCA) to an RN.

The American Hospital Association's Center for Nursing conducted a study in 1989 regarding the use of UAP. Two major functional categories for UAP in the hospital surveys, clinical and non-clinical, were found. The clinical UAP performed

tasks specified by an RN. This model included unit-based, team-based, and partnership role with RN. The non-clinical UAP model is unit with assignments based on the needs of the nursing unit. The assignments usually included transport, stocking supplies, clinical tasks, unit cleaning, and other needs identified by an RN (AHA, 1989). Similarly, the 1990 Tri-Council for Nursing that is composed of the American Nursing Association (ANA), the American Organization of Nurse Executives (AONE), the National League for Nursing (NLN), and the American Association of Colleges of Nursing (AACN) defined roles for two categories of UAP; the patient care assistant and the unit assistant. The patient care assistant is assigned or delegated aspects of direct patient care and is supervised by the registered nurse. The unit assistant supports the nursing care system by performing non-nursing tasks and may be supervised by nursing or non-nursing managers (ANA, 1994). The AHA reported that 97% of hospitals use UAP for either direct clinical care or unit support work (ANA, 1990).

Lengacher and Mabe (1993) reviewed published literature on nurse extender nursing practice models and partners in patient care between 1988 and 1992. In their search, 29 articles were reviewed. They found four categories of nursing care delivery models. These are (1) the traditional extender model, in which assistive personnel to the RN includes the nursing assistant, unit assistant, word clerk, orderly, housekeeping, and dietary aide; (2) the nontraditional extender model, in which assistive positions to the RN includes the EKG technician, monitor technician, phlebotomy technician, and corps members; (3) the traditional extenders in partnership model, assistive personnel

to the RN includes traditional extender as a partner in patient care with an RN (NA and LPN); and (4) the nontraditional extender in partnership model, the assistive personnel to the RN includes the use of a nontraditional extender as a partner in patient care with an RN (primary patient care and critical care technicians). The most reported category (32%) was nontraditional extender in partnership model, followed by traditional extender in partnership model (26%), traditional extender model (26%), and nontraditional extender model (16%).

There are very few descriptive evaluation methods for such programs. For example, a 1992 survey of 102 California hospitals using a UAP model revealed that 65% of the institutions were not conducting evaluations of the cost-effectiveness of this model, and 92% were not evaluating patient satisfaction (Barter, McLaughlin, & Thomas, 1994). Crawley, Marshall and Till (1993) confirmed that health care organizations are designing new care delivery models to provide RNs with more time to spend with patient and family.

#### Partner in Practice Model

Before discussing the outcomes of the Partner in Practice Model (PIP), the characteristics of the model will be described. The major objective of the model is to provide support service to the RN. The PIP combines the concept of UAP or nurse extender in partnership with a nurse; the partner assumes delegated nursing functions. The UAP has been defined since 1987 as an unlicensed individual who is trained to function in an assistive role to the registered professional nurse in the provision of

patient care activities as delegated by and under the supervision of the registered professional nurse (ANA, 1994, 1996).

The ANA (1996) classifies nursing activities as either direct or indirect patient-care activities. Direct patient-care activities are those actions that assist the patient/client in meeting basic human needs. This includes activities related to feeding, drinking, ambulating, positioning, grooming, toileting, dressing, performing dependent activities of daily living, assistance in self-care activities, assistance in therapeutic activity programs, patient socialization, and maintaining a safe comfortable environment. The direct-care activities may involve the collecting, reporting, and documentation of data related to these activities. When done by a non-RN, data is reported to the RN who uses the information to make a clinical judgement about patient care (ANA, 1992, 1996). Delegated activities to the UAP do not include health counseling, teaching or activities requiring independent, specialized nursing knowledge, skill or judgement. Judgement is the intellectual process that a nurse exercises in forming an opinion and reaching a clinical decision based upon an analysis of the evidence of data (ANA, 1996). Indirect patient-care activities focus on maintaining the environment and the systems in which nursing care is delivered and only incidentally involve direct patient contact. These activities assist in providing a clean, efficient, and safe patient-care environment, and typically encompass categories such as housekeeping, transporting, clerical, stocking and maintenance of supplies (ANA, 1996).

Nursing activities can be delegated and supervised within the domain of nursing. The act of delegation is the transfer of responsibility for the performance of an activity from one person to another while retaining accountability for the outcome. In delegating, the RN uses professional judgement to determine the appropriate activities to delegate. The determination is based on the concept of protection of the public and includes consideration of the needs of the patients and the education and training of the nursing and assistive staff. Any nursing intervention that requires independent, specialized nursing knowledge, skill or judgement cannot be delegated (ANA, 1996). Supervision is the action of the RN in directing, guiding, and influencing the UAP in performing an activity (ANA, 1996). The RN is responsible for the activities that are delegated to UAP and oversees the appropriate completion of that activities.

In 1992, Manthey pioneered the model of Partners-in-Practice which linked a nursing support person with an RN (Manthey, 1988, 1992; Christensen & Bender, 1994). The dyad then work the same shift, same schedule, and care for the same patients. Such partnerships have been created with LPNs, nursing assistants, hospital-trained technicians, and new graduates or nurses who have not yet passed licensing examinations (Manthey, 1988, 1992; Villaire, 1993).

The Partners in Practice model is based on the premise that the senior partner (RN) role carries with it the authority to teach the practice partner technical and decision-making skills within a framework of hospital policies and the state practice act, while working under the direct supervision of an RN and caring for the same

caseload of patients (Manthey, 1992). Partners work identical schedules, with each pair taking on a caseload of six to eight patients (Jacobson, 1990).

M. Manthey (personal communication, March 4, 1997) strongly encourages the change of nursing care delivery systems to PIP, believing implementation of PIP will have positive effects if it is done correctly. She suggests several important factors in order to establish PIP and obtain its benefits. For example, the nursing staff in the unit must decide that they want the new roles. The RN and UAP must choose to work together as a partnership, rather than be assigned. To be well utilized, a UAP must have adequate technical training and abilities. She personally suggests that the best partnership for an acute care unit should be an RN and LPN. However, she recommended the UAP should be able to do 50-60% of the volume of work that the RN can do. This RN partner will care for a larger group of patients than an RN without a partner. The RN should be experienced, not a new graduate. She mentions that three or four partnerships in a unit is enough for the best utilization of the workers. Lastly, she stresses that the nursing care delivery system of the future would require collaborative practice across the licensure continuum within which are effective teams of people providing care that is outcome, practice, and resource driven.

The overall goal of the PIP is to enhance patient care despite a declining supply of nurses and to reduce healthcare costs (Eastaugh, 1990; JCAHO, 1992; Prescott, 1993; Fritz & Cheeseman, 1994). This is achieved by allowing registered nurses to spend more of their time on activities that require advanced education and



judgment, including patient care assessment, care planning, coordination, and education. The nurse is freed to assume these activities by having another individual, the partner, to share in the performance of patient care.

Recent studies established specific objectives for the PIP model: (1) to increase nurse satisfaction by maintaining primary nursing and assuring adequate help; (2) to increase patient satisfaction by allowing the nurse to spend more time teaching and planning their overall care while the nursing assistant assures that more basic needs are met; (3) to ensure that the nursing assistant role is satisfying to incumbents; and (4) to increase the cost-effectiveness of patient care (Kirby & Garfink, 1991). Lengacher et al. (1993), for example, developed the PIP for medical-surgical units at a private, not-for-profit teaching facility in Florida to achieve the following outcomes: (1) to increase nurse, patient, and physician satisfaction; (2) to increase the autonomy of the nurse; (3) to deliver quality care; (4) to optimize the role of the nurse in patient care; (5) to decrease the need to hire additional registered nurses; and (6) to develop the non-traditional partnership extender model matching the nurse with a multi-skilled worker.

Although PIP has been adopted by many hospitals since the mid 1980's, little has been reported regarding the impact of PIP on both costs and patient satisfaction. McGee (1993) conducted a pilot study of the Partners-in-Practice Program at eight hospitals in Florida, Nebraska, and Minnesota. Nursing staff on 22 units (46 partnerships) perceived that partnerships had a positive impact on quality of care, cost

effectiveness, and efficiency, but actual patient and financial outcomes were not measured.

Grillo-Peck and Risner (1995) proposed a skill mix in an 800-bed not-for-profit hospital in southwestern Ohio. The hospital implemented a partnership model in August 1992. To meet the proposed skill mix changes for the division of nursing, 110 RNs were eliminated, 116 patient care technicians were added and 60 service associates were created. These changes decreased an 82% RN skill mix to a 65% RN skill mix hospital wide. The neuroscience unit, which is a 38-bed unit caring for patients with acute neuro-surgical problems, was one of the first three units within the institution that implemented the PIP. The proposed skill mix on the neuroscience unit changed from an 80% RN skill mix to a 60% RN skill mix. This resulted in the elimination of 8.4 RN positions with an addition of 7 patient care technicians and 5.8 service associates positions. The retrospective study, comparing quality of care and length of stay between pre-implementation and post-implementation of the nursing partnership model on the neuroscience unit was studied. Subjects included all patients admitted to the unit during these times. The results suggest that a level of quality of patient care can be maintained using the partnership model. Medication errors, procedural errors, nosocomial infections, and length of stay were not significantly different between pre-implementation and post-implementation of the model, but there were significantly less patient falls after implementation. Patient length of stay was not significantly different between pre-implementation and post-implementation of the model. They conclude that a patient care model which decreases the number of

RNs and increases UAP can provide cost-effective quality patient care without increasing patient length of stay, medication and procedural errors, falls, and infections. The authors believed that because the RN and nursing assistant work together, continuity of care is provided for and patient care needs are met. Registered nurses spend less time on nonprofessional tasks, and therefore can spend more time on patient assessment, the planning and coordination of patient care, patient and family education, and collaborating with the physician.

Bechtel and Printz (1994) studied the effects of modular nursing on nursing care quality in a 250-bed for-profit health maintenance organization located in the Southwestern United States. A 62-bed multispecialty unit was divided into two specialty modules and a large medical unit was studied. A retrospective chart audit that obtained the baseline data and cross-sectional analysis of care was used. The sample was 82 nurses who were reassigned to patients in either specialty modules or a general medical unit. Reassignment involved transferring nurses from one of two special modules to the general unit or from a general unit to a special module. Results of the study suggest that the special modules have reduced medication errors, improved documentation, and resulted in a more timely administration of PRN medications than general medical units. Quality of care remained high in specialty modules even when staff not accustomed to working with clients were assigned from the general medical unit. The study supports the concept of modular nursing and suggests large medical units be divided into specialty modules and that rotation of staff to general medical units be minimized. The author supported the development of

specialty nursing modules to replace large, general medical units. The impacts on efficiency, costs, and nursing care quality were recommended for further studies.

Outcome studies of the other forms of UAP have had similar results.

Lengacher and Mabe (1993) reviewed research and literature published between 1988 and 1992, using the search headings: nurse extenders, nursing practice models, and partners in patient care. From the 29 articles found, the authors discussed the use of extenders, processes for implementation, and the evaluation of new models. Most of the literature focused on positive outcomes and benefits for nurses and hospitals. Major benefits presented in the literature were the better use of RN's time, decreased costs of care, and increased satisfaction of RN and staff (Lengacher & Mabe, 1993).

Lengacher et al. (1993) introduced a multiskilled technician in partnership with the nurse as a patient care extender in a medical center (a 518-bed private, not-for-profit teaching facility) in southwest Florida. The multi-skilled partners were trained to perform electrocardiograms, use telemetry, recognize abnormal cardiac rhythm, draw blood, set up oxygen, and assist with patient mobility and basic nursing care. A 35-bed medical-surgical unit was randomly chosen from the first three units implementing the PIP to be the pilot. The control unit was also randomly chosen to provide contrast data. Both qualitative and quantitative designs were used. The quantitative design used a pretest-posttest with an experimental unit and a control unit. The design tested the effects of the practice model on quality of care, productivity, costs, patient satisfaction, physician and staff satisfaction. The outcome variables of job satisfaction, autonomy, and retention and turnover of nursing staff

between pre-implementation and post-implementation of PIP were measured (Lengacher et al., 1994).

The convenience sample of nursing staff from the experimental unit (a 36-bed general surgical unit) and control unit (a 34-bed orthopaedic unit) participated in this study. Staff who voluntarily participated in the pre-implementation on the control unit were 8 RNs, 6 LPNs, and 2 Technicians. After implementation (6 months), there were 7 RNs, 5 LPNs, and 1 Technician. Eleven RNs and 4 LPNs participated in the experimental unit, in pre-implementation; after implementation, 13 RNs, 3 LPNs, 9 Technicians, and 1 Unit Secretary participated in the study. The project was monitored at three time periods. Pre-intervention data were collected and analyzed 6 months before implementation. Interim data were collected 6 months after implementation of the model. Post-intervention data was collected 1 year after implementation. Staff wrote bi-weekly evaluations since the initial implementation of PIP. Preliminary analysis of the quantitative pre-assessment data indicated no significant differences between the pilot and control units on retention or turnover, staff satisfaction, costs, productivity in documentation time and quality indicators which included falls, medication errors, intravenous infection rates, and skin integrity. The results showed general staff satisfaction with the model but written evaluation of partners by nurses and of nurses by partners showed that nurses were inconsistent in delegating appropriate role activities in the partners.

Six months after implementation, significant differences were found between the control and the experimental unit on the overall job satisfaction and subscales of

pay and task requirements. Satisfaction with pay indicates that the staff were satisfied with their salary before implementation and that this perception had significantly increased after implementation of PIP. Nursing staff on the experimental unit were satisfied with tasks performed and with the tasks for which they were educated to perform. The total perception of job satisfaction increased from pre-implementation to post-implementation. No significant differences were found in the subscale scores on professional status, interaction, organizational policies, and autonomy. There were no significant differences in retention and turnover of staff between the experimental and control unit prior to, during, and 6 months after implementation (Lengacher et al., 1996).

Lengacher et al. (1996) also assessed the effects of a Partner in Patient Care (PIPC) nursing care delivery model on productivity and costs. Productivity referred to the efficiency and effectiveness in terms of time spent in indirect care activities and of time spent in documentation. Costs were defined as unit costs for patient care determined by personnel salary costs (calculated for total hours of care per patient day) and unit costs (calculated for total supply costs per unit per patient day). The researchers reported the differences in outcomes during the 18 months of the study (6 months prior [pre], 6 months after [interim], and at 1 year after implementation [post]). Significant differences in documentation time were identified between the pilot and control units. The pilot unit showed there was an increase during the interim period in minutes of documentation time of staff compared to the control unit. The documentation time was decreased to below premeasures on the pilot unit from pre,

interim to post. Similarly salary costs associated with documentation for the units were similar at pre and post, but were significantly higher for the pilot unit compared to the control unit at interim. The salary cost of documentation time decreased one year after implementation with no significant differences. The results showed increasing salary costs at the interim measure for the pilot unit, but decreased costs at the end of one year. Productivity increased significantly between the pre, interim, and post measures on the pilot unit in a linear fashion. These differences in costs and productivity were significant to nursing administration. Although it is difficult to identify why the differences occurred, changing to the PIP appears to have influenced costs and productivity.

Within the same setting used previously, Lengacher et al. (1994, 1996), and Heineman, Lengacher, VanCott, Mabe, and Sevymer (1996) reported the structural change in terms of its effects on patient outcomes (patient satisfaction and other quality indicators: medication errors, falls, and intravenous infection). All discharged patients from both the experimental unit (a 36-bed general surgical unit) and the control unit (a 34-bed orthopaedic unit) were sent the hospital's patient satisfaction questionnaire. The experimental unit received responses from 314 patients (100 at pre-test, 137 at interim, and 77 at post-test) and the control unit received responses from 135 patients (52 at pre-test, 37 at interim, and 46 at post-test). Quality indicators of patient satisfaction were measured using eight Likert-type items and five dichotomous items. The eight items represent specific aspects of nurse behavior as follows: (1) courtesy, (2) treatment of the patient's family and visitors, (3) training,

(4) phlebotomy skill, (5) timely meeting of patient's needs, (6) compassion, (7) ability to listen, and (8) ability to address personal care needs. Five dichotomous items addressed patient opinions regarding (1) overall satisfaction with care, (2) professionalism of nursing staff, (3) whether staff identified themselves to patients, (4) how treatments were explained, and (5) whether the concerns of families were adequately handled. The reliability of the instrument using Cronbach's alpha was .90. Medication errors and falls were collected from official incident reports. Intravenous infection data were derived from laboratory reports.

Over an 18-month period in this study, results showed a higher level of satisfaction with nursing care on the experimental unit compared to the control unit on all patient satisfaction items. The new delivery model had a significant effect on patient perceptions of the courtesy of nursing staff and the staff's treatment of the patient's family and friends, indicating a positive response to the presence of a partner for the nurse. The patients also agreed that nursing staff met their needs in a timely manner, since needs could be met by either the nurse or the partner. These responses supported the claim that the PIP had a significant impact on patient satisfaction with nursing care. Very few medication errors, falls, and intravenous infections occurred in the study.

A report by Gersch (1996) which evaluated the PIP used different time periods, different data collection methods, and different outcomes. This patient service partner program was initiated in a surgical unit of St. Luke Hospital in Cedar Rapids, Iowa. Patient satisfaction with diet, room cleaning, nursing, visitors and



response to call lights were tracked through interviews conducted three weeks before implementation and six months after implementation. Overall, post-implementation responses indicated a high rate of satisfaction. For patient satisfaction with nursing care, the post-implementation level was higher than pre-implementation, but not significantly. Still, the author suggested that utilization of the PIP program be continued because it was a cost-effective way of delivering patient care.

A similar PIP between patient care technicians (PCT) and RNs was implemented on three units of a 379-bed University Hospital at Boston University Medical Center (BUMC) in 1989 (Garfink, Kirby, Bachman, & Starck, 1991; Kirby, Garfink, Starck, Russo, & Bachman, 1991; Kirby & Garfink, 1991). The model supports and assists the RN practicing in a primary nursing model through the employment of appropriately skilled PCT. Patient care technicians were trained to do a variety of clinical tasks such as ostomy care, oral suctioning, and tracheostomy care. One RN and one PCT consistently worked together, jointly caring for a group of patients. The overall goal of this program was to enhance patient care despite a declining supply of nurses and increasing demands to reduce health care costs.

During a 2-year period, this program developed in phases: (1) initial development and implementation; (2) program enhancement; (3) program reimplementation and evaluation; and (4) further program enhancement (Kirby, et al., 1991). Garfink, Kirby, Bachman, and Starck, (1991) presented the results of a 1-year evaluation of the impact of the model on nursing practice and satisfaction, and the cost of using the model. Researchers compared survey results from three units with

PCT (general medicine, surgical intensive care, and surgical oncology) with three units that had similar patient intensity and staff patterns but were not using PCT (medical cardiology, medical intensive care, and medical oncology). Data from the nursing department's management information system were used to compare the costs of the nurse extender model to the traditional primary nursing model. Average hourly costs per patient day and average hourly salaries for nursing staff were calculated. All three units which implemented PCT showed a lower average hourly wage, lower cost per patient day and cost per hour of direct care, and more hours of direct care than did the control units. There were no differences in satisfaction with nursing care between nursing with PCT and non-PCT units. The results show nurses' job satisfaction remained unchanged while nurses workload increased, since they had to plan and care for more patients. In other words, costs per hour of direct patient care was reduced while nurse satisfaction did not change. Adoption of the model was therefore supported.

The quality of patient care and cost-effectiveness can be enhanced by using PIP, allowing RNs to spend their time on activities that require advanced education and judgement, including patient care assessment, care planning, co-ordination, and education. Unlicensed assistive personnel share responsibilities for both direct and indirect patient care. The nurse's knowledge and judgement are extended to all patient care activities through a very close working relationship with the UAP.

### Inputs: Demographic Characteristics

Nursing has addressed patient characteristics as a structural aspect of care (Halloran, Patterson, & Kiley, 1987; Holzemer, 1994). Demographic characteristics, such as age, gender, educational level, race, family size, income, and marital status appear to effect patients' ratings of satisfaction. For example, Ware, Davies-Avery, and Stewart (1978) reviewed 111 articles covering patient satisfaction. The authors summarized the demographic and socio-economic correlates with patient satisfaction from the reported data of 13 publications. In their review, older persons tended to be more satisfied with the conduct of providers and less satisfied with access to care and outcomes of care. Less educated persons tended to be less satisfied with medical care in general and with the conduct of providers. Persons in larger families tended to be less satisfied with access to care. Lower income persons tended to be less satisfied with access and outcomes of care. There were no clear trends related to race or social class. Persons with higher occupational levels tended to be more satisfied with medical care. Women tended to be more satisfied in general than men. No reasons for these correlates were reported. The authors only concluded that the concept of patient satisfaction appears to be related to socio-demographic characteristics and health and illness behaviors (p.12).

In contrast, Fox and Storms (1981) asserted that these demographic variables were characterized as chaotic and not having consistent relationships. While some studies have shown that older patients are more likely to report higher rates of satisfaction (Attkisson & Pascoe, 1983), other research does not support this finding

(Bader, 1988; Cleary, Keroy, Karpanos, & McMullen, 1989). While Pandiani, Kessler, Gordon, and Domkot (1982) found that women were more likely to be satisfied with care than were men, DiStefano, Pryer, and Garrison (1980) and Bader (1988) did not find any relationship between gender and satisfaction. With inconsistent results and a lack of theoretical exploration, reasons for such findings can only be hypothesized. For example, older patients may have higher satisfaction levels because they have more experience, acceptance and realistic expectations than younger patients, and are thus more able to compromise between expectation and actual care received. To explain gender differences, it could be that women have lower expectations than men, in which case their satisfaction level would be higher than men.

Shaw (1980) investigated the effects of race on client satisfaction with adult clients who came to a community health clinic for a first psychotherapy interview and did or did not return for a second interview. Over 50% of minorities, particularly African-American clients, dropped out. When more demographic variables were studied (Shaw, 1980), the results showed that the client with less education and lower socioeconomic status tended to drop-out of treatment after one or two-visits. However, this dynamic has not been thoroughly researched. Given these results, one hypothesis is that members of minority and people with less education or with lower income do not have a positive perception of care received or had a higher expectation of care than they received related to ethnic differences in expectations between patient and provider.

However, these factors also appear to have an inconsistent effect on patient satisfaction. Beech (1995) examined the level of patient satisfaction at an urban hospital in the Southwestern United States with age, gender, ethnicity, and education as variables. The results showed that only ethnicity was significantly related to patient satisfaction. Hispanic patients who were in good health and felt the hospital had a good image in their community were most satisfied with hospital care.

The process of evaluation and the use of evaluation data for improvement are critical for organizational effectiveness. There is no study reporting the effects of patient demographic characteristics, such as age and gender, on patient satisfaction with nursing care in the Partner in Practice model. An effect of PIP on patient satisfaction that might be influenced by demographic characteristics of patients is not well defined. Well-designed studies which measure patient outcomes, patient satisfaction with nursing care of innovative nursing care delivery systems, and the influence of demographic characteristics are needed. The demographic characteristics used for this study included age and gender.

### Outcomes

Nursing organizational literature acknowledges the impact of the practice model on patient outcomes (Anderson & McDaniel, 1992; Fralic, 1992; Hicks, Stallmeyer, & Coleman, 1992). The outcome studies included costs, patient satisfaction, nurse satisfaction, and productivity (Mareck, 1989; Eastaugh, 1990; Garfink, Kirby, Bachman, & Starck, 1991; McGee, 1993; Neidlinger, Bostrom,

Stricker, Hild, & Zhang, 1993). Bostrom and Zimmerman (1993) indicated that outcome measures that are sensitive to variations in nursing practice and can identify aspects of nursing care which are important to patients are needed to understand the impact of care delivery restructuring. However, few nursing care delivery system evaluations of PIP were reported. Some studies evaluated satisfaction only, while some investigated only costs. It is inconclusive whether or not the outcomes of the PIP are positive.

### Costs

Nursing is the largest labor component of hospital costs. Since nursing care costs comprise over one-third of a hospital's budget and nurses represent approximately two-thirds of the total hospital employees, nursing is a likely target for cutbacks and cost-containment efforts (Eastaugh, 1990; Dison, 1992). Fitzmaurice (1983) estimated that direct nursing salaries alone accounted for approximately 40% of routine costs, or 18.5% of total operating costs.

In the health care industry, operating expenses include the following: (1) salaries, the wages paid to employees of the institution, (2) employee benefits, health insurance, holiday pay, vacation pay, and sick pay, (3) medical supplies, soap, lotion, tissues, foley catheters, & so on, (4) non-medical supplies, forms, stationery, paper, paper clips, & so on, (5) medical fees and commissions, payments to physicians for administrative or clinical services, (6) purchased service, fees for occasionally utilized services, and consultant and management fees, (7) maintenance and utilities

expenses, (8) professional liability insurance, (9) financing costs, for equipment, and (10) depreciation, financial statements (Strasen, 1987).

Nursing costs can be measured several ways. For example, Trifino (1986) has described the Reality Based System for Pricing Nursing Services. There are two categories of nursing costs, direct nursing costs (associated with the nursing process) and total nursing costs (including those who are not caregivers). The total nursing labor cost per patient day, the registered nurse labor cost per patient day, and the total nursing cost per unit of workload were defined by Glandon, Colbert, and Thomasma (1989). The total cost per unit for workload normalizes nursing costs by acuity weighted patient days. Included in these nursing costs are the dollars spent on salary and benefits for nursing personnel providing direct patient care and indirect nursing care, including costs associated with administration and management of the units.

Reichelt and Larson (1994) defined total care costs that combined direct care costs and indirect care costs. Direct care costs are staff wages earned while nurses are assigned to patient care activities. Indirect care costs are those staff nurse wages paid while they are engaged in non-patient care activities, such as flex hours (vacation, holiday, and sick hours), orientation, and inservice hours.

Witzel, Ingersoll, Schultz, and Ryan (1996) also defined a total nursing cost that combined direct and indirect nursing costs. Direct nursing costs are computed for all direct nursing care (RN, LPN, NA, Technician, and float/agency/per diem nurse). Salary and benefit costs are summed for all direct care nursing personnel. Indirect nursing costs include all other nursing costs associated with care delivery on the unit.

This includes salary and benefit for nurse manager, unit secretary, and other administrative and educational costs.

Wilson, Prescott, and Aleksandrowicz (1988) defined a total nondirect nursing cost as indirect nursing costs and non-nursing costs. The non-nursing cost, or hotel cost, which is a component of nondirect nursing cost attributed to the nursing budget comprises dietary, laundry and linen, house keeping, and medical staff expenses.

Personnel costs, including salaries and benefits, are a major component of costs for all health care facilities. Nursing salaries make up the major portion of the budget of any hospital. Regardless of minor variations in subcategories, nursing labor expenses or costs are generally those related to nursing care provided that include: (a) direct labor costs, nursing costs at the bedside that reflect direct nursing care, set at the appropriate level of care which the acuity tool identifies; and (b) indirect labor costs at the nursing unit level accounted for by management salaries, salaries of ward clerks, nursing service technicians, clinical specialists, and clinical instructors, including decentralized education and specialty knowledge and management.

The major component of PIP implementation is the use of appropriate nursing personnel and cost controls. Analysis of costs associated with the various care delivery models has been a focus of study for some time.

