

The Restructuring of Work in Hospitals:
An Analysis of Determinants and Outcomes in Information - Based Organizations

by

Gil A. Preuss

B.S. Political Science
University of Michigan, 1986

M.A. Organizational Behavior
Cornell University, 1990

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Signature of Author: _____

Sloan School of Management
September 4, 1997

Certified by: _____

Thomas A. Kochan
Professor of Management
Thesis Supervisor

Accepted by: _____

~~Birger Wernerfelt~~, Chairman, Ph.D. Committee
Sloan School of Management

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**Submitted to the Sloan School Of Management
on September 4, 1997 in partial fulfillment of the
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in Management**

Abstract

Overall, this study investigates the determinants and outcomes of alternative work systems in hospitals as they respond to changing competitive and institutional environments. The dissertation first investigates the role of competitive, patient, and labor-management relations in structuring the practices observed within hospitals as they respond to an evolving institutional environment. Specifically, I find that unions and cooperative labor-management relations ease the adjustment of hospitals as they alter their nursing staffing patterns in response to changing competitive and patient needs. While unions and cooperative relations also increase observed nursing staffing levels these higher levels do not result in adverse financial performance outcomes for hospitals. Rather hospitals with more extensive unionization as well as longer running cooperation with registered nurses have higher net income per patient day. This suggests that hospital performance in this context either depends on the ability to respond to changing demands, or that hospitals with unions and longer running cooperation have developed systems that increase staffing levels and decrease costs. This question is examined using a ten-year, cross-sectional, panel data set of 14 hospitals in the Minneapolis/St. Paul region.

The second section of the dissertation examines the relationship between information in production systems and work organization and human resource practices. I propose that work organization and human resource practices are contingent upon two information characteristics: The speed at which the utility of information decays for use in decision making and the saliency of information as it arises during production. I develop and test a model of work organization and human resource practices in information-based production systems where information both decays rapidly and where the organization cannot, a priori, establish the saliency of information. Overall, I find that maintaining responsibility for routine tasks in the hands of employees with abstract knowledge and overlapping job responsibilities across employee groups increase the quality of information available. I then show that information quality, the division of labor, and employee skill are linked to critical production outcomes. I use original multi-level data collected from 3400 nursing unit employees on 68 acute-care units in 16 hospitals in the greater Minneapolis/St. Paul, Minnesota metropolitan area to test the model.

**Dissertation Advisor: Thomas A. Kochan
Title: Professor of Management**

THE RESTRUCTURING OF WORK IN HOSPITALS:
AN ANALYSIS OF DETERMINANTS AND OUTCOMES IN
INFORMATION-BASED ORGANIZATIONS

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Chapter 1: Introduction

Health care delivery in the United States is in the midst of broad and dramatic change. Evolving institutional and financial structures are reshaping the healthcare delivery system including the industrial organization of providers, the incentives under which patients, physicians, and hospitals operate, and the organizational structure of care providers. Strong financial pressures are leading hospital administrators and physicians to explore alternative means of providing care to patients. Hospitals throughout the United States are searching for new ways to structure work organization and human resource practices in efforts to cut costs and compete within an evolving market. Few examples exist on which to base changes in work organization. Moreover, the work organization and human resource models developed in manufacturing may serve as poor guides for the challenges of in-patient hospital care.

Hospital Work Organization in Transition

During the 1970s and 1980s, hospital administrators adopted a model of nursing work organization called “primary care nursing.” This model was based on the use of registered nurses to provide comprehensive patient care ranging from routine tasks, such as bathing and feeding to high skill care responsibility, such as overall coordination of care. The logic espoused at the time was that primary care nursing was a cost efficient model due to the greater flexibility and higher skill registered nurses provided in a hospital. Within a context of increasing technological sophistication and average patient acuity in hospitals, the combination of highly educated registered nurses and broad job responsibility was described as critical for providing high quality and efficient care.

During the 1990s, work organization practices on nursing units are in the midst of redefinition. In some hospitals, administrators are changing the skill mix on nursing units by bringing in more lower skilled employees such as licensed practical nurses (LPNs) and nurse assistants. Moreover, the division of labor among hospital employees is shifting so that lower skilled workers are being given responsibility not only for seemingly routine tasks but also for tasks requiring more extensive education and training. The logic currently espoused behind this shift in work organization is a desire to match skills to tasks. As one nursing Vice President suggested, “why should an RN feed a patient at 20 dollars an hour while a nurse assistant could do the exact same thing for less than half that?” Within a context of increasing technological sophistication and average patient acuity in hospitals, new work organization practices focus RN responsibility on “high skill” tasks while delegating more “routine” work responsibility to other nursing unit employees. These new practices are perceived by supporters as increasing cost efficiency and overall performance with no adverse effect on quality.

This description of nursing work organization reflects the overall trend in nursing practices and raises two important issues regarding the adoption and outcomes of different nursing work organization models. Though primary care was viewed as the dominant nursing model, it was never fully implemented in many hospitals. Similarly, new work organization models are currently being explored by some hospital administrators in response to competitive, product and labor market, and technological pressures (Greiner, 1996; IOM, 1996).

This broad description of change, however, fails to address critical differences among facilities. While some are decentralizing task responsibilities others are maintaining or even increasing responsibility for patient care with registered nurses. To understand the source of practices adopted by hospitals, we must address both environmental factors as well as internal

organization dynamics. Osterman (92) suggests the changes in internal labor markets arise from an interaction between three factors including performance concerns; organizational factors, such as norms, customs, and politics; and the external environment, including skill availability.

In hospitals, the recent changes in work organization are taking place within a context of increasing cost competitiveness, growing technological sophistication, and evolving institutional structures. Managed care growth is leading hospitals to reevaluate their cost structures and care processes. New technical systems are increasing management's capacity to standardize and formalize care processes. Clearer product market differentiation among hospitals is developing as administrators close in-patient units, focus on specific areas of expertise, and position themselves to compete for patients within particular market niches. Within this evolving context, hospital administrators are striving to develop new work organization practices which meet both cost and quality objectives. These practices, moreover, are in a constant state of flux as practices shift to meet new environmental and organizational demands.

The challenge facing hospitals is twofold. Long term performance arises both from steady-state characteristics as well as the ability to adjust practices in response to changing patient needs. Steady-state performance depends greatly on work organization and human resource practices in core organizational production settings.

Hospitals must also be able to adjust practices in response to evolving patient and environmental factors. Over time, as competitive pressures, technical systems, and patient characteristics evolve, hospitals must shift practices to match them with the specific demands present. Similarly, in other industries as new technologies, product markets, and consumer demands arise, work organization practices must shift to succeed in the new environment. The

ability to smoothly evolve practices in response to shifting demands improves organizational performance and reduces the need for large-scale and dramatic shifts in practices.

This dissertation examines both the steady-state outcomes of alternative work organization practices as well as the ability of hospitals to adjust practices within an evolving institutional environment. First, within a context of growing cost-based competition, what determines the work practices adopted within hospitals? Specifically, how do labor-management relations shape nursing practices in hospitals by constraining and providing opportunities for adjustment within an evolving institutional environment? By focusing on labor-management relations and how it shapes the types of practices adopted and the ability of hospitals to adjust practices in a changing environment, I hope to address a debate within the strategy literature on the relative role of industrial organization and firm resources in shaping firm performance. Unions can either constrain managerial choice by limiting change in work practices or broaden opportunities by providing voice to employee interests and easing change in practices. As pressure has grown to adjust practices in response to increased competition, the types of practices observed within hospitals and the outcomes experienced by hospitals are likely to be shaped by the labor-management relations in place. This adjustment capacity is a potential resource available in some hospitals as the management reacts to evolving forces in the health care market. Alternatively, labor-management relations may constrain the choices available to hospitals and create more rigid structures and practices that slow the adjustment process. Which of these affects dominates will be examined.

The second question examines the relationship between work organization practices and performance outcomes on in-patient hospital units. While existing research suggests that the organization of work shapes outcomes for employees and firms, nearly all of this research has

been conducted in manufacturing firms as they move from traditional to high performance production systems (Ichniowski, et al., 1996). In traditional high-performance models, quality improves while costs decrease as work is decentralized to front-line production workers. Through careful selection combined with increased training and direct employee responsibility over problem solving, information unavailable to supervisors is integrated into production decisions leading to improved quality and productivity (Bailey, 1992).

Little is known, however, about human resource and work organization practices in settings such as hospital care. The models depicted as “best practice” in manufacturing, may yield very different outcomes in hospitals where the nature of work and production are dramatically different. To understand the relationship between production and work organization practices, I develop a typology according to the characteristics of information necessary for successful production. The first characteristic is the speed at which the utility of existing information decays. Production systems with more rapid information decay require employees to regularly gather new information for integration into decision making. The second characteristic is the ability to establish, a priori, the saliency of different information for decision making. When organizational leaders cannot pre-determine which information will be most important, direct front-line employees must have the skills to evaluate the saliency of information as it is observed. I suggest that these two information characteristics differentiate among production systems and are linked to alternative models of work organization.

By defining production along information characteristics, I abandon the traditional distinctions between manufacturing and services and focus on the underlying logics of production which shape appropriate work organization and human resource practices. Many jobs in the service sector exhibit characteristics similar to manufacturing and vice versa. In

understanding the relationship between work organization and outcomes, we need to specify the characteristics of production which are shaped by alternative forms of work organization and show how they are linked to critical outcomes.

The development of this typology grew out of my research within in-patient hospital care. During extensive field work in hospitals, I began to focus on the central role of information accumulation and communication in determining performance outcomes. I observed nurses constantly gathering, communicating, and using information for all decision making and patient care. This information was important not only for traditional medical decisions but also for ensuring patient comfort and support. Moreover, the ability to gather information and integrate it into patient care decisions is the central characteristic of this production system. The utility of information decays rapidly within a setting where the organization cannot establish, a priori, which information will be most salient for decision making. These factors place unique pressures on work organization practices and the ability of hospital administrators to decentralize tasks, even routine tasks, to lower skilled workers.

In chapter 5, I highlight the particular role of information in production and claim that existing models of work organization fail to address the unique characteristics of production where information use plays a central in determining outcomes. This is supported by regression results which suggest that “best practice” models developed within manufacturing lead to poorer outcomes in production systems such as health care.

Project Development and Methodology

The project was developed in close cooperation with members of the Metropolitan Hospitals' Labor-Management Council (MHLMC). The MHLMC first developed in 1989 as a

regional organization to support and promote cooperation between labor and management in hospitals. Within a rapidly evolving environment, cooperation was seen as a tool to promote restructuring and bring together multiple parties into the discussion about the organization of hospitals. Following several years of work, MHLMC members felt a need to more precisely understand the role and effect of cooperation as hospitals adjust to an increasingly competitive market.

Initial theory development occurred through a qualitative research process including extensive interviewing of hospital members and observation of health care providers. Early research on hospital production and work organization occurred during observation of nurses and physicians at three hospitals in the Boston, Massachusetts area. During this initial phase, I shadowed several nurses and physicians for a few days each to understand the nature of in-patient care, its production process, and the work conducted within it. In addition, I spent 2 days with a single patient as he progressed through a pre-admission interview, a physical, a cardiac catheterization, recovery, and discharge. I followed him and tracked the people entering his room and their interactions with him. This provided me with a counter perspective to the one seen during observation of care providers as they treated numerous patients during the course of a single day. This stage first established the central role of information accumulation and communication during the production of care in hospitals.

Following initial theory development, I interviewed over 70 employees of Minneapolis/St. Paul hospitals. The interviews addressed several important factors including the challenges facing hospitals, the nature of labor-management relations, recent and projected changes to the hospital work organization, and other initiatives adopted by the hospital in response to competitive and product market changes. Vertical and horizontal slices of the

organizations were taken to get a comprehensive analysis of each hospital. Interviews were conducted with nursing unit employees including licensed practical nurses, nurse assistants, registered nurses, and unit managers. In addition, I interviewed several members of the hospital and union leadership to address more strategic perspectives of change in hospitals.

Following outreach to area hospitals, 16 out of 18 potential hospitals chose to participate in the research project. Participating hospitals include heavily unionized and non-union hospitals; rural, suburban, and urban hospitals; as well as public and private hospitals. All hospitals in the area are non-profit.

To formally test the questions developed within the qualitative research, data from several sources were brought together. The cross-sectional, panel data analysis in Chapter 4 is based on a ten-year longitudinal data set. Hospital participation included the release of proprietary patient discharge data which was combined with financial data available from the state and reports of labor-management cooperation from the regional Federal Mediation and Conciliation Service.

Participating hospitals also committed themselves to a survey distribution among employees. To examine hospital work organization practices I developed and distributed several surveys to employees in participating hospitals¹. Following a hospital's decision to participate, in-patient unit employees were selected for participation according to the types of patients treated on the unit (see Appendix 3 for a detailed unit and diagnosis selection process). All employees on selected units received surveys for the study² focusing on individual characteristics, task responsibilities, skill level, communication patterns, and nursing delivery practices. With an average of 50 employees on each hospital unit, surveys were distributed to approximately 3400

¹A copy of this survey is attached in Appendix 5.

²This excluded unit secretaries and other unit employees with limited direct patient care responsibilities.

people. Two thousand, three hundred, and fifty four (2354) surveys were returned for a 69 percent response rate.

Surveys were also distributed to the Vice President's of Finance, Human Resources, and Nursing and all union leaders at each hospital. These surveys addressed broader hospital and union characteristics as well as the nature of labor-management relations in the hospital. Finally, additional employee groups, including radiology technologies, plant/maintenance employees, and housekeeping and dietary workers received surveys addressing individual characteristics, task responsibilities, skill requirements and training for the job. Overall, almost 6,000 hospital employees received surveys for the project. More than 3,800 surveys were returned by employees providing an overall response rate of 63.3 percent,.

Minneapolis/St. Paul: A Model for Hospital Restructuring?

This research project is conducted in Minneapolis/St. Paul, Minnesota: In many ways an ideal setting for an examination of restructuring in hospital care. The Minneapolis/St. Paul region was one of the first areas in the country to experience extensive managed care growth and the dramatic changes in the health care market which result. Only over the past few years have most other regions in the country begun to enter a similar restructuring in hospital organization. The Twin Cities health care market has been described as a precursor and model for the current changes evident elsewhere towards a competitive health care market (OTA, 1994).

The Minneapolis/St. Paul region also exhibits several characteristics which may result in different restructuring paths compared to other regions of the country. First, the hospitals in Minneapolis/St. Paul are highly unionized with over 80 percent of registered nurses and 60 percent of all hospital employees belonging to unions. This is unusually high for most regions in

the United States, even areas with traditionally strong unions. Second, extensive cooperation has developed between the unions and hospitals to address patient care and restructuring initiatives. While this was extremely unique a few years ago, other cooperative efforts have recently developed in New York City and with Kaiser-Permanente in California. Third, the early growth of managed care in the Twin Cities may have eased the hospital adjustment process. The development and growth of HMOs in the Minneapolis/St. Paul region occurred over twenty years. In contrast, other regions of the country have gone from very low to very high managed care penetration more recently and occurred in just a few years.

Even with these caveats, I believe that the Minneapolis/St. Paul environment provides a valuable setting for understanding the response of hospitals to changing competitive and product market factors and the role of labor-management relations in shaping this response. In addition, the broad access allowed by the hospitals enabled a detailed analysis of work organization practices using both longitudinal and cross-sectional data within a single, health care market.

By focusing on a single industry in a single market, I control several important contextual factors which shape the capacity of organizations to adopt specific practices and respond to external demands as they arise. Many institutional factors, such as the regulatory environment, employers' organizations, corporate governance, and labor market characteristics which could affect the ability of firms to adopt specific practices are common across all participating hospitals. Due to the detailed data gathered from multiple sources, I am also able to clearly measure competitive pressures facing hospitals as well as changes in product markets and staffing patterns. By choosing to examine health care in a single local market, I control for many common institutional factors and focus specifically on competitive and strategic organizational

characteristics which can shape the ability of hospitals to adjust in response to rising pressures and the work organization and staffing patterns adopted.

Dissertation Format

The dissertation begins with a discussion of the changes within the health care industry over the past fifteen years as cost-based competition intensified among providers. Chapter 2 explores these developments both nationally and within the Minneapolis/St. Paul, Minnesota health care market. As part of this discussion, I focus on particular forces which may be affecting the staffing patterns and work organization practices in hospitals including the growth of managed care, increasing technological sophistication and patient acuity, and labor-management relations. Chapter 3 addresses historic and current changes in the work organization of nursing units. The chapter concludes with a discussion of staffing and work organization practices in six different Minneapolis/St. Paul hospitals. These case studies initiate a discussion regarding the source of change and variation among hospitals. In Chapter 4, I focus on the staffing practices adopted by hospitals over the past ten years within an evolving institutional environment. In particular, I focus on the role of labor-management relations in shaping the practices adopted and the ability of hospitals to adjust practices in accordance to changing competitive and product market characteristics. In chapter 5, I address the impact of alternative work organization practices in hospitals on patient care, through a detailed analysis of the division of labor and skill utilization on nursing units.

Chapter 2: Health Care: An Evolving Institutional Environment

Introduction

The health care industry is in the midst of broad scale restructuring. Over the past fifty years, health care in the United States has grown into one of the largest segments of the economy with 12.2 percent of the GNP, or \$666.2 billion, dedicated to health care expenditures in 1990. By the year 2000, estimates project the share of the GNP dedicated to health expenditures to surpass 16 percent (Lew, Greenberg, and Kichen, 1992). With more than 10.2 million people employed in the health care industry in 1993 (Outlook, 1994), changes to the organization, productivity, and institutions of health care delivery are having broad repercussions throughout the country and economy.

While medicine has continued to make dramatic technological improvements over the past fifty years, the industrial structure of health care remained surprisingly constant until recently. Over the years as the federal and state governments increasingly took responsibility for insuring people and regulating health care delivery, the policies adopted were fit into existing institutions. Recent initiatives, however, by private employers to control the spiraling costs of health care combined with continued pressure by the government to control Medicare and Medicaid costs have initiated broad changes to the organization and provision of health care.

The Industrial Structure Of Health Care In The United States

The structure of health care in the United States is a loose organization of hospitals, insurers, physicians, nursing homes, sub-acute facilities, and public and out-patient clinics. Until the past few years, hospitals were independent and non-profit; physicians operated in solo or small group

practices; and insurers reimbursed providers on a fee-for-service basis. The relationship among hospitals, physicians, and insurers arising from these factors has been the defining characteristic of health care in the United States. Individually held insurance allowed people to choose freely from the physicians in the community. The physician, in turn, determined both the extent and location of care, whether in a hospital or a specialized clinic. Finally, within broad guidelines, insurers reimburse any provider of care to their clients. As policies or practices shifted, this relationship and the power each party had in determining care evolved. In addition, new structures are arising to alter the health care industry in the United States.

Three main parties comprise the United States health care industry - insurers, hospitals, and physicians. It is the relationship among these three parties and the context surrounding them which shapes the nature of the industry. Health insurance in the United States is primarily provided through the private sector. Sixty one percent of the US population receives health insurance through employers. This includes both direct employees as well as spouses and children covered by employer plans. In addition, 13 percent of the population purchase non-group health insurance on their own (U.S. Bureau of the Census, 1991). While employer provided health insurance is voluntary, it is encouraged by Federal tax policy and has been seen as an important benefit to attract desired employees and as a way to maintain firm performance. Over the past several years, though, the proportion of total compensation which goes to health benefits has increased from 2.4 percent in 1970 to 5.8 percent in 1989 while the proportion of total benefits going to health care has increased from 23 percent in 1970 to 36 percent in 1989 (Piacentini, 1990). As a result, though most firms continued to provide this desired benefit, its increasing costs affect both firm competitiveness and employee wages.

Other firms, particularly small and medium size firms, dropped health insurance as a benefit. This resulted in an increasing proportion of the population with no insurance coverage at all, with a recent estimate suggesting that 14 percent of the population has no health insurance coverage (U.S. Bureau of the Census, 1991).

The two primary public insurance programs are Medicare and Medicaid serving the elderly and the poor, respectively. Medicare is a Federal insurance program serving the aged and the disabled. It is administered by the Federal government and insures over 13 percent of the United States population (Lew, Greenberg, and Kinchen, 1992). In contrast, Medicaid is a joint effort by the Federal and State governments to provide insurance to a portion of the poor. To receive coverage under Medicaid not only must someone have an income below the Federal poverty level but she must also qualify under an additional characteristic, such as being blind, elderly, or a parent with a dependent child. As a result, only 40 of those below the U.S. poverty level receive insurance coverage under Medicaid (Swartz and Lipson, 1989).

Hospitals in the United States are primarily non-profit institutions with many having arisen out of religious or benevolent groups. In 1993, there were 5,261 community hospitals in the United States admitting over 30 million patients (IOM, 1996). These numbers reflect a significant drop from 1983 when there were 5,783 hospitals with over 36 million patient admissions. Among the community hospitals, 59 percent were non-profit, 27 percent public, and 14 percent for-profit.

Approximately 600,000 physicians practice medicine in the United States historically in either solo or small group practices. The distribution of physicians in the United States is uneven both by region and area of medicine. While physicians are readily available in larger urban and suburban settings, rural and poorer communities suffer from a lack of available physician care. In addition, only 33 percent of active physicians are primary care physicians while the remaining are

specialists, such as Cardiologists, Radiologists, and Anesthesiologists. The proportion of specialists in the United States is significantly higher than other OECD countries (Rosenblatt, 1992). One possible repercussion of managed care (discussed later) is a redistribution of physicians across practice areas to include more primary care providers and fewer specialists.

Two key characteristics of health insurance up until the 1980s were its attachment to individuals and the fee-for-service reimbursement to physicians and hospitals. Under traditional indemnity insurance, individuals independently select their physicians. People chose physicians on the basis of personal preferences, community reputation, or references from others, regardless of cost or specialization. Once connected to a physician, the determination of where to admit a patient for care rested with the physician. When a patient was treated at a hospital, the services it provided to the physician and the patient increased revenues. As a result, hospitals maximized revenue by increasing patient admissions and providing more patient services.

This dynamic between insurance linked to individuals, the power of physicians to determine the site and extent of care, and the fee-for-service reimbursement to both hospitals and physicians, set up the physician in a unique power position over both hospitals and insurers. The physician determined both the cost of care and hospital revenue. In response, hospitals competed for patient admissions by providing desirable services and technology to physicians. Hospital administrators purchased new equipment to meet physician demands and even set up systems to satisfy physician idiosyncratic desires. In one hospital examined, 40 different hip replacement “kits” were necessary to meet specific physician demands. This form of competition among hospitals for physicians has been called the medical arms race, where hospitals must purchase the latest technology to remain competitive, though identical equipment is already available in the community to satisfy local needs.

The Evolution Of Cost Control Initiatives In The United States

The history of health care in the United States is one of cycles between efforts to expand the scope of health care provision and efforts to control the cost of care. The expansion of Federal health care coverage through Medicare and Medicaid in 1965 has been combined with a series of government and private efforts to control the spiraling cost of health care in the United States. Even today, as the government adopts cuts in Medicare and Medicaid, separate initiatives expand government provided insurance for children.

Health care inflation has been twice the Consumer Price Index with increases in annual health care expenditures averaging 10 percent per year during the 1980s. Hospital spending, comprising 38 percent of total health care expenditures, has grown by a similar rate ranging from annual increases of 7-15 percent during the 1980s (Lew, et al., 1992). While a slowdown in annual health care expenditures was observed in the early 1990s, recent research suggests that this was only a temporary deviation from the historical trend with future increases projected to match those observed in earlier years.

With public funding accounting for 42 percent of total health care expenditures in 1990 (Levit, et al., 1991), the government has taken several steps to control the spiraling costs of health care in the United States. Soon after the development of Medicare and Medicaid legislation in the 1960s, the US government began facing a series of cost crises. In response, the Federal government instituted multiple efforts to control the cost of care including certificate of need programs (1974-1986), support for Health Maintenance Organizations to promote competition (1972), and the Prospective Payment System (PPS) in Medicare to control hospital costs. The certificate of need program was an early attempt to control spending by hospitals and nursing homes on new facilities

and new equipment. With the support for HMOs, the government hoped to spur competition among care providers and build a more logical delivery system which promoted cost control and disease prevention. Though HMOs initially grew very slowly and attracted mostly young, healthy people, this early experience provided the learning necessary for the recent growth in a cost-conscious health care environment.

The adoption of the prospective payment system (PPS) signaled a dramatic shift in the incentives under which hospitals operated. Before 1983, Medicare reimbursed hospitals on a cost-plus basis. This system paid hospitals according to their experienced costs plus a specified markup and placed no incentives on hospitals to control costs. The PPS shifted the incentive structure of hospitals so that reimbursement levels were predetermined according to the patient's diagnosis regardless of actual costs experienced by the hospitals in treating a patient. If the hospital successfully treated patients at a lower cost, they kept the surplus. If treating the patients cost more than allocated under PPS, hospitals bore the loss. Even with all these efforts to control costs, however, Medicare and Medicaid are currently the largest growing segments of the Federal and State governments, respectively. Further efforts are currently under discussion to decrease the growth of these programs.

While government health care expenditures have risen dramatically over the past thirty years, private employers face an even greater challenge in controlling health insurance costs. Sixty one percent of the U.S. population receives health insurance through private employers (U.S. Bureau of the Census, 1991). By 1989, health benefits comprised 5.8 percent of total compensation and were growing significantly faster than wages. In an environment of increasing health care costs and world economic competition, private employers began to place significant pressure on insurers to control and even reduce future costs.

Traditional indemnity insurance operates on a fee-for-service basis. Under such a system, physicians and hospitals receive payment for each service provided to a patient. Every time a surgery is conducted, physicians and hospital each receive reimbursement. The longer the patient length of stay the higher the total hospital payment. For physicians, conducting more tests and more extensive procedures results in higher wages. One result of this incentive structure is the possibility of physicians conducting more procedures or ordering more tests than necessary to increase total wages. In addition, fear of lawsuits may propel physicians to practice preventative medicine and provide more intensive care than “medically” needed. Some studies suggest that 20-30 percent of all procedures conducted are unnecessary (Manning et al., 1984).

As pressure grew on insurers to control costs, new practices arose to more closely manage the care provided by physicians including mandatory second opinions for elective surgery, pre-approval for certain procedures, and negotiated discounts from hospitals. Moreover, firms encouraged employees to use insurers with greater cost controls and more centralized oversight. Instead of paying for complete health care coverage or a specified percentage of any insurance program chosen, firms opted to pay an amount defined by the low cost insurer available. Typically, these insurers were Health Maintenance Organizations or other managed care providers with stringent cost controls. If an employee selected a more expensive insurer, she would bear responsibility for the additional insurance costs. The result was an employee shift towards managed care providers during the late 1980s and 1990s.

Managed Care and Health Maintenance Organizations

Though the federal government first promoted the growth of HMOs in 1972, the large-scale growth of Health Maintenance Organizations (HMOs) is a recent phenomena. Even before the

Federal government support for HMOs, many existed throughout the country. In 1945, the Permanente was formed as a pre-paid group practice. By 1955, now Kaiser Permanente had over 300,000 members. In Minneapolis/St. Paul, Group Health, Inc. was founded as a consumer cooperative in 1957. Both of these early HMOs grew and survived initially primarily with the initial support of local unions. By 1985, the number of people enrolled in HMOs reached 19 million while by 1994, HMO enrollment had passed 45 million people.

Managed care encompasses a broad category of insurers attempting to control the type of care provided to patients. The control mechanisms adopted, though, focus on coordinating care through a primary provider responsible for decisions made, referrals to specialists, and hospital admissions rather than rely on a diffuse network of physicians to coordinate care. Within the category of managed care, HMOs reflected a particular approach to controlling the care process. More recently, as HMOs and other managed care forms have evolved, the distinctions between them have diminished with each incorporating characteristics of the other.

Early HMOs operated on a staff-model by directly employing physicians in clinics. This allowed HMOs extensive control over physician practices and removed financial incentive for physicians to provide additional care as a way to improve income. HMOs carefully tracked the practice patterns of physicians and focused on reducing hospital admissions as a way to control costs. In addition, patients within these HMOs had to choose a physician among those on staff with the HMO. As HMOs grew, alternative models evolved, including group and Individual Practice Association models of HMOs. These models provide individuals with greater freedom in choosing among physicians and build additional incentive and oversight mechanisms to control costs. While choice is still constrained by contracting directly with physician group practices, these HMOs brought many more community physicians into their network of providers. To replace direct

control over physician practices, HMOs adopted more extensive financial incentives, such as capitated payments and year-end bonuses, to maintain low utilization of hospital care and expensive procedures. Many of these HMOs also selected physicians for participation based on their practice patterns focusing on those physicians with less “aggressive” approaches to patient care.

By the early 1990s the structure of the health care industry in certain regions of the country had shifted dramatically with HMOs enrolling 39% of those insured in Massachusetts, 36% in California, and 35% in Minnesota by 1994. This growth of HMOs is expected to increase over the next several years as the Federal and State governments attempt to move Medicare and Medicaid patients into HMOs as a way to decrease government health care costs. As demand for managed care grew, for-profit insurers converted traditional indemnity plans into managed care programs and bought out existing HMOs to enter the growing market. Whereas for-profit HMO enrollment was only 5 million in 1985 compared to 14 million for non-profit HMOs, by 1994, for-profit HMOs had an enrollment of nearly 25 million surpassing the enrollment in non-profit HMOs of 20 million.

Through direct employment of physicians or the use of capitated contracts, HMOs control and monitor physician behavior while eliminating incentives present under fee-for-service reimbursement. HMOs carefully monitor patient admissions into hospitals and promote the use of out-patient clinics whenever possible. In addition, HMOs control where patients may be admitted if necessary. The historical power of physicians to admit patients is limited by HMO contracts with hospitals. Those hospitals which do not have contracts cannot treat patients covered by the HMO. By centralizing control over patient admissions, the HMOs have been able to negotiate “bulk-rate” contracts with hospitals demanding significant price reductions in exchange for channeling patients to the contracting hospitals. From 1983 to 1993 there was a 14 percent annual increase in the

number of community hospitals contracting with HMOs so that by 1993 over 50 percent of all community hospitals had contracts with HMOs.

The careful control over physician practices and hospital admissions has led to a decrease of overall health service utilization over the past decade. One study finds that HMOs which employ their own physicians reduce health service utilization by nearly 20% (CBO, 1995). Other studies find that even these savings from managed care in hospital and ambulatory care expenditures may be understated due to the spillover effect of managed care on the behavior of all providers in the region (Baker, 1993, Dowd, 1986). As a result, total patient days in hospitals dropped by nearly 21 percent and average length of stay decreased by 7 percent between 1983 and 1993. While there has been a corresponding drop in the number of beds in community hospitals from over 1 million 1983 to approximately 915,000 in 1993, this 10 percent drop has been insufficient to maintain occupancy levels (IOM, 1996).

Managed Care and Hospital Restructuring

The adoption of the Federal government Prospective Payment System combined with early managed care initiatives did not force hospitals to restructure. In response to lower hospital utilization, administrators primarily closed hospital beds. Existing reimbursement levels were still sufficiently high so that few hospitals needed to redesign in-patient care practices (Hirschhorn, 1994). Hospitals also sent patients home faster and discharged them to sub-acute care settings with lower daily costs. They did not radically change the way care was provided while patients were in the hospital.

In fact, nursing staffing patterns intensified during the 1980s (IOM, 1996). As patients were discharged faster or lower acuity patients were treated in out-patient clinics, the average acuity of

patients within hospitals steadily increased (Carter, Newhouse, and Relles; 1990). The development of new medical technology also enabled physicians to treat more acute patients than before. In response, hospitals employed more Registered Nurses and decreased the ratio of ancillary personnel throughout the 1980s. The higher skills and flexibility of RNs compensated for the modest wage differential between Registered Nurses and Licensed Practical Nurses at the time (Aiken and Hadley, 1988).

The growth of managed care also shifted the power relationship within the health care industry. Large regional and national managed care firms demanded ever increasing discounts over the “usual and customary rate” from independent, local hospitals. Particularly, where there was an over-supply of hospital beds, hospitals were in a weak negotiating position to resist insurer demands. Some HMOs negotiated capitated payment contracts whereby a hospital would be responsible for all hospitalization needs of a defined population. These contracts shift patient care risk to the hospital and encourage administrators and physicians at the hospital to adopt more efficient patient care practices.

Threatened with the loss of patients, hospitals had few choices but to accede to the demands of managed care providers. Some hospitals unwilling to grant such decreases lost significant portions of their business. Hospital administrators and physicians were forced to begin examining their care provision processes, in detail, and search for ways to drastically reduce costs. Hospitals merged, bought out physician practices, and built their own integrated delivery systems to increase their patient base and build market power against managed care providers. Recently, some hospitals have begun to compete directly with HMOs and other managed care providers by contracting directly with employers to provide comprehensive care for a given population. In Minneapolis/St. Paul, where the growth of HMOs preceded most areas of the country, nearly one third of the

hospitals have closed over the past ten years with a projection by local hospital leaders for an additional 5 more hospital closures over the next few years.

Overall, the recent changes in the industrial organization of health care signals a clear shift towards cost-based competition among care providers. In such an environment, hospital administrators are searching for ways to reduce patient care costs. While early response were focused on reducing the number of beds in hospitals, more recent attention has focused on nursing work organization. With nursing salaries comprising nearly 40 percent of total hospital wages (Witt Associates, 1990), some hospital administrators believe that alternative care delivery practices may yield significant cost savings leading to broad experimentation with alternative nursing work organization models.

Minneapolis/St. Paul, Minnesota - An Evolving Health Care market

The Minneapolis/St. Paul, Minnesota health care market is seen by many as a precursor to changes forthcoming in the rest of the United States. With the early growth of managed care and the development of integrated delivery systems, the health care environment in Minneapolis/St. Paul has been studied extensively to understand how changes in insurance, hospital industrial organization, and hospital structure affect critical outcomes (OTA, 1994). To set a context for future discussion on changes in hospital workplace practices, I will briefly review the historical changes in the Minneapolis/St. Paul health care market (for a more extensive review see OTA, 1994).

The Minneapolis/St. Paul health care market is typically described as one of the first regions in the United States with a competitive health care market (OTA, 1994). This resulted partly out of historical developments and partly from a specific state strategy to use competition among providers to control health care costs in Minnesota (Anderson, Heysel, and Dickler, 1993). Historically, HMOs have played a unique role in the Minneapolis/St. Paul area. The first regional HMO, Group Health, Inc., was formed in 1957 as a consumer cooperative. Group Health employed salaried physicians and contracted with local hospitals for services. At the time, private employers rarely offered Group Health to their members while physicians considered it inferior medicine. In fact, early advocates of Group Health were primarily local unions and public sector employees.

The local perception of HMOs changed in 1972 when a leading, multi-specialty physician group practice created an HMO, MedCenters, in response to local employer interest. In 1975, another HMO was formed signaling the broader growth of HMOs in the Minneapolis/St. Paul area. During this time, from 1971 to 1978, HMO membership was growing by a 27 percent annual rate

with 12.4 percent of the twin city population enrolled in one of the seven available HMOs by 1978. This compares with a national average of 5 percent at the time. One of the reasons for this growth was the developed of an alternative HMO model, Independent Practice Association, whereby people could choose their physician from a much larger pool of providers. This compares to the initial model whereby patients had to be treated by one of the physicians directly employed by the HMO. Providing consumer choice integrated the cost controls available within an HMO with the choice and freedom demanded by patients. Anderson, et al., (1993) suggest that HMOs grew faster in the Twin Cities due to three factors: an environment including social homogeneity, political progressiveness, and economic stability; employer initiatives, whereby the focus was on cost control rather than quality and access which had already been addressed; and community response.