Sukhla (1983a) compared three nursing care delivery models in three nursing units: an all-RN model (primary nursing model), a team model, and a modular nursing care delivery model at Riverside Hospital in Newport News, Virginia. The results showed that the structural differences do not significantly effect the quality of



nursing care delivered. The all-RN model, however, was found to be more costly than the other two models. These findings did not include turnover and unpaid sick leave costs.

Glandon, Colbert, and Thomasma (1989) studied four nursing care delivery models (team, modular, total patient care, and primary care), and RN mixes from a subset of a national multi-hospital dataset (Medicus Systems Corporation's National Comparative Database). The information was gathered from 392 medical and surgical units in 62 U.S. hospitals in 1987. The results show that the primary care delivery units and total patient care units with a high percentage of RNs were the most expensive and that the team method was the least expensive. The PIP model was not evaluated in that study.

In the last decade, both positive and negative effects of the use of UAP on the costs of nursing care delivery systems have been reported. Garfink, Kirby, Bachman, and Starck (1991) studied the effects of the nurse extender model (PIP) using patient care technicians at the Boston University Medical Center. This study compared the effects of nursing models between three units that implemented PIP and three units that did not. These effects were measured one year after implementation of the new model. The PIP resulted in a lower average hourly wage, a lower cost per patient day and savings for the hospital on cost per hour of direct care. Similarly, Bostrom and Zimmerman (1993) studied nursing support personnel, nurse's aides on medical-surgical units and also found that costs declined significantly in partner programs.

McGee (1993) conducted a study of PIP with the nursing staff on 22 units at eight hospitals in Florida, Nebraska, and Minnesota. A positive effect on cost was reported.

Fitz and Cheeseman (1994) analyzed process and identified roles and responsibilities that can change in a critical care unit (ICU) at St. Joseph Hospital, Houston, Texas. A new nursing care model, Patient Care Specialty Technician Role, was implemented in the ICU. This model decreased the staff mix from 100% RN to 75% RN and 25% patient care specialty technicians. This nursing role model was classified similarly to the nursing role in PIP. Patient care delivery systems and relative systems such as staff mix and patient care hours were analyzed. The staff mix that was changed was associated with a reduced cost while maintaining the level of patient satisfaction.

Gould et al. (1996) implemented a new model that altered the roles of RNs and NAs in the surgical division at the University of Iowa hospitals and clinics. The RN and NA worked together caring for a group of patients. The RNs had more time for patient assessments, direct patient care, patient education, and documentation, and the NA enjoyed being part of the patient care team. An important outcome was the dramatic decrease in overtime. Similarly to Donovan's study in 1988, the unit staff composed of RNs and nurse extenders reported more efficient use of time, less overtime usage, and greater patient satisfaction. In another study, a two-month pilot project, an RN was linked with a nursing student who performed the functions of a nurse's aide. After two months, partnered nurses subjectively reported that they were

freed from time-consuming tasks and were able to leave work on time more often than nurses without a student partner (Clark & Hollander, 1990).

In contrast, Neidlinger et al. (1993) evaluated the effect of the intervention of a nursing assistive model in a 560-bed unionized university medical center. Only data collected before the change and one year after the change were reported. They found higher costs and a decline in quality indicators in the study. The authors suggested many influences such as technology advancement, the nursing shortage, patient acuity, and so on. This result might be explained by the research of Powers, Dickey, and Ford (1990) who implemented the partnership model on a surgical unit at the University of Kentucky Hospital of Lexington. They found the program resulted in an increase in the nurse:patient ratio from 1:4 to 1:6-7, but it also caused an unexpected increase in the use of on-call staff, overtime, and sick leave. RNs also expressed frustration over not having adequate time to spend with patients or to complete charting, and recommended an increase in the amount of management support on evening and night shifts.

As can be seen, available data do not yet clearly establish the ability of this new model, PIP, to reduce costs. This may be related to variables not yet defined, such as the level of experience of the RN or partner, but more research is clearly needed.

### Patient Satisfaction

Patient satisfaction has been described as an outcome of health care delivery and represented as an indicator of quality of care (Leary & McNeil, 1988; Vuori,

1991; Buerhaus, 1992; Megivern, Halm, & Jones, 1992; Greeneich, 1993; Holzemer, 1994). Patient satisfaction with nursing care is the most important predictor of overall satisfaction with hospital care (Doering, 1983; Abromawitz, Cote, & Berry, 1987; Greeneich, 1993; Ludwig-Beymer, et al., 1993). Furthermore, patient satisfaction with nursing care is an important indicator for nursing service and for making decisions regarding the structure or the process of nursing care. Patient participation is a central tenet of nursing care. Therefore, seeking patients' feedback on their satisfaction with care and determining which personal characteristics might influence their satisfaction should be studied.

Since nurses comprise the largest proportion of personnel for the provision of health care services, the satisfaction that patients have with nursing care is especially important. Patient satisfaction, therefore, is one outcome specified in the nursing management data set. Satisfaction surveys give patients an opportunity to judge the quality of the care that they received. Quality is the degree to which patient care increases the likelihood of desirable outcomes and reduces the likelihood of undesirable outcomes (Lohr, Yordy, & Thier, 1988; Nelson, Rubin, Hays, & Meterko, 1990). Nursing practice is patient driven and patient centered. According to Holzemer (1994), patients' perceptions of satisfaction with nursing care can contribute to the quality of nursing care.

Patients are well able to define the quality of nursing care received. In recent years, evaluation efforts have focused on the assessment of patient satisfaction. Patient satisfaction with nursing care reflects good quality of care. Patient

dissatisfaction—that is, a failing to meet patient’s expectations—usually indicates poor quality of care (Laza & Wheaton, 1990; Nelson, Ware, & Batalden, 1990; Bond & Thomas, 1992).

Marek’s (1989) review of the nursing literature found a wide range of outcome measures including patient satisfaction, medication errors, the incidence of patient falls, and nosocomial infections. Patient satisfaction has been advocated as one aspect of outcome measurement in quality assurance (QA) programs (Marek, 1989; McDaniel & Nash, 1990), but those have been greatly varied in approach. Some surveys assess patient’s perception of all aspects of their hospital experiences (Abramowitz, Cote, & Berry, 1987; Cleary, Keroy, Karpanos, & McMullen, 1989), whereas others address certain aspects of patient’s satisfaction with nursing care (La Monica, Oberst, Madea, & Wolf, 1986; Courts, 1988; Larson & Freketich, 1993). Some studies additionally have assessed other aspects of patient’s health care such as interactions with physicians and the quality of ancillary services (Nelson & Niederberger, 1990; Wigger, Donovan, Redman, & Sanson-Fisher, 1990). Finally, some surveys compare the patient’s concept of ideal care with their actual experience (Risser, 1975; Abramowitz, Cote, & Berry, 1987; Nash et al., 1994; Scardina, 1994).

Individual units can use patient satisfaction to measure their progress in achieving quality care over time (Nelson et al., 1991). Patient satisfaction measurement also contributes to an increased quality of care because the patient can often identify problem areas of which management is not aware. Furthermore, quality

of care can be improved by innovative ideas for change often offered by patients in their satisfaction surveys.

Early in 1975, Risser first proposed a definition of patient satisfaction with nursing care as “the degree of congruency between a patient’s expectations of ideal nursing care and his perception of the real nursing care he receives” (p. 46). This definition was later adopted by other researchers (e.g., Hinshaw & Atwood, 1982; La Monica, Oberst, Madea, & Wolf, 1986; Cottrell & Grubbs, 1994; Scardina, 1994). A similar definition of patient satisfaction is expressed as the match between patient expectations of nursing care and the care actually received (Greeneich, Long, & Miller, 1992). Additionally, Petersen (1988) generally described patient satisfaction as “the patients’ perceptions of how their care was provided, excluding the outcome of their health status or the appropriateness of their therapy” (p. 26). Also, several researchers (e.g., Richardson & Lambert, 1987; Lewis & Woodside, 1992; Munro, Jacobsen, & Brooten, 1994) have left the definition of patient satisfaction to the interpretation of the reader.

Patient satisfaction with nursing care, then, has consistent definitions but incongruently conceptualized dimensions. For example, Risser (1975) developed the first standardized measurement to measure patient’s satisfaction with primary care nurses and nursing care in an output setting. The 25-item Patient Satisfaction Scale (PSS) was originally developed to test four dimensions: (1) technical-professional factors, e.g., technical activities and the knowledge base required to competently complete the nursing care tasks; (2) interpersonal-interpersonal relationship; (3)

trusting relationship, e.g., nursing characteristics that allow for constructive and comfortable patient-nurse interaction and communication aspects of the interaction; and (4) an educational relationship, e.g., nurses' ability to provide information to patients, including answering questions, explaining care, and demonstrating techniques. In a later modification of the scale the interpersonal-interpersonal relationship dimension was dropped without further explanation. This revised instrument was used with 138 patients in primary health care settings. The reliability of the PSS was established by using Cronbach's alpha, which ranged from .64 to .89. Only the content validity was mentioned.

Many nursing studies use the Risser PSS (Risser, 1975) as the basic measure of patient's satisfaction. For example, the Patient Satisfaction Instrument (PSI) (Hinshaw & Atwood, 1982) was developed by revising one item on the PSS in order for it to be used with inpatients. In the item, "The nurse gives good advice over the telephone," the phrase "over the telephone" was deleted. The PSI was tested in five studies with a total of 600 patients, primarily medical surgical inpatients and outpatients. Patient satisfaction scores were highly positively skewed. For this new version, the reliability estimated by internal consistency (Cronbach's alpha) ranged from .78 to .88. Construct validity estimates were made via discriminant and predictive modeling.

Researchers have enumerated varying components of satisfaction. Carey and Posavac (1982) conducted a satisfaction survey of patients discharged from a large teaching hospital in the Midwest. They reported that patient's perception of nursing

care was an important determinant of satisfaction with overall care. They established four determinants of satisfaction which were (a) support and kindness of the nursing staff; (b) perceived competence of the nurses; (c) prompt answers to call buttons; and (d) clear answers to patient's questions. Cleary et al. (1991) developed a 95-item telephone survey to assess patient perceptions of hospital experience that included seven dimensions: (1) respect for patients' values, preferences, and expressed needs; (2) coordination of care; (3) information and education; (4) physical comfort; (5) emotional support; (6) involvement of family and friends; and (7) continuity and transition. Greeneich, Long, and Miller (1992) conducted a review of patient satisfaction instruments and proposed a nursing taxonomy of patient satisfaction, which includes the following three dimensions: (1) the nurse's inherent personality characteristics, nursing care characteristics, and nursing proficiency, (2) the patient's expectations, and (3) the organizational environment, i.e., nursing milieu.

Adopting a marketing service approach, Scardina (1994) suggested that patient satisfaction with nursing care included five dimensions: (1) tangible, e.g., the appearance of physical facilities, equipment, personnel, and communication materials; (2) reliability, e.g., the ability to perform the promised service dependably and accurately; (3) responsiveness, e.g., the willingness to help customers and to provide prompt service; (4) assurance, e.g., the knowledge and courtesy of employers and their ability to convey trust and confidence; and (5) empathy, e.g., the provision of caring, individualized attention to customers.



Patient satisfaction instruments also have different formats. Abdellah and Levine's (1957) study is one of the earliest. They used a check list of events (49 items) where patients indicate whether or not they had encountered these events during hospitalization. Davis and Adams-Greenly (1994) created a weighted satisfaction instrument on the basis of patient input. Likert-type items were grouped in major categories, each weighted by how much that area contributed to the patient's overall assessment, for example, nursing = 50%, food = 15%, social services = 3%. Their response rate to this rather complex instrument was 23%. Ryan, Collins, Dowd, and Pierce (1995) reported that discharged patients preferred dichotomous items to Likert scales, particularly with telephone surveys.

The review of the existing instruments of patient satisfaction used in nursing shows that reliability and validity have posed a number of problems which may be related to conceptualization. For instance, no estimates of reliability or validity have been reported for the patient satisfaction with nursing care tool that was formulated by Abdellah and Levine in 1957. The estimate of reliability was done during Erickson's study in 1987; at this time, Cronbach alpha for a 49-item check list used was .89 (Erickson, 1987). Reliability has been measured only by internal consistency (Cronbach's alpha). No test-retest reliability has yet been estimated for this instrument. The lack of an appropriate theoretical framework introduces difficulties in testing validity. As a result, in some instruments only face and content validity (Risser, 1975) or only construct validity (Hinshaw & Atwood, 1982) have been mentioned. Most researchers fail to provide strong evidence for validity (Lin, 1996).

Weisman (1992) examined the state of knowledge regarding the effects of nursing practice models on patient outcomes. A methodological issue is timing of outcome measures. The length of time that a unit has been using the model could affect patient outcomes. Most of the reported evaluations have assessed effects over a short period (i.e., 8 months to 1 year following implementation of the models).

The effect of changing structure and process, exemplified by the change to a new nursing care delivery model, PIP, can be determined. Assessing patient satisfaction with nursing care provides a means of monitoring a component of the quality of nursing care and evaluating the effectiveness of nursing interventions (La Monica, Oberst, Madea, & Wolf, 1986; Marek, 1989; Johnson, Gardner, Kelly, Maas, & McCloskey, 1991; Cottrell & Grubbs, 1994; Russo & Lancaster, 1995). For this study, patient satisfaction with nursing care will be assessed. As an outcome, nurses thus can use patient satisfaction to evaluate and improve their practices.

As hospitals and health care agencies redesign patient care delivery, the effects of this change on patient satisfaction should be measured. The cost-effectiveness of nursing care should be evaluated before a restructuring of the patient care delivery system is attempted. The literature supports the need to study the effects of new care delivery models on quality as critical to the continued use of a new system.

Patient satisfaction and costs reduction are appropriate outcomes for evaluating the effects of a new delivery model. These outcomes reflect the technical and interpersonal aspects of nursing care and are, to some extent, amenable to nursing

intervention. Well-designed studies which measure patient outcomes, cost effectiveness and patient satisfaction are needed to understand the effects of innovative nursing care delivery systems. This quasi-experimental research is proposed to determine the effects of the Partners in Practice model (PIP) on the outcomes of costs and patient satisfaction over a 15-month study period. The process of evaluation and the use of evaluation data for the improvement of nursing care delivery system are critical for organizational effectiveness.

Nursing care is the most significant factor in high-quality hospital care and a significant component of the total hospital budget. Hospitals are redesigning care delivery systems, yet few are measuring the costs and levels of patient satisfaction associated with redesign. The expanded use of unlicensed assistive personnel in system redesign presents challenges for containing costs while safeguarding quality (Lengacher & Mabe, 1993; Barter & Furnidge, 1994; Currin, 1994). The effects of a newly designed care delivery model should be studied to demonstrate the linkages between the delivery of care and its effects.

## CHAPTER 3

### METHOD

The specific purpose of this study was to investigate the effects of PIP on the outcomes of costs and patient satisfaction with nursing care and changes in the effects over time (during the pre-implementation, interim, and post-implementation periods of the model) on the specified unit. Ultimately, a demonstration of lower costs and higher levels of patient satisfaction may lead to the implementation of PIP in other units or other hospitals. Before discussing the research design, the concepts of the specified nursing care delivery systems (PIP and Traditional Model), demographic characteristics of patients (age and gender), costs (salary costs, costs per patient care day, and costs per discharge), and patient satisfaction with nursing care are defined.

*Partner in Practice Model (PIP)* is a new organizational model that has been proposed to control costs and to improve patient outcomes. Each registered nurse is “partnered” with an unlicensed worker, i.e., a nurse’s aide or patient care assistant (PCA) and works as a dyad on a consistent basis (Manthey, 1989; Powers, Dickey, & Ford, 1990).

*Traditional Model* includes functional nursing, which refers to the assignment of the total work of a patient care division along functional lines, with one individual assigned to administer medications, one to perform treatments, etc., team nursing, primary nursing, and modular nursing. Team nursing refers to the system of dividing the staff into two or three teams, each of which assumes responsibility for a portion of

the patients and then assigns individual patients to individual staff on that team.

Primary nursing refers to the practice of assigning one nurse to each patient to act as the primary individual responsible for planning and supervising care; actual physical care may be provided by anyone on that shift. Modular nursing refers to the method of delivery care by dividing patients into small groups according to the geographic location. A coordinator is responsible for all nursing care and staffing. A nurse aide provides the unit support for patient care and non-nursing activities.

*Age*, the chronological age of patients, was measured as a continuous variable based on the patients' report of their ages. Ages were grouped to young (16-45 years), middle age (46-65 years), and old (more than 65 years).

*Gender* referred to the sex of the patient as either male or female. This variable was reported by the patient.

*Patient satisfaction with nursing care* was defined as the patients' perceptions of how their care was provided (Petersen, 1988) reported on a patient satisfaction tool (described under Instruments). The higher score of their perceptions indicated the higher level of satisfaction with nursing care.

*Costs* can be measured several ways including total nursing labor costs per patient day, registered nurse labor costs per patient day, and total nursing costs per unit of workload (Glandon, Colbert, & Thomasma, 1989). In this study costs were defined as unit costs for patient care determined by personnel salary costs, calculated as total costs per patient care day and total costs per discharge.

*Salary cost* was the dollars spent on salaries and wages for nursing personnel providing direct and indirect nursing care.

*Total cost* was the total dollar amount spent for providing unit-based patient care.

*Patient care days* referred to the number of patients cared for on the unit each day, totaled for the month.

*Discharges* represented another method of counting the number of patients cared for per month.

### Design

This was a quasi-experimental pretest-posttest design. Pre-implementation data (6 months prior to implementing PIP, using Traditional Model), interim data (3 months after implementing PIP), and post-implementation data (4-9 months after PIP implementation) were collected. This study examined the effects of an empirically designed patient care delivery model upon the outcomes, costs and level of patient satisfaction over time.

### Research Questions

The research questions were:

1. How do costs change over time following implementation of PIP?
  - (a) How do pre-implementation costs differ from post-implementation?
  - (b) What is the pattern of change in costs over three time periods?
2. How does patient satisfaction change over time following implementation of PIP?

(a) How does pre-implementation patient satisfaction differ from post-implementation?

(b) What is the pattern of change in patient satisfaction over three time periods?

(c) How is the change in patient satisfaction modified by demographic characteristics of age and gender?

(d) How is patient satisfaction associated with the demographic characteristics of age and gender?

#### Hypotheses

1. The costs will decrease after implementation of PIP, comparing pre-implementation and post-implementation.
2. The level of patient satisfaction will increase after implementation of PIP, comparing pre-implementation and post-implementation.
3. The costs in PIP will decrease in a linear fashion over three time points.
4. The level of patient satisfaction associated with the PIP model will increase in a linear fashion over three time points.
5. Change in patient satisfaction is not modified by demographic characteristics of age and gender.
6. Patient satisfaction is not associated with the demographic characteristics of age and gender.

### Setting

Lerner Tower 7 (T7), located on the seventh floor of Lerner Tower at University Hospitals of Cleveland (UHC), is a 30-bed adult inpatient division caring for patients with a wide variety of medical disorders. Patients' ages ranged from sixteen to over ninety. Lerner Tower 7 staff treats each patient individually based on patients' needs, including assessment, treatment, teaching, caring, curing, palliation, discharge planning, and emotional support while assisting their families to learn and cope (Appendix A).

The clinical staff is comprised of RNs (Registered Nurse) and PCAs (Patient Care Assistant). In 1996, there were 23.4 RN FTE (Full Time Equivalent) (including the head nurse and assistant head nurse), 6 PCA FTE, 4 secretary FTE, and 4 PSW FTE (Patient Service Worker). Six, five, and three RNs were assigned to the day, evening, and night shift respectively. The range of RN age was 21 to 38. Most of them were BSN (Bachelor of Science in Nursing) level (20 RNs). The rest (4 RNs) were AD (Associate Degree) level. Their experience in nursing was between 0 and 14 years. The expenses of T7 exceeded the budget and needed to be controlled. The Partner in Practice model (PIP) was implemented in January 1997. After implementing PIP (March 1997), the unit was expected to have 22.4 RN FTE, 8 PCA FTE, 4 secretaries FTE, and 4 PSW FTE. In 1997, RNs with partners took care of a larger number of patients, or 8 patients vs. the 5-6 patients per nurse without a partner (B. Broseman, personal communication, March 27, 1997).



The unit began implementation of the PIP with a series of talks to explain this new model in mandatory staff meetings. Staff and volunteers were encouraged to participate and work in this new role. The RNs and PCAs who decided to work as a partnership attended a preparatory program. They were sent to see and talk to people who were and were not in partnership in another unit already implementing PIP. They made their own decision and signed an agreement to work together as a partnership (see Appendix B).

### Patient Sample

Simple random sampling was used. The sample consisted of discharged patients who were cared for on a medical unit, Lerner Tower 7 (T7), at University Hospitals of Cleveland (UHC), which implemented the PIP instead of the traditional model. The sample consisted of patients who had an inpatient stay of one or more days and who were discharged from the unit. The inclusion criteria was comprised of patients aged 16 or older, who were oriented to name, date, and time. Patients discharged to a long term care facility and patients discharged against medical advice were excluded. The hospital mailed questionnaires to patients selected by simple random sampling. Each time period, pre-implementation, interim, and post-implementation, represented a different sample group (see Figure 3).

The Partner in Practice model was implemented from January through March 1997, on T7. Because the PIP was implemented before this study started, the study of pre-implementation (July to December 1996) was retrospective. Both interim

(January to March 1997) and post-implementation (April to October 1997) of the model was under concurrent study.

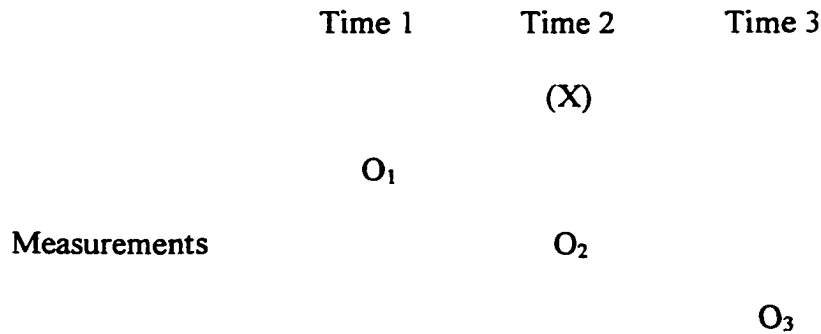


Figure 3. Separate-sample design: Time 1 = Prior implementation six months, (Traditional model), Time 2 = From implementation to three months, and Time 3 = Four to nine months after implementation; (X) = The PIP model implementation; and  $O_{1,2,3}$  = Measurements of dependent variables.

### Instruments

For this study, expenditures for nursing salary were computed including direct and indirect care providers. Direct care providers included nurses and nursing assistants. Indirect care providers included a variety of individuals, from nursing administrators to ward secretaries and other ancillary personnel. Standardized data collection tools from the unit were used in collecting nursing costs data. The method of cost measurement and reporting remained unchanged throughout the study, thus, providing comparable data for analysis. Whether the costs of the PIP were the same

as the costs of care delivery before the implementation of the model was the focus of this study.

The instrument for measurement of costs was a standard spread sheet format used by units of the University Hospitals of Cleveland (see Appendix C1). Total salary costs including direct and indirect nursing care cost were used. This study used secondary analysis of the existing data set. Data for this study was from monthly hospital reported costs (see Appendixes C2-C7). The original data of patient satisfaction with nursing care was collected monthly and analyzed and reported to the hospital quarterly (see Appendix D). The original data sets of costs and patient satisfaction with nursing care that had been collected were determined to be valid, making a secondary analysis possible.

### Costs

The patient care division or the unit (T7) represented a hospital cost center. The unit reports reflecting personnel costs, patient census, and staff mix were used. The monthly departmental expense statements that showed actual, budget, and variance of all expenses were used. These expenses included salaries and wages, benefits, telecommunication charges, plant operation, supplies, depreciation, and other expenses. The monthly departmental utilization statements reported the number of patient days, cases, length of stay of patients and the differences between the actual and the budget.

The salary model which was used as a guideline for T7 comprised two different categories: hourly rate and salary. Some per diem, as needed, or “PRN”

nursing staff received an hourly rate. This rate depended on hours of work performed and level of experience. However, the majority of nursing staff received a fixed yearly salary. The rate depended only on experience, not on how many hours or particular jobs were performed, on the assumption that each person worked a relatively fixed number of hours per time period.

The study unit did not have overtime (OT) costs budgeted. However, when it was busy and the unit needed extra workers, the unit requested or mandated some personnel to work extra hours in addition to their regular schedules in return for time off “saved” as compensatory (COMP) time. Those personnel who had COMP time could take it off. With this strategy, the unit could not only manage their work, but could also save overtime costs.

For the personnel salary costs, the unit calculated its total from regular salaries, paid time off, and fringe benefits (see Appendix C5). Because of budget limitation, overtime pay was not routinely used (B. Broseman, personal communication, March 27, 1997). Total personnel costs for this study included costs for nursing personnel who gave the patients’ direct care (RNs and PCAs) and indirect care (head nurse, secretaries, and patient service workers). The non-nursing costs that included overhead, plant operations, finance and administration, and depreciation expenses were excluded. The head nurse (HN), secretaries, and patient service workers (PSW) were included for this cost analysis because salaries and benefits of these positions were taken as a constant. These personnel FTE did not change during the period of the study. Thus, it was not necessary to exclude them.

Total costs per patient per day were determined for pre-implementation, interim, and post-implementation periods (July-December 1996, January-March 1997, and April-October 1997 respectively). To calculate total costs per patient day, total costs from each period were summed and divided by the total patient census of the unit. In the post-implementation period, the contracted salary did not increase, and it was therefore not necessary to adjust for constant dollars. For the study period the personnel of the hospital did not get increases in salary.

#### Patient Satisfaction with Nursing Care

The Patient Questionnaire (PQ) of UHC was used to measure patient satisfaction among all patients at UHC (Appendix E). The survey measured how patients perceived the quality of nursing care as part of their overall satisfaction (UHC, 1997). The PQ had been used to provide a system for monitoring satisfaction and quality of services as perceived by patients. The 66-item questionnaire comprised seven subscales: (1) Entering the Hospital, (2) Physician Care, (3) Nursing Care, (4) In the Patient Room, (5) Families and Visitors, (6) Additional Information, and (7) Patient Information. The subscale of patient satisfaction with nursing care consisted of 10 positive items about nursing practice. The responses to three items were No and Yes; the other responses were on a 5-point scale: 5=Excellent, 4=Very Good, 3=Good, 2=Fair, and 1=Poor. The items were combined to yield a total score. Higher scores indicated higher levels of satisfaction with nursing care. Before the total score was calculated, the accuracy of questionnaire responses and data management techniques for missing data imputation and transformation were considered.

There was no report of psychometric testing of the PQ. However, 10 items of the subscale of patient satisfaction with nursing care on the PQ were nearly identical to five items of patient satisfaction with nursing care on the Patient ViewPoint Survey (PVS), a well tested instrument, which was developed by the Hospital Corporation of America (Nelson, Hays, Larson, & Batalden, 1989). Thus, content validity could be assumed. In order to examine test-retest reliability, the PQ was pilot tested with a similar group of patients, drawn from Lerner Tower 8 (T8) at UHC.

The pilot subjects were 40 patients who were selected from T8. The T8 charge nurse was asked to identify patients who were close to discharge and were without cognitive impairment. Consecutive patients were approached until a convenience sample of 40 was achieved. A final number of 30 was desirable, so sending 40 questionnaires allowed for an attrition rate of 25%. These subjects were asked to participate in the study. Oral consent was obtained from the subjects before mailing the questionnaire (See Script in Appendix F). Completing the questionnaire confirmed consent. The questionnaires were sent to the subjects on two occasions, the first one week after discharge and the second three weeks later, with a self-addressed, stamped envelope for return. From the subjects' responses, test-retest correlation coefficient and percent of agreement were determined.

#### Data Collection

The sample consisted of discharged patients who were cared for on a medical unit, Lerner Tower 7 at UHC between July 1996 and September 1997. Satisfaction Questionnaires were mailed to patients by the hospital. Patients were selected by

simple random sampling. For this separate-sample design, pre-implementation (July-December 1996), interim (January-March 1997), and post-implementation (April-September 1997) sampling was done with three different groups of patients.

The dependent variable, patient satisfaction, was measured throughout the study period. Because there was no report on power analysis for this measurement, the effect size was estimated. Cohen (1988) recommended a minimum power of .80. Based on F test between three groups of subjects, the sample size was estimated to meet the requirements of a 0.40 (large effect size) power estimation, and an established significance criterion of 0.05. The recommended sample size for statistical power 80% was 21 subjects per group (Cohen, 1988).

#### Procedures

The feasibility of the study was determined. Communication with authorized personal was crucial in obtaining existing data related to the study. For the costs and patient consensus, the head nurse was the key person to interview. For patient satisfaction, hospital personnel in the Guest Relationship Department responsible for the patient questionnaire were contacted. After the feasibility was assured, permission to collect data was requested of the nursing administrator of the hospital. Every month, cost data were requested from the head nurse and patient census was monitored from patient records. The total personnel costs were updated monthly.

Appropriate approval from the School of Nursing Research Committee, Case Western Reserve University, Vice President of Nursing, and the Institutional Review Boards at UHC were obtained prior to data collection (see Appendix G).

The process of the patient satisfaction survey mailing was as follows: the first questionnaire was mailed five days after discharge to a randomly selected sample; a reminder card was sent one week following the first mailing; another questionnaire was mailed to non-respondents two weeks following the initial mailing (UHC, 1997).

After getting permission to use the patient satisfaction with nursing care data from UHC, the data set that contained specified variables were copied to a diskette and installed in a locked file of a personal computer to ensure security.

### Human Subjects

Respondents were chosen randomly from the roster of discharged patients by the University Hospital Health System. Questionnaires with return envelope were mailed to selected subjects by the hospital's Guest Relations Department. As part of their procedure, patients were informed that participation was voluntary. Names on the questionnaires were optional and were not used. The instructions included assurance of anonymity and confidentiality. Completion of the questionnaire implied consent.

Several additional procedures were used to safeguard confidentiality. A numbering system for patients was used. Data were tabulated to guarantee that no individual could be identified in the report. Data stored on the personal computer was only accessible to the investigator, and all back-up copies of files were stored in a locked file.



### Analyses

This study was a secondary analysis because it tested new hypotheses by using raw data that had been collected by someone else (Jacobson, Hamilton, & Galloway, 1993). Data obtained from the questionnaires and the record of costs were coded for computerized statistical analysis. The Statistical Package for Social Science for Windows (SPSS) Release 7.0 (Norusis, 1995) was used for the analysis of data in this study. Descriptive statistics, such as frequencies, percentages, mean, and standard deviation, were used to describe the demographic data.

To answer the research questions, quantitative analysis was used. Because the patient satisfaction with nursing care was an interval level of measurement and the nursing care model was a nominal system, it could be investigated appropriately using analysis of variance (ANOVA).

For research question 1(a) and 2(a), the t test was used to measure the effects of the nursing care delivery system on costs and patient satisfaction with nursing care.

For research question 1(b) and 2(b), to examine the change in outcomes over the periods of time, the one-way between-subjects analysis of variance (ANOVA) was appropriate.

For research question 2(c), the two-way between-subjects ANOVA was used to analyze the interaction between PIP implementation and patients' demographic characteristics of age and gender with patient satisfaction. Similarly, for research question 2(d), the two-way between-subjects ANOVA was used.

For all hypotheses, a level of significance of .05 was selected.

## CHAPTER 4

### RESULTS

In this chapter, the findings of the investigation are presented in three sections. First, data regarding the Partner in Practice model (PIP) and characteristics of the unit (Lerner Tower 7, UHC) are summarized. The organization for the remainder of this chapter is based on the results of the effects of PIP on costs and patient satisfaction. The second section explores the effects of PIP on costs and includes (a) costs between pre-implementation and post-implementation and (b) the pattern of change of costs over three periods of time (pre-implementation, interim, and post-implementation).

In the third section, before presenting the effects of PIP on patient satisfaction, the test-retest pilot study, accuracy of the patient questionnaire responses, and data management techniques for missing data imputation and transformation, as well as responses to each of satisfaction questions, are discussed. The effects of PIP on patient satisfaction are comprised of (a) patient satisfaction with nursing care between pre-implementation and post-implementation, (b) the pattern of change of patient satisfaction over three time periods, (c) the effects of the implementation period and demographic characteristics on patient satisfaction with nursing care, and (d) the relationship between patient satisfaction and demographic data. Reliability of the patient satisfaction measure and power calculation are included.

Partner in Practice Model

The study unit, Lerner Tower 7, implemented the PIP beginning in January 1997 with four partnerships. In order to assure that the PIP system was actually in place, work scheduling was monitored. During the interim period and post-implementation periods, two six-week working schedules of 2/16/97 – 3/29/97 and 5/11/97 – 6/21/97 were selected. Partner #1 (PIP1) and partner # 2 (PIP2) worked together on the day and night shift. Another two partnerships worked together on the day and evening shift. During approximately 67-71% of their working time, they worked the same schedule (see Table 1). Only two days of each schedule (4.76%) had no partnerships working (see Table 2).

Table 1  
Partnership Working Together

Partnership	2/16/97 – 3/29/97		5/11/97 – 6/21/97	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
PIP1	13	43.33	21	70.00
PIP2	22	73.33	16	53.33
PIP3	27	90.00	25	83.33
PIP4	23	76.67	20	66.67
Total	85	70.83	81	67.50

Note. N = number of shifts on which partners worked together during total period.  
% = % of total possible shift (30) in which partners actually worked together.

Table 2

Partnerships Working Together per Day

Number of partnership working/day	2/16/97 – 3/29/97		5/11/97 – 6/21/97	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
0	2	4.76	2	4.76
1	11	26.19	6	14.29
2	20	47.62	26	61.90
3	7	16.67	7	16.67
4	2	4.76	1	2.38

Note. Interim = 2/16/97 – 3/29/97, Post-implementation = 5/11/97 – 6/21/97.

N = number of days on which x partnerships were scheduled.

% = % of total days (42) in the period on which x number of partnerships were scheduled.

From the hospital's records, Lerner Tower 7, UHC, a 30-bed medical unit, had an average daily census (ADC) of 28. The ADC for pre-implementation, interim and post-implementation period was 27.78, 28.43, and 28.00 respectively. The average occupancy rate of the unit (OCC) was 93.13%. Pre-implementation, interim, and post-implementation occupancy rates were 92.52, 94.73, and 92.95 % respectively. The average of length of patient stay in the hospital (LOS) was 5.50 days, with pre-implementation, interim, and post-implementation LOS of 5.23, 5.91, and 5.57

respectively. The average number of cases per month or average number of discharges per month was 156.53; the pre-implementation, interim, and post-implementation period were 163.17, 144.33, and 156.00 respectively. The average patient care days (PCD) per month were 851.83 (pre-implementation), 852.67 (interim), and 854.50 (post-implementation) (see Table 3). Thus, the average workload, as reflected by the number of patients and length of stay, was stable between study periods.

Table 3

Characteristics of Unit (Lerner Tower 7, UHC) by Implementation Period

Characteristics	Implementation period		
	Pre-implementation N=6	Interim N=3	Post-implementation N=6
ADC	27.78	28.43	28.00
OCC	92.52	94.73	92.95
LOS	5.23	5.91	5.57
Discharges or Cases	163.17	144.33	156.00
PCD	851.83	852.67	854.50

Note. Pre-implementation period = July–December 1996, Interim period = January–March 1997, Post-implementation period = April–September 1997.

Lerner Tower 7 nursing staff was comprised of registered nurses (RN) and non-registered nurses (non-RN). With PIP implementation, RN full-time equivalents (FTE) decreased from pre-implementation to post-implementation period by 1 FTE (21.87 to 20.93) and Non-RN FTE (non-licensed clinical staff and clerical staff) increased from pre-implementation to post implementation period by 2.5 FTE (8.93 to 11.37). With the increase of non-RN FTE, clinical hours per patient day (total hours of RN and non-RN clinical hours) increased from 5.27 in pre-implementation period to 7.13 in interim period and 7.37 in post-implementation period as shown in Table 4.

Table 4

FTE of Nursing Staff by Implementation Period

FTE	Implementation period		
	Pre-implementation N=6	Interim N=3	Post- implementation N=6
RN FTE	21.87	22.03	20.93
Non-RN FTE	8.93	11.13	11.37
Clinical	5.27	7.13	7.37
Clerical	3.67	4.00	4.00

Note. N = number of months.

When comparing pre-implementation period to post-implementation period, the RN clinical hours remained essentially the same. The clinical hours per patient care day increased slightly from 5.83 to 5.93 which is attributable to an increase in non-RN clinical hours from 1.38 to 1.45. The clinical hours per discharge increased from 29.18 in pre-implementation period to 33.03 post-implementation period (see Table 5).

Table 5

Clinical Hours by Implementation Period

Clinical hours	Implementation period		
	Pre-implementation N=6	Interim N=3	Post-implementation N=6
Clinical hours/PCD			
RN	4.44	4.40	4.48
Non-RN	1.38	1.57	1.45
Total	5.83	5.97	5.93
Clinical hours/discharge	29.18	33.60	33.03

Note. N = number of months.

The RN clinical hours per month decreased from 3382.50 in pre-implementation period to 3154.83 in post-implementation period. The PRN and

overtime hours showed the opposite trend. The PRN hours increased from 402.67 to 629.67 and overtime increased slightly from 37.50 in pre-implementation period to 52.00 in post-implementation period (see Table 6).

Consistent with the purpose of the PIP to use nursing personnel effectively, RN FTE decreased while non-RN FTE increased. Although the RN clinical hours/PCD remained essentially the same, total clinical hours/PCD from nursing staff (RN and non-RN) increased. Thus, total clinical hours/discharge were increased.

While total clinical hours/month was slightly increased, RN clinical hours/month was decreased. The decreased RN hours were replaced by PRN hours and over time hours.

Table 6

RN Clinical Hours per Month by Implementation Period

RN Clinical hours/month	Implementation period		
	Pre-implementation N=6	Interim N=3	Post-implementation N=6
RN	3382.50	3343.67	3154.83
PRN	402.67	354.00	629.67
Overtime	37.50	49.67	52.00
Total	3822.67	3747.34	3836.50

Note. N = number of months



### The Effect of PIP on Costs

During the 15 study months, 6 months (July-December 1996) were in the pre-implementation, 3 months (January-March 1997) were considered the interim, and 6 months (April-September 1997) were in the post-implementation period. Differences in costs were first examined using t test. Differences were considered statistically significant at a probability level of .05.

#### Research Question 1(a): How do pre-implementation costs differ from post-implementation?

Personnel salary costs, costs per patient care day, and costs per patient discharge were examined. Differences between pre-implementation and post-implementation period in all analyses were tested using t tests (see Tables 7 and 8). There were no significant differences in costs (total salary costs, costs/PCD, and costs/discharge) between pre-implementation and post-implementation. The largest differences were in costs/discharge (increased \$82/discharge), but this did not reach statistical significance.

Table 7

Costs by Implementation Period

Costs	Implementation period					
	Pre-implementation		Interim		Post-implementation	
	<u>M</u> (\$)	<u>SD</u>	<u>M</u> (\$)	<u>SD</u>	<u>M</u> (\$)	<u>SD</u>
Salary costs	126,243.12	6,956.33	125,642.37	9,542.51	127,947.01	6,317.51
Costs/PCD	204.02	5.79	202.74	7.25	206.81	11.35
Costs/discharge	1,066.04	50.67	1,198.25	85.85	1,148.50	163.03

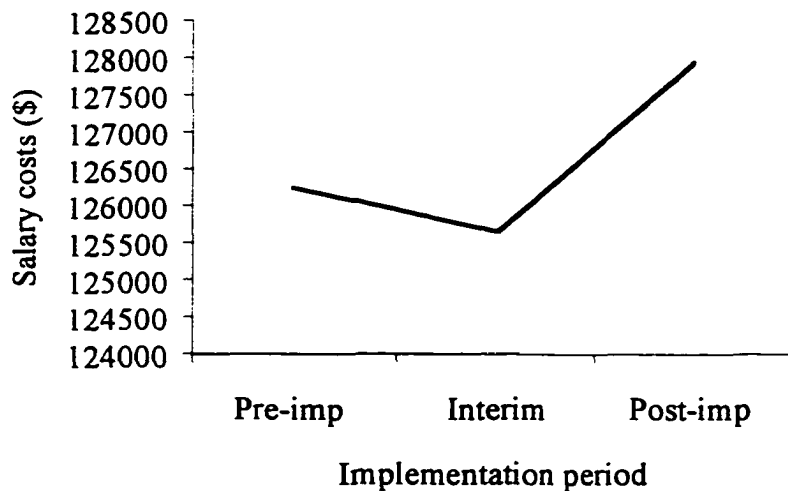
Table 8

Costs between Pre-Implementation and Post-Implementation Period

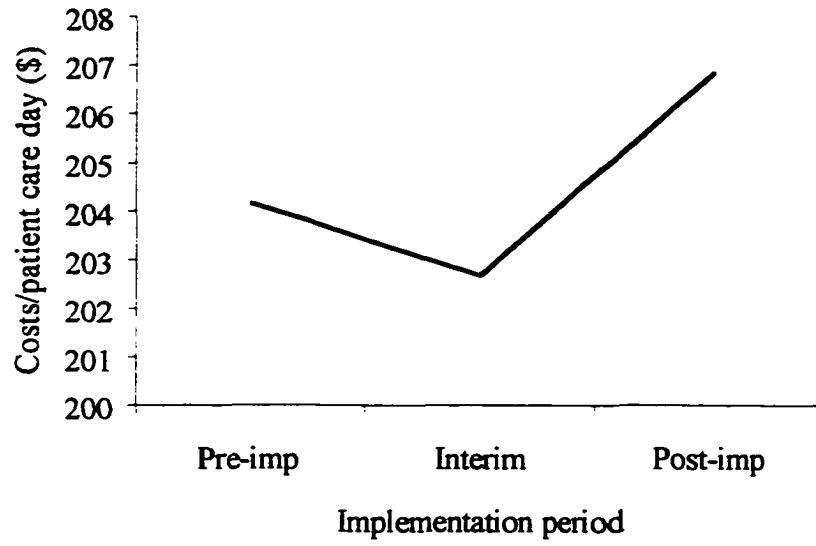
Costs	Equal variance	Levene's test for equality of variances		t test for equality of means						
		<u>F</u>	Sig	<u>t</u>	<u>df</u>	Sig	Mean difference	<u>SE</u> difference	95% Confidence interval of the mean	
									Lower	Upper
Salary costs	Not assumed	0.19	0.67	-0.44	10	0.67	-1703.89	3836.26	-10262.31	6854.53
Costs/PCD	Not assumed	3.59	0.09	-0.51	7	0.62	-2.67	5.19	-14.8	9.47
Costs/discharge	Not assumed	1.74	0.22	-1.19	6	0.28	-82.67	69.66	-253.39	88.05

**Research Question 1(b): What is the pattern of change in costs over 3 time periods?**

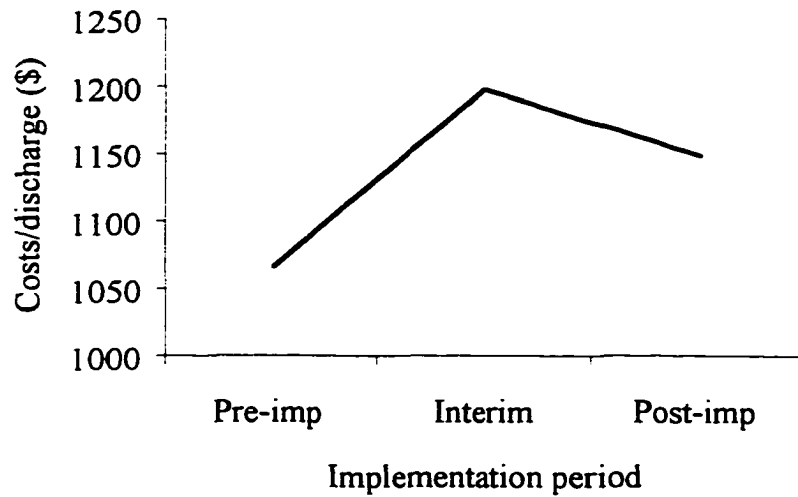
As seen in Figures 4-6, over 3 time periods, the pattern of change in costs (salary costs, costs/PCD, and costs/discharge) was non-linear. The costs were not significantly different among implementation groups. With alpha equal to .05, a one factor between-subjects analysis of variance (ANOVA) indicated a nonsignificant effect for the PIP:  $F_{(2,12)} = .13$ ,  $p > .05$  for salary costs;  $F_{(2,12)} = .27$ ,  $p > .05$  for costs/PCD; and  $F_{(2,12)} = 1.51$ ,  $p > .05$  for costs/discharge. Eta-square for salary costs indicated that small variances (2.2% in the salary costs, 4.2% in costs/PCD, and 20.1% in costs/discharge) were accounted for by the implementation period (see Table 9).



**Figure 4.** Salary costs by implementation period



**Figure 5.** Costs/patient care day by implementation period



**Figure 6.** Costs/discharge by implementation period

Table 9

F test for Costs by Implementation Period

Costs		<u>df</u>	<u>F</u>	<u>Sig</u>	$\eta^2$
Salary costs	Between groups	2	0.13	0.88	0.022
	Within groups	12			
	Total	14			
Costs/PCD	Between groups	2	0.27	0.77	0.042
	Within groups	12			
	Total	14			
Costs/discharge	Between groups	2	1.51	0.26	0.201
	Within groups	12			
	Total	14			

Related Costs Measures

As shown in Tables 10-12, the mean clinical hours/PCD were stable from pre-implementation to post-implementation period. The mean clinical hours/discharge increased from 29.18 (SD=1.71) in the pre-implementation period, to 33.60 (SD=1.18) in the interim period, and 33.03 (SD=4.09) in the post-implementation period. With alpha equal to .05, a one factor between-subjects ANOVA indicated a

nonsignificant effect for the PIP:  $F_{(2,12)} = 3.52$ ,  $p = .06$ . Eta-square showed 37% of variance in the clinical hours/discharge was accounted for by the implementation period.

Test of the differences in total RN clinical hours indicated a nonsignificant effect for PIP:  $F_{(2,12)} = .18$ ,  $p > .05$ . The mean RN clinical hours decreased over time from 3382.50 ( $SD=97.57$ ) in pre-implementation period to 3343.67 ( $SD=167.84$ ) in interim period, and 3154.83 ( $SD=99.98$ ) in post-implementation period. While the mean RN clinical hours decreased, the mean PRN clinical hours increased from 402.67 ( $SD=155.96$ ) in the pre-implementation period to 629.67 ( $SD=101.66$ ) in the post-implementation period. With alpha equal to .05, a one factor between-subjects ANOVA indicated significant effect for the PIP:  $F_{(2,12)} = 6.59$ ,  $p < .05$  and  $F_{(2,12)} = 7.02$ ,  $p < .05$  for RN clinical hours and PRN clinical hours. Post-hoc comparisons using Scheffe test at an  $\alpha$  of .05 indicated significant differences between pre-implementation period compared with post-implementation period for RN clinical hours and significant differences between pre-implementation and post-implementation period, and between interim and post implementation period for PRN clinical hours. Eta-square for RN clinical hours indicated similar large amounts of variance in the RN clinical hours (52.3%) and PRN clinical hours (53.9%) was accounted for by the implementation period.

The mean overtime hours were increased from 37.50 ( $SD=22.23$ ) in pre-implementation period, to 49.67 ( $SD=24.79$ ) in the interim period, and 52.00 ( $SD=12.84$ ) in post-implementation period. With alpha equal to .05, a one factor

between-subjects ANOVA indicated a nonsignificant effect for the PIP:  $F_{(2,12)} = .913$ ,  $p > .05$ . Eta-square for overtime hours indicated that 13.2% of variance in the overtime hours was accounted for by the implementation period.

Table 10

RN Clinical Hours by Implementation Period

RN clinical hours	Implementation period					
	Pre-implementation		Interim		Post-implementation	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Clinical hours/PCD	5.83	0.13	5.97	0.12	5.93	0.23
Clinical hours/discharge	29.18	1.71	33.60	1.18	33.03	4.09
Clinical hours/month						
RN	3382.50	97.53	3343.67	167.84	3154.83	99.98
PRN	402.67	155.96	354.00	80.29	629.67	101.66
OT	37.50	22.23	49.67	24.79	52.00	12.84
Total	3822.67	240.71	3747.33	226.43	3836.50	182.54

Table 11

F test of RN Clinical Hours by Implementation Period

RN clinical hours		df	F	Sig	$\eta^2$
Clinical hours/PCD	Between groups	2	0.85	0.45	.124
	Within groups	12			
	Total	14			
Clinical hours/discharge	Between groups	2	3.52	0.06	0.37
	Within groups	12			
	Total	14			
RN clinical hours	Between groups	2	6.59	0.01	0.523
	Within groups	12			
	Total	14			
PRN clinical hours	Between groups	2	7.02	0.01	0.539
	Within groups	12			
	Total	14			
OT clinical hours	Between groups	2	0.91	0.43	0.132
	Within groups	12			
	Total	14			

(table continues)



Table 11. (continued)

RN clinical hours		df	F	Sig	$\eta^2$
Total RN clinical hours	Between groups	2	0.18	0.84	0.029
	Within groups	12			
	Total	14			

Table 12

Multiple Comparisons for Clinical Hours by Implementation Period

Scheffe

Dependent Variable	Implementation period (I)	Implementation period (J)	Mean difference (I-J)	Std. error	Sig	95% Confidence interval		
						Lower bound	Upper bound	
RN clinical hrs	Pre-implementation	Interim	38.83	80.07	0.89	-184.38	262.04	
		Post-implementation	227.67	65.38	0.02	45.42	409.92	
	Interim	Pre-implementation	-38.83	80.07	0.89	-262.04	184.38	
		Post-implementation	188.83	80.07	0.10	-34.38	412.04	
	PRN clinical hrs	Pre-implementation	Interim	48.67	88.08	0.86	-196.86	294.19
			Post-implementation	227	71.91	0.03	-427.47	-26.53
Interim		Pre-implementation	-48.67	88.08	0.86	-294.19	196.86	
		Post-implementation	275.67	88.08	0.03	-521.19	-30.14	

Post-hoc calculation of power for costs 15 months, 3 groups, was .18 (Cohen, 1988). This reflects the small number of cases (i.e., months) available for analysis.

### The Effect of PIP on Patient Satisfaction

#### Sample Description

Of the 194 subjects, 67 were in the pre-implementation period, 47 were in the interim period, and 80 were in the post-implementation period. These numbers of patients exceed the target of 21 subjects per group for the study. The characteristics of the sample are presented in Table 13. Post-hoc calculation of power for 194 subjects, 3 groups, was .98 (Borenstein & Cohen, 1988).

As shown in Table 13, most of the sample were elderly (more than 65 years old). There were slightly more females than males, and most had been hospitalized previously. The most common length of stay was 3-7 days and the most common reimbursement mechanism was Medicare.

Chi-square was used to test the differences in demographic characteristics among 3 groups of subjects from pre-implementation, interim, and post-implementation period. The results show no statistical difference in any of demographic characteristics among 3 groups of subjects ( $p > .05$ ).

Prior to discussing research questions about the effects of PIP on patient satisfaction with nursing care, several related issues will be discussed. These include the test-retest pilot study, accuracy of the questionnaire responses, management of missing data imputation and data transformation.

Table 13

Comparisons of Demographic Characteristics by Implementation Period

Demographic Characteristics	Implementation period								$\chi^2$	Sig
	Pre-implementation		Interim		Post-implementation		Total			
	N	%	N	%	N	%	N	%		
<b>Age (Years)</b>										
< 45	7	11.9	4	8.9	7	9.3	18	10.1	2.03	0.73
45 – 65	12	20.3	13	28.9	23	30.7	48	26.8		
> 65	40	67.8	28	62.2	45	60	113	63.1		
<b>Gender</b>										
Male	23	39.7	18	46.2	34	45.9	75	43.9	0.63	0.73
Female	35	60.3	21	53.8	40	54.1	96	56.1		
<b>First time patient</b>										
No	31	54.4	30	71.4	53	71.6	114	65.9	5.01	0.08
Yes	26	45.6	12	28.6	21	28.4	59	34.1		
<b>Length of stay</b>										
< 3 days	12	21.1	7	15.6	19	24.1	38	21	1.91	0.75
3 - 7 days	30	52.6	28	62.2	40	50.6	98	54.1		
> 1 week	15	26.3	10	22.2	20	25.3	45	24.9		
<b>Medical insurance</b>										
Medicaid	5	8.8	4	9.5	8	11.6	17	10.1	0.87	0.93
Medicare	35	61.4	24	57.1	43	62.3	102	60.7		
Private	17	29.8	14	33.3	18	26.1	49	29.2		

### Test-Retest Pilot Study

Because no psychometric analysis report for the patient satisfaction questionnaire was available, a test-retest pilot study was conducted to test the stability of the measure. The total sample of the pilot study was 40 discharged patients from a medical unit, Lerner Tower 8, that was similar to the study unit. Twenty-nine subjects responded to the first questionnaire that was mailed one week after discharge. Thirty-three subjects responded to the second questionnaire that was mailed three weeks after the first mailing. Only 24 of the responses were complete and used for this study.

The percent of agreement between test and retest and the stability of the measure using Pearson correlation coefficient were computed. The percent of agreement between test and retest was 87.04. The Pearson correlation coefficient which was significant ( $r = .81$ ) at the .01 level (2-tailed) (see Appendix H), showed an acceptable level of stability for the patient satisfaction with nursing care tool. Reliability coefficient of this measure of patient satisfaction with nursing care was estimated using Cronbach's alpha. As seen in Appendix I, there was high internal consistency ( $\alpha = .87$ ).

### Accuracy of Responses

To confirm the accuracy of demographic data contained on the patient satisfaction questionnaires, demographic characteristics of patients (age, gender, and medical insurance classification) from the hospital record were compared. Twenty-three records from study subjects were selected from the pre-implementation, interim,

and post-implementation period. Patient satisfaction questionnaires and hospital records of these subjects showed a high accuracy of the answers, with 98.6% agreement.

### Data Management

#### Missing data imputation.

One hundred ninety eight subjects were used in this study. Of the 198 patients who returned patient questionnaires, 4 returned blank questionnaires which were discarded. Of the 194 remaining questionnaires, 72 (37%) were incomplete. These 194 questionnaires were retained for analyses.

The missing answer for each item on the patient satisfaction questionnaire was imputed using the mean of that item (stratified mean imputation) (Little & Rubin, 1987). The mean used to replace the missing value was derived from the relevant group of subjects stratified by implementation period, gender, and age.