During the 1980s, HMO growth was further promoted by a revision in Minnesota state policy to encourage the use of HMOs by its 144,000 state employees. In 1985, the state revised its health care contribution formula so that employees were required to pay the difference in premium costs above the low-cost insurer offered. This resulted in a movement of many state employees, who lived in the Twin City region, into HMO providers. In fact, the 1980s was a period of dramatic growth for regional HMOs so that 44 percent of the population in the Twin Cities was enrolled in HMOs by 1992.

While research suggests that early growth of HMOs in the 1970s minimally affected hospital utilization (Kralewski, et al., 1982; Luft, et. al., 1986; and Feldman, et al., 1986;), the broad expansion of HMOs during the 1980s began to significantly decrease hospital admissions and length of stay. During the 1970s, HMOs typically did not use competitive bidding in developing contractual arrangements with hospitals (Kralewski, et al., 1982). In addition, discounts given to HMOs did not appear to result in lower hospital costs or profits (Feldman, et al., 1986). During this

time, HMOs probably succeeding in controlling costs by reducing hospital admissions rather than in changing hospital treatment of patients once admitted while the growth of Medicare and Medicaid replaced any lower utilization from HMOs.

By the mid 1980s, however, HMOs began to concentrate patients in certain hospitals with cost playing an important role in hospital selection. At this time, hospitals began to experience declining discharges and lengths of stay across all service areas with HMOs linked with significantly shorter lengths of stay than traditional indemnity insurers (Dowd, 1986). Whereas there were approximately 10,000 acute care beds in the Twin Cities in 1971, this had shrunk to 7,480 beds in 1990 with the number of beds per 1,000 people decreasing from 5.1 to 3.0 (OTA, 1994). This was primarily achieved through the closure of six Twin City hospitals from 1982 to 1993. Finally, even with the decreasing number of available beds, hospital occupancy shrank from almost 74 percent in 1971 to less than 44 percent in 1990. Among hospitals participating in this study occupancy rates fell from 51.6 percent in 1985 to 40.6 percent in 1994 on the basis of beds licensed. Since 1993, additional hospitals have closed while others have reduced the number of beds staffed.

A recent report by the Office of Technology Assessment (1994) finds that existing evidence, though imperfect, suggests that "HMO enrollment may have contributed to a reduction in hospital beds in the Twin Cities." Overall, hospital utilization and emergency room visits were lower in Minnesota than elsewhere in the country, with the average length of stay one half day shorter than the national average. This lower hospital utilization did arise at the expense of increasing uninsured in the Twin Cities. In fact, Minneapolis/St. Paul ranked near the bottom of United States metropolitan areas in the number of uninsured people with 10.1 percent of the population in the

Twin Cities uninsured compared to a national average of 17.6 percent in comparable metropolitan areas (OTA, 1994).

As hospitals faced increasing pressure from HMOs, they merged to form multi-hospital systems. These mergers served multiple functions including increasing market power in negotiations with HMOs, easing hospital closures and downsizing, reducing administrative costs through common overhead, and improving access to capital markets (OTA, 1994). By 1987, four hospital systems grew to dominate the Twin City market with over 50 percent of all admissions. Since then additional hospital mergers have occurred with two hospital systems merging with each other, another system merging with the University of Minnesota hospital, one of the few remaining independent facilities in the area, and two children's hospitals merging with each other.

The final phase of health care restructuring in Minneapolis/St. Paul occurred during the early 1990s with mergers among large HMOs and with hospitals. While five different HMOs dominated the Twin Cities market in 1977, two HMOs, Medica and HealthPartners, had over 90 percent of the HMO enrollment by the end of 1992. In addition, for the first time HMOs and hospitals began to merge forming large integrated systems combining the insurance and provider components of the health care industry. On December 2, 1993, HealthPartners completed a merger with one hospital, Ramsey - St. Paul, to improve coordination of care for patients in the HMO. Six days later, Medica announced a proposed merger with the largest multi-hospital system to form Allina - the first truly integrated delivery system with a large HMO, numerous physician clinics, and a health care delivery system including hospitals, long-term care facilities, and nursing homes.

These final mergers resulted from two forces operating in the Twin City health care market. The first force was the adoption of a Minnesota law, in 1992, promoting the development of integrated service networks which combine the insurance and the care provision components of the

health care industry. These integrated service networks would contract directly with employers and provide cradle to grave care for patients. State regulation was adopted to control the rate of growth in each network's expenditures and limit overall health care costs in the state.

The second force promoting integration was a push by large employers in the area through the Business Health Care Action Group (BHCAG) to develop cost effective health care for their employees. The BHCAG members, primarily large, self-insured firms, formed a coalition in 1992 to develop a new health care option for employees. Through close cooperation with a health plan, the BHCAG hoped to decrease costs while improving health care outcomes. The selection of HealthPartners as the sole provider to BHCAG members directly led to its merger with Ramsey - St. Paul to meet the enhanced need for close coordination and carefully monitored costs.

These changes in the industrial structure of health care in Minneapolis/St. Paul have had clear repercussions on the performance of hospitals. As HMOs began to move patients into specific facilities and demand wide price concessions, hospitals suffered financially. During 1985-1987, the net mean income per patient day among hospitals participating in the study was near zero. As hospitals merged into systems and reduced the number of beds in the area, financial performance improved so that there have been continuous gains in income per patient day since 1988. Financial performance has not grown steadily for all area hospitals. The variation among hospitals has increased so that while some facilities appear to be prospering within the current environment others continue to lose money. Over the past year, two hospitals which have lost money throughout the past decade were either closed or slated for closing in the next few years.

Forces Shaping Nursing Work Organization

Technological Development and Patient Care Acuity in Hospitals

The acuity of patients in hospitals continues to increase. This has occurred due to three forces shaping medicine. The most prominent force is advances in medical technology. The ability to keep people alive longer and conduct procedures once only imagined, are changing the nature of care in hospitals. For example, the age at which premature babies are considered viable has been steadily decreasing. Technology available in neonatal intensive care units now allows babies born after only 25 or 26 weeks to live. Similarly changes in supporting older patients have increased the expected life span for people in their 70s and 80s. More recent developments, though, have also shifted the type of care provided in hospitals versus outpatient clinics. New technology has allowed the conduct of many surgeries on an out-patient clinic. Procedures such as cardiac catheterization do not require an overnight stay in a hospital.

The increasing average patient acuity in hospitals is also being driven by attempts to decrease the average length of stay. Growing cost pressures on hospitals during the 1980s and 1990s led to a reconsideration of many practices developed for the convenience of hospitals and physicians. Patients are no longer admitted in the hospital a day before surgery for testing and observation. They conduct all necessary testing on an outpatient basis and arrive the morning of surgery for admission and preparation. In addition, hospitals and doctors have begun to place more care in the hands of the patients and their families. Families may now be responsible for giving intravenous medications, draining tubes, or cleaning sterile wounds. The perception of what patients can do for themselves and under what conditions they can be discharged is changing. Moreover, the decentralization of care to the patient and family may only continue further in the

future as new computer technology allows distant monitoring of patients. By removing “healthier” patients from hospitals, those remaining have higher acuity and require more extensive care.

The result of many of these changes have been an increase in the proportion of hospital beds in intensive care units. Nationally, the percentage of total hospital beds which are in Intensive Care Units increased from 7.5 percent in 1983 to 10.8 percent in 1993, a 44 percent increase over ten years (IOM, 1996). This increase in proportion resulted from a combination of hospitals closing acute care beds and opening up more intensive care beds. In Minneapolis/St. Paul, the proportion of total patient days in intensive care units increased from 6 percent to 9.4 percent from 1986 to 1994.

While changes in medical technology and increasing cost pressures have altered the acuity levels of patients, new technical developments are also altering the way care is provided to patients. One significant development has been the use of care pathways (sometimes called clinical pathways, care algorithms, etc.) to standardize and coordinate patient care. Pathways are maps of possible patient paths specifying what should be conducted when and by whom. For example, the care for a women after a cesarean section was typically determined by the doctor and nurse on the basis of how the women was proceeding following the surgery. A pathway may specify what is expected to occur on each day. When a women should have the catheter removed, when first stand up, etc. The nurse then follows the pathway as long as the patient’s condition falls within guidelines specified in the pathway. Other pathways may be used for treating open heart surgery, balloon angioplasty, and total hip replacement. In some Minneapolis/St. Paul hospitals nearly 80 percent of all patients are placed on pathways. While some people are very critical of pathways as “cookie-cutter medicine,” others believe that this is first time that medicine is facing strict efforts to understand what works and what does not work rather than leave it to physician discretion.

The use of information technology is also growing within hospitals, as efforts are made to place more information about medicines, treatment, and patients on computer systems. The IT systems are being used for multiple reasons including communication among care providers, access to patient records, ordering of laboratories or receiving results, and discharge planning.

Product Market Changes

Increasing economic pressure on hospitals and efforts by insurers to reduce patient care costs has shifted hospital product markets. In addition, hospitals are facing competition from specialized facilities with work organization and staffing patterns developed specifically for a narrow product market niche. For example, over the past several years there has been a dramatic growth in the number of sub-acute and rehabilitation centers to treat patients not requiring hospitalization but not yet ready for discharge. Whereas many of these patients would traditionally have remained in hospitals, the new centers have staffing levels and overhead costs designed for treating patients who do not need as extensive monitoring and care as is given in hospitals. A patient today may be transferred to a sub-acute center for several days before discharge home.

As hospitals are facing pressures to provide cost-effective care to patients, administrators must also determine the types of patients to treat within the facility. Previously, even small hospitals responded to physicians demands by maintaining the capacity to care for a broad range of patients. In the current environment, hospitals are focusing more narrowly on certain kinds of patients as well as certain levels of patient acuity. For example, a few hospitals have dramatically increased their focus on psychiatric and chemical dependency patients. Others have increased their care for cardiology patients. This enables them to adopt appropriate work organization and staffing

practices. On a unit which treats a broad range of patients staffing patterns must be above those needed for the simpler cases present. As a result, costs are higher on such a unit.

Hospitals are also shifting the level of patient acuity within their facilities. Whereas in 1985 one hospital was clearly differentiated from all others in patient acuity as measured by HCFA case mix index, the distribution is much wider in 1994. While a group of hospitals have maintained treatment of low acuity patients, others have steadily increased the average acuity of patients in their hospital. The result is a much broader range in 1994 than observed in 1985. The increased differentiation among hospitals can also be seen through an examination of the percentage of patient days in intensive care units. In 1986, the mean among hospitals participating in this study was 6 percent of total patient days in intensive care units. There was a range from 0 to 12 percent and a standard deviation of .03. In 1994, the mean increased to .09 reflecting the higher acuity patients treated, overall, The range broadened to 4-25 percent with a standard deviation of .06. While most hospitals increased their treatment of patients in intensive care units, some hospitals now had 25 percent of all patient days in such units which require much more intensive technology and staffing patterns (see Table 2.1).

All of these changes in hospital product market could have important repercussions on staffing and work organization patterns. Increasing patient acuity has traditionally required most intensive nursing care. In addition, treating different kinds of diagnoses affects the types of skills needed within the hospital. Delivering babies is very different from chemical dependency. The work organization and staffing patterns would be shaped accordingly.

Labor Market Developments

Development in labor market characteristics shape the types of work organizations considered and desired by firms. High wage differentials may result in a substitution of one skill group for another. While firms affect employee outcomes through the practices which exist in firms, they must also adjust to the available people, skills, and wages which exist in the community. In 1993, approximately 4 million people worked in nursing in the United States (BLS, 1995). This includes 1.9 million Registered Nurses (RNs), 680,000 Licensed Practical Nurses (LPNs) and Licensed Vocation Nurses (LVNs), and 1.3 million Nurse Assistants (NAs) (BLS, 1993).

In 1992, 2.2 million people in the United States had a license to practices as RNs with 83 percent actively practicing (Moses, 1994). Over the past decade the number of licensed RNs has increased both in its absolute level and in its proportion to the United States population (IOM, 1996). In addition, the growth of RNs employed within nursing has increased by over 46 percent from 1983 to 1993 - more than double the increase in employment overall in the United States (BLS, 1995). In Minneapolis/St. Paul the 16 hospitals participating in this study employed 4,720 RN full-time-equivalents(FTEs) in 1985. By 1995 this increased by over 40 percent to over 6,700 FTEs. Even with the growth in RNs in the United States, they have had one of the lowest unemployment rates as a group (1.5 percent in 1994) compared to both other professions within the health care industry as well as other traditionally female professions, such as teachers. Two thirds of all employed RNs work in staff positions in hospitals. As a result, changes in work organization, skill requirements, and compensation for RNs in hospitals will have broad repercussions for RNs, overall.

Though all RNs must have a license granted by state agencies, the education and responsibilities of RNs vary tremendously. In 1992, approximately one third of nurses had a 2-year

diploma degree, one third had a 3-year associates degree, and another third had a 4-year baccalaureate degree (IOM, 1996). This even distribution hides a shift in the education of RNs over the past forty years towards longer educational programs. In 1993, about 60 percent of new RNs graduated with a 3-year associates degree and 35 percent with a 4-year baccalaureate. In contrast, the proportion of new graduates with a 2-year degree has nearly disappeared compared to over 80 percent of all new RN graduates forty years ago. Some hospitals today only hire RNs with baccalaureates believing that patient care requires the science background and training provided in the longer program. Among those RNs participating in this study, 22.6 percent hold a 2-year diploma degree, 41.3 percent have a 3-year associates degree, and 34.9 percent had a baccalaureate in nursing. Slightly over 1 percent hold a Master's of nursing degree. These number are similar to the national sample in 1992 except that there is a greater tendency towards an associates degree over the 2 - year diploma, perhaps reflecting that the survey includes only hospital-based RNs and not RNs working in nursing homes or clinics.

Registered Nurse wages have grown significantly over the past fifteen years. Following relatively, stagnant wages during the 1970s, RN salaries increased by 33 percent from 1980 to 1992 in real dollars (OASH, 1994) growing faster than overall earnings in the United States. The average annual salary for full-time RNs was \$37,738, in 1992 with those in hospital staff positions earning, on average \$35,212. In Minneapolis/St. Paul, starting wages for RNs with an Associates degree, rose from about \$20,600 in 1984 to over \$34,000 in 1996. The average annual salary of RNs in the participating Minneapolis/St. Paul hospitals increased from \$27,000 - 29,000 in 1985 to \$44,000 - 51,000 in 1995, an increase of approximately 65-70% over ten years. The range reflects differences in RN educational levels as well as differences in average seniority among the hospitals.

While LPNs comprise a significant portion of nursing employment in nursing homes, they make up only a small percentage (17%) of nurses in hospitals (IOM, 1996). Over the past decade, LPN employment decreased by nearly 10 percent in hospitals while their employment within nursing homes increased by 33 percent. This is partly due to the broader scope of practice permitted LPNs in nursing homes and the perception that RNs are more cost-effective in hospitals due to their greater flexibility. LPN graduations, while decreasing from 1983 to 1988, have since returned to levels of earlier years with approximately 45,000 new LPNs graduating every year. In addition, a slight, recent increase in LPN employment within hospitals since 1992 may signal a shift within hospitals towards greater LPN utilization. In Minneapolis/St. Paul the participating hospitals employed 737 LPN FTEs in 1985 decreasing to 687 FTEs in 1995. This decrease, though, masks a similar increase to that seen nationally. Among participating hospitals LPN utilization reached a nadir in 1993 with 652 FTEs employed.

LPNs must receive a license from state boards to practice. LPNs training is typically received in vocational schools lasting from 12-18 months with an educational focus on providing basic patient care under the supervision of RNs. In the sample included within the study, nearly 94 percent of LPNs responding held an LPN diploma. Interestingly, almost 5 percent of the respondents said they had one of the three RN certification degrees.

Nationally, wages for LPNs have increased in line with broader national averages since 1993. In Minneapolis/St. Paul, the wages for starting LPNs have increased from \$15 thousand per year in 1984 to almost \$22 thousand in 1995. Among participating hospitals, the average LPN annual salary increased from \$17-19 thousand in 1985 to \$26-30 in 1995 an increase of approximately 55 percent.

Finally, the number of nurse assistants working in nursing occupations has increased by 20 percent over the past ten years (BLS). While most of this growth was in nursing homes (16%), the number of nurse assistants employed in hospitals increased by 5.5 percent from 1988-1993. In Minneapolis/St. Paul, nurse assistant FTEs in participating hospitals grew by 50 percent increasing from 1034 FTEs in 1985 to 1572 FTEs in 1995.

Nurse assistants do not require a license, though a certificate program does exist. In fact, nearly 20 percent of the nurse assistants in the United States do not have a high school degree while another 46 percent have only a high school degree (IOM, 1996). Most training for nurse assistants is conducted through an orientation of 1-3 weeks conducted by the hospital. In addition, the job definition of nurse assistants is determined by the hospital of nursing home with wide variation observed in utilization (Eaton, 1997).

In contrast to the national sample, nearly 75 of the nurse assistant surveyed in this study are certified nurse assistants with only 7 percent holding a high school degree. Surprisingly, 6 percent had LPN certification and 8 percent were RNs. This “over” education of nurse assistants in hospitals may arise from the tendency of some hospitals to hire recent RN grads who are searching for a particular RN position. During my field work at a Boston hospital, the two nurse assistants on the unit were both new RN grads who were waiting for a job opening to work as RNs on the pediatric unit. In fact, by the end of my field work, both “nurse assistants” were beginning their RN orientation and training on the unit. In addition, nurse assistants may be pursuing an LPN or RN degree while working in the hospital.