#### Transformation.

The Patient Questionnaire (PQ) was used to measure patient satisfaction among all patients (see Appendix E). The PQ was comprised of 66 items which were divided into 7 subscales. The subscale of patient satisfaction with nursing care consisted of 10 positive items about nursing practice. The response of 3 items was No and Yes, the other responses were on a 5-point scale: 5=Excellent, 4=Very good, 3=Good, 2=Fair, and 1=Poor. The items were combined to yield a total score. The last question (Overall quality of nursing care) was excluded from the transformation.

Before all items of patient satisfaction with nursing care were summed to a total satisfaction score, linear transformation was applied. The answers from the 3 dichotomous items (0-1 score from No/Yes question) were transformed to an interval scale (1-5 score) (Neter, Wasserman, & Kutner, 1990).

The transformation formula was:

$$y = 6 + 8 (\text{Sum } 0-1)$$

For example:

From 3 No/Yes questions

ID	Q20	Q24	Q27	Sum 0-1	$y = 6 + 8(\text{Sum}0-1)$
1001	0	1	1	2	$6 + 8(2) = 22$
1002	0	0	1	1	$6 + 8(1) = 14$
1003	0	0	0	0	$6 + 8(0) = 6$
1004	1	1	1	3	$6 + 8(3) = 30$

Subtotals of scores from the 6 interval scale items and the 3 transformed dichotomous items were then weighted to reflect their proportion of the total items and a final weighted total score calculated. This score equals 2/3 of the total of 6 scores on the 1-5 scale plus 1/3 of the transformed score from 3 items of the 0-1 scale.

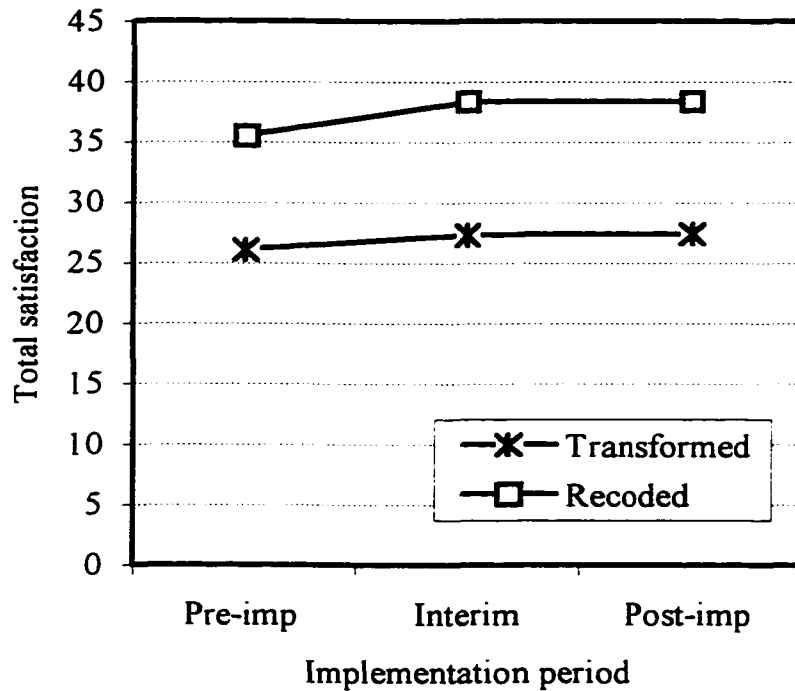
For example:

ID	Sum of 6 items (1-5 scale) ( <u>A</u> )	Sum of 3 items (0-1 scale) ( <u>B</u> )	Total satisfaction $2/3(\underline{A}) + 1/3(\underline{B})$
1001	18	22	19.3
1002	25	14	22.3
1003	21	6	16
1004	27	30	28

Total satisfaction with nursing care on the 9-item scale ranged from 6 to 30.

Higher total satisfaction scores mean higher levels of satisfaction.

Alternatively, the dichotomous items could have been simply recoded rather than transformed. A “no” answer, originally scored as 0, would be the middle of 1-3 range of 1-5 scale. A “yes” answer, scored as 1, would be in the middle of the 3-5 range. After responses 0 and 1 were recoded to 2 and 4, all 9 items were summed to yield a total satisfaction score. Using this method, total patient satisfaction with nursing care on this 9-items scale ranged from 9 to 45. Higher satisfaction scores also meant higher levels of patient satisfaction with nursing care (see Figure 7).



**Figure 7.** Total patient satisfaction with nursing care

The mean of total satisfaction (Transformed) increased from 26.13 ( $SD=4.31$ ) in pre-implementation, to 27.40 ( $SD=3.35$ ) in the interim period, and 27.45 ( $SD=2.74$ ) in post-implementation period. The mean of recoded total satisfaction also increased from 35.55 ( $SD=5.67$ ) to 38.32 ( $SD=4.45$ ) and 38.35 ( $SD=3.78$ ) from the three periods of time (see Table 14). There are no advantages of one method over another (transformation and recoding). Transformation was chosen for this study.



Table 14

Total Satisfaction with Nursing Care by Implementation Period

Satisfaction	Implementation period						Levene	Sig
	Pre-implementation		Interim		Post-implementation			
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Total Satisfaction (Transformed)	26.13	4.31	27.40	3.35	27.45	2.74	3.78	0.025
Total Satisfaction (Recoded)	35.55	5.67	38.32	4.45	38.35	3.78	3.80	0.024

Patient Satisfaction with Nursing Care Questions

The questions on the Patient Questionnaire instrument represent common areas of patient concern. The specific topics of each satisfaction with nursing care question are:

Q20: Nurses personally introduced themselves

Q21: Courtesy of nurses

Q22: Concern of nurses

Q23: How clearly nurses answered questions

Q24: Nurses explained condition and care in understandable terms

Q25: Promptness of nursing staff to answer call light

Q26: Frequency of nursing staff check and see

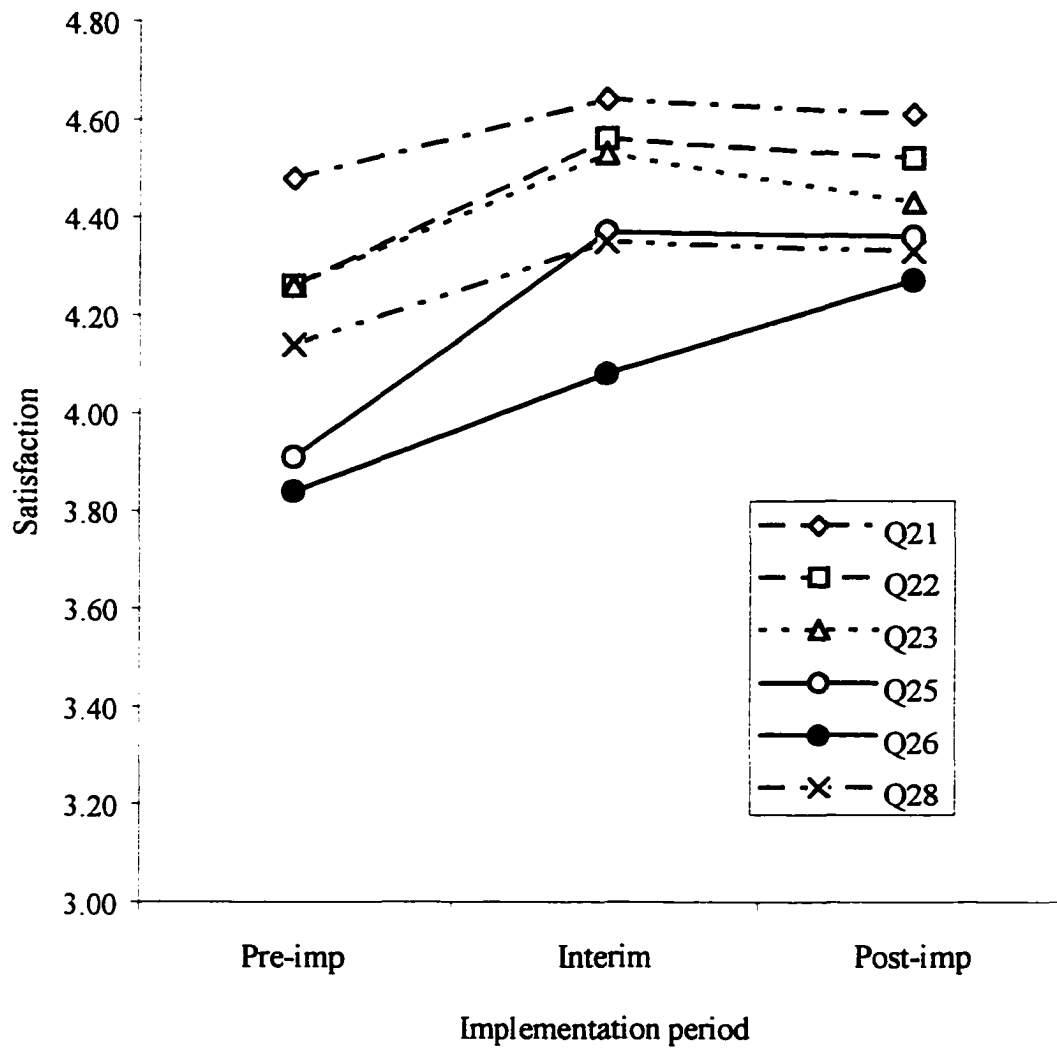
Q27: Feel involved in overall plan of care

Q28: Nurses help in planning return home

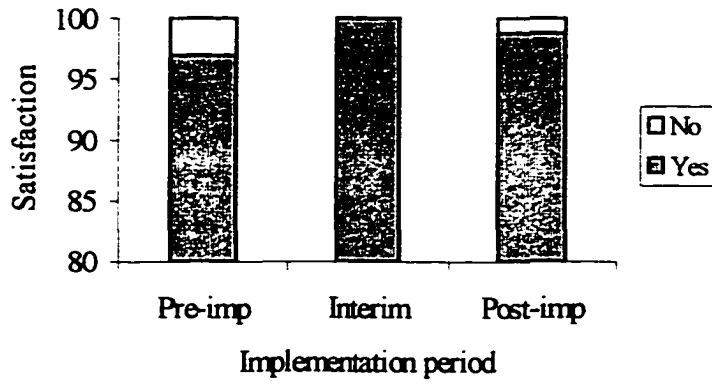
Q29: Overall quality of nursing care

The mean and standard deviations for each question according to the periods of implementation are shown in Table 15. Positive changes occurred for all aspects of patient satisfaction from pre-implementation to post-implementation period (See Figures 8 and 9). Interestingly, Q26 steadily increased. This was the only item that changed in absolute linear fashion, although all items increased from pre-implementation to interim and most then remained rather constant or decreased only slightly (see Figure 8).

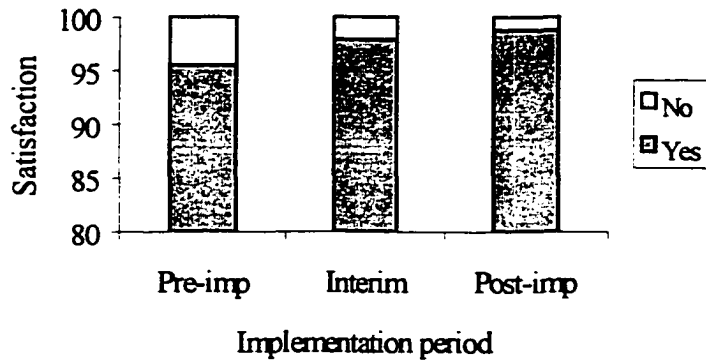
Total satisfaction with nursing care after transformation of responses to the three dichotomous items increased from pre-implementation to interim and post-implementation as shown in Table 15. Total satisfaction was validated with the last question (Q29: Overall quality of nursing care) ( $r = .77, p < .01$ ) (see Appendix J).



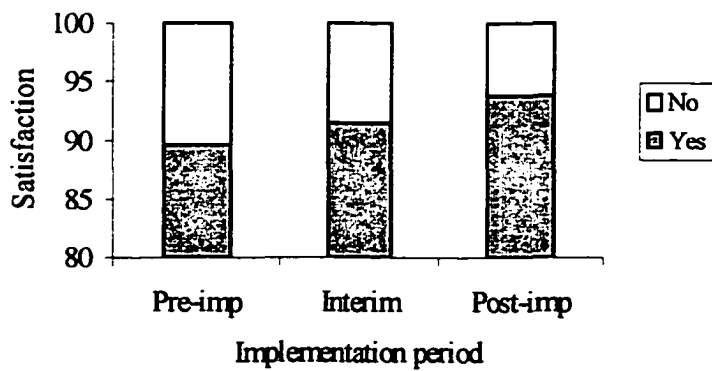
**Figure 8.** Patient satisfaction questions (1-5 score scale)



Q20: Nurses personally introduced themselves



Q24: Nurses explained condition and care in terms of understanding



Q27: Feel involved in overall plan of care

Figure 9. Patient satisfaction questions (No/Yes scale)

Table 15

Total Satisfaction with Nursing Care among Implementation Period

Satisfaction questions	Implementation period					
	Pre-implementation (N=67)		Interim (N=47)		Post-implementation (N=80)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Q21 Courtesy	4.48	0.78	4.64	0.62	4.61	0.57
Q22 Concern	4.26	0.89	4.56	0.63	4.52	0.64
Q23 Clearly answer	4.26	0.95	4.53	0.72	4.43	0.65
Q25 Promptness answer	3.91	1.21	4.37	0.85	4.36	0.82
Q26 Frequency check	3.84	1.12	4.08	0.94	4.27	0.80
Q28 Help planning	4.14	0.94	4.35	0.98	4.33	0.84
Subtotal	24.91	4.95	26.53	3.94	26.53	4.20
	Yes	%	Yes	%	Yes	%
Q20 Nurses introduced	65.00	97.00	47.00	100.00	79.00	98.80
Q24 Explain conditions	64.00	95.50	46.00	97.90	79.00	98.80
Q27 Involved plan	60.00	89.60	43.00	91.50	75.00	93.80
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Total satisfaction (Transformed)	26.13	4.31	27.40	3.35	27.45	2.74

**Research Question 2(a): How does pre-implementation patient satisfaction differ from post-implementation?**

As seen in Table 16, the t test of differences in total satisfaction between pre-implementation and post-implementation period was significant at .03 level. A null hypothesis of no difference in means between the pre-implementation and post-implementation period is rejected. In other words, the means of patient satisfaction between pre-implementation and post implementation period are significantly different. Patient satisfaction with nursing care increased from the pre-implementation period to the post-implementation period (see Table 15). However, the actual difference is quite small.

Table 16

**T test for Patient Satisfaction with Nursing Care between Pre-Implementation and Post-Implementation Period**

Satisfaction	Equal Variance	Levene's test for equality of variances		t test for equality of means						
		F	Sig	t	df	Sig	Mean difference	SE difference	95% Confidence interval of the mean Lower Upper	
Total satisfaction (Transformed)	Assumed	6.66	.01	-2.25	145	.03	-1.32	.59	-2.48	-.16

Research Question 2(b): What is the pattern of change in patient satisfaction over the 3 time periods?

As seen in Table 15, over 3 time periods, the pattern of change in total patient satisfaction with nursing care was non-linear. The one-way ANOVA for comparison of satisfaction scores among pre-implementation, interim, and post-implementation periods is shown in Tables 17 and 18. The F test revealed that patient satisfaction with nursing care was different at different periods of times, at the level of .05. From post-hoc multiple comparisons, using the Scheffe test, the difference in patient satisfaction between pre-implementation and post-implementation period was more significant than the difference between pre-implementation and interim period. Eta squared ( $\eta^2$ ) was used as a strength of effect measure. The  $\eta^2 = .031$  indicated that the implementation period accounts for a small proportion of the variance in the satisfaction with nursing care.

Table 17

F test for Patient Satisfaction with Nursing Care by Implementation Period

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Between group	74.81	2	37.41	3.06*
Within group	2337.17	191	12.24	
Total	2411.98	193		

Note.  $N_{\text{Total}} = 194$  ( $N_{\text{Pre-Implementation}} = 67$ ,  $N_{\text{Interim}} = 47$ ,  $N_{\text{Post-Implementation}} = 80$ ).

$\eta^2 = .031$ . \*  $p < .05$ .

Table 18

Multiple Comparisons for Patient Satisfaction with Nursing Care amongImplementation Period

Scheffe

Implementation period (I)	Implementation period (J)	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Pre-implementation	Interim	-1.28	.67	.16	-2.92	.37
	Post-implementation	-1.32	.58	.08	-2.75	.11
Interim	Pre-implementation	1.28	.67	.16	-.36	2.92
	Post-implementation	.05	.64	1.00	-1.63	1.54

Research Question 2(c): How is the change in patient satisfaction modified by demographic characteristics of age and gender?

To examine research question 2(c), the differences in the effect of PIP on satisfaction according to demographic characteristics, a two-way ANOVA was used. Table 19 and Figures 10-11 present the data according to implementation period and age and implementation and gender.



Table 19

The Effect of PIP on Total Patient Satisfaction with Nursing Care by ImplementationPeriod and Demographic Characteristics

Implementation	Age (Year)			Main effect Means for implementation
	Lowest – 45 (N=18)	46 – 65 (N=48)	66 – Highest (N=113)	
	<u>M</u> (SD)	<u>M</u> (SD)	<u>M</u> (SD)	
Pre-implementation	26.03 (3.24)	27.62 (3.18)	25.74 (4.97)	26.46
Interim	28.67 (1.22)	26.60 (3.96)	27.64 (3.26)	27.64
Post-implementation	26.84 (2.26)	27.44 (2.84)	27.40 (2.88)	27.23
Main effect Means for age	27.18	27.22	26.93	

Implementation	Gender		Main effect Means for implementation
	Male (N=75)	Female (N=96)	
	<u>M</u> (SD)	<u>M</u> (SD)	
Pre-implementation	26.64 (4.29)	25.26 (4.83)	25.95
Interim	28.06 (1.73)	26.80 (4.22)	27.43
Post-implementation	27.31 (2.52)	27.51 (3.17)	27.41
Main effect Means for gender	27.33	26.53	26.93

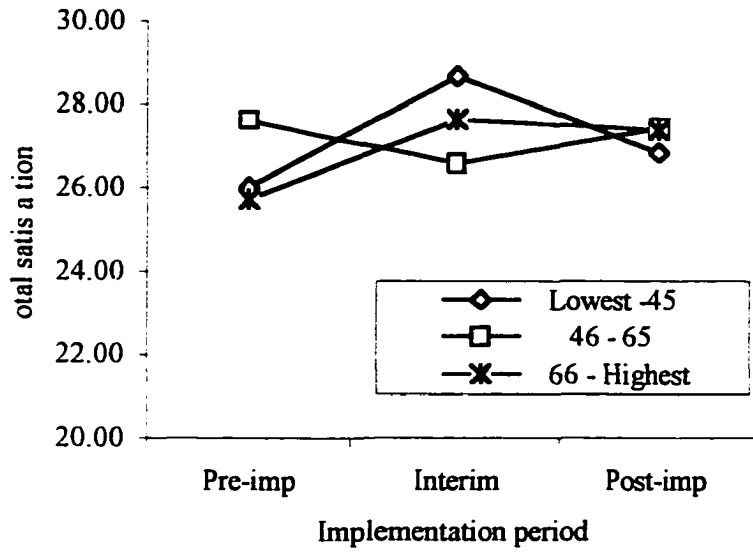


Figure 10. Total satisfaction by implementation and age

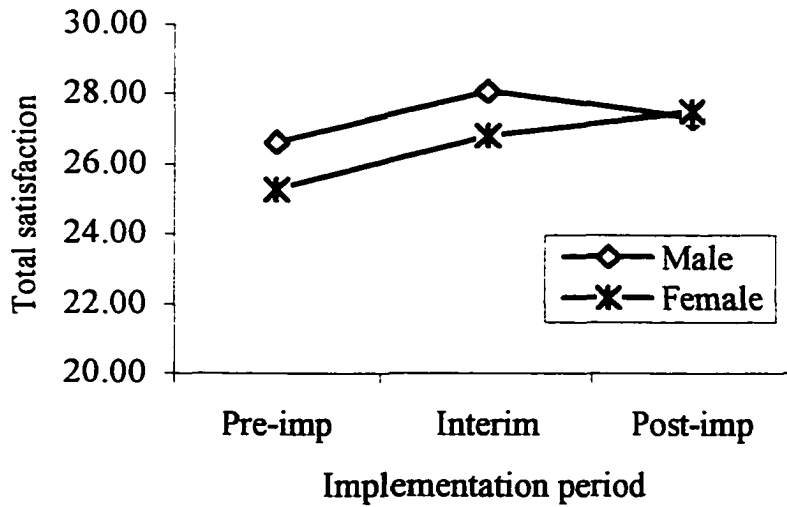


Figure 11. Total satisfaction by implementation and gender

As shown in Table 20, the  $F$  test was used to test the hypothesis that demographic characteristics of age and gender contributed to the main effect of differences in satisfaction by implementation period. This analysis shows a nonsignificant interaction of the independent variables (Implementation x Age and Implementation x Gender) in the two-way ANOVA of patient satisfaction (see Table 21).

Table 20

Test of Between-Subjects Effects for Patient Satisfaction with Nursing Care by Implementation Period and Demographic Characteristics

Source	Patient satisfaction					
	df	SS	MS	F	p	$\eta^2$
Implementation (A)	2	22.19	11.09	0.86	0.43	0.010
Age (B)	2	3.18	1.59	0.12	0.88	0.001
A x B	4	48.98	12.25	0.95	0.44	0.002
Error	170	2190.33	12.88			
Implementation (A)	2	80.12	40.06	3.18	0.04	0.037
Gender (B)	1	25.58	25.58	2.03	0.16	0.012
A x B	2	24.43	12.21	0.97	0.38	0.012
Error	165	2079.66	12.60			

Table 21

**Multiple Comparisons for Patient Satisfaction with Nursing Care by Implementation****Period and Gender**

Scheffe

Implementation period (I)	Implementation period (J)	Mean difference (I-J)	Std. error	Sig	95% Confidence interval	
					Lower bound	Upper bound
Pre-implementation	Interim	-1.39	.74	.17	-3.20	.43
	Post-implementation	-1.31	.62	.11	-2.85	.23
Interim	Pre-implementation	1.39	.74	.17	-.43	3.20
	Post-implementation	-.08	.70	.99	-1.66	1.81

For the other related demographic characteristics (length of stay, medical insurance, and status as a first time patient), the analyses showed similar results. Length of stay and medical insurance had no statistically significant effect on patient satisfaction (Tables 22-23, Figures 12-14). The interaction effect between status as a first time patient and implementation period was statistically significant at  $p < .05$ . The difference in satisfaction between patients who were hospitalized for the first time and patients who were not was not significant ( $p > .05$ ), while the analysis of differences in satisfaction among implementation groups was significant ( $p < .05$ ).

Multiple comparisons showed that the difference in patient satisfaction between the pre-implementation and post-implementation was more significant than between pre-implementation and interim period (see Table 24).

Table 22

The Effect of PIP on Patient Satisfaction by Implementation Period and Related Demographic Characteristics

Implementation	LOS			Main effect Means for implementation
	<3 days (N=38)	3-7 days (N=98)	>1 week (N=45)	
	<u>M</u> ( <u>SD</u> )	<u>M</u> ( <u>SD</u> )	<u>M</u> ( <u>SD</u> )	
Pre-implementation	27.01 (3.29)	26.45 (3.89)	25.13 (6.27)	26.20
Interim	26.08 (4.34)	27.46 (3.51)	25.81 (1.86)	27.37
Post-implementation	26.46 (3.05)	27.69 (2.43)	27.78 (2.94)	27.31
Main effect Means for LOS	26.52	27.20	27.16	26.96

Implementation	Medical insurance			Main effect Means for implementation
	Medicaid (N=17)	Medicare (N=102)	Private (N=49)	
	<u>M</u> ( <u>SD</u> )	<u>M</u> ( <u>SD</u> )	<u>M</u> ( <u>SD</u> )	
Pre-implementation	29.10 (0.97)	25.72 (5.10)	25.89 (3.51)	26.90
Interim	26.59 (2.22)	27.41 (3.88)	28.14 (1.40)	27.71
Post-implementation	27.78 (1.82)	27.47 (3.12)	27.31 (2.53)	27.52
Main effect Means for medical ins	28.15	26.86	27.11	27.37

Table 22. (continued)

Implementation	Status of patient		Main effect Means for Implementation
	Not first time (N=114)	First time (N=59)	
	<u>M</u> (SD)	<u>M</u> (SD)	
Pre-implementation	27.04 (3.48)	25.77 (4.50)	26.40
Interim	27.08 (3.41)	29.33 (1.01)	28.20
Post-implementation	27.66 (2.65)	27.20 (2.61)	27.43
Main effect Means for status as a first time patient	27.26	27.43	27.35

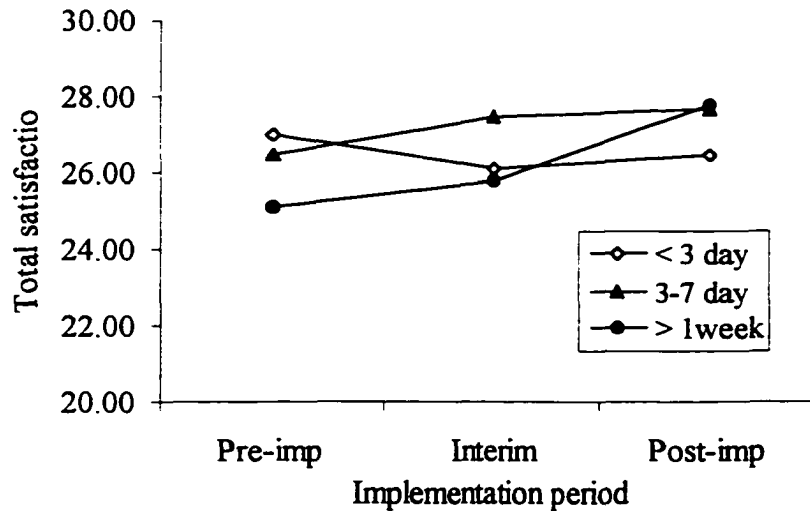
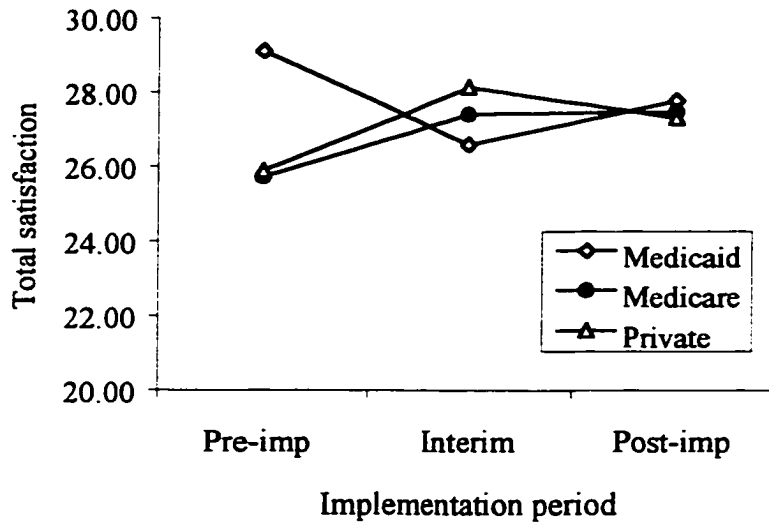
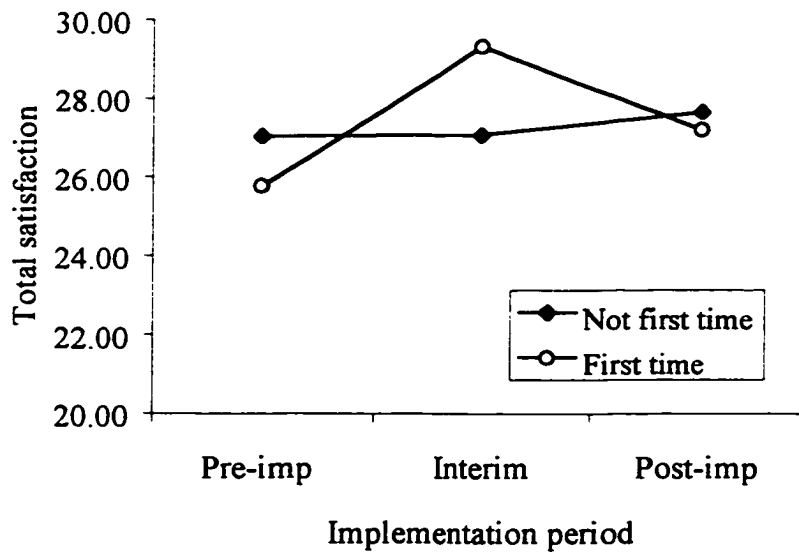


Figure 12. Total satisfaction by implementation period and length of stay



**Figure 13.** Total satisfaction by implementation period and medical insurance status



**Figure 14.** Total satisfaction by implementation period and status as a first time patient

Table 23

**Test of Between-Subjects Effects for Patient Satisfaction with Nursing Care by  
Implementation Period and Related Demographic Characteristics**

Source	Patient satisfaction					
	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p</u>	<u><math>\eta^2</math></u>
Implementation (A)	2	42.97	21.49	1.72	.18	.020
LOS (B)	2	11.75	5.87	.47	.63	.005
A x B	4	63.39	15.85	1.27	.28	.029
Error	172	2147.53	12.49			
Implementation (A)	2	10.62	5.31	0.42	0.66	.005
MI (B)	2	22.59	11.30	0.89	0.41	.011
A x B	4	35.64	8.91	0.70	0.59	.017
Error	159	2014.12	12.67			
Implementation (A)	2	73.51	36.75	3.57	0.03	.041
1 <sup>st</sup> time patient (B)	1	1.02	1.02	0.10	0.75	.001
A x B	2	68.11	34.05	3.31	0.04	.038
Error	167	1718.37	10.29			



Table 24

Multiple Comparisons for Patient Satisfaction with Nursing Care by ImplementationPeriod and Status as a First Time Patient

Scheffe

Implementation period (I)	Implementation period (J)	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Pre-implementation	Interim	-1.27	.70	.19	-2.99	.45
	Post-implementation	-1.20	.61	.15	-2.70	.30
Interim	Pre-implementation	1.27	.61	.19	-.45	2.99
	Post-implementation	.07	.65	.99	-1.54	1.69

Eta Square ( $\eta^2$ ) of demographic characteristics of age, gender, length of stay, medical insurance classification, and status as first time patient range between .001 and .031. All demographic characteristics of patient and implementation period account for a small proportion of the variance in the total satisfaction.