Starting wages for nurse assistants was almost \$18,000 in 1995 similar to the wages received by patient transport workers and slightly more than dietary and housekeeping workers. The average

annual salary of nurse assistants within the participating hospitals was \$14-16 thousand in 1985 and \$20-22 thousand in 1995 an increase of approximately 40 percent over the decade.

Unions and Labor - Management Relations

Unions are playing an increasingly important role in shaping hospital practices. The right of hospital workers to organize, though, has not always been accepted under the National Labor Relations Act. While the initial interpretation of the right of hospital workers to organize in non-profit hospitals was ambiguous, the passage of the Taft-Hartley act in 1947 specifically exempted private, not-for-profit hospitals from coverage under the NLRA. As a result, from 1947 to 1974 nurses working in private, non-profit hospitals could not organize unions under the protection of the NLRA. In 1974, an amendment to the Taft-Hartley act was passed removing this exemption for private, non-profit hospitals. The absence of coverage under the NLRA, however, did not prohibit union organizing in hospitals. Widespread unionization efforts began in the early 1960s using traditional organizing drives in for-profit and public hospitals and through attempts to achieve voluntary recognition in non-profit facilities (Schoen and Hilgert, 1978). In 1973, even before the amendments to the Taft-Hartley Act were passed, almost 17 percent of all hospitals and 14 percent of non-profit hospitals had at least one or more union contracts (Schoen and Hilgert, 1978). By 1977, 29 percent of all hospital nurses were covered by a collective bargaining agreement (Feldman and Lee, 1980). Most recently,

In contrast the Federal regulations, nurses and hospitals in Minnesota operated under a distinct state law, the Charitable Hospitals Act of 1947, which permitted union organizing but prohibited strikes and promoted the use of arbitration to resolve conflict. Before passage of the Charitable Hospitals Act, hospital unions had already established a significant role in

Minneapolis/St. Paul (Miller, et al., 1979). Following their continued growth, unions represented over 80 percent of professional and nonprofessional employees in private hospitals in the region by 1978.

Four unions represent the majority of organized health care workers in the United States including the Service Employees international Union, Local 1199, AFSCME, and the ANA. In Minneapolis/St. Paul, both the SEIU and the MNA represent unions in nearly all hospitals while AFSCME primarily represents employees in public hospitals and Local 1199 has minimal presence. One other union, the Minnesota Licensed Practical Nurses Association (MLPNA) represents LPNs in a single Twin City hospital. Two other unions have broad representation of non-nursing employees including the International Union of Operating Engineers (IUOE) representing plant/maintenance workers, and the Association of Diagnostic Imaging Technologists (ADIT) representing all forms of technologists in the area hospitals.

While the SEIU arose as a traditional union, the ANA first originated as a professional organization focusing on the education, certification, and promotion of registered nursing within the health care industry. When RNs first began to organize into unions during the 1930s and 1940s, the ANA opposed unionization as antagonistic to the nursing mission and professionalization initiatives (Reverby, 1987). Following the changes adopted to the Taft-Hartely Act in 1974, some state branches of the ANA chose to represent their members within collective bargaining contracts while others remains professional organizations focusing on education and certification. In fact, many RNs feel that collective bargaining is at odds with attempts to build a professional model of nursing (Aiken, 1983).

Health Care Unions and Nursing Work Organization

Unionization of hospital workers has been important in shaping the nature of work in hospitals. Throughout their history, nursing unions have attempted to address employee job definitions and staffing rather than focusing solely on economic issues. While the division of labor is a typical point of discussion during any collective bargaining process, in hospitals the debate coincides with discussions over professional identity and education requirements. Who is qualified to conduct which work? Is certification required for certain tasks or can the hospital train employees sufficiently on its own? One of the first major RN strikes in the country occurred in Youngstown, Ohio in 1975 over efforts to get the hospital to include the American Nurse's Association Code for Nurses into the union contract (Miller, et al., 1979). This code broadly specified responsibilities of RNs in providing care to patients. Though unsuccessful, the strike reflected the focus among nurses to use the union as a tool to affect nursing practices in hospitals including the division of labor and staffing patterns.

Though this was an important issue for registered nurses, Miller, et al., (1979) conclude that unions in 1977 placed few restrictions on hospital practices including subcontracting, the use of supervisors to conduct bargaining unit work, and the free assignment of employees to tasks. In addition, few contracts had provisions on seniority, training, and due process. According to Miller, et al., these issues did not initially arise due to a combination of non-militant leadership and a growing hospital industry where jobs and wages were both increasing simultaneously. As hospitals began to face greater economic constraints and as unions became more entrenched within hospitals, the nature of work in hospitals began to take on an increasing role. In addition, registered nurses began to see the union as a viable tool for achieving professionalization objectives. Whereas

registered nurses had seen a conflict between professionalization and unionization, the voice and power available through a union highlight its role as a tool to achieve objectives beyond traditional economic goals (Miller, et al., 1979).

To examine the priorities of nursing unions in Minneapolis/St. Paul, I distributed surveys to the hospital-based union leaders asking them to evaluate the relative importance of different issues for their members. Across all of the unions surveyed representing nursing employees, including the MNA, SEIU, MLPNA, and AFSCME, the respondents consistently ranked job security as the top priority for members. Within an environment of growing managed care, hospital closures, and cost cuts this priority is not surprising. Increasing wage and benefits, expanding training opportunities, and improving promotion opportunities all closely followed job security as important objectives. Two of the lowest priorities across all employee groups were maintaining overall hospital employment levels and maintaining current job definitions. This latter result is surprising given the focus within the media and among the nursing leadership on the centrality of nursing job definitions in ensuring quality patient care (IOM, 1996).

Labor-Management Relations And The Growth Of Cooperation In Minneapolis/St. Paul

In contrast to other regions in the country union organizing has historically been very high in the Minneapolis/St. Paul region even before Federal government restrictions were removed from health care groups operating as unions (Miller, et al., 1979). Health care unions in private hospitals first organized employees in the mid-1940s and continued to represent them in collective bargaining even when unionization nationwide was limited by the Taft-Hartley act of 1947. The Minnesota Charitable Hospitals Act of 1947 permitted unionization though it prohibited strikes in all hospitals. If negotiations reached impasse, the law stipulated the use of mandatory arbitration to resolve

outstanding issues. Perhaps due to the historical legacy of this law or broader characteristics of the Minneapolis/St. Paul community, the relations between unions and hospital managers had always been “characterized by good feeling between the parties” (Miller, et al., 1979, p. 118). This continued even after the state law was superseded by the Federal law in 1974 which permitted strikes and lockouts.

Though not all state branches of the American Nurse’s Association decided to participate in collective bargaining after unionization in hospitals was permitted, the Minnesota Nurses Association (MNA), operating under state law had actively organized and represented registered nurses throughout the state. By 1989, the MNA represented 91 percent of all RNs in the Twin Cities (Industry wage Survey, 1989). Other unions including the Service Employees International Union (SEIU), The International Union of Operating Engineers (IUOE), the Minnesota Licensed Practical Nurses Association (MLPNA), and the Association of Diagnostic and Imaging Technologists (ADIT) represent a large portion of their potential members within hospitals. The largest of these unions in the Twin Cities is the SEIU which typically represents LPNs, Nurse Assistants, Dietary workers, and Housekeeping aides in the hospitals. The IUOE represents plant maintenance workers in nearly every hospital in the area. The MLPNA, while the predominant LPN association in the state, represent LPNs in only one hospital in the Twin Cities. The ADIT primarily represents technologists in the local hospitals. All together these unions represented nearly 50 percent of non-RN health care workers in 1989 (Industry Wage Survey, 1989). The American Federation of State, County, and Municipal Employees (AFSCME) represents multiple employee groups at one county hospital.

This unusually high unionization rate of hospital employees greatly affected the character of labor-management relations in the Twin Cities. Beginning in the mid-1970s the hospitals and

unions began negotiating area wide contracts to standardize employment costs and remove them from competition. The few non-union hospitals in the area, typically, match the wages and benefits agreed to within the collective bargaining process to prevent the unions from organizing their employees. At times, individual hospitals have excluded themselves from the centralized bargaining to increase hospital flexibility. The decision by two hospitals, United and Children's St. Paul, to remove themselves from the 1984 collective bargaining negotiations with the MNA, however, was critical in shaping future labor-management relations in the Twin Cities.

The 1984 negotiations between the hospitals and the MNA took place during a critical juncture in the history of health care in the United States and Minneapolis/St. Paul. As described earlier, HMOs grew moderately during the 1970s. This growth, however, did not greatly affect the character and practices of hospitals in the Twin Cities. By the early to mid 1980s, HMOs began to reduce hospital utilization rates and centralize patients in certain hospitals. In addition, the Federal government had recently adopted the Prospective Payment System for the Medicare program signaling additional financial constraints for hospitals. The result was a clear signal that several hospitals would close and that a new health care environment was being created. This tension in defining a new health care environment was exhibited in the 1984 RN negotiations. The hospitals were reacting to external pressures by trying to increase staffing flexibility while the registered nurses wanted to ensure some control over the process and increase job security. When a few hospitals attempted to cut costs by laying off some of their more skilled and senior RNs, tensions between the MNA and local hospitals increased (Reverby, 1987).

After an inability to reach an agreement, 6300 RNs went on strike against 16 hospitals over job security (Rothman, 1989). The strike was the largest nursing strike ever in the United States and lasted for 39 days. Though the hospitals remained open throughout the strike, they operated at

30-40 percent of capacity (Rothman, 1989) To resolve the strike, the hospitals agreed to use seniority as a basis for future layoffs.

Prior to the negotiations, two hospitals, United and Children's St. Paul, excluded themselves for the multi-employer bargaining and negotiated separately with the MNA. With the coming strike clear to all parties, the hospitals' administrations and the hospital MNA did not want to get caught up in a conflict felt more clearly at other facilities. Though the hospitals ended up paying higher wages to their employees, they also successfully avoided the strike and the animosity associated with it. In contrast, the two hospitals together with the local Federal Mediation and Conciliation Service (FMCS) decided to experiment with labor-management cooperation as a way to address internal issues. This approach built on the earlier history of open relations though little cooperation existed at the time.

Through the cooperative efforts, the FMCS brought together people who, though working in the same hospital, never established a relationship including hospital Vice Presidents, managers, and union Stewards. The objective was to build a relationship and improve communication within the hospital. As an initial step, the hospital and union leaders chose to work on a few projects desired by both parties including efforts to reduce absenteeism, improve overall communication, devise a vacation scheduling system, and ease educational programs for RNs. These projects were supported through an 18 month grant from the FMCS and the hiring of facilitator to push along the cooperation and the various initiatives. With the end of the FMCS grant, both the union and the hospital opted to further build cooperation. The formalization of cooperation within these two hospitals proposed an alternative approach to address change in hospitals. Through regular discussion and communication, new ways to cut costs and improve productivity could be devised.

The Diffusion Of Labor-Management Cooperation

During the first few years of labor-management cooperation, diffusion occurred primarily through mergers among Twin City hospital. As described, the mid to late 1980s saw a series of mergers among hospitals so that by the end of the 1980s four multi-hospital systems dominated the Twin Cities health care market. As hospitals merged, the idea of labor-management cooperation spread. Those hospitals building cooperation taught other hospitals how to initiate cooperation with relationships established in one facility transferred to others.

In 1987, though, a shift in the character of cooperation occurred in a few hospitals. While early efforts primarily focused on building relationship between the hospital and union leadership, the growing pressures on hospitals to restructure care suggested a growth in two directions. First, a decision was made to increase cooperation throughout the organizational structure including direct participation of employees in quality initiatives and work redesign efforts as well as increasing cooperation at the corporate level to oversee efforts and more formally promote cooperation with diverse employee groups. These corporate efforts resulted in greater information sharing including financial data.

While labor-management cooperation was expanding in a few hospitals, its growth was slow across hospitals even within individual systems. Single systems had both very cooperative and very adversarial labor-management relations. Even among those hospitals supporting employee involvement, different hospital leaders adopted alternative strategies. In contrast to formal labor-management cooperation, some hospital administrators decided to exclude the unions from the process and directly build cooperation with employees. In 1989, only 4 hospitals had labor-management committees (LMC). Out of these, only one hospital had developed an LMC with

unions besides the MNA. In addition, it appeared that labor-management cooperation had a short half-life. Older LMCs developed fewer new ideas and were less active than newer LMCs.

While diffusing slowly as a practice, the idea behind labor-management cooperation was building a larger support network among hospitals and unions in the Twin Cities. With the support of several hospitals and unions, the Metropolitan Hospitals' Labor - Management Council was established in 1989 with the goal to promote the expansion of labor-management cooperation in the Twin Cities. This includes an annual conference bringing together hundreds of hospital and union leaders, regular meetings among top hospital and union leaders to promote the further expansion and deepening of cooperation, and training efforts by the MHLMC in hospitals to develop cooperation. One early initiative was the adoption of a guidelines for union organizing campaigns including "do and don't" of organizing. The idea behind these guidelines was to reduce the animosity which arises during union campaigns as each party characterizes the other in draconian terms in an effort to sway votes.

Throughout the late 1980s and 1990s, labor-management cooperation has constantly been tested. One opportunity for building cooperation arose, though, when one of the hospital systems, Health One, decided to close a large, downtown, tertiary hospital in 1991 (Presentation to the Commission on the Future of Worker-Management Relations, 1994). With the changes in population away from downtown facilities and the decreased hospital utilization, managers within Health One decided to close the Metropolitan Mount Sinai facility. Through close cooperation among hospitals, both within the same system as well as with competing facilities and with the MNA and the SEIU, nearly 90 percent of the 1,475 employees were placed in new jobs. This close cooperation highlighted the potential of cooperation in an era of restructuring and the value to all parties which can be achieved when working together to address problems. This cooperation is also

reflected in the common union contract in that employees laid off from one hospital system have some seniority hiring rights at other hospitals compared to new nurses.

While this close cooperation signaled the positive potential of cooperation, other incidences showed the continued conflict which arises even within a context of cooperation. In 1993, one hospital responded to the growth of managed care and the perception of future decreases in occupancy by bringing in a consulting group to quickly cut direct patient care costs. While the hospital administrators offered to involve the MNA in the process, the restructuring objective, to cut \$10 million from the budget, was not negotiable. As a result, the MNA selected not to participate in the process and, in fact, led an active, public campaign against the initiative which focused on reducing the RN ratio and decentralizing work to ancillary personnel as a way to cut average wages in the hospital.

Overall, the early 1990s saw a rapid diffusion of labor-management cooperation across and within hospitals. By 1996, every hospital with unionized employees had at least one LMC with most hospitals having LMCs with several unions particularly, the MNA, SEIU, and IUOE. In those instances where hospitals had only a single LMC, it was with the MNA reflecting the path of diffusion where cooperation begins with the MNA, the most powerful union in the hospital. Individual hospitals adopted LMCs with additional unions, formed LMCs with multiple unions, and adopted LMCs at different levels of the organizational hierarchy. In addition, several hospitals formed LMCs for the first time. The confusion over hospital strategic directions during the late 1980s and early 1990s also eased somewhat as hospitals regained positions within the community and as profits in hospitals increased. Significant differences, though, remained among the hospitals and hospital systems in their extent of labor-management cooperation. While some hospitals had

continued and built cooperation for over a decade, other hospitals were taking early steps to build communication.

The next stage in the effort to institutionalize labor-management cooperation was a movement away from traditional bargaining in the multi-employer negotiations towards interest-based bargaining. Every three years as contract negotiations neared, relations between hospitals and unions grew more traditional. The logic of traditional bargaining rested on very different assumptions than labor-management cooperation. Traditional bargaining requires parties to conceal information and play games while both parties were striving through cooperation to build open communication and trust. Each time contract negotiations arose, relations would deteriorate and require a reestablishment of the trust which preexisted the negotiations. In response, both hospital administrators and union leaders felt that contract negotiations should adopt characteristics of more open discussions as seen in the rest of the relationship. By 1995, when the MNA completed its contract with the hospitals, most of the health care unions had shifted to interest based bargaining with very positive results. To ease flexibility and promote the resolution of hospital specific issues, the MNA negotiations incorporated a central "table" to address financial issues and "local" tables to deal with hospital specific issues. According to local participants, these negotiations were very successful and helped to further strengthen cooperation within hospitals. Many hospital leaders felt that the more difficult negotiations occurred among the hospitals in their attempt to fashion an agreement in line with particular hospital strategies.

Recent Developments: The End Of Centralization

During the recent negotiations between the hospitals and the MNA, several developments foreshadowed recent changes. One of the independent hospitals chose to negotiate separately with

the MNA. Though the agreement closely mirrored the broader contract, the hospital administration felt that they needed greater flexibility in adjusting to competitive pressures and building their own strategic direction. Over the next several negotiations, they felt that the contract would adjust more and more to local needs rather than the general tendency among all the hospitals. This same pressure was felt in several recent negotiations where the hospitals spent most of the time negotiating with each other rather than with the union. For example, several hospitals wanted to increase LPN wages to meet their growing demand. Other hospital administrations were resistant to this idea since increases in LPN wages would push up nurse assistant wages, though candidates for these positions are not in short supply.

Separately, the hospitals and hospital systems appear to be taking different approaches to labor-management relations. Of the three dominant hospital systems, one system has actively promoted cooperation at all levels of the organization including strategic involvement while another system has maintained distant relations with the unions with limited cooperation. The third system has built cooperative relations with unions in the hospitals, though has not pushed up involvement into strategic decisions. These differences in nursing practices and strategic directions appear to have resulted in the demise of the multi-employer bargaining in the Twin Cities with future negotiations occurring independently for each system or hospital. Moreover, I believe, that future negotiations will begin to mirror the labor-management relations evident within each hospital and/or system with some negotiations returning to more traditional adversarial models while others maintaining and building the interest based bargaining recently used.

The different approaches to labor-management relations have also led to the recent demise of the Metropolitan Hospitals' Labor-Management Council. One hospital system announced a merger with the University of Minnesota hospital in 1996. As part of this merger,

most in-patient care will be moved from the largest of the system's current hospitals, a unionized facility, to the university hospital, a non-union facility. Moreover, the system leadership said they would resist the unionization of the nursing staff in the hospital. As tensions grew between this system and the MNA, the MNA leadership wanted the support of the MHLMC board in enforcing the "do and don'ts of organizing" developed years earlier. This document states that hospitals will remain neutral in any organizing drive. While the MNA leadership felt that this document was a commitment by all hospitals, the hospital leaders felt that it was a guideline for behavior and that they could not enforce it upon another hospital which chosen not to abide by it. The result of this growing tension was a demand by the MNA leadership for hospital leaders to either view the document as a commitment or to end the operation of the MHLMC. In their opinion, if MHLMC members could not support openly documents developed by its members, the MHLMC served no role as a community institution.

This reflects a growing differentiation among hospital systems in their labor-management practices. One chain views cooperative relations with unions as a strategic advantage and has developed new agreements on cooperation and union involvement in decision making at all levels of the organization. This includes strategic decisions with the participation of one union leader at the corporate board of directors. Another chain has promoted cooperation extensively within each hospital but has limited involvement in strategic decision making. A third chain has maintained more distant relations with unions and limited cooperation and involvement. Finally, individual hospitals have adopted various strategies to union involvement.

The demise of the MHLMC, however, was not the only community health care institution facing dramatic changes. The Minnesota Hospital and Healthcare Partnership (MHHP), the recent descendent of the Metropolitan Healthcare Council has seen several hospitals remove

themselves for key portions of its historical functions. As bargaining becomes decentralized to hospitals and systems, the central role of the MHHP in organizing the negotiations with the unions is disappearing. In addition, as large systems grew to dominate the twin city market, many of the data gathering and quality assurance functions of the MHHP have been taken over by the systems themselves.

Through all these changes, many of the broader institutions building common practices across hospitals have disappeared. As negotiations devolve and labor-management relations develop hospital or chain specific characteristics, hospital practices will become more varied across facilities reflecting specific characteristics and needs of each organization. While previous attempts to bargaining separately has resulted in higher wages, the current competitive environment may limit wage increases even in decentralized negotiations.

The flexibility hospitals achieved through participation within a broader community of care providers, however, may diminish. For example, the cooperation among hospitals and unions to find jobs for nearly all employee when a larger hospital was closed in the late 1980s, may not be possible in a more decentralized environment. Each hospital or hospital system will have to create its own internal mechanisms to ensure similar job security and flexibility. While larger systems may be able to achieve this, it is the smaller and independent hospitals which will suffer from a breakdown in cooperation.

Conclusion

In the evolving competitive environment, hospital administrators are exploring opportunities for controlling costs and providing cost-efficient care to patients. During the mid-1980s this was achieved by merging with other hospitals and closing unnecessary beds. More

recently, hospital administrators have focused on the staffing and work organization practices on nursing units as ways to reduce patient care costs.

The forces described in this chapter including performance demands, technological changes, new product markets, labor market characteristics, and labor-management relations all play a critical role in determining the work organization practices adopted by hospitals within the evolving competitive environment. In the next chapter, I try to differentiate among these factors in shaping the practices observed on in-patient hospital units. To understand current shifts, I first examine the evolution towards primary nursing - the nursing work organization dominant in the 1980s. I then describe the changes in the current environment and address some of the explanations provided for these shifts in practices. I conclude the chapter with two comparative case studies based on hospitals in the Minneapolis/St. Paul area. The hospitals selected for the case studies operate in similar product and labor markets yet adopt very different work organization and staffing practices. The intention of the comparative cases is to highlight points of variation among hospitals which may predict the observed differences in work organization practices.

Chapter 3: The Evolving Nursing Role In Hospitals

Introduction

The nursing work organization in United States hospitals is currently undergoing wide scale transformation. These developments, however, are not the first time that nursing has faced a restructuring of the skill utilization and division of labor among care providers over the past fifty years. Nursing work organization has undergone a series of redefinitions over the past several decades as hospital care faces continuously increasing technological intensity and cycles of cost pressures. While the intersection of technological change and evolving cost pressures may play an important role in shaping the “average” practices observed, they do not explain the differences among hospitals even within a single labor market.

Work Organization and Human Resource Practices in Hospitals

The changing institutional context of hospitals has resulted in dramatic changes to the work organization and human practice models being adopted. Whereas the 1980s saw an increase in the ratio of registered Nurses employed within hospitals, the 1990s are beginning to show a leveling off or decrease in the RN ratio even as the average patient acuity level within hospitals continues to increase. Moreover, hospital administrators are struggling to find new ways to deliver hospital care within the growing cost constraints by redistributing tasks among care providers and creating new multi-skilled jobs in hospitals.

The nursing work organization model within hospitals has evolved dramatically over the past 80 years³. Before the Great Depression most paid nursing care was provided within the home. Hospitals, founded as religious or benevolent associations, cared for those too impoverished to pay for care on their own. Within hospitals, nursing care was provided by students in exchange for the education they received. To satisfy this demand for nursing students, many hospitals opened their own nursing schools. The education of nurses, however, comprised little more than cleaning, comforting, and caring for patients to build moral character. The hospitals could not afford wages demanded by graduate nurses and fought attempts to require their use within hospitals.

The advent of the Great Depression resulted in a shift in hospital nursing due to the combination of several forces. First, nursing care was becoming increasingly technical. As medicine grew complex, additional tasks for providing and coordinating care were added to the traditional nursing tasks (Reverby, 1987). In addition, the wages of graduate nurses dropped as the demand for their services in private homes shrank during the Great Depression.

With the advent of World War II, an additional shift occurred in hospital nursing employment. In contrast to the Great Depression, World War II brought a shortage of graduate nurses. This shortage and rising wages for graduate nurses led hospital administrators to search for alternative care providers, including LPNs and nurse assistants, to help nurses in care delivery. As the skill mix in hospitals changed, the work organization adopted arose from a combination of the historical legacy within nursing and the dominant model of organizing work within the economy at the time. Florence Nightingale, in her efforts to develop a professional model of nursing, put in place rigid bureaucratic structures adopted from the military and religious institutions. By adopting

³ Some early history of nursing is adopted from Susan M. Reverby's (1987) Ordered to Care: The Dilemma of American Nursing, 1850-1945.

legitimated structures, Nightingale hoped to build legitimacy for her new form of hospitals and nursing's role within it (Abel-Smith, 1964). As LPNs and nurse assistants were brought into hospitals during the 1940s and 1950s, the narrow division of labor developed by Frederick Taylor in manufacturing served as an additional model which coincided with the paradigm developed by Florence Nightingale.

This work organization stressed the distinct roles of each group. Care was coordinated under the authority of RNs and the ward leadership. RNs operated as team leaders and supervised the work of LPNs and nurse assistants. Work was clearly divided along skill levels with RNs responsible for high skill tasks and coordinating the work of others while LPNs and nurse assistants provided most of the direct care to patients. By 1960, LPNs and nurse assistants comprised the vast majority of nursing personnel (70 percent) with RNs making up only 30 percent of the total nursing staff in hospitals.

From the 1960s to the 1980s, nursing work organization shifted dramatically. In place of the team approach to nursing, an alternative work organization model called "primary nursing" arose. Within this model registered nurses were responsible for comprehensive patient care with limited support from LPNs and nurse assistants. This model defines the RN as "*the accountable professional for the development of an ongoing plan of care... with the authority to coordinate all aspects of care*" (Clifford, 1991: italics in the original). In this model, a single RN has full, 24-hour responsibility for patient care and acts as the point of coordination for physicians, ancillary services, and families. Instead of maintaining coordination and authority within a supervisor, these responsibilities were decentralized to RNs who provided direct care to fewer patients. This care responsibility included both highly technical medical work as well as routine tasks, such as bathing and feeding, previously conducted by LPNs and nurse assistants.

One of the centers of primary care in the United States is Beth Israel Hospital in Boston. During observation of nurses at Beth Israel hospital, a single nurse was given responsibility for all aspects of patient care. As soon as the charge nurse on the unit was informed that a patient would arrive, this patient was assigned to a single nurse who then took all responsibility for organizing the patient's care including room preparation, initial assessment, contact with internal and external physicians, and discharge planning. Patient care was directly coordinated with the admitting physician and with nurses across shifts. Moreover, if this patient was admitted back onto the unit in the future, every attempt was made to use the same person as the primary nurse on the unit (please see Appendix 1 for a more detailed description of the primary nursing model and supporting practices at Beth Israel Hospital).

By the mid-1980s, primary nursing was the dominant model of nursing in the United States. Researchers have attributed several factors to the broad adoption of primary nursing. First, Registered Nurses were perceived to be much more flexible and efficient in providing patient care. Due to licensing and educational differences, LPNs were restricted in the type of patient care they could provide. Second, the increased employment of RNs was eased by the relatively low wage differential between RNs and LPNs during the 1970s and early 1980s. Third, medical care was changing in hospitals. With the advent of new medicine and technological developments, nurses were treating increasingly acute patients. As a result, the nursing leadership in many hospitals felt that the additional training of RNs was required in this context of increased technical sophistication. Even among RNs, educational requirements were increasing so that more RNs had 3 and 4 year degrees rather than the traditional 2-year diploma. Some hospitals, such as Beth Israel Hospital, decided to only hire RNs with Baccalaureate degrees. Finally, the primary nursing model was seen by members of the nursing leadership as part of a professional model of nursing defining a specific

and clear role for RNs in hospitals (Aiken, 1983; Aiken, et al.,1981; Krall and Prus, 1995). As a result, by 1986 RNs comprised approximately 60 percent of the total nursing staff (Brannon, 1990) - a dramatic shift from that observed in 1960. This increased to 68 percent RNs by 1994 (IOM, 1996). In Minneapolis/ St. Paul, the mean RN ratio in 1985 was 74 percent with a very slight increase to 75 percent in 1995 among participating hospitals. The RN ratio peaked at over 78 percent in 1988 with a slow and steady decrease from 1991 to 1995.

In a recent review of studies on primary nursing and the professional practice model, few differences in outcomes were observed as compared to alternative nursing models (Verran, 1996). While employee job satisfaction and perceived autonomy were higher, no differences in cost or patient outcomes were observed. Several studies have recently focused precisely on the nursing work organization model and have attempted to differentiate between changes in overall skill level on the unit and changing nursing practice models. A recent review of the studies on nursing skill mix, finds that those hospitals employing a higher proportion of RNs on the nursing staff have lower mortality rates (Prescott, 1993). On other hand, a different study finds that the improvements in mortality rates arise from nursing work organization, particularly responsibility for broad care coordination, rather than the skill mix in the hospitals (Aiken, et al., 1994).

Recent Changes in the Work Organization of Nursing

In response to recent cost pressures in health care, hospital administrators have begun to reexamine nursing practices in search of cheaper ways to provide patient care (Hirschhorn, 1994). One recent study finds that the nursing department represents 30 percent of the average annual budget and 40 percent of total hospital FTEs (Witt Associates, 1990). In Minneapolis/St. Paul, the total nursing wages comprised 40.5 percent of total hospital wages in 1985 and 44 percent of total

hospital wages in 1995. In addition, total nursing FTEs were 36 percent of overall hospital FTEs in 1985 and 40 in 1995. On the other hand, nursing wages remained at 18 percent of total patient costs in both 1985 and 1995.

With the focus on wages and FTEs in hospitals, cuts in nursing personnel labor costs are seen as a prime source for increasing overall hospital financial performance. By substituting lower cost personnel for more expensive RNs or by decreasing the staffing intensity, hospitals can reduce costs per patient day. By cutting one hour of RN time per patient day, a hospital with 80,000 annual patient days can save 1.3 million dollars. Efforts to cut costs, though, must be seen within a context which is promoting further increases in RN utilization including the continued decrease in patient average length of stay, increases in patient acuity levels in hospitals, and a larger proportion of total hospital beds within intensive care units (IOM, 1996).

According to a recent report by the Institutes of Medicine (1996), the most dramatic source of change within hospitals is the utilization and job characteristics of nurse assistants and other ancillary personnel. Overall, the report finds that nurse assistants are assuming an increasing role in direct patient care. This change ranges from greater responsibility over routine tasks, such as changing dressings and taking vital signs, to more significant patient care responsibilities, such as physical therapy and telemonitoring (Barter, et. al., 1994). Among the nurse assistants participating in this study, over 80 percent were responsible for taking vital signs, bathing and feeding patients, and transporting patients. In addition, 27 percent conducted sterile procedures, 23 percent drew blood, 12 percent did ECGs, and 6 percent conducted respiratory therapy.

Even with these greater responsibilities, however, Barter, et. al., (1994) find no wide-scale training for nurse assistants with 66 percent of California hospitals providing less than 40 hours of classroom instruction and with 99 percent of the hospitals studied providing less than 120 hours of

on-the-job training for newly hired nurse assistants. This was supported in my research where initial training for new nursing assistants was between 2-4 weeks with most hospital units providing only 2 weeks of initial training for new nursing assistants. There was no significant correlation between nurse assistant job definition and the extent of training provided on the unit.

Nurse assistant responsibilities are evolving as part of broader restructuring of ancillary job functions within hospitals. Some facilities are combining transport, housekeeping, and dietary into a single multi-functional job and moving them from functional departments into nursing units under the responsibility of the unit nurse manager. By combining tasks, administrators hope to ease flexibility, decrease costs, and reduce the number of different people having contact with a particular patient during the course of a day (Perry, 1991). In addition, hospital administrators are also actively combining clinical skills across traditional boundaries such as respiratory therapist with ECG technician or combining tasks traditionally under the control of different technologist groups (Perry, 1991). As hospitals experience shortages among certain skill groups, they are also undertaking responsibility for training existing workers and hoping to build long term employee commitment to the hospital while ensuring future skill availability. According to hospital administrators, wages for over half of these cross-trained employees have not increase commensurately (Perry, 1991).

One new model of care attempting to integrate these various developments into a single nursing model is called "patient focused care" (Chicago health Executives Forum, 1991; Greiner, 1994, SEIU report). In this approach, a multi-skilled team of care providers works together to coordinate care for a small group of patients. Cross-training may include routine responsibilities, such as phlebotomy, respiratory therapy, and vital signs. Support services, such as housekeeping, dietary, transport, and restocking supplies are also combined and placed within the team. Finally,

ancillary services including x-ray and physical therapy are decentralized to the unit. This shifting of responsibility to the team combined with multi-skilled workers is intended to build communication and improve an understanding of the relationship between different aspects of patient care. In the original model, patient focused care additionally involved physical plant restructuring so that each team had responsibility over a narrowly defined group of patients, according to diagnosis, and worked within a distinct physical space. Due to financial constraints, physical changes are rarely implemented. RNs supervise the team and ensure overall patient care. According to a recent report, most nursing unit employees are pleased with changes towards patient focused care. Registered nurses expressed particular satisfaction with the increased team work, new skill development, and expanded job responsibilities to include additional supervisory and decision making responsibilities (Greiner, 1994).

A second “model” observed in hospitals is broadly defined as operation improvement. Operation improvement, or OI, is focused on cost reduction by changing the skill mix and the division of labor on nursing units. “OI seeks to realize fairly rapid cost savings by diluting the RN-ancillary mix and shifting some basic care responsibilities from RNs to aides” (Greiner, 1994). The additional changes under patient focused care, such as multi-skilling and team responsibility for patients are typically not observed in conjunction with OI. The result is a redistribution of labor with minimal flexibility and coordination built into the work organization.

Both of these models have examined the division of labor under primary nursing and proposed alternative models with increased utilization of ancillary personnel on nursing units. Patient focused care, though, pushes high level work down to RNs from supervisors and focuses on multi-skilling and teamwork, operations improvement pushes work down from RNs without increasing mechanisms for coordination among care providers.

Source of Nursing Work Organization Change in Hospitals

Researchers on evolving nursing work organization have linked the changes in the division of labor and skill mix over the past several decades to the interaction of several forces. These include, changes in medical technology, increasing patient acuity levels, and cost pressures facing hospital administrators (IOM, 1996, Reverby, 1987). The intersection of these forces were believed to be the central force behind the adoption of primary nursing during the 1960s, 1970s, and 1980s. As medical technology and the average acuity level of patients increased, more skilled care providers were necessary to treat patients. The knowledge of RNs was necessary to treat sicker patients and understand the more complex care processes being developed. In addition, broad job responsibilities for RNs reduced hospital costs by increasing flexibility of care providers. As patients needs changed, RNs could provide the type of care necessary. Moreover, RNs could conduct multiple tasks simultaneously, such as take vital signs and educate a patient regarding medication and discharge.

In the current environment, hospital administrators are describing the shift towards patient-focused care and operations improvement as being driven by cost pressures from HMOs and other managed care providers. Moreover, to increase flexibility, multi-skilled care providers are being developed to conduct a series of tasks on patients rather than focus on an individual task across multiple patients. Within this context, medical technology and average patient acuity continues to increase and push for increasing RN utilization. In contrast to the primary nursing model, the current approach has been to focus RN responsibility on high skill tasks and delegate more routine work to LPNs and nurse assistants.

The result is that both the movement to primary nursing as well as the movement away from primary nursing have been described as arising from cost and flexibility demands placed on hospitals. One possibility is that changes in wage differentials have changed the relative cost of each approach. I believe that this is one part of the story. Primary nursing may be cheaper as long as RN wage differentials are not too high above LPN and nurse assistant wages. The shift during the 1980s towards greater RN utilization arose partly from low wage differentials with LPNs. The current pressures to reduce RN utilization may arise from increases in wage differentials among care providers. From 1985 to 1995 wages for RNs in Minneapolis/St. Paul increased by approximately 63 percent, wages for LPN increased by 53 percent, and wages for nurse assistants increased by 43 percent. As a result, by 1995 the wage differentials among the three skill groups had increased significantly promoting the utilization of lower skill workers.