Research Question 2(d): Is patient satisfaction related to demographic characteristics of age and gender?

As seen in Table 21, the  $F$  for the main effect of age or gender on patient satisfaction in pre-implementation, interim, and post-implementation group of subjects was not significant. In other words, patient satisfaction with nursing care, regardless of implementation group, was not related to the demographic characteristics of age and gender. Age and gender account for a small proportion of the variance in the total satisfaction ( $\eta^2$  of age was .001 and of gender was .012).

Summary

The PIP was monitored for 15 months (pre-implementation period: 6 months before PIP implementation; interim period: 3 months after implementing PIP; and post-implementation period: 4-9 months after implementation). Costs and patient satisfaction were investigated. This chapter includes a description of the sample, the major variables, and the findings. Data from this study demonstrate that among 3 periods of PIP implementation, costs as indicated by salary costs, costs/patient care day, and costs/discharge were not significantly different. Differences in patient satisfaction with nursing care between the pre-implementation and post-implementation period did reach statistical significance, but the difference is small. Demographic characteristics of age and gender had no significant effect on patient satisfaction. The interpretation and implications of these results will be discussed in the next chapter.

## CHAPTER 5

### DISCUSSION

This chapter includes a study summary, a discussion of findings, limitations, implications for nursing, recommendations, and a conclusion.

#### Study Summary

This study utilized a quasi-experimental pretest-posttest design. The purpose of this research was to determine the effects of the Partner in Practice model (PIP) on the outcomes of costs and patient satisfaction and any changes in these effects over time (during the periods of pre-implementation, interim, and post-implementation of the model) on the specified unit. This was done in order to begin to build an empirical basis for nurse administrators which will assist them in designing nursing delivery care models that lower costs and increase levels of patient satisfaction. Measuring the outcomes of new nursing care delivery models is critical to fiscal survival and to the continued use of new models. Ultimately, the demonstration of desired outcomes may lead to the implementation of effective models in other units or in other hospitals. Previous studies offer some preliminary evidence of the effects of PIP on costs and patient satisfaction. However, how patient demographic characteristics interact with PIP to effect patient satisfaction has not been previously examined.

The theoretical framework for this study is based on Holzemer's model (1994). This study framework includes two independent dimensions of inputs: client (demographic characteristics of patients) and setting (nursing care delivery systems of

PIP and Traditional model). Two outcomes of the client (patient satisfaction with nursing care) and setting (costs) were examined. Costs were defined as personnel salary costs, costs/patient care day, and costs/discharge. Patient satisfaction was defined as the patients' perception of the quality of nursing care that they received as measured by a facility-designed patient satisfaction questionnaire.

The Partner in Practice model is a nursing care delivery system which has been recommended to control costs and improves patient outcomes. Each registered nurse is partnered with an unlicensed worker (aide or patient care assistance); the pair works as a dyad on a consistent basis. The same registered nurse and patient care assistant consistently work together, jointly caring for a group of patients. The partnerships develop a pattern of work, become familiar with each other's abilities and preferences, and are able to develop stable and efficient work patterns.

The PIP was implemented on a medical unit of the study hospital in January 1997. Data were collected from three time periods: pre-implementation data (6 months prior to implementing PIP); interim data (the first 3 months after implementing PIP); and post-implementation data (4-9 months after implementation of PIP). The research questions focused on changes in costs and patient satisfaction over these three time periods.

The sample of costs for this study was taken from departmental expense statements, monthly budget variance worksheets, monthly departmental costs per day statements, monthly departmental utilization statements, and departmental summary reports (division fact sheets). Total costs were determined for the pre-implementation,

interim, and post-implementation periods. To calculate personnel costs, the monthly personnel salary costs were averaged for each period. To calculate costs per patient care day and costs per discharge, total costs from each period were summed and divided by the total patient census.

Related workload variables, such as patient care days (PCD), length of stay (LOS), percent of occupancy (OCC), number of discharges or number of patients, and nursing staff clinical hours that were reported monthly were also used. From these data, average numbers of nursing clinical hours per day and per discharge for the study periods were derived.

Patient satisfaction questionnaires (PQ) were mailed to discharged patients by the hospital (UHC). Reliability of the tool was estimated in a test-retest pilot study. The total of 194 questionnaires (67 in pre-implementation, 47 in interim, and 80 in post-implementation period) was used for this study.

Before testing the hypotheses, characteristics of the unit, monitoring of the consistency of the PIP, and data management were discussed. The PIP was started in January 1997 at a medical unit (Lerner Tower 7, UHC). Four registered nurses (RN) and four unlicensed patient care assistants (PCA) who were nursing aids volunteered to form partnerships and signed an agreement to work as a partner for one year. The work schedule remained relatively consistent.

The measure of patient satisfaction with nursing care was part of a patient questionnaire comprised of nine items. Six of the nine items were on a 5-point scale; the others were No/Yes questions. The items were transformed to yield a total score.

Total patient satisfaction for nine items had a possible range of 6-30. A higher score indicated a higher level of satisfaction.

Analysis was conducted using the Statistical Package for the Social Science (SPSS) release 7.0. Data analyses included the use of descriptive statistics (measures of central tendency and variability). The t test was used to test hypotheses 1(a) and 2(a). One-way analysis of variance (ANOVA) was used to test hypotheses 1(b) and 2(b). Two-way ANOVA was used to test hypotheses 2(c) and 2(d). A level of significance of less than .05 was selected.

### Discussion of Findings

#### Costs

##### Research question 1: How do costs change over time following the implementation of PIP?

It was hypothesized that (1) costs will decrease after implementation of PIP, comparing pre-implementation and post-implementation, and (2) costs in PIP will decrease in a linear fashion over three time points.

Because patient care assistant (PCA) salaries are lower than registered nurse (RN) salaries, a decrease in costs was expected, as was documented in other studies (Garfink, Kirby, Bachman, & Starck, 1991; McGee, 1993; Lengacher et al., 1994, 1996). However, the results showed that there were no significant differences in costs (salary costs, costs/patient care day, and costs/discharge) between the pre-implementation and the post-implementation period. Over three periods of time, the

pattern of change in costs was non-linear which differed from a previous study (Lengacher et al., 1996). These results did not support that hypothesis.

In examining the data related to workload and full-time equivalents (FTE), it appears that from pre-implementation to post-implementation of PIP, RN (FTE) decreased by 1 FTE and non-RN FTE increased by 2.5 FTE. The average RN salary was \$21.16 per hour while the average non-RN (PCA) salary was \$11.00 per hour (B. Broseman, personal communication, March 5, 1998). The non-RN salary was lower than the RN by 51.98%. In other words, the salary of 1 RN equals the salary of 1.92 non-RN. Given the substitution of 2.5 non-RNs for 1 RN, given the salary differences, the total nursing salary cost was not decreased, but increased.

To explain the non-linear pattern of changes in costs/PCD and costs/discharge, the average workload (PCD, OCC, and ADC) during the study periods must be examined. There were fewer patients cared for on the study unit in both the interim and the post-implementation periods, as reflected by decreased discharges. However, the average LOS increased both in the interim and post-implementation period and, consequently, ADC and PCD remained relatively constant. Thus the demand for nursing clinical hours of the unit was not changed while the RN FTE had been decreased. If the perception of the staff was that the demand for RN hours was constant, yet available regular RN hours were decreased, the needed hours would have to be made up from other sources, such as OT hours or PRN hours.

Both OT and PRN hours are usually more expensive. In this hospital, the PRN rate is \$23.50 per hour. Overtime was compensated through a combination of “compensation time” and pay at the regular RN rate (\$21.16 per hour). Thus, in contrast to the hypotheses, costs including salary costs, costs per patient care days, and costs per discharge were increased during the study periods. This result of increasing PRN and OT hours was similar to the findings of Power, Dickey, and Ford (1990) and was in contrast to the study of Donovan (1988).

Based on this description of the PIP, there are several reasons why the costs of PIP in this study differ from previous literature. These differences may reflect the number of RNs, the demand for nursing hours, and the patient characteristics, as well as the cost definition of the studies.

The first reason involves the number of RNs. Other places may have decreased more RNs by the substitution of fewer unlicensed assistive personnel/RN and thus, saved more money per substitution (Glandon, Colbert, & Thomasma, 1989; Wong, Gordon, Cassard, Weisman, & Bergner, 1993; Rizzo et al., 1994; Smith et al., 1994). In addition, the number of RNs in the pre-implementation period on the study unit might have already been at a minimum. Thus, when the RN FTE complement was reduced, it took RN staffing to unacceptable levels and the hours were “made up” for from other categories (PRN and OT). In other words, to meet the demand in nursing that was not changed while the RN FTE was decreased, other RNs (PRN and OT) were needed. Other hospitals may have had an excess of RN FTE initially and



could therefore have been able to afford to decrease RN FTE without increasing PRN and OT hours.

In addition, according to the unit's original plan for PIP, RN FTE should have been decreased by 1.5 FTE, from 23.4 RN FTE in 1996 to 22.4 RN FTE in 1997. However, the actual number of RNs at the time PIP started was already lower than what was planned (21.87 RN FTE). This lower RN FTE might have been a result of the resignation of RNs. Thus, the further decrease to 20.93 RN FTE in the post-implementation period may have moved staffing to unacceptable levels.

The second possible explanation is related to patient characteristics. The patients in this study may have been sicker than patients in other studies. If this were so, the attempt to substitute non-RNs for RNs may have been less successful.

The next possible reason concerns the definition of cost related measures. When assessing nursing costs, most reports in the literature define only the total dollars spent by the hospital on nursing personnel, including both salaries and benefits, aggregating the various type of all nursing personnel (Wong et al., 1993; Reichelt & Larson, 1994; Lengacher et al., 1996). Stefan, Gillies, and Biordi (1992) divided nursing costs differently, into direct and indirect nursing costs. Finkler, Kovner, Knickman, and Hendrickson (1994) included not only salaries and benefits, but also other costs, such as supplies, in personnel costs. Lengacher et al. (1996) defined costs as unit costs for patient care determined by personnel salary costs (calculated for total hours of care per patient day) and unit costs (calculated for supplies per unit per patient day). In this study, salary costs were dollars spent on

salaries and wages for nursing personnel providing direct and indirect care. The total costs referred to total dollar expenditures for providing unit-based patient care.

Lastly, because of the short time periods of study, RN hours could have been affected by an inconsistent pattern of use of benefit hours, such as vacation and sick leaves. Similarly, differences in the turnover rate and orientation of new staff among the different study periods may have effected costs.

### Patient Satisfaction

Research question 2: How does patient satisfaction change over time following implementation of PIP?

The hypotheses were (1) Level of patient satisfaction will increase after implementation of PIP, comparing the pre-implementation and the post-implementation period, (2) Level of patient satisfaction from PIP model will increase in linear fashion over three time points, (3) Change in patient satisfaction is not modified by demographic characteristics of age and gender, and (4) Patient satisfaction is not associated with the demographic characteristics of age and gender.

The results showed that patient satisfaction increased from the pre-implementation to the post-implementation period. However, the real difference was quite small. This result is in contrast to the study of Bostrom and Zimmerman (1993), who reported that patients were overwhelmingly positive about the change to PIP.

The patient satisfaction with nursing care tool was designed to elicit patient's perceptions of their care with the assumption that patient satisfaction is an indicator of quality nursing care. The 9-item scale provided information on the patients'

perception of the nursing care received during hospitalization. After carefully examining the specific questionnaire items, the two that seem to reflect changes that might be expected to occur with PIP are “Promptness of nursing staff to answer call light” and “Frequency of nursing staff check and see.” It is expected that when RNs worked with their partners, they would coordinate efforts to care for their group of patients and this would enable them to answer patients more promptly and check patients more frequently. In addition to substitution of 2.5 PCA FTE for 1 RN FTE mean that more personnel would be available.

The findings of the investigation supported research hypotheses 2(a) and 2(b) except for the hypothesis concerning the pattern of change in patient satisfaction over periods of time. While there was a significant difference among the implementation periods, the change between the pre-implementation and the interim period was larger than between the interim period and the post-implementation period, resulting in a non-linear pattern.

Regarding the small differences in level of patient satisfaction, one might infer that PIP had little significant impact. However, with the nature of patient satisfaction measures, this may be related to the markedly skewed distribution. As with most satisfaction measures, the distribution of responses is skewed to the very high end of the scale. Therefore, there was little room for improvement on this measure.

There was nonsignificant interaction of PIP implementation periods and age and implementation and gender. Other related demographic characteristics (length of stay, medical insurance classification, and status as a first time patient) showed quite

similar results. Patient satisfaction was not related to the demographic characteristics of age and gender, length of stay, medical insurance classification, and status as a first time patient. There was, however, an interaction effect between the implementation period and status as a first time patient.

One explanation of the lack of a relationship with demographic factors may be that when independent variables are highly effected by one another, the contribution of each successive variable to the model is smaller. The interrelationship among demographic variables was not examined in this study, but this could be a partial explanation of the lack of effect of age and gender. Thus, given the significant effect of the implementation period, status as a first time patient did not contribute much additional variance.

Previous studies indicated that patient satisfaction appeared to be related to demographic characteristics (Attkisson & Pascoe, 1983; Bader, 1988; Clearly, Keroy, Karpanos, & McMullen, 1989; Rubin, 1990; Gerteis, Edgman-Levitan, Daley, & Delbanco, 1993). However, in this study of the interaction of implementation and the demographic characteristics of age and gender, the hypothesis of no relationship was supported. Perhaps age and gender might not be the most significant measure of patients' characteristics. One possible reason that age and gender were not important determinants of patient satisfaction in this study may be that these demographic characteristics exert their influence on patient satisfaction through other variables. Perhaps demographic characteristics are external variables that effect patient satisfaction indirectly through interaction with other unidentified variables such as

acuity, severity of illness and prognosis (Charlson, Pompei, Ales, & Mackenzie, 1987).

In summary, there were four main findings. First, nursing salary costs, costs/PCD, and costs/discharge between the pre-implementation and the post-implementation period did not differ. Secondly, PIP effected patient satisfaction with nursing care during the study periods. After the implementation of PIP, patient satisfaction was statistically increased, but with little actual difference among the means. The pattern of change in costs and patient satisfaction was non-linear. Thirdly, the effect of PIP on patient satisfaction was not modified by the demographic characteristics of patients, except for status as a first time patient. Lastly, patient satisfaction itself did not differ by demographic characteristics of patients.

#### Limitations

There are several limitations in the PIP implementation and the design of this study. The sample of costs was collected within only 15 months (6 months in the pre-implementation period, 3 months in the interim period, and 6 months in the post-implementation period). Because of the short period of time and the small number of months, cost data had less explanatory power in this study.

Additional client variables which might influence patients' perceptions about nursing care were not identified. These include severity of the patient's illness or nursing care classification. The analysis of costs assumed all patients consume the same amount of nursing resources for each day in the hospital. This approach ignored

the unique needs of individual patients who require different amounts of care during their hospital stay. It is possible that the effect of PIP on costs could be related to the needs of individual patients which can be specified by the severity of illness or nursing patient classification (Wilson et al., 1988; Stefan, Gillies, & Biordi, 1992; Allshouse, 1993; Jones, 1993). The effects of these characteristics of patients on their perceived nursing care need further study.

Only one medical unit at the study hospital where PIP was implemented was studied. Research including other units or other hospitals may result in different findings. More research is needed to provide evidence for generalizability of the findings to the broad population of setting. Further research is needed to understand similarities and differences in the effects of PIP.

It was recommended by the pioneer of this model (M. Manthey, personal communication, March 4, 1997) that three or four partners are appropriate for PIP in a unit. Empirical research is needed to test this notion. Contrary to Manthey's view, the absence of positive effects of PIP in this study may reflect a "dose effect." That is, four partnerships may be an inadequate number to effect the overall efficiency of care delivery. This study was limited in that staff on the study unit were allowed to decide if they wished to form partnerships and only four RNs and four non-RNs volunteered.

In addition, reliable information on retention and turnover rates, training costs, and the orientation of new staff that might influence costs (Powers, Dickey, & Ford, 1990; Jones, 1992) was not available for this study.

### Implications for Nursing

These findings provide nurse administrators with knowledge regarding the effects of PIP on the outcomes of costs and patient satisfaction. If costs and patient satisfaction are not significantly influenced by PIP, there is not a strong argument for implementing PIP.

The results suggest that hospital managers, when considering the costs of alternative nursing models, should take into account the costs on nursing staff in the context of the overall system of providing care, the characteristics of patients that are involved, and, hence, the feasibility of substituting other personnel for RNs. Results of this study suggest, with PIP used fewer RN and more PCA, needed similar clinical hours, needed more “other” categories of RN (PRN and OT), the end result may not be in decreasing costs.

Other outcomes, such as staff satisfaction, retention and turnover, productivity, and other quality indicators, which include falls, medication errors, and infection rates may provide valid reasons for implementation (Omachonu & Nanda, 1989; Benner & Tanner, 1990; Lengacher et al., 1994, 1996). However, this study suggests that simply implementing partnerships will not reduce costs nor make significant changes in patient satisfaction.

Conversely, there were nonnegative changes in costs or total satisfaction. This study suggests that there may be some specific aspects of patient satisfaction that may be improved with PIP as the nursing care delivery system. The investigation found that, of all aspects measured, the patients’ perception of more “Frequency of nursing

staff check and see” and “Promptness of nursing staff to answer call light” showed the greatest improvement from the pre-implementation to the post-implementation period. This finding may indicate that this is a positive effect associated with PIP. Wider implementation within the work group might be appropriate to further explore this relationship.

### Recommendations

Findings of this study clearly indicate the need for further exploration, especially of the effect of wider implementation within the work group.

Descriptive data from this study identified these variables as influencing the costs and patient satisfaction in the unit. Further research would serve to validate this finding. More of the unit’s components should be considered, such as planned and actual RN FTE. This knowledge may prove especially important when linked to quality of services.

More information is needed to enhance the nurses’ capability to effect the outcomes. To predict and understand the outcomes, and to influence the outcomes where possible and desirable, nursing staff should be defined as providers in the conceptual framework. Again, the outcomes of services, especially provider’s outcomes, such as nursing staff satisfaction, nursing retention and turnover rate, are needed.

Another approach to examining the effect of new models of care delivering could be the use of multivariate statistics incorporating several measures of outcomes



(Fowler, Clearly, Magaziner, Patrick, & Benjamin, 1994; Tabachnick, & Fidell, 1996). This may identify the broader effects of PIP on the quality of care. Patient satisfaction with nursing care and costs may not have been adequate measures of nursing outcomes.

In this study, PIP significantly ( $p < .05$ ) effected on patient satisfaction with nursing care in the unit where PIP was implemented. It is unknown if other units might have demonstrated the same change during that time even without PIP. A true experimental design would allow more definitive conclusions about the relationship between PIP and outcomes. For example, two similar units might be designed to a study unit and a control unit. The PIP would be implemented in the study unit. Patients would be randomly assigned to the units.

Another example of true experimental design is that only one unit is designed. Patients would be randomly assigned to partners and non-partners in the unit. The outcomes might be derived. These research designs seem unrealistic because two similar units cannot be found or the patient assignment cannot be controlled. The diffusion or imitation of treatment can be a problem if patients are in the same unit (Cook & Campbell, 1979; Rogers, 1983; Brink & Wood, 1989). However, the true experimental design should be recommended if the appropriate situations can be created.

A study in which costs can be compared across time is needed. For this study, a period of only 15 months (6 months for pre-implementation, 3 months for interim, and 6 months for the post-implementation period) resulted in too small of a sample to

detect true differences in population values. The smaller sample size, the lower the power (Rudy & Kerr, 1991). Power was low (.17). Furthermore, this prevents generalization of the findings to other groups. Replication of this study over a longer period of time is necessary to corroborate the findings. Therefore, relationships among the PIP intervention's outcomes and a longer period of time of the implementation period need to be explored.

However, the literature does not give any evidence for how long each period would need to be to maximize an improvement of outcomes. In previous studies, the duration of each period varied. Lengacher et al. (1993) used 6 months pre-implementation, 6 months in interim, and 6 months in the post-implementation period; Gersch (1996) studied only 3 weeks before implementation and 6 months after implementation; and Neidlinger et al. (1993) examined only data collected before implementation and 1 year after implementation.

For this study, the PIP was implemented in January 1997. By April 1997, the unit had completed PIP implementation. Thus, a 15-month study period (6 months in pre-implementation, 3 month in interim, and 6 months in post-implementation) was used. Nine months after implementation may have still represented a "honeymoon" period (Weisman, 1992). Weisman (1992) predicted that nursing staff will be more motivated during the beginning of an implementation period (8 months to 1 year) as a "honeymoon." However, the outcomes might even improve over a longer period. The year after implementation, during the "setting in" period, might show greater improvement. During this period the model will be perfected and nursing staff will

have learned their new roles. Partnerships might also need a longer period of time to become proficient in their roles as partners. Thus, one year in the post-implementation period would be more appropriate.

This 15-month study was divided into three groups: (a) July to December 1996 for the pre-implementation period, (b) January to April 1997 for the interim period, and (c) April to September 1997 for the post-implementation period. The time span of a 1-year period of time might effect the outcomes in several ways. For example, the number of patients might be higher in the fourth quarter of the year; patients might be more severely ill in the first quarter and need more professional nursing care; nursing staff might take more vacation time and sick leave at different periods. These extraneous variables might not only effect salary costs and the total costs of the unit, but also effect the need for other nursing staff such as PRN and OT. In other words, the seasonal variation or interaction of history and treatment might effect the outcomes of PIP implementation (Cook & Campbell, 1979; Brink & Wood, 1989). Thus, data collection for a full one-year prior to implementation and 1 year after implementation is recommended. This would also increase the power to detect differences by increasing the “n” of months from 15 to 24.

Qualitative and quantitative strategies seem indicated to strengthen future research designs. Qualitative studies in this area should focus on identifying or developing an understanding of how PIP or the nursing staff influence patient outcomes, how patients perceive and weigh their received services in comparison to their needs, and how nursing group practice factors effect patients' outcomes. These

studies might be accomplished through the use of the critical incident analysis. For example, patients could be interviewed and asked to relate incidents where they influenced their care, or used information to evaluate their care. Content analysis could then be used to identify themes and useful approaches for further work (Creswell, 1994). Based on the results of this study and aided by the knowledge developed from additional qualitative work, quantitative approaches to studying the effects of PIP would benefit from better measures of patient satisfaction.

Use of the patient satisfaction measure was a strength because of the acceptable stability and internal consistency reliability of the measure. The investigator using this instrument could replicate this study in future studies with hospital inpatients.

Because of the high correlation between the last item of patient satisfaction measure, "Q29: Overall quality of nursing care," and total patient satisfaction calculated from nine items, Q20-Q28, the last item can be used as a single item measure of patient satisfaction. However, this item could be used only as a general indicator because some sensitivity to the effect of PIP might be lost (Stewart & Archbold, 1992a, 1992b; Youngblut & Casper, 1993; Lewis, 1994). The data from this study suggests that only some aspects of satisfaction are sensitive to the change to PIP. Therefore, further studies of the PIP implementation should retain the items Q20-Q28.

### Conclusion

In this time of major health care change, it is imperative that nursing administration research continues to focus on nursing care delivery systems in order to better provide services to meet nursing goals, satisfy clients, and increase professionalism within the larger hospital context. Nursing administrators should think of their work in terms of enhancing nursing supervision, delegation, and accountability. This might be accomplished through building nursing staff competency, selecting staffing and organizational policies that facilitate development of all aspects of staffing, including scheduling and definition of duties, etc., and the support of nursing practice development in terms of removing non-nursing duties from the RN. This study has resulted in some specific findings supporting the conclusion that PIP can effect aspects of patient satisfaction. However, clearly the effect of PIP is not strong enough nor sufficiently comprehensive to represent the only needed change in the on-going development of nursing care delivery systems.