The increases in RN wages and education may also have led hospital administrators and nursing leaders to view their role in a different way. New RN graduates are arriving with more extensive education than their predecessors enabling them to eventually take on higher skill responsibility within the hospital. Part of the shift in work organization may also be to decentralize traditional supervisory work to RNs as they give lower skill employees part of their job responsibilities.

When examining hospital work organization, we must also look beyond national or regional averages. On average certain staffing ratios may be observed even though there is wide variation among hospitals. In Minneapolis/St. Paul this can be observed in the RN ratio within hospitals. Area wide, RNs comprise almost 74 percent of total FTEs. This ranges among hospitals from 60 percent to over 84 percent. Even increasing or decreasing averages do not fully clarify dynamics within hospitals. From 1985 to 1995 one hospital increased its RN ratio from 69 percent to 81

percent while another decreased from 74 percent to 67 percent. To understand changes in nursing work organization, we must look not only at broad economic and technological forces, but also on hospital specific factors which shape the nursing practices adopted. Variation among hospitals is very important and could suggest forces which operate on the work organization adopted even within a single institutional environment with common labor market characteristics.

To clarify some of these differences, I will present two comparative case studies among hospitals in the Minneapolis/St. Paul region. Though the hospitals are matched along patient characteristics, they cannot be considered match cases. I do not control and test for specific factors. Rather, I use the variation and changes among hospitals to develop ideas about the source of variation in work organization and staffing practices within a single institutional environment. The first three hospitals treat patients in the lower range of average acuity in suburban facilities while the second two treat above average acuity patients in more urban environments. All of these hospitals operate in a single labor market with common wage differentials across skill groups. The cases are intended to suggest some of the sources of variation among hospitals and the role of various forces in shaping work organization and staffing practices. In the next chapter, I will conduct a more formal analysis focusing on the role of competitive and labor-management relations factors in shaping staffing patterns and outcomes in hospitals.

Hospital Characteristics And Work Practices

To examine variation among hospitals in their staffing and work organization practices, I have selected six hospitals among those participating in the study. Three of the six treat low acuity patients with the remaining three treating average to above average acuity patients. Within these two sets, though, there is wide variation in nursing practices. I will first describe each hospital

including economic, product market, and work organization characteristics and then raise some possible questions about the source of variation among hospitals. More specifically, the cases suggest that traditional arguments do not explain the observed variation among hospitals in their work organization practices.

Hospital A

Hospital A is a small, suburban, non-union facility. Over the past ten years as hospitals in the region closed beds and faced shrinking markets, this hospital increased its total patient days. Part of this growth may be due to its focus on obstetrics and newborns in a growing, suburban community. Overall, the hospital treats low acuity patients primarily in labor and delivery. Over the past decade, there has also been a slow decrease in cardiology and orthopedics patients.

Perhaps due to the focus on obstetrics and newborns or its location in a suburban and growing community, the hospital had very high managed care penetration and very low Medicare penetration among its patients. Managed care penetration has historically been comparatively high in this hospital increasing to over 65 percent in 1994. The high managed care has not resulted in poor financial performance. While the hospital lost money during the mid-1980s, income per patient day has increased steadily since then with the hospital currently outperforming most area hospitals, as measured by income per patient day.

One of the main recent technological innovations within hospitals has been the use of care pathways to coordinate and structure patient care. This hospital uses pathways significantly below other similar hospitals. In addition, the use of information technology by nurses to communicate and coordinate care is negligible.

Hospital A has average RN staffing intensity compared to other hospitals with similar acuity levels. In contrast to others, though, the hospital employs many more ancillary personnel, primarily nurse assistants, to support the RNs. Total staffing intensity is, therefore, very high compared to other similar hospitals with a very low RN ratio. Very few LPNs are employed at the hospital, though their ratio has increased over the past decade.

Given the high nurse assistant utilization it not surprising that they are given responsibility over more routine tasks than observed in comparable facilities. In contrast, the RN job definitions are similar to those in other similar hospitals suggesting more overlap across employee groups in their task responsibilities.

Employee involvement in this hospital is split between participation in off-line teams and direct on-the-job involvement. In this hospital, employees across all nursing skill groups are very involved in off-line, quality and cost teams. While the level of participation for RNs is moderately higher than other facilities examined, the nurse assistants in the hospital participate on teams dramatically more than any other hospital observed. Perhaps due to the high nurse assistant utilization or the absence of unions, the hospital appears to make little distinction among employee groups in their participation on teams. Active off-line participation does not appear connected to direct involvement in job decisions. Nurses at this hospital feel less involved in unit decision making than employees at other facilities.

Hospital B

Hospital B is a small to medium size, suburban, highly unionized facility. Over the past several years, the hospital has established extensive labor-management cooperation with the unions present so that there are currently cooperative arrangements with all nursing unit employee groups

including nurse assistants, LPNs, and RNs. The hospital treats approximately twice as many patients annually as hospital A, though the number of patient days has decreased slightly over the past decade. Similar to hospital A, the average acuity level of patients is very low. The service areas within the hospital are broad with increasing reliance on cardiology and obstetrics.

Managed care coverage among the hospital's patients has been increasing steadily over the past decade with percent penetration moving along the regional mean. Compared to other similar hospitals, this facility has had a significantly higher proportion of patients covered by Medicare. The hospital's financial performance followed a similar path to that described previously. Poor performance in the mid-1980s has been followed with steadily increasing income per patient day, so that it is also one of the higher earning hospitals in the region.

Compared to other low acuity hospitals, the use of care pathways for patient care is lower. On the other hand, there is moderate use of information technology by nurses on the unit

Though the financial performance and product markets are similar to hospital A, the work organization in the two hospital is dramatically different. Both hospitals have similar RN staffing intensity levels (Hospital B is a little higher). In hospital B, though, RN staffing is not matched with additional LPNs and nurse assistants. Overall, there is very low utilization of these two skill groups in the hospital so that this facility has one of the highest RN ratios in the region. In contrast, hospital A has one of the lowest RN ratio in the region. The low utilization of LPNs and nurse assistants is linked with broad job responsibilities for RNs including routine tasks. Nurse assistant and LPN jobs are much more narrowly defined than other comparable hospitals.

In contrast to hospital A, employee involvement is primarily focused on direct participation on the unit with less involvement in cost reduction teams within the hospital. Nursing employees across all skill groups have more flexibility in job related decisions including the order of tasks and

the way tasks are conducted on the unit. Hospital B, in fact, has unusually low employee involvement in cost reduction teams, though average participation on quality improvement teams. Two possibilities are that cost reduction efforts are limited by the wide unionization at the hospital or that cost initiatives are centralized through the labor-management cooperation. In fact, formal labor-management cooperation over the past few years has addressed nursing practices and patient care costs within the hospital.

Hospital C

Hospital C is small to medium size, suburban, mostly non-union facility. A few employee groups do have union representation though the nursing employees are not organized by unions. The main services provided by the hospital include obstetrics, cardiology, and orthopedics, though they have a growing chemical dependency program. The average patient acuity level at the hospital is low, similar to the other hospitals discussed in these cases.

Over the past ten years the hospital has experienced more financial difficulties than the two hospitals discussed above. This is observed both in the continued decrease in number of patient days treated and the erratic financial performance of the hospital. Whereas the other two facilities have continuously improved their performance over the past decade, income per patient day in this hospital does not follow any clear pattern with several up and down cycles observed. Managed care penetration among patients has progressed along the mean observed within the area. The hospital treats a lower percentage of Medicare patients than the community average, though significantly higher than hospital A.

There is extensive use of technical systems to coordinate patient care in the hospital. Care pathway utilization is nearly twice as high in hospital C compared to hospital B. In addition,

information technology is used for more functions here than in either of the other two facilities examined.

Staffing patterns in this hospital are somewhat different from the other two examined. RN staffing intensity is similar to both hospitals with overall staffing, including RNs, LPNs, and nurse assistants similar to the high levels observed in hospital A. In contrast to that hospital, however, the increased staffing is due to higher utilization of LPNs with only moderate use of nurse assistants. Part of the challenge in evaluating current staffing levels is that the hospital undertook a restructuring initiative of the nursing practices a few years ago. During restructuring, overall staffing increased dramatically but has been steadily decreasing ever since. As a result, the practices currently in place may reflect a temporary stage towards still lower staffing in the future.

RNs in this hospital are responsible for the least amount of routine work in patient care. Though hospital A has a lower RN ratio, the RNs there maintained broader responsibility for routine tasks compared to the levels observed here. This is combined with very high levels of nurse assistant responsibility over routine tasks. This shift in the division of labor, in fact, was one of the main objectives during restructuring to control nursing costs.

Overall, employees in hospital C participate in hospital decisions through multiple mechanisms. Employee participation includes direct decision making on the unit over job definition and training as well as participation on both cost-cutting and quality improvement teams. This contrast with the more focused participation observed in the other hospitals. Part of this may reflect participation by employee in the recent restructuring undertaken at the hospital.

Observations Across Hospitals In Case Study One

There are several initial observations from comparing the economic forces, technology use, and work organization practices across these three hospitals. First, financial performance does not appear closely linked to work organization practices. Hospitals A and B are both performing very well, as measured by income per patient day, yet they have maintained very different staffing and work organization practices. The differences in product markets (hospital A more Obstetrics) would not lead to the observed dramatic differences between the two facilities. In addition, the hospitals operate in the same labor market even though one facility is unionized while the other is not. Labor unions are sufficiently strong in the region that non-union facilities match union wages.

Second, poor performance does appear to lead hospital administrators to search for new staffing patterns and work organization practices. Hospitals A and B maintained their existing practices as financial performance improved. In contrast, hospital C restructured practices in the face of erratic earnings. Given the decision to restructure however, it is unclear exactly what promoted the specific practices adopted. Overall, there was an attempt to rationalize and decentralize work on nursing units. These changes, however, did not result in a lower RN staffing intensity, though this may be the long term objective. In addition, changes in the work organization at hospital C may also be linked to greater care pathway and information technology utilization. These systems may substitute some of the direct coordination which occurs among nurses and with nurse assistants.

Third, it appears that alternative forms of employee participation are not linked with each other. One clear difference between union and non-union facilities in the extent of employee participation on cost-cutting teams. Unions may object to broad employee participation on such

teams and may promote, instead the use of labor-management committees to address these issues in the hospital. Hospital B, in fact, does have a long history of labor-management cooperation.

"Case Study" Two

For the second set of hospitals selected for comparison, I chose hospitals treating above average acuity patients. The hospitals were selected due to the close proximity of patient acuity. Importantly, they have wide variation in their staffing patterns, though all three are heavily unionized. These hospitals are typically larger facilities but range in location from downtown to urban to suburban. On average they treat about twice as many patients per year as the facilities discussed previously. Over the past decade the number of patient days treated in the facilities has been relatively constant, though one hospital has shown a slow decrease in utilization while another has experienced a slight increase.

Hospital D

Hospital D is a medium to large size, suburban hospital. It is heavily unionized with moderate levels of cooperation with nursing employees. Over the past ten years, annual hospital patient days have decreased by approximately 10 percent. This change in patient days may partly arise from lower levels of newborn delivery and care over that time. There are no clear service areas which dominate in the hospital's overall service mix. The hospital administrators have steadily increased the average acuity of patients treated in the hospital, as measured by the HCFA case mix index.

This hospital was one of the first facilities in the Twin Cities with significant managed care penetration. Even in 1985, over 40 percent of the patients treated at Hospital D were covered by

managed care insurers. In contrast, a relatively low number of patients were covered by Medicare in 1985. By 1994, these two points of differentiation changed. While the hospital still treats a similar level of managed care patients, other facilities have almost identical penetration levels. In addition, the low levels of Medicare doubled over the decade so that Hospital D currently treats a relatively high proportion of Medicare patients compared to other facilities in the area. The hospital's financial performance appears to have been very steady from 1985 to 1994, though below comparable hospitals. Income per patient day has remained below average for the region with low positive returns throughout the decade.

To a certain extent the staffing patterns observed at Hospital D are very similar to those in Hospital A. Hospital D has average RN staffing intensity among facilities with similar patient acuity levels combined with very high levels of nurse assistant utilization. As a result, total staffing intensity is significantly higher than the other facilities discussed. This staffing pattern has been in place since 1985 with very little modification over the decade. Approximately 30 percent of all FTEs are nurse assistants, 6-7 percent are LPNs, and 60 percent are RNs. While this is a relatively low RN ratio it is due to high nurse assistant utilization rather than low RN staffing.

Given the high level of nurse assistants in the hospitals it is somewhat surprising that the RNs continue to maintain responsibility over many routine tasks. In fact, over such tasks as feeding and bathing RNs in this hospital have broader responsibility than RNs in other comparable facilities. The nurse assistants have also been granted broader jobs here than in other facilities suggesting wide overlap in responsibilities across RNs and nurse assistants. The use of care pathways on this hospital is below comparable hospitals though there is above average use of information technology.

Overall, the three hospitals in this case study appear to have similar levels of employee involvement. This hospital does appear to have broader involvement of nursing unit employees on cost cutting and quality improvement teams. In a similar pattern to hospital A, more nurse assistants participate on these teams than in hospitals with lower levels of nurse assistant utilization. There is no difference among RNs in their participation in job or unit decisions across hospitals.

Hospital E

Hospital E is a medium to large, heavily unionized, urban facility. Recently, the hospital administration and unions developed labor-management committees, though they are still in their development stages. The patient population in this hospital has remained very constant with a slight increase in annual patient days over the past decade. The service mix of patients treated has also been consistent over the past decade. Overall, the average acuity level is in the middle range of all hospitals in the area.

In contrast to Hospital D, the level of Medicare population in the hospital has remained almost constant over the past decade. It is now in the lower range of Medicare patients treated among comparable hospitals. In contrast, managed care penetration has increased at this hospital so that over 46 percent of all patients are now covered by managed care insurers. This reflects almost a quadrupling of managed care penetration since 1985. The financial performance of hospital E has consistently been one of the best in the area. Among medium to larger hospital it has shown the highest level of income per patient day throughout the decade.

Though the financial performance and patient levels over the past decade have been steady, the hospital has altered its staffing patterns to increase the relative intensity of non-RN employees. In 1985, RN staffing intensity was somewhat below comparable facilities. This was combined with

a below average use of LPNs and nurse assistants so that total staffing was significantly below the other hospitals examined. The RN ratio, however, was very high at over 76 percent. In 1994, while the RN staffing intensity remained somewhat below other comparable facilities, the support of other nursing unit employees has increased dramatically so that total staffing is now equivalent to other comparable hospitals. This increase in total staffing has been achieved primarily through an increase in nurse assistant utilization, though there has been an increase in LPN utilization in the hospital.

The division of labor among nursing unit employees at Hospital E is similar to Hospital D. Nurse assistants and LPNs are responsible for similar levels of routine tasks while RNs have a somewhat lower responsibility over routine tasks in patient care suggesting clearer differentiation in task responsibility among skill groups. The use of care pathways in Hospital E is moderate, though there is very little use of information technology in the hospital for coordination and communication.

As stated above, employee involvement in decision making across the three hospitals is very similar. There is broad participation of employees on quality improvement teams, though significantly lower participation on cost cutting efforts. The flexibility given employees in the structure of their work is similar across all three facilities except where noted above.

Hospital F

Hospital F is a medium to large, downtown, unionized facility. There has been extensive labor-management cooperation at this hospital for many years with very close relations between hospital administration and union leadership developing over that time. Over the past ten years it has experienced a slow increase in the annual number of patient days, with a slight shift towards

more obstetric and less psychiatric care. There remains a high level of cardiac care at the hospital, clearly an area of specialization. Over the past decade, the average acuity of patients has decreased relative to other comparable hospitals. While in 1985, hospital F had one of the highest HCFA case mix indexes in the area, they are now in the middle among regional hospitals.

Perhaps due to its specialization in cardiology, hospital F has always had a very high level of Medicare penetration. Even in 1985, over 33 percent of the hospital's patients were covered by Medicare. In contrast, managed care penetration among patients at this hospital was extremely low in 1985 with fewer than 10 percent of all patients covered by managed care firms. By 1994, managed care penetration was similar in this hospital to the levels observed in other facilities with over 40 percent of the patients covered by managed care insurers. The hospital's financial performance has tracked along the regional average with slightly better returns than the overall mean among hospitals. Low, but positive, income per patient day in the mid-1980s has been followed by steadily increasing returns more recently.

The evolving staffing patterns in this hospital exhibit a dramatically different pattern than the previous two hospitals discussed. In 1985, the hospital combined an above average RN staffing intensity with high use of nurse assistants in the hospital. The result was very high total staffing per patient day in 1985 with a very low RN ratio. This is a similar pattern to that observed in hospitals A and D. In contrast to those hospitals, hospital F decreased its use of nurse assistants over the decade. Whereas almost 40 percent of FTEs in 1985 were nurse assistants, this shrank to almost 11 percent by 1994. At the same time, there was a slight increase in LPN utilization. By 1994, therefore, the hospital combined an average level of RN staffing intensity with low levels of LPN and nurse assistant support leading to a high RN ratio.

Given the high RN ratio, it is somewhat surprising that nurses are not responsible for broad routine work at the hospital. In fact, among comparable hospitals, the RNs at hospital F focus their responsibility on a narrower range of routine tasks. This is matched with the fact that both the LPNs and nurse assistants are responsible for a narrower set of tasks than elsewhere suggesting a clearer division of labor among skill groups. The use of care pathways is higher here than observed elsewhere though below the levels observed among the low acuity hospitals discussed in case study one. The use of information technology is very high at this hospital with many more coordination and communication functions conducted through the computer network.

As discussed above, employee involvement is similar across all three hospitals. This includes participation on cost and quality teams, participation in unit decision making, and participation in decisions over the conduct of one's job.

Observations Across Hospitals in Case Study Two

The hospitals discussed in this section are very similar in their financial performance over the past decade and the types of patients they treat. Yet their staffing and work organization practices exhibit very different patterns over the decade with no clear link to specific economic or product market characteristics. The observed differences do not arise from the extent of union organizing since all three hospitals have similar levels of employee representation by the same local unions. There are a few important differences, however, among the hospitals. First, is the level of labor-management cooperation. The hospital with the longest running and most extensive cooperation shifted its staffing patterns over the past decade to primarily RN staffing with relatively low utilization of LPNs and nurse assistants. On the other hand, the hospital with the least cooperation, maintained low staffing levels for RNs and increased the use of LPNs and nurse

assistants over the decade. While a comparison of the first two hospitals would suggest that cooperation increases RN utilization relative to other employee groups, the third hospital does not fit into this model. This hospitals, with moderate levels of cooperation, did not alter its staffing and work organization practices either before cooperation or after its development. They have maintained high RN staffing with the support of high nurse assistant utilization.

One possibility is that the environmental context shapes the role and effect of cooperation. Ten years ago, wage differentials between RNs and others were relatively low. As part of a broad movement towards high RN utilization, cooperation may have further promoted this path. Similarly, hospitals at the time were focusing on merging with other facilities and closing beds. Cooperation may have resulted in increased RN utilization to offset some of the broader changes in hospital care. In the current environment of higher wage differentials and a climate of greater utilization of LPNs and nurse assistants, cooperation may address work organization on nursing units and focus on the division of labor among care providers and the role of different skill groups.

With very different staffing patterns and labor-management cooperation, it is surprising that so little variation in the extent of direct employee involvement was found. One possibility is that product markets or hospital size constrain the extent of cooperation possible. I find this explanation unlikely since it is unclear why these factors would place such clear constraints on participation. The similarity in direct participation could also arise from the unions present at all three facilities or local assumptions about the role of employees in hospital decision making.

While there is variation in the use of care pathways, the three hospitals are much closer to each other than to the lower acuity hospitals. There is wide variation, though, in the use of information systems to coordinate and communicate care among nurses and with other functions in the hospital.

Case Study Conclusions

Product markets appear to be important in differentiating among hospitals in the staffing and work organization practices observed. First, higher acuity patients require higher staffing intensity. This is true whether measured as RN staffing intensity or total staffing intensity. The product market, however, does not determine staffing levels. Within acuity levels there is wide variation among hospitals in the level of staffing intensity. The product market also appears to shape the division of labor across skill groups. In higher acuity hospitals, less work is decentralized to nurse assistants. The decision to maintain more routine tasks under the responsibility of higher skilled employees reflects the level of work complexity conducted in these hospitals.

The use of technology in hospitals appears linked to both organization strategy and patient characteristics. Care pathways are more frequently used in hospitals treating low acuity patients. This probably reflects the ability to “standardize” care for patients with less acute diagnoses. Patients with more ‘routine’ open heart surgeries can be placed on pathways while ‘complex’ surgeries follow along predictable paths less frequently. Care pathways are also more easily used when a patient arrives with a single diagnosis to treat. The use of pathways, however, also varies within acuity levels. The two hospitals with higher pathway use in the cases belong to the same hospital system suggesting the importance of organization strategy in pathway implementation rather than technological determinism. The use of information technology on nursing units appears almost completely driven by strategic decision making with wide variation among hospitals in different systems.

Direct employee participation does not dramatically vary across the hospitals. Overall, participation on quality improvement teams, participation in one’s own job, and participation in unit decisions are similar across all of the hospitals. Only participation on cost cutting teams varied

across facilities with more direct employee involvement in non-union hospitals. In contrast, unionized hospitals may build indirect involvement through labor-management cooperation, though this was not directly examined in these cases.

Labor-management cooperation does appear related to staffing patterns in hospitals. Hospitals with more extensive and longer cooperation have higher RN staffing intensity. This higher RN staffing intensity, though, is not related to differences in overall staffing. In fact, two of the three hospitals with longer running cooperation have lower than average total staffing due to the low utilization of LPNs and nurse assistants.

Conclusion

The historical review of nurse work organization models together with the case studies of hospital staffing and work organization models are intended to begin a discussion of the forces operating on hospitals as work models are adopted in the current competitive environment. On the basis of these cases, It appears that product and labor markets, competitive pressures, and available technology do not determine the nursing staffing patterns and work organization practices observed within hospitals. Nor are there clear models which yield the best financial outcomes for hospitals. While these forces may affect observed practices, hospital administrators operating within an evolving context decide what patients to treat and how best to organize the care. We must look at factors within the organization to understand what decisions are made and why some choose particular models of care while others select alternative paths. To examine these factors, the next chapter focuses on the role of unions and labor-management relations as they constrain and provide opportunities for hospital administrators to react within a involving framework.

Chapter 4: Determinants of Hospital Employment Practices

Introduction

Existing literature on the relationship between business strategy and organizational practices consistently promotes the adoption of strategies and practices which fit together in support of organizational objectives (Chandler, 1962; Dean and Snell, 1996). High performance is achieved through the integration of business strategy and organizational practices within a specific competitive environment.

The adoption of appropriate firm strategies and practices as well as the ability to achieve and maintain fit over time remain a challenge to organizational leaders. Even if leaders understand the strategies and practices desired, they may face constraints from internal and external factors which limit movement and adjustment. This capacity to maintain fit is increasingly difficult within an intensifying competitive environment. Not only must organizations fit strategy and practices but these must constantly evolve in response to the actions of others and changing environmental demands (D'Aveni, 1994; Hambrick, Cho, and Chen, 1996). The practices and strategies appropriate today may require a reevaluation and restructuring in the near future. As such, the capacity to adjust organizational practices is growing increasingly important. While downsizing and outsourcing are tools used recently by firms to alter available resources, the internal capacity to adjust practices could improve the long term competitiveness of firms in rapidly evolving environments as multiple shifts in practices and skills are required. Constraints and opportunities faced by organizational leaders can significantly shape firm outcomes as they attempt to adjust strategies and practices and maintain fit within an evolving, and dynamic, environment.

To examine the role of opportunities and constraints on organizational practices and adjustment, I use the industrial relations literature and develop specific hypotheses on how labor - management relations shape an organization's employment practices and its capacity to adjust within an evolving competitive environment. Recently, a dramatic change in the nature of competition among hospitals, as well as increasingly complex medical technology and shifts in product markets, have led hospital administrators to search for new business strategies as well as new ways of organizing nursing care practices. These new practices include changes in the nursing skill mix, staffing intensity, and work organization practices on nursing units. Reviewing the industrial relations literature, I develop hypotheses focusing on the constraints and opportunities available to hospital administrators arising from labor-management characteristics in an evolving context.

Industrial Relations, Workplace Practices, And Organizational Strategy

In contrast to the strategic management literature, industrial relations research historically examined the relationship between business strategy and organizational practices by focusing on the constraints placed on management decision making. For many years, the industrial relations literature operated under an assumption of constrained managerial behavior. Due to the presence or threat of a union, managers are limited in their decision making scope when considering organizational change. Changes in work organization must be approved by the union and employees if contractual language addresses the division of labor among employees.

By constraining managerial behavior unions also preclude the adoption of specific business strategies. For example, by limiting the capacity of firms to compete on wages, unions may lead business leaders to adopt competitive strategies based on quality rather than cost

reduction. This constraint placed on management is one explanation why industries in Germany, where wages and employee skills are relatively high, have adopted high end competitive strategies rather than strategies based on the low-cost production of mass produced goods. Similarly, though General Motors attempted to adopt a “Southern Strategy” during the 1970s with the opening of non-union plants in southern states, the United Auto Workers had sufficient power to force the organization of these plants and alter General Motors’ business strategy. Unions with sufficient organizational power can constrain managerial strategies by pushing for higher wages and higher skill utilization. In hospitals, this would be observed through higher staffing intensity within specific product markets.

Unions have also typically constrained managers ability to alter work practices in response to economic or competitive changes (Freeman and Medoff, 1984). For example, the division of labor in manufacturing became institutionalized within union contracts and used as a tool to maintain employment stability and limit management discretion (Slichter, Healy, and Livernash, 1960). As a result, hospital administrators’ response to changing staffing demands may be slower under unionization. This has also been the traditional role played by unions in American industry.

In recent years, the traditional role of unions and labor-management relations has undergone significant change leading to greater variability in unions affects. To the extent that this is the case, we may need to consider the nature of labor-management relations, rather than simply union presence, in shaping practices. As a base case hypothesis, however, unions should increase the staffing intensity in hospitals and slow the adjustment of practices in response to changing environmental and competitive factors.

Hypothesis 1: Unions increase staffing intensity in hospitals.

Hypothesis 2: Unions slow hospital adjustment to changing staffing needs.

While union representation acting to constrain management practice is a particular mechanism through which union shape organizational practices and strategies, a second function of unions evolves through closer relations between labor and management. Unions can also enable adjustment and change in firm practices and strategies. Unions have recently also been examined as voice mechanisms for employees (Freeman and Medoff, 1984). By reducing individual fear of reprisal from management, unions increase employee willingness to express differences with supervisors and other managers. Through this process, employees more freely express concerns and disagreements with existing policies. The result is decreased turnover among employees and the maintenance of existing employee skills within the organization (Freeman and Medoff, 1984).

Unions, as organizations, may also promote the adoption of more comprehensive organizational change efforts (Eaton and Voos, 1992; Frost, 1997; Rubenstein, 1996). By operating as a unified voice for employees, unions express employee interests in the adoption and implementation of innovations and ease the adoption of change in the interest of both the employees and the firm. With the development of close cooperative labor-management relations, unions and managers can address problems as they arise and develop workplace practices meeting both competitive and employee requirements. Some recent research has focused more on the ability of managers to adopt new workplace practices with union cooperation rather than on the constraints placed on management with a union present (Eaton and Voos, 1992).

Hypothesis 3: Labor - management cooperation eases adjustment in workplace practices.

Labor - management cooperation eases organizational change by increasing the amount and type of information communicated between management and the union leadership. In fact, this was specifically stated as one of the prime objectives in developing cooperation between the hospitals and unions. Through this process, management and labor could more easily express the need for change in existing practices and the rationale behind it. Detailed conversations of existing conditions and future projections could convince the other party that changes in practices or strategy are necessary for future success. In contrast, labor-management cooperation should not necessarily ease changes in practices when limited market pressure exists on the organization. As a result, labor-management cooperation should only ease changes in practices when competitive pressures limit changes in business strategy.

Hypothesis 4: Labor-management cooperation eases change in workplace practices only when market pressure requires the adoption of alternative work practices.

By focusing on constraints and opportunities facing organizational leaders, we can begin to address the forces which shape workplace practices and business strategies and the ability to adjust within an evolving competitive environment. Constraints and opportunities as framed by internal factors not only determine whether organizations change but also the types of practices adopted by the organization.

Organizational Change And Outcomes

Organizations are complex entities typically requiring the coordination of work across numerous functional boundaries (Lawrence and Lorsch, 1968; Gittel, 1996). In any effort to restructure work practices, changes in the work job function of one group typically crosses over into the domain of other functional areas. For example, as automotive assembly plants pushed down responsibility to semi-autonomous teams, the first line supervisors' job changed. Not only were specific tasks moved from one group of workers to another, but the remaining responsibilities shifted in character. As a result, to successfully accomplish restructuring, cooperation must be developed with employees and unions in multiple functional groups. In hospitals, this issue is particularly salient since the National Labor Relations Board may recognize up to nine different unions in a single hospital. In Minneapolis/St. Paul, several hospitals have five unions representing different employee groups. Cooperation with a single union may fail to address critical changes that occur across functional boundaries and the benefits to productivity when traditional boundaries among groups are allowed to shift.

In one Minneapolis/St. Paul hospital, cooperation with several unions eased the transfer of responsibility for basic "maintenance work," such as changing a light bulb, to employees within the hospital unit. Traditionally, the unit managers contacted plant maintenance to come and change a light bulb. The risk of decreasing responsibility over maintenance tasks was minimized since the hospital was working with plant maintenance workers to develop new high-level technical skills with the goal of bringing work previously out-sourced back into the hospital. As new skills and tasks were developed, plant maintenance workers did not fear losing lower skill work to unit ancillary personnel. As a result, those organizations with more extensive

cooperation will successfully adopt productivity improvements leading to higher performance for the organization.

Hypothesis 5: Hospitals with more extensive labor - management cooperation will exhibit higher performance outcomes than firms without cooperation.

Methods

Sample and Data

The analysis for this section is based on a ten-year panel data set of hospitals in the Minneapolis/St. Paul, Minnesota area. Out of a potential set of 18 hospitals in the Minneapolis/St. Paul area, 2 hospitals chose not to participate in the study. Out of the 16 participating hospitals, I exclude 2 facilities since they are children's hospitals with a sufficiently different patient client base and competitive market. Not all remaining hospitals, however, are included within every analysis. One hospital with no unions is excluded from the analysis on the effect of broad labor-management cooperation. In addition, four hospitals with no unions representing RNs are excluded from the analysis on cooperation with RNs.

Agreement to participate in the study included the release of proprietary, patient discharge data from the Minnesota Hospital and Healthcare Partnership (MHHP): a local, service organization developed by the hospitals to gather and distribute data on hospital performance. For almost 20 years, hospitals have sent the MHHP a summary report about each patient discharged. Examples of measures from the MHHP for this analysis include: number of discharges and patient days (for hospital and by service group), payer mix, average length of stay, market share, patient demographics, and case severity index. Each participating hospital released ten years of annual data from 1985-1994.

The patient discharge data were integrated with data from two additional sources. First, the Minnesota Department of Health requires hospitals to complete annual financial reports with information about all sources of costs and revenue. These reports include measures on the number of Full-Time-Equivalents (FTEs) for each skill group, hospital investments, skill mix, number of beds, patient days by hospital area, and total wages. Second, the Federal Mediation and Conciliation Service has provided broad support and training for hospitals and unions in their movement towards cooperative relations. A chronicle of this involvement dating back to 1985 records FMCS training conducted with hospitals and unions. Information from the FMCS was integrated and cross-checked with the reports from hospital and union leaders regarding the initiation of labor-management cooperation.

Measures

Staffing and Performance

RN hours per patient day. RN hours per patient day measures the extent of skilled nursing care utilization in patient care. Higher acuity patients require more extensive care by RNs without regard to the number of hours of care provided by other less skilled employees. This measure was created by dividing the total number of RN hours at the hospital by the number of patient days treated at the same facility.

RN ratio. The RN ratio is developed by dividing the number of RNs FTEs divided by the total number of nursing FTEs, including RNs, LPNs, and nurse assistants, in the hospital. These data are gathered annually by the state. There is one danger in examining the RN ratio in hospitals. A lower RN ratio can reflect either the decreased use of RNs or the increased use of other care providers on the unit.

Income per patient day. Income per patient day is developed by dividing total income (loss) from hospital operations by the total number of patient days.

Patient Characteristics

Case Mix Index. Patient acuity level is measured using the case mix index developed by the Health Care Financing Administration (HCFA) as part of the Prospective Payment System in Medicare. The strength of this case mix index is that it is a measure incorporating intensity of care required on the basis of national standards. The primary weakness of this measure is that it is solely based on Medicare patients who, by definition, must be at least 65 years old. Theoretically, hospitals which treat high acuity pediatrics may still have a low HCFA case mix index. Previous studies, though,

have found a close correlation between the HCFA case mix index and the overall hospital patient population.

Percent ICU days. This variable is a second patient acuity measure reflecting the percentage of total patient days where patients were in an intensive care unit. While intensive care unit reflect the overall acuity levels in the hospital, the unstable characteristics of patients typically placed in intensive care units results in higher staffing levels.

Hospital service areas. Patients treated in hospitals are classified into one of 15 different service areas. To control for the demands of different service areas on staffing intensity, I conducted a factor analysis on the distribution of service areas in hospitals. Three factors arose reflecting different types of patients being treated in the hospitals. For example, in some hospitals, OB/GYN patients comprise a larger proportion of the overall patient population than in others. This difference could affect staffing levels and other practices in hospitals when observed at the organizational level. Though I have no, a priori, assumption regarding the relationship of hospital service areas and staffing levels, I control for them in attempt to remove their role in determining staffing patterns.

Labor-management characteristics

Union status: Unionized hospitals typically have multiple different unions representing employees. In Minneapolis/St. Paul, six different unions were included within the study as potential representatives of seven different employee groups. As a measure of unionization, I include the proportion of these seven employee groups represented by a union in the hospital. I also separately examine the RN union role in the hospital.

Labor-management cooperation. Several different measures of labor-management cooperation have been developed for the analysis. The first measure examines how long a labor-management committee with the Registered Nurses union (MNA) has been in existence. The RNs were selected due to central role in the hospital care production process and their power in shaping nursing practices and staffing ratios. The inclusion of the RN labor-management committee variable limits sample size to only those hospitals with a unionized RN staff. The second measure examines the proportion of unionized groups with a labor-management committee at the time. Broader cooperation would ease change within the hospital particularly due to the need for cross-functional changes and cooperation. This variable includes all hospitals and is entered in conjunction with the measure on the proportion of employee groups unionized.

Competitive characteristics

Several different measures of competitive pressure are examined within the analyses. These measures, including managed care penetration and recent changes in patient days are intended to address both short term and long term characteristics of competition on hospitals.

Percent Managed Care Penetration. This measure is based on the total number of patient days covered by a managed care insurer. Participating hospitals send discharge reports to their local hospital organization detailing the payer of each patient admitted. On the basis of these reports, the

hospital organization provided me with an annual summary of the proportion of total patient days in each hospital with a managed care provider as the insurer.

RN / LPN Starting wage ratio. Over time the wage differential between RNs and LPNs shifts. This occurs as a result of collective bargaining negotiations conducted at the twin city level. As a result, wage differentials are mostly exogenous to hospital practices and can influence decisions made about staffing intensity and ratios among different care providers.