## REFERENCES

- Abdellah, F. G., & Levine, E. (1957). Developing a measure of patient and personnel satisfaction with nursing. Nursing Research, *5*, 100-108.
- Abramowitz, S., Cote, A. A., & Berry, E. (1987). Analyzing patient satisfaction: A multianalytic approach. Quality Review Bulletin, *13*, 122-130.
- Aiken, L. H., & Mullinix, C. F. (1987). The nurse shortage: Myth or Reality. New England Journal of Medicine, *317*, 641-646.
- Alexander, J. H., Kaldenberg, D. O., & Koenig, H. F. (1994). Service quality measurement. Journal of Health Care Marketing, *14*(3), 34-40.
- Allshouse, K. D. (1993). Treating patients as individuals. In Gerteis, M. Edgemean-Levitan, S., Daley, J., & Delbanco, T. M. (Eds.). Through the patients' eyes: Understanding and promoting patient-centered care (pp. 19-44). San Francisco, CA: Jossey-Bass Publishers.
- American Hospital Association. (1989). Restructuring the work load: Methods and models to address the nursing shortage. Chicago, IL: AHA Center for Nursing.
- American Hospital Association. (1991-1992). Hospital statistics. Chicago, IL: American Hospital Association.
- American Nurses Association. (1990). Annual survey of the state nurse associations. Kansas City, MO: The Author.
- American Nurses Association. (1992). Roles and responsibilities of continuing education and staff development personnel. Kansas City, MO: The Author.
- American Nurses Association. (1994). Registered professional nurses and unlicensed assistive personnel. Washington, DC: American Nurses Publishing.
- American Nurses Association. (1996). Compendium of American Nurses Association: Position statement, Unlicensed assistive personnel. Washington, DC: American Nurses Publishing.
- Anderson, R. A., & McDaniel, R. R. (1992). The implication of environmental turbulence for nursing-unit design in effective nursing homes. Nursing Economics, *10*, 117-125.

- Attkisson, C. C., & Pascoe, G. C. (1983). Patient satisfaction in health and mental health services: Evaluation and program planning. International Journal, 6(1-2), 185-210.
- Bader, B. (1988). Nursing behaviors that can predict patient satisfaction. Journal of Nursing Quality Assurance, 2(3), 11-17.
- Bailey, D. R. (1988). Computer applications in nursing: A prototypical model for planning nursing care. Computers in Nursing, 6(5), 199-203.
- Barrett, M. J. (1989). How nurses can help hospitals to achieve financial goals. Healthcare Financial Review, 11(6), 64-70.
- Barry, C. T., & Gibbons, L. K. (1990). DHHS nursing roundtable: Redesigning patient care delivery. Nursing Management, 21(9), 64-66.
- Barter, M., & Furmidge, M. L. (1994). Unlicensed assistive personnel: Issues relating to delegation and supervision. Journal of Nursing Administration, 24(4), 36-40.
- Barter, M., McLaughlin, F. E., & Thomas, S. A. (1994). Use of unlicensed assistive personnel by hospitals. Nursing Economics, 12, 82-87.
- Bateson, G. (1985). Perceived control and the service encounter. In J. A. Czepiel, M.R. Solomon, & C. F. Surprenant (Eds.), The service encounter: Managing employee/customer interaction in service business. Lexington, MA: D.C. Health and Company.
- Bechtel, G. A., & Printz, V. (1994). Evaluating quality of care using modular nursing on a multispecialty unit. Clinical Nurse Specialist, 8(2), 81-84.
- Beech, B. M. (1995). Patient satisfaction and nursing staff work satisfaction in an urban public teaching hospital. (Doctoral dissertation, University of Texas Health Science Center at Houston, 1995). Dissertation Abstracts International, vol. 56-12, Section B, 6692.
- Benner, P. & Tanner, C. (1990). Clinical judgment: How experts use intuition. In Ozbolt, J. G., Vandewal, D., Hannah, K. J. (Eds.), Decision support systems in nursing (pp. 193-205). St.Louis, MO: Mosby.
- Bennett, M. K., & Hylton, J. P. (1990). Modular nursing: Partners in professional practice. Nursing Management, 21(3), 20-24
- Bertram, D. L. (1994). Selecting patient care delivery models. In G. S. Wlody (Ed.),

- Managing clinical practice in critical care nursing (pp. 210-230). St. Louis, MO: Mosby.
- Berwick, D. M. (1991). Controlling variation in health care: A consultation from Walter Shewhart. Medical Care, 29, 1212-1225.
- Beyers, M. (1988). Quality: The banner of the 1980s. Nursing Clinics of North America, 23, 617-623.
- Blackman, B. A. (1985). Making a service more tangible can make it manageable. In J. A. Czepiel, M. R. Solomon, & C. F. Furprenant (Eds.), The service encounter: Managing employee/customer interaction in service business (pp. 291-302). Lexington, MA: D.C. Health and Company.
- Bond, S., & Thomas, L. H. (1992). Measuring patients' satisfaction with nursing care. Journal of Advanced Nursing, 17(1), 52-63.
- Borenstein, M., & Cohen, J. (1988). Statistical power analysis: Computer program [Computer software]. Hillsdale, NJ: Lawrence Erlbaum Association.
- Bostrom, J., & Zimmerman, J. (1993). Restructuring nursing for a competitive health care environment. Nursing Economics, 11(1), 35-41, 54.
- Brider, P. (1992). The move to patient focused care. American Journal of Nursing, 92(9), 26-33.
- Brink, T. J., & Wood, M. J. (1989). Advanced design in nursing research. Newbury Park, CA: Sage Publication.
- Buerhaus, P. I. (1992). Nursing, competition, and quality. Nursing Economics, 10, 21-29.
- Carey, R. G., & Posavac, E. J. (1982). Using patient information to identify areas for service improvement. Healthcare Management Review, 7(2), 43-48.
- Charlson, M. E., Pompei, P., Ales, K. L., & Mackenzie, C. R. (1987). A new model of classifying prognosis comorbidity in longitudinal studies: Development and validation. Journal of Chronic Disability, 40, 373-383.
- Charns, M. P., & Schaefer, M. P. (1983). Health care organizations: A model for management. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Christensen, P., & Bender, L. H. (1994). Models of nursing care in a changing environment: Current challenges and future directions. Orthopaedic Nursing,



13(2), 64-70.

- Clark, C. M. & Hollander, S. M. (1990). Primary nursing partners. Nursing Management, 21(7), 26-27.
- Cleary, P. D., Keroy, L., Karpanos, G., & McMullen, W. (1989). Patient assessments of hospital care. Quality Review bulletin, 15, 172-179.
- Cleary, P. D., & McNeil, B. J. (1988). Patient satisfaction as an indicator of quality of care. Inquiry, 25(1), 25-36.
- Cleary, P. D., Edgman-Levitan, S., Roberts, M., Molony, T. W., McMullen, W., Walker, J. D., & Delbanco, T. L. (1991). Patients evaluate their hospital care: A national survey. Health Affairs, 10, 254-267.
- Closs, S. J., & Tierney, A. J. (1993). The complexities of using a structure, process, and outcome framework: The case of an evaluation of discharge planning for elderly patients. Journal of Advanced Nursing, 18, 1279-1287.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2<sup>nd</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cook, T. D., & Campbell, D. T. (1979). Quasi-experimentation and analysis issues for field setting. Boston, MA: Houghton Mifflin Co.
- Cottrell, B. H., & Grubbs, L. M. (1994). Women's satisfaction with couplet care nursing compared to traditional postpartum care with rooming-in. Research in Nursing and Health, 17, 401-409.
- Courts, N. F. (1988). A patient satisfaction survey for a rehabilitation unit. Rehabilitation Nursing, 13, 79-81.
- Crawley, W. D., Marshall, R. S., & Till, A. H. (1993). Use of unlicensed assistive staff. Orthopaedic Nursing, 12(6), 47-53
- Creswell, J. W. (1994). Research design: Qualitative & quantitative approaches. Thousand Oaks, CA: SAGE Publications, Inc.
- Curtin, L. (1994). The heart of care. Nursing Management, 25(5), 7-8.
- Czepiel, J. A., Solomon, M. R., & Surprenant, C. F. (1985). The service encounter: Managing employee/customer interaction in service business. Lexington, MA: D.C. Health and Company.

- Davis, S. L., & Adams-Greenly, M. (1994). Integrating patient satisfaction with a quality improvement program. Journal of Nursing Administration, 24(12), 28-31.
- Day, R. L. (1977). A model for monitoring consumer satisfaction. In H. K. Hunt (Ed.), Conceptualization and measurement of consumer satisfaction and dissatisfaction (pp. 153-183). Cambridge, MA: Marketing Science Institute.
- Dison, C. C. (1992). An action plan for nurse executives. In M. E. Cowart & W. J. Serow (Eds.), Nurses in the workplace (pp. 219-234). Newbury Park, CA: Sage Publications.
- DiStefano, M. K., Pryer, M. W., & Garrison, J. L. (1980). Attitudinal, demographic, and outcome correlates of clients' satisfaction. Psychological Report, 47(1), 287-290.
- Doering, E. R. (1983). Factors influencing inpatient satisfaction with care. Quality Review Bulletin, 9, 291-299.
- Donabedian, A. (1966). Evaluating the quality of medical care. Milbank Memorial Quarterly, 44, 166-203.
- Donabedian, A. (1968). Promoting quality through evaluating the process of patient care. Medical Care, 6, 181-202.
- Donabedian, A. (1980). Explorations in quality assessment and monitoring: The deinition of quality and approaches to its assessment. Ann Arbor, MI: Health Administration Press.
- Donabedian, A. (1982). The criteria and standards of quality. Ann Arbor, MI: Health Administration Press.
- Donabedian, A. (1984). Quality, cost, and cost containment. Nursing Outlook, 32, 142-145.
- Donabedian, A. (1987). Commentary on some studies of the quality of care. Health Care financing Review, 20(10), 75-85.
- Donabedian, A. (1988). The quality of care: How can it be assessed? Journal of the American Medical Association, 260, 1743-1748.
- Donabedian, A. (1992). The role of outcomes in quality assessment and assurance. Quality Review Bulletin, 18, 356-360.

- Eastaugh, S. R. (1985). The impact of the nurse training act on the supply of nurses, 1974-1983. Inquiry 22, 404-417.
- Eastaugh, S. R. (1990). Hospital nursing technical efficiency: Nurse extenders and enhanced productivity. Hospital & Health Services Administration, 35, 561-573.
- Eastaugh, S. R., & Regan-Donovan, M. (1990). Nurse extenders offer a way to trim staff expenses. Healthcare Financial Management, 44(4), 58-60, 62.
- Erkel, E. (1993). The impact of case management in preventive services. Journal of Nursing Administration, 23(1), 27-31.
- Erickson, L. R. (1987). Patient satisfaction: An indicator of nursing care quality? Nursing Management, 18(7), 31-35.
- Ethridge, P. (1991). A nursing HMO: Carondelet St. Mary's experience. Nursing Management, 22(7), 22-27.
- Ethridge, P., & Lamb, G. (1989). Professional nursing case management improves quality, access, and costs. Nursing Management, 20(3): 30-35.
- Fitzmaurice, J. M. (1983). A statistical analysis of the medicare hospital routine salary cost differential. Health Care Financing Review, 5(1), 45-64.
- Fowler, F. J., Clearly, P. D., Magaziner, J., Patrick, D. L., & Benjamin, K. (1994). Methodological issues in measuring patient reported outcomes: The agenda of the work group on outcome assessment. Medical Care, 32(7), JS65-JS76.
- Fowler, F. J., Wennberg, J. E., & Timothy, R. P. (1988). Symptom status and quality of life following prostatectomy. Journal of American Medical Association, 259, 3018.
- Fox, J. G., & Storms, D. M. (1981). A different approach to sociodemographic predictors of satisfaction with health care. Social Science & Medicine: Part A, Medical Sociology, 15, 557-564.
- Frinkler, S. A., Kovner, C. T., Knickman, J. R., & Hendrickson, G. (1994). Innovation in nursing: A benefit/cost analysis. Nursing Economics, 12(1), 18-27.
- Fralic, M. F. (1992). Creating new practice models and designing new roles: Reflections and recommendations. Journal of Nursing Administration, 22(2), 6-8.

- Fritz, D. J., & Cheeseman, S. (1994). Blueprint for integrating nurse extenders in critical care. Nursing Economics, *12*, 327-326.
- Gaines, A. D. (1994). Race and racism. In W. Reich (Ed.), Encyclopedia of bioethics (2<sup>nd</sup> ed., pp. 1-26). New York: McMillan.
- Gardner, D. L. (1991). Issues related to the use of nurse extenders. Journal of Nursing Administration, *21*(10), 40-45.
- Gardner, K. G., & Tilbury, M. (1991). A longitudinal cost analysis of primary and team nursing. Nursing Economics, *9*, 97-104.
- Garfink, C. M., Kirby, K. K., Bachman, S. S., & Starck, P. (1991). The university hospital nurse extender model: Part III, Program evaluation. Journal of Nursing Administration, *21*(3), 21-27.
- Gersch, P. (1996). Initiating a patient service partner program. Nursing Management, *27*(10), 46-50.
- Gerteis, M., Edgman, Levitan, S., Daley, J., & Delbanco, T. M. (1993). Through the patient eyes: Understanding and promoting patient-centered care. San Francisco, CA: Jossey-Bass Publishers.
- Giovanetti, R. (1986). Evaluation of primary nursing. In H. Werley, J. Fitzpatrick & R. Taunton (Eds.), Annual Review of Nursing Research: Vol. 4. New York, NY: Springer.
- Glandon, G. L., Colbert, K. W., & Thomasma, M. (1989). Nursing delivery models and RN mix: Cost implications. Nursing Management, *20*(5), 30-33.
- Gould, R., Thompson, R., Rakel, B., Jensen, J., Hasselman, E., & Young, L. (1996). Redesigning the RN and NA roles. Nursing Management, *27*(2), 37-41.
- Greeneich, D. (1993). The link between new and return business and quality of care: Patient satisfaction. Advanced Nursing Science, *16*(1), 62-72.
- Greeneich, D. S., Long, C. O., & Miller, B. K. (1992). Patient satisfaction update: Research applied to practice. Applied Nursing Research, *5*(1), 43-48.
- Grillo-Peck, A. M., & Risner, P. B. (1995). The effect of a partnership model on quality and length of stay. Nursing Economics, *13*, 367-374.
- Guiliano, K. K., & Proirier, C. E. (1991). Nursing case management: Critical pathways to desirable outcomes. Nursing Management, *22*(3), 52-55.

- Hall, L. M. (1997). Staff mix models: Complementary or substitution roles for nurses. Nursing Administration Quarterly, 21(2), 31-39.
- Halloran, E. J., Patterson, C., & Kiley, M. (1987). Case-mix: Matching patient need with nursing resource. Nursing Management, 18(3), 27-42.
- Hamm-Vida, D. E. (1990). Cost of non-nursing tasks. Nursing Management, 21(4), 46-52.
- Hartshorn, J. C. (1985). Modular nursing: A model ahead. Nursing Success Today, 2(5), 25-29.
- Hartz, A., Krakauer, H., Kuhn, E., Young, M., Jacobsen, S., Gay, G., Muenz, L., Katzoff, M., Bailey, R., & Rimm, A. (1989). Hospital characteristics and mortality rates. The New England Journal of Medicine, 321, 1720-1725.
- Hausmann, R. K. & Hegyvary, S. T. (1977). Monitoring quality of nursing care. (DHEW Publication No. [HRA] 70-77). Washington, DC: U.S. Government Printing Office.
- Hay Group. (1989). Misuse of RNs spurs shortage, says new study: Only 26% of time is spent in professional care. American Journal of Nursing, 89, 1223, 1231.
- Hayes, P. M. (1994). Non-nursing functions: Time for them to go. Nursing Economics, 12, 120-125
- Heinemann, D., Lengacher, C. A., VanCott, M. L., Mabe, P., & Sevymer, S. (1996). Partners in practice care: Measuring the effects on patient satisfaction and other quality indicators. Nursing Economics, 14, 276-285.
- Hendrickson, G., Doddato, T. M., & Kovner, C. T. (1990). How do nurses use their time? Journal of Nursing Administration, 20(3), 31-38.
- Henry, S. B., Holzemer, W. L., & Reilly, C. A. (1994). The relationship between type of care planning system and patient outcomes in hospitalized AIDS patients. Journal of Advanced Nursing, 19, 691-698.
- Hershey, J. C., & Baron, J. (1992). Judgment by outcomes: When is it justified? Organizational Behavior and Human Decision Making Process, 53, 89-93.
- Hicks, L., Stallmeyer, J. M., & Coleman, J. R. (1992). Nursing challenges in managed care. Nursing Economics, 10, 265-276.
- Hinshaw, A. S., & Atwood, J. R. (1982). A patient satisfaction instrument: Precision

- by replication. Nursing Research, 31, 170-175.
- Hinshaw, A. S., Scofield, R., & Atwood, J. R. (1981). Staff, patient and cost outcomes of all-registered nurse staffing. Journal of Nursing Administration, 11(11-12), 30-36.
- Holzemer, W. L. (1990). Quality and costs of nursing care: Is anybody out there listening? Nursing and Health Care, 11, 412-415.
- Holzemer, W. L. (1992). Nursing effectiveness research and patient outcomes: A challenge for the second HIV/AIDS decade. Critical Care Nursing Clinics of North America, 4, 429-435.
- Holzemer, W. L. (1994). The impact of nursing care in Latin America and the Caribbean: A focus on outcomes. Journal of Advanced Nursing, 20(1), 5-12.
- Holzemer, W. L., & Henry, S. B. (1991). Nursing care plans for people with HIV/AIDS: Confusion or consensus? Journal of Advanced Nursing, 16, 257-261.
- Holzemer, W. L., & Henry, S. B. (1992). Computer-supported versus manually generated nursing care plans: A comparison of patient problems, nursing interventions and AIDS patient outcomes. Computer Nursing, 10(1), 19-24.
- Holzemer, W. L., & Reilly, C. A. (1995). Variables, variability, and variations research: Implications for medical informatics. Journal of American Medical Informatic Association, 2, 183-190.
- Jacobson, E. (1990). Three new ways to deliver care. American Journal of Nursing, 90(7), 24-26.
- Joint Commission on Accreditation of Health Care Organizations (1992). Accreditation manual for hospitals: Vol. 1. Oakbrook Terrace, IL: JCAHO Department of Publications.
- Johnson, M., Gardner, D., Kelly, K., Maas, M., & McCloskey, J. C. (1991). The Iowa model: A proposed model for nursing administration. Nursing Economics, 9, 255-262.
- Johnson, M. & McCloskey, J. C. (1993). Economics myths and realities: Doing more with no more. St. Louis, MO: Mosby-Year Book.
- Jones, K. R. (1993). Outcomes analysis: Methods and issues. Nursing Economics, 11(3), 145-152.

- Kalanek, C. (1992). A study of unlicensed personnel who provide assistance to the nurse. Journal of Nursing Care Quality, 6(Special report), 49-55.
- Kirby, K. K., & Garfink, C. M. (1991). The university hospital nurse extender model: Part I, An overview and conceptual framework. Journal of Nursing Administration, 21(1), 25-30.
- Kirby, K. K., Garfink, G. M., Starck, P., Russo, J. M., & Bachman, S. S. (1991). The University Hospital nurse extender model: Part II, Program implementation. Journal of Nursing Administration, 21(2), 22-26.
- Kirk, R. E. (1995). Experimental design: Procedure for the behavioral science (3<sup>rd</sup> ed.). Pacific Grove, CA: Brooks/Cole Publishing Co.
- Knapp, T. R. (1990). Treating ordinal scales as interval scales: An attempt to resolve to controversy. Nursing Research, 39(2), 121-123.
- Knaus, W., Draper, E., Wagner, D., Zimmerman, J. (1986). An evaluation of outcomes from intensive care in major medical centers. American Intern Medicine. 104, 410-418.
- Kramer, M. (1990). The magnet hospitals: Excellence revisited. Journal of Nursing Administration, 20(9), 35-44.
- Krapohl, G. L., & Larson, E. (1996). The impact of unlicensed assistive personnel on nursing care delivery. Nursing Economics, 14, 99-110, 122.
- Kunkle, V. (1990). Marketing strategies for nurse managers: A guide for developing and implementing a nursing marketing plan. Rockville, MD: An Aspen Publication.
- La Monica, E. L., Oberst, M. T., Madea, A. R., & Wolf, R. M. (1986). Development of a patient satisfaction scale. Research in Nursing & Health, 9(1), 43-50.
- Landefeld, C. S., Palmer, R. M., Kresevic, D., Fortinsky, R. H., & Kowal, J. (1995). A randomized trial of care in a hospital medical unit especially designed to improve the functional outcomes of acutely ill older patients. The New England Journal of Medicine, 332(20), 1338-1344.
- Lang, N. M., & Clinton, J. F. (1984). Quality assurance: The idea and its development in the United States. In L. D. Willis, & M. E. Linwood (Eds.), Measuring the quality of care (pp. 69-88). Edinburgh, Churchill Livingstone.
- Lang, N. M., & Marek, K. D. (1990). The classification of patient outcomes. Journal

of Professional Nursing, 6, 158-163.

- Lang, N. M., & Marek, K. D. (1992). Outcomes that reflect clinical practice. In National Institution of Health. Patient outcomes research: Examining the effectiveness of nursing practice. Bethesda, MD: Public Health Service.
- Larabee, J. H. (1995). The changing role of the consumer in health care quality. Journal of Nursing Care Quality, 9(2), 8-15.
- Larabee, J. H., Engle, V. F., Tolley, E. (1995). Predictors of patient-perceived quality. Scandinavian Journal of Caring Sciences, 9, 153-164.
- Larson, P. J., & Ferketich, S. L. (1993). Patients' satisfaction with nurses caring during hospitalization. Western Journal of Nursing Research, 15, 690-707.
- Laza, R. W., Wheaton, P. L. (1990). Recognizing the pitfalls of total quality management. Public Utilities Fortrightly, 125(8), 17-21.
- Lengacher, C. A., & Mabe, P. R. (1993) Nurse extenders. Journal of Nursing Administration, 23(3), 16-19.
- Lengacher, C. A., Mabe, P. R., Bowling, C. D., Heinemann, D., Kent, K., & VanCott, M. L. (1993). Redesigning nursing practice: The partners in patient care model. Journal of Nursing Administration, 23(12), 31-37.
- Lengacher, C. A., Kent, K., Mabe, P. R., Heinemann, D., VanCott, M. L., & Bowling, C. D. (1994). Effects of the partners in care practice model on nursing outcomes. Nursing Economics, 12, 300-308.
- Lengacher, C. A., Patricia, R., Mabe, M. P. A., Kent, K., & Allred, R. (1995). Design, implementation, and evaluation of an educational program for a new practice model. Journal of Nursing Staff Development, 11, 195-200.
- Lengacher, G. A., Mabe, P. R., Heinemann, D., VanCott, M. L., Swymer, S., & Kent, K. (1996). Effects of the PIPC model on outcome measures of productivity and costs. Nursing Economics, 14, 205-212, 238.
- Levit, K. R., Sensenig, A. L., Cowan, C. A., Lazenby, H. C., McDonnell, P. A., Won, D. K., Sivarajan, L., Stiller, J. M., Donham, C. S., & Stewart, M. S. (1994).
- Levy, P. S., & Lemeshow, S. (1991). Sampling of population: Methods and applications. New York, NY: John Wiley & Sons, Inc.
- Lewis, J. R. (1994). Patient views on quality care in general practice: Literature



- review. Social Science Medicine, 39(5), 665-670.
- Lewis, K. E., & Woodside, R. E. (1992). Patient satisfaction with care in the emergency department. Journal of Advanced Nursing, 17, 959-964.
- Lin, C. C. (1996). Patient satisfaction with nursing care as an outcome variable: Dilemmas for nursing evaluation researchers. Journal of Professional Nursing, 12, 207-216.
- Lipsey, M. W. (1990). Design sensitivity: Statistical power for experimental research. Newbury Park, CA: SAGE Publication Inc.
- Little, R. J. A., & Rubin, D. B. (1987). Statistical analysis with missing data. New York, NY: John Wiley & Son.
- Lohr, K. N. (1988). Outcome measurement: Concepts and questions. Inquiry, 25(Spring), 37-50.
- Lohr, K. N., Yordy, K. D., & Thier, S. O. (1988). Current issues in quality of care. Health Affairs, 7(1), 5-18.
- Longo, D. R. (1993). Patient practice variation: A call for research. Medical Care, 31(5), YS81-YS85.
- Lovelock, C. H. (1985). Developing and managing the customer-service function in the service sector. In J. A. Czepiel, M. R. Solomon, & C. F. Furprenant (Eds.), The service encounter: Managing employee/customer interaction in service business (pp. 291-302). Lexington, MA: D.C. Health and Company.
- Ludwig-Beymer, P., Ryan, C. J., Johnson, N. J., Hennesy, K. A., Guttuso, M. C., Epton, R., & Czurylo, K. T. (1993). Using patient perceptions to improve quality care. Journal of Nursing Quality, 7(2), 42-51.
- Magargal, P. (1987). Modular nursing: Nurses rediscover nursing. Nursing Management, 18(11), 98-104.
- Marek, K. D. (1989). Outcome measurement in nursing. Journal of Nursing Quality Assurance, 4(1), 1-9.
- Manss, V. C. (1993). Influencing the rising costs of health care: A staff nurse's perspective. Nursing Economics, 11, 83-86. 114.
- Manthey, M. (1980). The practice of primary nursing. Boston, MA: Blackwell Scientific Publication.

- Manthey, M. (1988). Primary practice partners: A nurse extender system. Nursing Management, 19(3): 58-59.
- Manthey, M. (1989). Practice partnerships: The newest concept in care delivery. Journal of Nursing Administration, 19(2), 33-34.
- Manthey, M. (1992). Practice partners: Humanizing healthcare. Nursing Management, 23(5), 18-19.
- Mayer, G. G. (1992). Work sampling in ambulatory care nursing. Nursing Management, 23(9), 52-56.
- McCarthy, S. (1989). The future of nursing practice and implications for nurse education. Journal of Professional Nursing, 5, 121, 168.
- McCloskey, J. C., Bulechek, G. M., Moorhead, S., & Daly, J. (1996). Nurses' use and delegation of indirect care interventions. Nursing Economics, 14, 22-33.
- McClure, M. L. (1989). The nurse executive role: A leadership opportunity. Nursing Administration Quarterly, 13(3), 1-8.
- McCormick, K. A. (1991). The urgency of establishing international uniformity of data. In E. J. S. Hovenga, K. J. Hannah, & K. A. McCormick (Eds.), Nursing informatics 91: Proceeding of the fourth international conference on nursing use of computers and information service (pp. 77-81). Berlin, Springer-Verlog.
- McDaniel, C., & Nash, J. G. (1990). Compendium of instruments measuring patient satisfaction with nursing care. Quality Research Bulletin, 16, 182-188.
- McGee, J. (1993). 1991-1992 Pilot study: Evaluation of partners in practice. Unpublished study from Creative Nursing Management, Inc., Minnesota, MN.
- McKibbin, R. (1989). New study finds vacancy rate threatens care. The American Nurse, 21(6), 5.
- McLaughlin, F. E., Thomas, S. A., & Barter, M. (1995). Changes related to care delivery patterns. Journal of Nursing Administration, 25(5), 35-46.
- Megivern, K., Halm, M. A., & Jones, G. (1992). Measuring patient satisfaction as an outcome of nursing care. Journal of Nursing Care Quality, 6(4), 9-24.
- Melberg, S. E. (1997). Effects of changing skill mix. Nursing Management, 28(11),

47-48.

- Merker, L. R., Cerda, F., & Blank, M. A. (1991). 1990 Utilization of nurse extenders. Chicago, IL: American Hospital Association.
- Merry, M. D. (1987). What is quality care? A model for measuring health care excellence. Quality Review Bulletin, *13*, 298-301.
- Mills, P. K. (1986). Managing service industries: Organizational practices in a postindustrial economy. Cambridge, MA: Ballinger Publishing Company.
- Moye, C. E. (1991). Product line management. Orthopaedic Nursing, *10*(1), 56-61.
- Munro, B. H. (1997). Statistical methods for health and research (3<sup>rd</sup> ed.). Philadelphia, PA: Lippincott-Raven Publishers.
- Munro, B. H., Jacobsen, B. S., & Brooten, D. A. (1994). Re-examination of the psychometric characteristics of the La Monica-Oberst patient satisfaction scale. Research in Nursing and Health, *17*, 119-125.
- Nash, M. G., Blackwood, D., Boone, E. B., Klar, R., Lewis, E., MacInnis, K., McKay, J., Okress, J., Richer, S., & Tannas, C. (1994). Managing expectations between patient and nurse. Journal of Nursing Administration, *24*(11), 49-55.
- National Center for Health Statistics. (1985). U. S. decennial life tables for 1979-1981. Hyattsville, MD: U. S. Department of Health and Human Services.
- National health expenditures, 1993. Health Care Financing Review, *16*, 247-294.
- Neidlinger, S. H., Bostrom, J., Stricker, A., Hild, J., & Zhang, J. Q. (1993). Incorporating nursing assistive personnel into a nursing professional practice model. Journal of Nursing Administration, *23*(3), 29-37.
- Nelson, C. W., & Niederberger, J. (1990). Patient satisfaction surveys: An opportunity for total quality improvement. Hospital & Health Services Administration, *35*, 407-427.
- Nelson, E. C., Hays, R. D., Larson, C., & Batalden, P. B. (1989). The patient judgment system: Reliability and validity. Quality Review Bulletin, *15*, 185-191.
- Nelson, E. C., Larson, C. O., Davies, A. R., Gustafson, D., Ferreira, P. L., & Ware, J. E. (1991). The patient comment card: A system to gather customer feedback.

Quality Review Bulletin, 17, 278-285.

- Nelson, E. C., Rubin, H. R., Hays, R. D., & Meterko, M. (1990). Patient judgments of hospital quality: Response to questionnaire. Medical Care, 28(9), S18-22.
- Nelson, E. C., Ware, J. E., & Batalden, P. (1990). Patient judgments of hospital quality: Pilot study methods, design study. Medical Care, 28(9), S15-17.
- Neter, J., Wasserman, W., & Kutner, M. H. (1990). Applied linear statistical models: Regression, analysis of variance, and experimental designs (3<sup>rd</sup> ed.). Boston, MA: Irwin.
- Norusis, M. J. (1995). SPSS for Windows: Release 7.0. Chicago, IL: SPSS Inc.
- Nunnally, J. C., & Bernstein, I. H. (1994). Psychometric theory (3<sup>rd</sup> ed.). New York, NY: McGraw-Hill.
- Omachonu, V. K., & Nanada, R. (1989). Measuring productivity: Outcome vs. output. Nursing Management, 20(4), 35-40.
- Pandiani, J. A., Kessler, R., Gordon, L., & Domkot, D. (1982). Monitoring client satisfaction: Ethical, political, and empirical issues. In H. Fishman (Ed.), Creativity and innovation. Davis, CA: Pyramid.
- Parsons, M. L., Scaltrito, S., & Vondle, D. P. (1990). A program to manage nurse staffing costs. Nursing Management, 21(10), 42-44.
- Petersen, M. (1988). Measuring patient satisfaction: Collecting useful data. Journal of Nursing Quality Assurance, 2(3), 25-35.
- Polit, D. F. (1996). Data analysis and statistic for nursing research. Stamford, CT: Appleton & Lange.
- Polit, D. F., & Hungler, B. P. (1991). Nursing Research: Principles and Methods (4<sup>th</sup> ed.). Philadelphia, PA: J. B. Lippincott Co.
- Polit, D. F., & Sherman, R. E. (1990). Statistical power in nursing research. Nursing Research, 39(6), 365-369.
- Powers, P. H., Dickey, C. A., & Ford, A. (1990). Evaluating an RN/co-worker model. Journal of Nursing Administration, 20(3), 11-15.
- Prescott, P. A. (1993). Nursing: An important component of hospital survival under a reformed health care system. Nursing Economics, 11, 192-199.

- Prescott, P. A, Phillips, C. Y., Ryan, J. W., & Thompson, K. O. (1991). Changing how nurses spend their time. IMAGE: Journal of Nursing Scholarship, 23(1), 23-28.
- Reichelt, P. A., & Larson, P. A. (1994). Preimplementation financial evaluation of a structural work change: Cost analysis of an innovative staffing schedule. Nursing Administration Quarterly, 18(3), 68-73.
- Reitz, J. A. (1985). The development of a cost-allocation statistic for nursing. In F. A. Shaffer (Ed.), Costing out nursing: Pricing our product (pp. 123-133). New York, NY: National League for Nursing.
- Richardson, D. A., & Lambert, P. (1987). The nursing process: The effect on patients' satisfaction with nursing care. Journal of Advanced Nursing, 12, 559-562.
- Ringl, K. K. (1994). Patient care delivery systems. In R. Spitzer-Lehmann (Ed.), Nursing management desk reference: Concepts, skills and strategies (pp. 548-562). Philadelphia, PA: W. B. Saunders Company.
- Risser, N. (1975). Development of an instrument to measure patient satisfaction with nurses and nursing care in primary care settings. Nursing Research, 24, 45-51.
- Rizzo, J. A., et al. (1994). Facilitating care delivery redesign using measure of using culture and work characteristics. Journal of Nursing Administration, 24(5), 32-37.
- Robinson, N. C. (1991). A Patient-centered framework for restructuring care. Journal of Nursing Administration, 21(9), 29-34.
- Rogers, E. M. (1983). Diffusion of Innovation (3<sup>rd</sup> ed.). New York, NY: The Free Press.
- Rubin, H. R. (1990). Patient evaluations of hospital care: A review of the literature. Medical Care, 28(9), S3-S9, Supplement.
- Rudy, E. B., & Kerr, M. (1991). Unraveling the mystique of power analysis. Heart & Lung, 20(5), 517-522.
- Russo, J. M. K., & Lancaster, D. R. (1995). Evaluating unlicensed assistive personnel models: Asking the right questions, collecting the right data. Journal of Nursing Administration, 25(9), 51-57.

- Ryan, M. E., Collins, F. J., Dowd, J. B., & Pierce, P. K. (1995). Measuring patient satisfaction: A case study. Journal of Nursing Care Quality, 9(2), 44-53.
- Sandella, D. L. (1990). Cost versus quality: In the balance. Nursing Administration Quarterly, 14(3), 31-40.
- Scardina, S. A. (1994). SERVQUAL: A tool for evaluating patient satisfaction with nursing care. Journal of Nursing Care Quality, 8(2), 38-46.
- Shamian, J., Hagen, B., Hu, T. W., & Forgaty, T. E. (1994). The relationship between length of stay and required nursing care hours. Journal of Nursing Administration, 24(7/8), 52-58.
- Shaw, J. (1978). The quality-productivity connection in service sector management. New York, NY: Van Nostrand Reinhold Company.
- Shaw, H. E. (1980). Expectations and satisfaction of minority group clients: Implications for early termination of psychotherapy (Doctoral dissertation, California school of professional psychology - Berkley/Alameda, 1990). Disseration Abstracts International, vol. 41-12, Section B, 4689.
- Sherman, R. O. (1990). Team nursing revisited. Journal of Nursing Administration, 20(11), 43-46.
- Shukla, R. K. (1983a). AII-RN model of nursing care delivery: A cost-benefit evaluation. Inquiry, 20, 173-184.
- Shukla, R. K. (1983b). Technical and structural support systems and nurse utilization. Inquiry, 20, 381-389.
- Smith, G. B., et al. (1994). Role restructuring: Nurse, case manager and educator. Nursing Administration Quarterly, 19(1), 21-32.
- Spitzer, R. (1986). Nursing productivity: The hospital's key to survival and profit. Chicago, IL: S-N Publications, Inc.
- Stefan, S., Gillies, D. A., & Biordi, D. (1992). Nursing care costs for a DRG subgroup. Nursing Economics, 10(4), 277-310.
- Steward, B. J., & Archbold, P. G. (1992). Focus on psychometric: Nursing intervention studies require outcome measures that are sensitive to change, Part I. Research in Nursing and Health, 15, 477-481.
- Steward, B. J., & Archbold, P. G. (1992). Focus on psychometric: Nursing

intervention studies require outcome measures that are sensitive to change, Part II. Research in Nursing and Health, 16, 77-81.

Stillwagon, C. A. (1989). The impact of nurse managed care on the cost of nurse practice and nurse satisfaction. Journal of Nursing Administration, 19(11), 21-27, 122.

Strasen, L. (1994). Reengineering hospitals using the function follows form model. Journal of Nursing Administration, 24(12), 59-63

Stricklin, M. L. (1993). Home care consumers speak out on quality. Home Healthcare Nurse, 11(6), 10-17.

Tabachnick, B. G., & Fidell, L. S. (1996). Using Multivariate Statistics. Harper Collins College Publishers.

Thorpe, K. E. (1992). Health care cost containment: Result and lessons from the past 20 years. In S. Shortell & U. E. Reinhardt (Eds.), Improving health policy and management: Nine critical research issues for the 1990s (pp, 227-274). Ann Arbor, MI: Health Administration Press.

Tri-Council for Nursing. (1990). Statement on assistive personnel to the RN. Washington, DC: American Association of Colleges of Nursing.

Trifino, J. (1986). A reality based system for pricing nursing service. Nursing Management, 17(1), 19-24.

Troup, N., & Rushing, S. (1992). Working smarter with patient-focused care. Southern Hospitals, July-August, 13-15.

University Hospitals of Cleveland, Guest Relations Department. (1996). Patient satisfaction reports. 3<sup>rd</sup> & 4<sup>th</sup> Quarter 96. Cleveland, OH: Author.

University Hospitals of Cleveland, Guest Relations Department. (1997). Patient satisfaction reports. 1<sup>st</sup>, 2<sup>nd</sup>, & 3<sup>rd</sup> Quarter 97. Cleveland, OH: Author.

U.S. Department of Commerce. (1991). U.S. industrial outlook, 1991: Health and medical services. Washington, DC: U.S. Government Printing Office.

Vaughan, D. G., Fottler, M. D., Bamberg, R., & Blayney, K. D. (1991). Utilization and management of multiskilled health practitioners in U.S. hospitals. Hospital & Health Service Administration, 36, 397-417.

Villaire, M. (1993). Marie Manthey on the evolution of primary nursing. Critical Care

- Nurse, 13, 100-107.
- Vuori, H. (1991). Patient satisfaction: Does it matter? Quality Assurance in Health Care, 3, 183-189.
- Ware, J. E., Davies-Avery, A., & Stewart, A. L. (1978). The measurement and meaning of patient satisfaction. Health and Medical Care Service Review, 1(1), 1, 3-15.
- Weingarten, S., Agos, L., Tankel, N., Sheng, A., Ellrodt, A. G. (1993). Reducing lengths of stay for patients hospitalized with chest pain using medical practice guidelines and opinion leaders. American Journal of Cardiology, 71, 259-262.
- Weisman, C. S. (1992). Nursing practice models: Research on patient outcomes. In Department of Health and Human Services, Public Health Service, National Institutes of Health. Patient outcome research: Examining the effectiveness of nursing practice (pp. 112-120). NIH Publication no. 93-3411.
- Wennberg, J. E. (1990). Better policy to promote the evaluative clinical science. Quality Assurance Health Care, 2, 21-29.
- Widtfeldt, A. K. (1992). Quality and quality improvement in occupational health nursing. AAOHN Journal, 40, 326-332.
- Wiggers, J. H., Donovan, K. O., Redman, S., & Sanson-Fisher, R. W. (1990). Cancer patient satisfaction with care. Cancer, 66, 610-616.
- Wilson, J. L. (1994a). Using assistive personnel in the ICU. In G. S. Wlody (Ed.), Managing clinical practice in critical care nursing (pp. 210-230). St. Louis, MO: Mosby.
- Wilson, C. K. (1994b). PAL program: A collaborative nursing extender program. Aspen's Advisor for Nurse Executives, 9(8), 1-3.
- Wilson, L., Prescott, P. A., & Aleksandrowicz, L. (1988). Nursing: A major hospital cost component. Health Services Research, 22, 773-796.
- Witzel, P. A., Ingersoll, G. L., Schultz, A. W., & Ryan, S. A. (1996). A cost estimation model for measuring professional practice. Nursing Economics, 14, 286-291, 314.
- Wong, R., Gordon, D. L., Cassard, S. D., Weisman, C. S., & Bergner, M. (1992). A cost analysis of a professional practice model for nursing. Nursing Economics, 11(5), 292-297.



- Young, S. (1990). From primary to modular nursing. Nursing Management, 21(5), 97.
- Youngblut, J. M., & Casper, G. R. (1993). Focus on psychometrics: Single-item indicators in nursing research. Research in Nursing & Health, 16, 459-465.
- Zander, K. (1988). Nursing case management: Strategic management of cost and quality outcomes. Journal of Nursing Administration, 18(5), 23-30.

**Appendix A**

**Lerner Tower 7, University Hospitals of Cleveland**

**LERNER TOWER 7  
ANNUAL REPORT 1996**

**I. Service Population**

Lerner Tower 7 continues to serve a wide variety of patients who present with multiple medical and hematological/oncological diseases. Almost all of our patients have multiple medical problems which are not fully represented by a list of leading DRG's. Patients presenting with CHF (127 cases; same as 1995) remain our most prevalent type of patient. The next four most common DRG's are patients with chemotherapy (88 cases); patients with RBC disorders, i.e. sickle cell crisis predominantly (83 cases); patients with pneumonias (79 cases); and patients with asthma (63 cases). We had 1468 patients who presented with over 200 other different DRG's. This huge variety of patients is both the most exciting part of a medical division as well as being one of the most challenging aspect of one. We continue to have 5 medical teams admitting to us. Our patients range in age from late adolescent (18 years) to very old (90's and 100's). Patients with VRE seem to be increasing in numbers and the cost of caring for these patients in strict isolation is partially reflected in the supply budget overage.

**II. Volume: Budget vs Actual**

Tower 7 had been budgeted to have a 95% occupancy rate in 1996. We did not meet our budgeted projections in patient days and occupancy but did exceed in number of budgeted cases. We believe this can be explained by a decrease in LOS by .8 days (see table):

	Budgeted	Actual	Variance
Days	10467	10111	-352
Cases	1713	1908	+195
LOS	6.1	5.3	.8
Occupancy	95%	92%	

Nursing hours per patient day were only 4.48 and total hours per patient day (additional PCA's etc) was 5.78.

**III. Expense Performance**

Tower 7 was \$129,171 overbudget for 1996 at least half of which was in salaries (see table). Because of volume, our cost per day (\$198) was only \$20 overbudgeted cost per day (\$178).

ELEMENT	VARIANCE	EXPLANATION
RN, PCA, PSW Salaries	-68557.70	a) RN FMLA days 266 b) PCA FMLA days 10 c) RN vacancies varied .6 to 2.8 d) oriented 4 RN's plus prn RN's e) PTO - used 6300 hours of PTO/vac/misc for RN's/PCA's/PSW's - averaged 270 hours per FTE.
Private Duty (Sitters)	-24715	Population continues to require sitter for demented, confused, agitated and combative patients. We had one patient for more than 40 days who required 24 hour sitter coverage to prevent self destructive behaviors.
D.S. Salaries	+1506	a) One D.S. on FMLA b) Used over 1000 hours PTO - average 259 hours/FTE
Equipment Rental	-17963	High risk population for development of skin breakdown.
Supplies	-8609	a) Heavy volume floor b) High number of VRE patients

#### IV. Clinical Practice Issues/Changes

The focus of the year was to improve the utilization of our support services and to continue team building initiatives from previous years. After much discussion and inservices Tower 7 seemed to be ready to initiate Partners In Practice which we did in January, 1997. This necessitated looking at all roles; PCA, CTA, RN and especially looking at charge nurse role. We are continuing our efforts in these areas. We also implemented Nursing Coordinating Councils initiative for walk rounds with limited success. The last half of the year was occupied by the adoption and initiation of the PSW into the division. We continue to work on this area.

#### V. Goals for 1997

- A. 1. Full implementation of Partners In Practice  
Time Line  
January, 1997 - 3 partnerships were formed and began working with each other.  
March, 1997 - the 3 partnerships have finished orienting and will take a full assignment.  
April, 1997 - another partnership has been formed and will orient.  
June, 1997 - should be fully implemented.

2. Education

The need for open discussion of concerns and need for guidelines for the partnerships as well as the interface between them and the solo practitioners remains. At least one staff meeting per month will be used for the purpose. Separate meetings with just the partners will be initiated.

- B. Increase delegation skills of RN's.. Need is felt not only because of partners but for all practitioners. On-going discussion/classes have been initiated and will continue. This is on on-going project.
- C. Orientation of PCA's  
We started a new orientation process for new PCA's in 1996. We have more work to do on this.

**Appendix B**  
**Partnership Agreement**

## PARTNERS-IN-PRACTICE™ SAMPLE AGREEMENT

This agreement made on \_\_\_\_\_, 1992, is a non-legally binding agreement known as PARTNERS-IN-PRACTICE™.

It is formed between \_\_\_\_\_, and \_\_\_\_\_ in which we declare ourselves to be in a partnership relationship. The terms of the relationship include, but may not be limited to the following:

We agree to work the same schedule normally and work together during that shift.

We agree to share a group of patients and the responsibilities for meeting the needs of those patients.

We agree the Senior Partner has the authority to define the role and activities of the Practice Partner within established regulations and standards.

We agree the Senior Partner has an obligation to develop and coach the Practice Partner. The Practice Partner will share her/his unique knowledge with the Senior Partner.

We agree that both of us are responsible for giving feedback to each other.

We recognize our obligation to maintain healthy relationships with each other and between the other members of the unit staff.

Either of us may choose to terminate the relationship after an agreed upon period of time. When a partnership is terminated due to factors other than unacceptable job performance, each member shall continue employment in an appropriate job category and may choose to form a new partnership.

A month's notice is an acceptable timeframe for dissolving a relationship. It is recognized that circumstances may result in a shorter notice period.

**Appendix C**

**Cost Reports**

**Appendix C1 Unit Spread Sheet**

**Appendix C2 Departmental Expense Statement**

**Appendix C3 Departmental Costs Statement**

**Appendix C4 Departmental Utilization Statement**

**Appendix C5 Salary Cost**

**Appendix C6 Inpatient Census Statistics**

**Appendix C7 Division Fact Sheet**



### Appendix C1 Unit Spread Sheet

Division/Unit \_\_\_\_\_ MONTHLY BUDGET VARIANCE WORKSHEET Month/Year \_\_\_\_\_

	Month Actual	Month Budget	Month Variance	YTD Actual	YTD Budget	YTD Variance		
<b># Cases</b>								
<b>LOS</b>								
Patient Days	_____	_____	_____	_____	_____	_____		
Discharges	_____	_____	_____	_____	_____	_____		
Cost/Day	_____	_____	_____	_____	_____	_____		
Cost/Discharge	_____	_____	_____	_____	_____	_____		
% Occupancy	_____	_____	_____	_____	_____	_____		
Procedure and OBS Pts	_____	_____	_____	_____	_____	_____		
	RN Month (CMIS)	RN YTD (CMIS)	PCA Month (CMIS)	PCA YTD (CMIS)	D/S Month (Pay - )	D/S YTD (Thru Pay )	Other Month (CMIS)	Other YTD (CMIS)
<b>Please express in hours</b>								
Vacancy	_____	_____	_____	_____	_____	_____	_____	_____
Education	_____	_____	_____	_____	_____	_____	_____	_____
Orientation	_____	_____	_____	_____	_____	_____	_____	_____
Overtime	_____	_____	_____	_____	_____	_____	_____	_____
Agency PRN - RN	_____	_____	_____	_____	_____	_____	_____	_____
Misc. (Salaried Areas)	_____	_____	_____	_____	_____	_____	_____	_____
Other (JD, FL, LOA)	_____	_____	_____	_____	_____	_____	_____	_____
PTO	_____	_____	_____	_____	_____	_____	_____	_____

Relevant Data: \_\_\_\_\_

Appendix C2 Departmental Expense Statement

REPORT #: DEPT		UNIVERSITY HOSPITALS OF CLEVELAND		PRELIM			
RUN DATE 04/07/1997		DEPARTMENTAL EXPENSE STATEMENT - BY DEPARTMENT		PAGE 0236			
RUN TIME 08:12:07		PERIOD ENDING MARCH 31, 1997					
ACCOUNT NUMBER	ACCOUNT NAME	ACTUAL	CURRENT MONTH BUDGET	VARIANCE	ACTUAL	YEAR TO DATE BUDGET	VARIANCE
1-51-41341-140-02	SALARIES & WAGES						
1-51-41341-151-02	T7 MEDICINE - PRIVATE DUTY						
1-51-42341-140-02	SALARIES & WAGES						
1-51-41341-100-02	TOTAL SALARIES AND WAGES						
1-51-41341-210-02	BENEFIT ALLOCATION SUMMARY						
1-51-41341-200-02	BENEFIT EXPENSE SUMMARY						
1-51-41341-413-02	T7 MEDICINE - TELECOM CHRGS						
1-51-41341-400-02	TOTAL PLANT OPERATION						
1-51-41341-651-02	T7 MEDICINE - MINOR EQUIPME						
1-51-41341-600-02	TOTAL GENERAL EXPENSE						
1-51-41341-791-02	T7 MEDICINE - SUPPLIES						
1-51-41341-700-02	TOTAL PATIENT CARE SUPPLIES						
1-51-41341-831-02	T7 MEDICINE - DEPRECIATION						
1-51-41341-800-02	TOTAL OTHER EXPENSE						
1-51-41340-000-02	T7 - MEDICINE						

### Appendix C3 Departmental Costs Statement

University Hospitals of Cleveland  
 General Manager Reports - Med/Surg  
 March 1997  
 Monthly Departmental Cost per Day

FINAL - MARCH 1997

Mar-97

( ) = more than budget

#### Performance Tracking System

Department	Actual			Budget			Difference	
	Days	Expenses	Expense per Day	Days	Expenses	Expense per Day	In Expense per Day	Percentage Difference
Lakeside Pavilion Div 20								
Lakeside Pavilion Div 40								
Nursing - T3 Telemetry								
Nursing - T7 Medicine								
Nursing - L60 Medicine								
Nursing - T9 Surg/Trsp								
Nursing - L50 Medicine								
Nursing - T6 BMT/Tumor								
Nursing - T5 Orthopedics								
Nursing - T8 Surgery								
Nursing - L55S CRC								
Nursing - L65 CCS								
Nursing - T4 Neuro/Spine								
Nursing - Flex								
<b>Totals</b>								
<b>Intensive Care Units</b>								
Nursing - P3 CICU								
Nursing - T4 NSICU								
Nursing - P3 MICU								
Nursing - P2 SICU								
Nursing - P3 SCU								
<b>Grand Totals</b>								

University Hospitals of Cleveland  
 General Manager Reports - Med/Surg  
 March 1997  
 Monthly Departmental Cost per Discharge

FINAL - MARCH 1997

Mar-97

( ) = more than budget

Performance Tracking System

Department	Actual			Budget			Difference	
	Disch	Expenses	Expense per Disch	Disch	Expenses	Expense per Disch	In Expense per Disch	Percentage Difference
Lakeside Pavilion Div 20								
Lakeside Pavilion Div 40								
Nursing - T3 Telemetry								
Nursing - T7 Medicine								
Nursing - L60 Medicine								
Nursing - T9 Surg/Trsp								
Nursing - L50 Medicine								
Nursing - T6 BMT/Tumor								
Nursing - T5 Orthopedics								
Nursing - T8 Surgery								
Nursing - L55S CRC								
Nursing - L65 CCS								
Nursing - T4 Neuro/Spine								
Nursing - Flex								
ICU Discharges								
<b>Grand Totals</b>								
<b>Intensive Care Units</b>								
Nursing - P3 CICU								
Nursing - T4 NSICU								
Nursing - P3 MICU								
Nursing - P2 SICU								
Nursing - P3 SCU								
<b>Totals</b>								

CASE FOR ICU IS DEFINED AS DIRECT ADMIT PLUS TRANSFER IN.

### Appendix C4 Departmental Utilization Statement

General Manager Reports - Med/Surg  
 March 1997  
 Monthly Departmental Utilization

FINAL - MARCH 1997

Mar-97

( ) = more than budget

Department	Patient Days			Cases			LOS		
	Actual	Budget	Difference	Actual	Budget	Difference	Actual	Budget	Difference
Lakeside Pavilion Div 20									
Lakeside Pavilion Div 40									
Nursing - T3 Telemetry									
Nursing - T7 Medicine									
Nursing - L60 Medicine									
Nursing - T9 Surg/Trsp									
Nursing - L50 Medicine									
Nursing - T6 BMT/Tumor									
Nursing - T5 Orthopedics									
Nursing - T8 Surgery									
Nursing - L55S CRC									
Nursing - L65 CCS									
Nursing - T4 Neuro/Spine									
Nursing - Flex									
ICU Discharges									
<b>Totals</b>									
<b>Intensive Care Units</b>									
Nursing - P3 CICU									
Nursing - T4 NSICU									
Nursing - P3 MICU									
Nursing - P2 SICU									
Nursing - P3 SCU									
<b>Totals</b>									
<b>Grand Totals</b>									

CASE FOR ICU IS DEFINED AS DIRECT ADMIT PLUS TRANSFER IN.

### Appendix C5 Salary Cost

ALB 0510  
 RUN DATE 09 OCT 1996

ACCOUNT CODE LEVEL BUDGETER  
 UNIVERSITY HOSPITALS OF CLEVELAND  
 ACCOUNT MODELING WORKSHEET

COST CENTER: 15142341 TOWER 7  
 ASSUMPTION : MS97 TOT MEDICAL SURGICAL, 1997 (PERIODS: 1 - 12)

	BASE	REVISED \$	DIFFERENCE	PCT
	----	-----	-----	---
***** ** EXPENSES ** *****				
111 REGULAR SALARIES				
121 PAID TIME OFF				
131 OVERTIME PAY				
219 FRINGE BENEFITS				
TOTAL EXPENSES				
***** ** FTE'S ** *****				
111H REGULAR SALARIES-HOURS				
121H PAID TIME OFF HOURS				
TOTAL FTE'S				

## Appendix C6 Inpatient Census Statistics

(ADAPTED FROM PTMCSNS)  
Adapted to PBFACSTA

INPATIENT CENSUS STATISTICS  
BY NURSE STATION (DIVISION)  
FOR THE MONTH OF DECEMBER 1986  
UNIVERSITY HOSPITALS OF CLEVELAND

NURSE STATION	NUMBER OF ADMISSIONS	TRANSFERS IN	TRANSFERS OUT	DISCHARGES DEATHS OTHER	TOTAL	ACTUAL PT DAYS	DISCH PT DAYS
MED/SURG							
C020							
C040							
LT03							
LT04							
LT05							
LT06							
LT07							
LT08							
LT09							
CICU							
TCIT							
MICU							
TNSU							
SCU							
TPHA							
SICU							
L50							
L80							
L85							
L55R&S							
OTHER ADMISS:							
MACDONALD							
L&D							
MC2N							
MAC3							
MC3N							
MC3P							
MAC4							
MAC5							
H.P.							
HP03							
HP04							
RB&C							
MICU							
PICU							
R55N							
R3W							
R4W							
R45L							
R5W							
R6W							
R7N							
R7W(O&S)							
SNF							
S002							
S003							
H004							
TOTAL							

Nursing Resources







Page 1  
HRS303

UNIVERSITY HOSPITALS OF CLEVELAND  
NURSING CARE HOURS PER PATIENT PER DAY (SOURCE - HR77,HRS2,PTMICSNS)  
FOR THE MONTH OF DECEMBER 1986

DIVISION	CENSUS	ADMIN	RN	PRN AGENCY	TOTAL RN	NON RN	TOTAL CLN CARE
MD/SG. CICU/MP3	HR HO						
MD/SG. NSU/MP4	HR HO						
MD/SG. MICU/MP3	HR HO						
MD/SG. SICU/MP2	HR HO						
MD/SG. SCU/MP3	HR HO						
MD/SG. LT 3	HR HO						
MD/SG. LT 4	HR HO						
MD/SG. LT 5	HR HO						
MD/SG. LT 6	HR HO						
MD/SG. LT 7	HR HO						
MD/SG. LT 8	HR HO						
MD/SG. LT 9	HR HO						
MD/SG. DIV 50	HR HO						
MD/SG. CRC Incomplete Pt Data	HR HO						
MD/SG. DIV 80	HR HO						
MD/SG. L65/CCS	HR HO						
RB&C. NICU	HR HO						
RB&C. PICU	HR HO						

Nursing Resources  
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Appendix C7 Division Fact Sheet

REGID, L17 COST CENTER NUMBER: 14134111101	DIVISION FACT SHEET FOR THE MONTH OF DECEMBER 1999														
	12/99	11/99	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1999
PATIENT CENSUS DATA **Occupancy on staffed beds															
Available Beds															
Staffed Beds															
Avg Daily Census															
Avg % Occupancy**															
Patient Care Days															
DBS Pts/P in Beds															
Admissions															
Transfers In															
Transfers out															
Discharges															
Deaths															
POSITION DATA															
Authorized FTE's															
Registered Nurse															
Clinical support															
Central support															
Actual FTE's															
Beginning RN FTE															
Clinical support															
Central support															
RN FTE Net Change															
RN Onroll															
RN Transfer In															
RN Transfer Out															
RN Other															
Ending RN FTE															
CLINICAL HR\$/PAT DAY															
Base (incl) Hours/PCD															
Worked Hours/PCD															
RN Hr/PCD															
Clin Sup Hr/PCD															
Clin HRM/DRG/CHG															
CLINICAL HOURS DATA															
Base Hours Budget															
Base Hours Actual															
Overtime Hours Actual															
Over + Under - Budget															
Pts by Type RN (REG)															
PRN															
Agency															
Clin Supp (REG)															
PTO/VAC/BACK(HOL)															
PT Sick Wkrs(REG)															
Secondary Worked															
Secondary Paid															
Specy Paid Hours/PCD															
NURSING RESOURCES 01/17/97 19 22 99															

**Appendix D**  
**Patient Satisfaction Report**

# Objectives/Methodology

**Objective:** To provide a system for monitoring satisfaction and quality of service as perceived by patients of Lerner Tower/Lakeside Hospital.

**Additional benefits:**

- To provide patient feedback (quantitative/ qualitative data) to hospital management for assisting in improving quality service.
- To identify specific areas that significantly impact quality service as perceived by patients.
- To identify specific patient needs/concerns as a result of survey feedback and intervene or refer to appropriate management for intervention.
- To refer complimentary remarks to departmental management in order to communicate "positives" and recognize employees mentioned as exemplary by patients. To provide a process by which patients can communicate opinions and perceptions of their medical care and service received.

**Methodology:**

- Mail survey process is conducted to obtain information from discharged patients of Lerner Tower/Lakeside Hospital.
- Parents of patients are mailed a questionnaire 5 days after discharge with a cover letter signed by Mrs. Walters during 2nd Qrt. and 3rd Qrt. '96.
- Reminder cards are sent one week after questionnaire are mailed in order to increase response rate.
- Non-respondents are mailed another questionnaire two weeks after the initial mailing.
- Questionnaires that contain pertinent information in need of immediate attention are forwarded to appropriate hospital management. Guest Relations respond to each patient who requests additional information or follow-up.
- Questionnaires containing favorable comments about specific departments/staff are forwarded to departmental management.

**Patient Satisfaction  
Total Sample Demographics - 2nd & 3rd Qrt. 96**

Total Sample Size: 1,550

1.	First time patient:	
	Yes	50%
	No	50%
2.	Length of hospital stay:	
	< 3 three days	30%
	3 - 7 days	51%
	8 - 14 days	13%
	> 14 days	6%
3.	Patient's Age:	
	< 17	1%
	18 - 25	3%
	26 - 35	7%
	36 - 45	13%
	46 - 55	15%
	56 - 65	19%
	> 66	42%
4.	Gender:	
	Male	49%
	Female	51%
5.	Medical Insurance:	
	Self Pay	3%
	Medicaid	6%
	Medicare	43%
	Private Insurance	48%

Lerner Tower/Lakeside Patient Satisfaction Report for Nursing: 4th Qtr '96.

Overall Results		Tower 3	Tower 4	Tower 5	Tower 6	Tower 7
Total Patients Surveyed	1117	111	47	55	29	38
Sample Size	484	43%				
<b>NURSING CARE</b>						
<b>1. Nurses Introduced themselves</b>						
Yes	451	97%	44	51	25	36
No		3%	2%	98%	98%	100%
<b>2. Courtesy of nurses</b>						
5	440	96	45	46	26	35
4		64%	67%	50%	50%	81%
3		22%	18%	33%	33%	17%
2		11%	13%	15%	15%	8%
1		1%	0%	0%	0%	3%
		2%	2%	2%	2%	0%
<b>3. Concern of nurses</b>						
5	427	96	44	45	24	35
4		61%	66%	66%	53%	68%
3		22%	16%	29%	4%	57%
2		12%	14%	16%	29%	29%
1		3%	2%	0%	8%	11%
		2%	2%	0%	0%	3%
		1%	2%	2%	0%	0%
<b>4. Nurses answered questions clearly</b>						
5	422	96	44	46	22	32
4		55%	61%	50%	73%	66%
3		27%	16%	33%	18%	22%
2		14%	21%	15%	4%	9%
1		3%	2%	2%	5%	3%
		1%	0%	0%	0%	0%
<b>5. Nurses explained condition/care in terms I understood</b>						
Yes	414	92	45	45	22	31
No		95%	93%	93%	95%	100%
		5%	7%	7%	5%	0%
<b>6. Promptness of nursing staff to answer call light</b>						
5	428	101	40	50	24	30
4		43%	42%	32%	58%	43%
3		31%	40%	44%	21%	37%
2		15%	13%	20%	17%	10%
1		8%	0%	4%	4%	10%
		3%	5%	0%	0%	0%

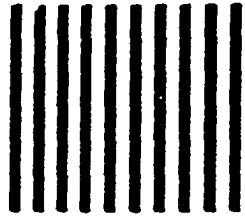
**Lerner Tower/ Lakeside Patient Satisfaction Report for Nursing: 4th Qtr '96.**

	Overall Results	Tower 3	Tower 4	Tower 5	Tower 6	Tower 7
<b>Total Patients Surveyed</b>	<b>1117</b>					
<b>Sample Size</b>	<b>484</b>	<b>111</b>	<b>47</b>	<b>55</b>	<b>29</b>	<b>38</b>
<b>7. Frequency of nursing staff to check on me</b>	<b>425</b>	<b>102</b>	<b>41</b>	<b>47</b>	<b>23</b>	<b>32</b>
5	41%	46%	49%	32%	52%	41%
4	32%	32%	24%	43%	31%	19%
3	18%	10%	22%	19%	17%	34%
2	6%	8%	0%	6%	0%	3%
1	3%	4%	5%	0%	0%	3%
<b>8. Felt involved in overall plan of care</b>	<b>404</b>	<b>98</b>	<b>39</b>	<b>48</b>	<b>24</b>	<b>29</b>
Yes	91%	89%	92%	92%	96%	90%
No	9%	11%	8%	8%	4%	10%
<b>9. Help nurses gave in planning for discharge</b>	<b>416</b>	<b>98</b>	<b>38</b>	<b>43</b>	<b>24</b>	<b>31</b>
5	51%	53%	58%	51%	63%	52%
4	25%	24%	16%	19%	25%	29%
3	14%	13%	16%	20%	8%	13%
2	6%	7%	3%	5%	4%	6%
1	4%	3%	7%	5%	0%	0%
<b>10. Overall quality of nursing care</b>	<b>421</b>	<b>99</b>	<b>42</b>	<b>43</b>	<b>23</b>	<b>33</b>
5	53%	52%	64%	37%	65%	58%
4	27%	30%	14%	40%	31%	30%
3	13%	9%	14%	19%	4%	9%
2	5%	7%	3%	2%	0%	3%
1	2%	2%	5%	2%	0%	0%



**Appendix E**  
**Patient Questionnaire**

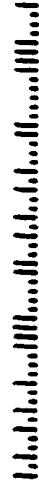
NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**  
First Class Permit No. 10879, Cleveland, Ohio

POSTAGE WILL BE PAID BY ADDRESSEE

FARAH M. WALTERS, PRESIDENT AND CHIEF EXECUTIVE OFFICER  
UNIVERSITY HOSPITALS OF CLEVELAND  
11000 EUCLID AVENUE  
CLEVELAND, OHIO 44106-9961

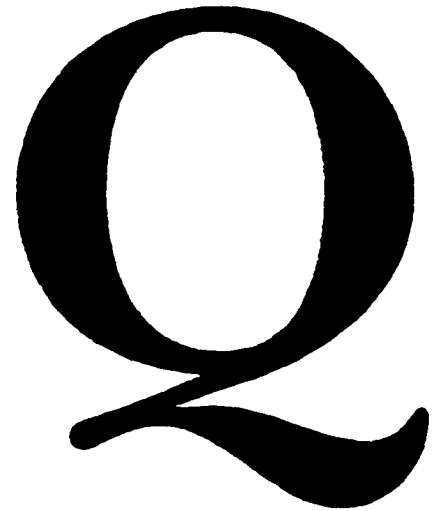


University Hospitals Health System  
**University Hospitals**  
of Cleveland



**The Lerner Tower  
The Mather Pavilion  
Lakeside Hospital**

Patient  
Questionnaire



Primary Affiliate of Case Western Reserve University

**PATIENT QUESTIONNAIRE**

Please rate your satisfaction by filling in the appropriate circle

Shade circles like this: ●  
 Not like this: ⊗ ✓

If any question does not apply to you, please leave it blank.

5 4 3 2 1  
 excellent very good good fair poor  
**ENTERING THE HOSPITAL** 5 4 3 2 1

- 1 I was admitted through the:
- Admitting Office
  - Emergency Department
  - Directly to the patient room

*Please answer the following questions as they refer to your experience with entering the hospital.*

- 2 If I had contact with entrance greeters
- Courtesy of greeters
  - Helpfulness of greeters
- 3 Courtesy of admitting staff
- 4 Helpfulness of admitting staff
- 5 Admitting staff kept me informed and responded to my needs during the process  Yes  No
- 6 Efficiency of the admitting process
- 7 If I had tests taken while waiting to be admitted
- Courtesy of testing staff
  - How clearly staff provided information
- 8 How long was it between the time I arrived and the time I was actually in my room
- less than 30 minutes
  - 30 minutes - 1 hour
  - longer than 1 hour



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Comments/Suggestions  
 \_\_\_\_\_  
 \_\_\_\_\_



\_\_\_\_\_ - \_\_\_\_\_ Please do not mark in these boxes

**PHYSICIAN CARE** 5 4 3 2 1

- 1 Physicians personally introduced themselves to me  Yes  No
- 2 Courtesy of my physician
- 3 Concern of my physician
- 4 How clearly my physician explained:
- My medical condition
  - My tests and procedures
- 5 Courtesy of interns and residents
- 6 Concern of interns and residents
- 7 How clearly interns and residents explained:
- My medical condition
  - My tests and procedures
- 8 Promptness of physicians to come when I asked to see them
- 9 Teamwork among all doctors who cared for me
- 10 Overall quality of physician care

Comments/Suggestions

**NURSING CARE** 5 4 3 2 1

- 1 Nurses personally introduced themselves to me  Yes  No
- 2 Courtesy of my nurses
- 3 Concern of my nurses
- 4 How clearly nurses answered my questions
- 5 Nurses explained my condition and care in terms I understood  Yes  No

- 6 Promptness of nursing staff to answer my call light  5  4  3  2  1
  - 7 Frequency of nursing staff to check on me and to see how I was doing
  - 8 I felt involved in my overall plan of care  Yes  No
  - 9 Help nurses gave me in planning for going home
  - 10 Overall quality of nursing care
- Comments/Suggestions:
- 

- IN THE PATIENT ROOM**  5  4  3  2  1
- 1. Cleanliness of my room
  - 2. Cleanliness of my bathroom
  - 3 My rights to privacy and confidentiality was respected  Yes  No
  - 4. My room was restful and quiet  Yes  No
  - 5 Courtesy of staff who delivered the menus and meals
  - 6. Helpfulness of staff who delivered the menus and meals
  - 7 Overall quality of food (temperature, taste, variety)
  - 8. Overall quality of my patient room
- Comments/Suggestions:
- 

- FAMILIES AND VISITORS**  5  4  3  2  1
- 1 Comfort of waiting rooms
  - 2. Family and visitors were treated as welcome guests  Yes  No
  - 3. Availability and convenience of parking

- 4 My family was aware of discount parking  5  4  3  2  1  Yes  No
- 5 Signs outside the hospital were easy to follow  Yes  No
- 6. Signs inside the hospital were easy to follow  Yes  No
- 7 Ease of finding my way around the hospital
- 8 Security personnel (Protective Services) were visible within the hospitals  Yes  No

9. If I had contact with security personnel:
- Courtesy of security
  - Helpfulness of security
10. If I had contact with cafeteria staff:
- Courtesy of staff
  - Helpfulness of staff
- 11 Overall quality of food in cafeteria (temperature, taste, variety)
12. Overall cleanliness of hospital

Comments/Suggestions

---



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**ADDITIONAL INFORMATION**

1. When I was discharged, I felt prepared to take care of myself at home  Yes  No  
If no, please explain
- 

- 2 Was discharge delayed  Yes  No  
If yes, please explain
-



3 Please rank your top 3 reasons for choosing University Hospitals

- Referred by my doctor
- Friend/relative recommended
- My doctor on staff
- Location
- Directed by insurance
- Reputation of nursing
- Reputation of University Hospitals
- Transferred here
- Offers needed treatment
- Other \_\_\_\_\_

4 I would return to University Hospitals  Yes  No

5 I would recommend University Hospitals  Yes  No

6 Overall quality of care at University Hospitals

PATIENT INFORMATION

1. Patient was a first time patient  Yes  No

2. Patient's hospital floor / unit \_\_\_\_\_

3 The date of patient's discharge.

\_\_\_\_ / \_\_\_\_ / 9 6

4. Patient's zip code \_\_\_\_\_

5 Length of patient's hospital stay:
 Less than 3 days  8 - 14 days
 3 - 7 days  more than 2 weeks

6 Patient's age
 17 or under  46 - 55
 18 - 25  56 - 65
 26 - 35  66 or older
 36 - 45

7  Male  Female

8 Which of the following categories best describes the patient's medical insurance?

- self pay
- Medicaid
- Medicare
- private insurance

9 Patient's name (optional) \_\_\_\_\_

10 Individuals I found especially helpful \_\_\_\_\_

11 What I valued most about my stay \_\_\_\_\_

12 To improve services at the hospital, I would recommend: \_\_\_\_\_

COMMENTS

Please tell us in the space below what you liked best and what you liked least about this hospital experience

Multiple horizontal lines for writing comments.



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Please do not mark in these boxes

Thank you for sharing your feelings with us. Please call 844-7554 if you have further comments

**Appendix F**  
**Consent Script**

### Script

Hello, Mr/Ms \_\_\_\_\_. My name is Yupin Aunguroch. I am a graduate student at Frances Payne Bolton School of Nursing Case Western Reserve University. I would like to ask if you would be willing to take part in a small study of patient satisfaction.

University Hospitals of Cleveland has a questionnaire that is sent to the discharged patient by random. This questionnaire needs to be evaluated. The purpose of this study is to investigate your opinion of the care you received soon after discharge and several weeks later. Although participating in this study will not be of immediate benefit to you, the information you contribute may benefit hospital and other patients in the future.

If you choose to participate in this study, you will be ask to complete the same questionnaire on 2 occasions, once one week after you discharge and then 3 weeks later. The questionnaire will take about 5 minutes to complete each time. The questionnaires will be about caring you received in the hospital.

Your participation in this project is completely voluntary and participation or refusal has no effect on your care. Your questionnaire will be marked with a number, not your name, and the questionnaire will be kept in a locked file cabinet. Only investigator will has access to the questionnaires, and the information will be destroyed when reports of the study are completed.

You will not be paid for your involvement and there are no financial costs associated with your participation.

Would you willing to help?

**Appendix G**

**Institutional Review Board Approval**

**Appendix G1 Approval from Frances Payne Bolton School of Nursing**

**Appendix G2 Approval from University Hospitals of Cleveland**



Appendix G1 Approval from Frances Payne Bolton School of Nursing



CASE WESTERN RESERVE UNIVERSITY  
Cleveland, Ohio 44106

UNIVERSITY REVIEW COMMITTEE FOR HUMAN STUDIES  
Request for Project Review and Approval

INVESTIGATOR: Yupin Aunguroch |  Faculty  Student

Faculty Supervisor: Dr. Barbara J. Daly (For Student Projects)

Department or School: Nursing | Telephone: 382-1999

Project Title: The Effects of Partner in Practice Model on Costs and Patient Satisfaction

Beginning Date: ASAP | Expected Duration: 1 year

Type of Support:  Federal Grant Agency: \_\_\_\_\_  
 Other Sponsor: \_\_\_\_\_  
 Departmental: \_\_\_\_\_

Hospital Sponsor's Name (where applicable): \_\_\_\_\_

Please provide a 2-3 page abstract or summary of the research projects covering the points included in the attached instructions. If any of the categories do not apply please indicate so.

Approval for the submitted information:

Faculty Member: [Signature] | Chairperson/Dean: [Signature]

Date: 9/10/97

Research Committee Recommendation

Exempt Status?  Yes  No | Category (45 CFR 46.101 No. \_\_\_\_\_  
 Expedited Review:  Yes  No  
 Full Committee Review:  Yes  No

Approved By: Joseph F. Fagan, Ph.D | Date: \_\_\_\_\_

IR-07296 DS-1

Office of Research Administration

MAILING ADDRESS: Case Western Reserve University, 10800 Euclid Avenue, Cleveland, Ohio 44106-7015

WEBSITE AND E-MAIL: www.case.edu | 4 ACEBOL@case.edu

PHONE: 216-368-4510 | FAX: 216-368-4679 | INTERNET: rtsadm@po.cwr.edu

Appendix G2 Approval from University Hospitals of Cleveland

UNIVERSITY HOSPITALS OF CLEVELAND  
INSTITUTIONAL REVIEW BOARD FOR HUMAN INVESTIGATION

TO: Dean J. Fitzpatrick  
Department Chairman

The University Hospitals Institutional Review Board has reviewed the proposal

Submitted by: AUNGSUROCH, Dr. Yupin et al.

Entitled: The effects of partner in practice model on costs and patient satisfaction(10-07-01)

Please be advised that with respect to:  
(1) The rights and welfare of the individuals  
(2) The appropriateness of the methods to be used to secure informed consent  
(3) The risks and potential medical benefits of the investigation the Board considers this project

FULLY ACCEPTABLE, without reservation; approved through 10/98  
 NOT ACCEPTABLE for reasons noted

REMARKS:

The annual review is due by the date noted above.  
Please reference the IRB number on future reviews and correspondence

October 7, 1997  
Date(s) of Committee Review

October 7, 1997  
Date of Approval

  
Signature IRB Chairman

TYPE PROJECT  New  Renewal  Addendum  
HUMAN RISK  Yes  No  
SOURCE OF SUPPORT:  None  Departmental  Outside Funding

Agency (Potential) \_\_\_\_\_ Agency Number \_\_\_\_\_

ARE ANY OF THE FOLLOWING INVOLVED?  No  Yes, those checked  
 Minors  Fetuses  Abortuses  Prisoners  Pregnant Women  Mentally Retarded  Mentally Disabled

CC: Investigator, ORA, General Clinical Research Center

*The UHC IRB operates under the HHS Multiple Project Assurance of Compliance number M 1521 02*

Rev. 01/97

**Appendix H**  
**Test-Retest Correlation**

## Correlations

### Descriptive Statistics

	Mean	Std. Deviation	N
Total satisfaction (test)	27.5831	2.5894	24
Total satisfaction (retest)	27.1940	2.5481	24

### Correlations

		Total satisfaction (test)	Total satisfaction (retest)
Pearson Correlation	Total satisfaction (test)	1.000	.805**
	Total satisfaction (retest)	.805**	1.000
Sig. (2-tailed)	Total satisfaction (test)	.	.000
	Total satisfaction (retest)	.000	.
N	Total satisfaction (test)	24	24
	Total satisfaction (retest)	24	24

\*\* Correlation is significant at the 0.01 level (2-tailed).

Appendix I

Cronbach's alpha of Patient Satisfaction with Nursing Care

**Reliability**R E L I A B I L I T Y   A N A L Y S I S  
S C A L E   ( A L P H A )

Statistics for	Mean	Variance	Std Dev	N of
SCALE	28.8462	19.8821	4.4589	Variables
				9

## Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
Q20	27.8616	19.5896	.2531	.8814
Q21	24.2710	15.4485	.7685	.8426
Q22	24.4075	14.6860	.8172	.8358
Q23	24.4496	14.3459	.8265	.8338
Q24	27.8720	19.2412	.4417	.8773
Q25	24.6377	13.7580	.6897	.8526
Q26	24.7645	13.2900	.7982	.8373
Q27	27.9287	18.6687	.4772	.8723
Q28	24.5769	14.6427	.6323	.8567

## Reliability Coefficients

N of Cases = 194.0

N of Items = 9

Alpha = .8706

Appendix J

Total Satisfaction Score and Overall Quality of Nursing Care Question Correlation

## Correlations

### Descriptive Statistics

	Mean	Std. Deviation	N
Total Satisfaction (Transformed)	26.9834	3.5352	194
Q29: Overall Quality of Nursing Care	4.2430	.9471	194

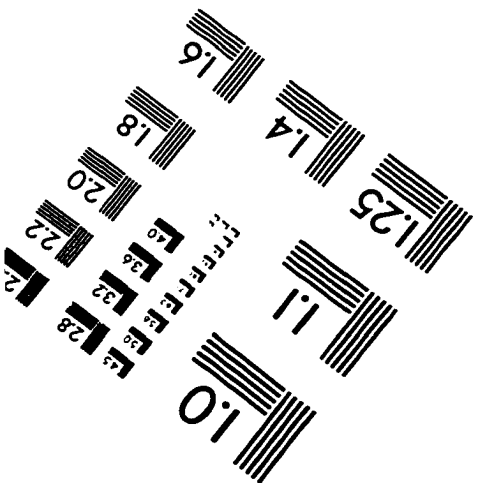
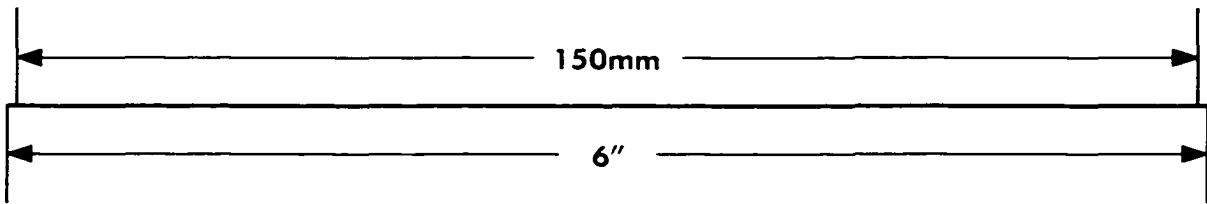
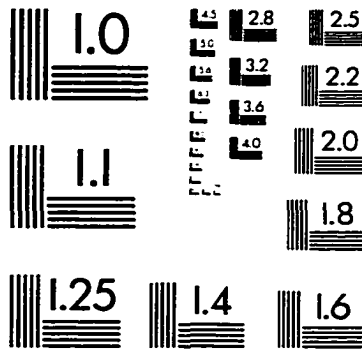
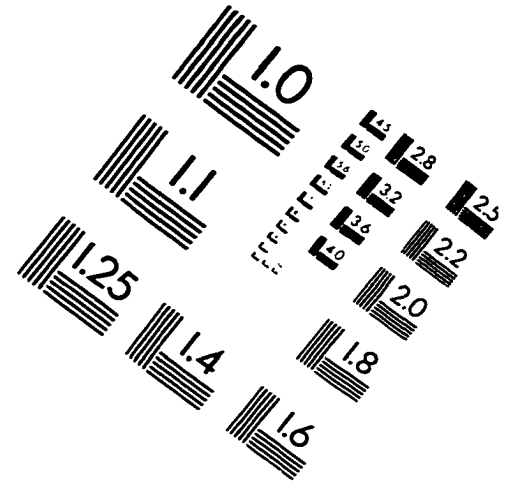
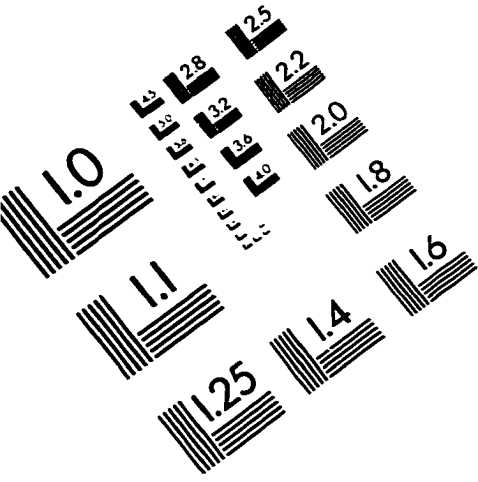
### Correlations

		Total Satisfaction (Transformed)	Q29: Overall Quality of Nursing Care
Pearson Correlation	Total Satisfaction (Transformed)	1.000	.769**
	Q29: Overall Quality of Nursing Care	.769**	1.000
Sig. (2-tailed)	Total Satisfaction (Transformed)	.	.000
	Q29: Overall Quality of Nursing Care	.000	.
N	Total Satisfaction (Transformed)	194	194
	Q29: Overall Quality of Nursing Care	194	194

\*\* Correlation is significant at the 0.01 level (2-tailed).



# IMAGE EVALUATION TEST TARGET (QA-3)



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 Rochester, NY 14609 USA  
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 Fax: 716/288-5989

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