RN wages per Full-Time-Equivalent. This measure is based on the total wages for RNs in the hospital divided by total RN full-time-equivalents. In the analysis on income per patient day, this measure is used to control nursing wage costs in the hospital.

Control measures

In addition to the above measures, I control for the year and hospital size. I use a time trend by including the actual year as a variable in the analysis. In separate regressions, I include a dummy variable for each year except 1986 with no differences in outcomes observed. The second control variable is hospital size measured through the total number of patient days during the year. This was included to control for any economies of scale which hospitals may achieve in staffing practices.

Analysis

To analyze the data I use a cross-sectional time-series data structure. Each hospital / year is an independent observation. With 14 hospitals and nine years, the total sample is 126. This is reduced in specific analyses due to missing data or an examination of sub-sample characteristics. To correct for heteroskedasticity across panels and autocorrelation, I use a one year lagged autoregressive iterative analysis (Greene, 1993).

I examine the effect of labor-management relations on the ease of hospital restructuring through a partial adjustment model with a lagged dependent variable to address how quickly hospital administrators are able to alter staffing intensity in response to environmental and patient changes. Interaction variables between labor-management practices and the lagged dependent variable measure the extent to which practices ease or constrain adjustment of staffing patterns in response to evolving environmental and patient characteristics. Table 4.1 reports the summary statistics as well as a first-order correlation matrix.

Results

Column one in each table is included as a base analysis. These measures are included in all subsequent analyses to control for patient, competitive, and hospital characteristics. Overall, hypothesis one is partially supported. While more extensive unionization is not linked with more intensive staffing patterns, RN unionization predicts higher staffing intensity (Table 4.2, column 3).

Hypothesis two is not supported. Though the result is significant, the effect of unionization on hospital adjustment is the opposite from that predicted. In a partial adjustment model, the lagged dependent variable reflects the extent to which practices in the previous period determine current practices even under a changed environment. If the coefficient on the lagged dependent variable equals 1, it suggests that current practices are completely determined by previous practices with no adjustment for changing patient and environmental factors. If the coefficient equals 0, then previous practices have no effect on current practices. Contrary to the hypothesized direction, the negative coefficient on the interaction between the proportion of groups unionized and the lagged measure of RN hours per patient day (Table 4.2, column 2), suggests that hospitals adjust their staffing patterns more rapidly to new patient and market characteristics under conditions of more extensive unionization.

Unions, whether measured as proportion of groups unionized or presence of an RN union, ease adjustment of hospital practices even after controlling for the extent of labor-management cooperation (Table 4.2, Columns 2 and 3). Perhaps within a climate of hospital restructuring and labor-management cooperation, unions ease adjustment in staffing patterns even without the presence of formal committees. The relative role of unions as monopolists or voice mechanisms

may partly depend on the context within which they operate. While both are important, unions within a context of cooperation and restructuring may serve as critical voice mechanisms even after controlling for formal practices.

Hypothesis three, examining the effect of labor-management cooperation on a hospital's ability to restructure practices, is supported. The interaction between labor-management cooperation and the lagged measure of RN hours per patient day is significant and negative suggesting that hospitals adjust their staffing patterns more rapidly under conditions of more extensive cooperation. Closer communication, increased trust, and more extensive information transfer ease the adjustment in response to competitive and patient shifts. Cooperation increases the capacity of unions to promote higher staffing intensity when patient severity increases, while hospital management is able to achieve lower staffing levels as competitive pressures or patient changes push for alternative nursing staffing levels.

Results on hypothesis four are mixed. Hypothesis 4 claims that labor-management cooperation would result in lower staffing intensity when hospitals face economic pressure to restructure. Results shown in Table 4.2, Column 5 suggest that broader cooperation among unionized groups combined with higher wage differentials between RNs and LPNs alters hospital staffing patterns. When RN wage differentials are higher, broad cooperation leads to lower RN staffing intensity. In contrast, no differences in hospital staffing patterns are observed as a result of cooperation with RNs in the context of strong economic pressures.

The results on analyses for hypothesis five support a unique role for employee participation in improving hospital financial performance (Table 4.3). Column 1 is included as the base model for the analysis on hospital financial performance. While the breadth of cooperation does not significantly improve hospital performance, longer running cooperation

with registered nurses is correlated with higher hospital income per patient day (Table 4.3, Column 4). Registered nurses play a unique role in hospital practices in that they comprise the largest employee group and affect key hospital costs both in the nursing practices adopted and in their patient care role. One possibility is that the observed higher performance is achieved through faster responses in staffing intensity within an evolving health care environment. Hospitals with longer cooperation with RNs may also improve productivity by delegating additional managerial responsibility to RNs or by finding new ways to improve productivity and reduce costs within a given staffing intensity.

Since the regression controls for RN staffing intensity, it is possible that cooperation improves performance only after holding staffing patterns constant. Closer cooperation may hurt overall performance by increasing staffing intensity above levels “necessary” by patient characteristics. As a partial test of this, I removed RN staffing levels from the regression and found no change in the positive effect of cooperation (analysis not shown). This suggests that cooperation may actually achieve the dual objective of higher staffing intensity and higher hospital performance.

Broad unionization of employee groups and RN unionization are also linked with better hospital performance (Table 4.3, Column 2 and 3, respectively). The direction of causality in these analyses, however, cannot be established. Since no hospitals changed union status during the period examined, this is a fixed-effects outcome. Unions could either help improve hospital performance or they could organize employees at better performing hospitals. Previous research suggests that both of these processes occur in organizations (Freeman and Medoff, 1984).

Summary

In an environment requiring regular adjustments to changing demands, unionization and cooperation significantly affect hospitals' practices and their capacity to respond to changing competitive pressures. Formal cooperation between labor and management consistently eases adjustment of hospital staffing practices. Dramatic changes to the organization of health care in Minneapolis / St. Paul and the nature of competition among hospitals, led unions and managers to search for alternative means to address the pressures arising on hospitals for flexibility and cost competitiveness. One danger, however, was that the cooperation would not ease adjustment but simply serve as additional points of contention. In fact, when examining cooperation in a few hospitals, this, in fact, has been the observed outcome. Over the whole community, however, cooperation has served as a means to increase communication and an understanding of both employee and hospital needs.

This strength of the environment, however, may shape not only the development of cooperation but also the character of labor-management relations. In a turbulent environment both parties depend on the other for successful responses to evolving conditions. Competition and the real threat of layoffs leads both labor and management representatives to address the needs of the organization and employees. As a result, a context of restructuring and cooperation may promote both labor and management to focus on information sharing and flexibility.

Labor-management cooperation and unions do not only ease adjustment they also lead to two important outcomes for hospitals. On the one hand, RN unionization and cooperation is linked with higher staffing level intensity in hospitals controlling for patient and market characteristics. On the other hand, these same factors are correlated with better hospital performance. Several possible alternatives may explain this result. First, better performing hospitals may have higher

staffing levels and adopt cooperation with unions. This explanation is clearly plausible. Higher performing hospitals may simply be run by better managers. This “better” management may enable both the higher staffing levels observed and the foresight to adopt cooperation with unions.

A second explanation is that RNs unions and cooperation help or enable hospitals to adopt better performing work practices even at higher staffing levels. Hospitals with both unions and extensive cooperation with RNs may increase staffing intensity and decentralize supervisory work to the RNs. In response to the higher staffing, additional responsibilities may be granted to RNs reducing overall patient care costs and improving hospital performance.

A third alternative, is that cooperation enables hospitals to compete in a different within a turbulent environment. By easing adjustment, hospital administrators flexibly respond to evolving patient demands both by increasing staffing to attract patients and by decreasing staffing levels as the types of patients require lower staffing intensity. In contrast, hospitals with slower adjustment may not be able to take advantage of opportunities as they arise from concern that practices adopted today may limit future flexibility when lower cost practices are necessary.

For registered nurses, unionization and cooperation within an evolving context enables them to achieve their desired objectives of higher RN staffing intensity by interacting more extensively with management through cooperative discussions. Moreover, this was not influenced by external competitive factors such as wage differentials or managed care penetration. Cooperation between RNs and administrators creates a framework for pursuing joint objectives of higher RN staffing and increased hospital financial performance.

Conclusion

The recent literature on organizational strategy and workplace practices suggests that firms with an appropriate fit between strategy and practices show higher performance (Youndt, et al., 1996). In this paper, I address the determinants of particular practices adopted as well as the ability to maintain fit over time. One possibility is that the constraints and opportunities shaped by unionization and cooperative relations encourage the adoption of particular business strategies. While recent research addresses the nature of labor-management relations as a strategic characteristic adopted to coincide with business strategies (Kochan, Katz, and McKersie, 1986; Cappelli, 1985), existing labor-management relations also affect the range of competitive strategies available to firms as they compete with other organizations. The results suggest that managers facing strong unions and unions representing strategic groups of workers are more likely to assure their objectives through cooperative structures than in a traditional arms length relationship.

The ability to adjust workplace practices within an evolving environment may also function as a source of competitive advantage for firms. A rapidly changing environment is forcing business leaders to continuously alter strategies, practices, and skills. The ability to continuously reestablish fit between strategy and practices is a critical resource for organizations. Freeman and Medoff (1984) discuss the union role in creating a voice mechanism for employees rather than relying on exit in response to an undesirable situation. Employee voice through unionization is found to increase organizational performance by improving productivity and reducing turnover.

In the current analysis, I find that voice and communication through cooperation is a characteristic of the relationship and context rather than simply of unions. Both unions and management can increase their “voice” in the relationship through the development of cooperative relations. As employees and managers respond to a changing environment, cooperative relations

ease adjustment and changes in practices. As a result, firms can adopt different strategies and improve performance.

Literature within industrial relations has incorporated the concept of exit versus voice and loyalty as alternative ways of relating employees to the firm. The findings from this research suggest that managers may also choose among these alternatives in building relations with employees, particularly within a context of restructuring. When change cannot or is not achieved through communication and adjustment, organizational leaders may exit their relationship with employees through downsizing, outsourcing, and broad layoffs. The development of voice, however, is a long term investment in establishing communication channels and building relations. One clear example of the exit/voice option in Minneapolis/St. Paul occurred with the recent merge between a hospital system and the University of Minnesota hospital. As part of its restructuring the hospital system is converting a large facility into an out-patient clinic and moving most of its in-patient care to the non-union, university facility. In the hospital facing restructuring, adversarial interactions characterize labor-management relations with little room for voice and adjustment. Moreover, previous efforts to alter workplace practices were challenged by employees and resulted minimal changes to actual staffing patterns.

As competitive pressures increase, the ability to create voice mechanisms within organizations and use them to alter work practices will prove a critical source of competitive advantage. It is a resource which can increase organizational performance and improve outcomes for employees. By shaping what form of adjustment is possible, voice alters what form of competition is possible and whether multiple shifts are possible in response to evolving environmental demands.

Chapter 5: Work Organization and Information In Hospital Units

Work organization and human resource practices help shape critical organizational outcomes. Whether through the adoption of a narrow division of labor or the use of work teams, the structure of work affects interactions of employees with their task and each other. Existing research, however, fails to fully specify under what conditions alternative modes of work organization are appropriate. Moreover, research has focused primarily on only a narrow range of production systems limiting our capacity to hypothesize and test the relationship between production characteristics and work organization and human resource practices.

Over the past fifty years the nature of jobs in the United States economy have undergone a dramatic shift as jobs have shifted from work requiring the repetition of routines to work involving the integration of information and skills into production (Piore and Sabel, 1984; Kochan and Osterman, 1994). Part of the change in jobs has occurred within firms as they restructure work systems and adopt team-based production with decentralized decision making (Lawler, Mohrman, and Ledford, 1992; Osterman, 1994; Appelbaum and Batt, 1994). This change has also occurred through the growth of industries or organizational functions where production requires the constant accumulation and utilization of information for decision making (Drucker, 1988)⁴.

Organizations within this latter group are currently adopting broad scale restructuring but with limited understanding of the relationship between work organization and information use in production. One example of such an industry is in-patient hospital care. Simply adopting models developed within manufacturing settings or without regard for their effect on the unique

⁴Examples of such information-based systems include: health care, management consulting, legal services, and investment banking.

characteristics of production, fails to address the role of information as the core production attribute and poses a great risk to critical organizational outcomes. Moreover, existing theoretical models on work organization fail to integrate the relationship among the division of labor, skill availability, and information characteristics, and their effect on organizational outcomes. It is this relationship between work organization and the nature of information within production systems which must be clarified to understand the effect of restructuring in information-based firms.

In this chapter, I first review existing work organization literature and its relationship to organizational outcomes. I then highlight the role of information in organizational production processes and suggest that the nature of information in production plays a critical role in determining the relationship between work organization and organizational outcomes. To further illustrate the nature of information in production, I describe the production process of in-patient hospital care. This setting is chosen precisely because it challenges existing models of work organization by placing unique demands on the division of labor and the use of skill in production. Moreover, by examining the dynamics of work within a particular setting, we can learn about the role of work organization in structuring behavior in other settings resting on similar logics of production.

On the basis of information demands in production, existing literature, and extensive observation in several hospitals, I develop hypotheses examining the effect of specific ways of dividing labor and skills on the capacity of employees to accumulate and communicate accurate information. This model is tested using an original data set collected through surveys distributed to 3400 nursing employees on 68 units in 16 hospitals in the Minneapolis/St. Paul, Minnesota

metropolitan area. I then link these data to patient care outcomes to examine the role of unit information quality on the frequency of patient care errors.

Model of Work Organization

Theories of work organization and organizational performance range across a broad array of models including universalistic, contingency, and configurational designs. Universalistic models propose a singular way of structuring work for all organizations. These models hypothesize improvements in organizational outcomes regardless of other organizational characteristics. Contingency models, in contrast, typically specify an organizational or market characteristic which determines the appropriate form of work organization. Those organizations which match or best 'fit' the work organization approach with the specified characteristic would exhibit higher performance. More recently, configurational models of work organization suggest that multiple, ideal models exist. Organizational outcomes depend on adopting a coherent set of practices rather than on characteristics of the specific model or organizational demands.

Early research on work organization focuses on the productivity benefits of narrowly defined, standardized jobs (Smith, 1937, Taylor, 1911, Weber, 1978). By taking existing jobs, dividing them into simple tasks and standardizing the work process, the overall productivity of an organization can be dramatically improved. Moreover, narrow work specialization enables organizations to develop a single best way to conduct a task (Taylor, 1911) and employ people with the specific skills necessary to accomplish narrowly defined jobs. Through this process, complex jobs can be subdivided into narrow tasks both to improve productivity and reduce costs.

This change in work organization was observed throughout the organizational structure in numerous industries during the first half of this century (Baron, Dobbin, and Jennings, 1986). In

production, work once conducted by skilled craftspeople was subdivided into narrow standardized tasks and given to semi or unskilled workers (Stone, 1974). Moreover, as firms grew into large bureaucratic systems, jobs throughout the organization were subdivided into components with each person responsible for a small, clearly defined area of responsibility.

While productivity increased as firms adopted narrow job definitions and highly standardized work processes, some researchers questioned the link between these work organization characteristics and observed outcomes (Marglin, 1974) while others focused on the negative repercussions on employees arising from the adopted practices. One work organization strategy called Sociotechnical Systems (STS) arose promoting the integration of both technological and social demands in job design (Trist and Bamforth, 1951; Emery and Thorsud, 1976). The hypothesized results include improved outcomes both for the employees as well as the organization. In an early experiment on work organization in coal mines, researchers found that when employees were permitted to determine their own work processes, “they (the miners) had evolved a form of work organization based on practices common in unmechanistic days when small groups, who took responsibility for the entire cycle, had worked autonomously” (Trist, 1981). From this initial experiment, STS grew to promote certain forms of work organization including the adoption of autonomous work groups, extensive skill development, decentralized decision making, and varied tasks responsibility. While STS theory promotes the integration of technical and social demands into work design, the specific practices promoted in the literature cover a particular mode of organizing work and human resources across a broad array of technical systems.

Separately, another research stream focuses on the inherent motivational characteristics of jobs and proposed ways to increase organizational performance through work redesign (Hackman

and Oldham, 1975; 1980). This literature suggests that designing jobs with task variety, autonomy, feedback, identity, and significance can create psychological states in workers which increase motivation and organizational outcomes. While researchers have found only a loose connection between employee attitudes and performance, a strong and consistent link between work characteristics and performance has been observed (Cotton, 1993).

Research within strategic human resource management also proposes that certain practices including self directed teams, job rotation, employee problem solving, employee training, and contingent compensation improve organizational performance (Appelbaum and Batt, 1994; Kochan and Osterman, 1994; Pfeffer, 1994). Over the past several years, research within this area has found consistent support linking these “high performance” work practices with improved organizational outcomes (Levine and Tyson, 1990; Cutcher-Gershenfeld, 1991; Huselid, 1995; Huselid and Becker, 1996; Ichniowski et al., 1996). The challenge facing researchers on high performance practices is that no individual set of coherent “best practices” has consistently been found linked to organizational outcomes. Each researcher defines a slightly different set of practices according to characteristics of the setting or study (see Becker and Gerhart, 1996 for a review of this literature). In addition, the practices found linked to outcomes vary among studies suggesting that, perhaps, no single set of best practices do in fact exist.

While the preceding approaches to work design propose different ways of organizing jobs and human resource practices, they each maintain a “best practice” approach. Whether through the narrow division of labor, the use of autonomous work groups, the implementation of work redesign to promote internal motivation, or the adoption of high performance human resource systems, these models prescribe specific methods to improve organizational performance across all organizational settings.

Configurational models arise from a more recent literature focusing on complementarities among practices (Milgrom and Roberts, 1992). This literature suggests that no single set of practices is best rather that multiple sets of “best practice” models exist each with a distinct internal logic and complementarities. As a result, a firm with individualized jobs, rewards, and evaluation may be equally successful as another with team-based production, group rewards, and long term employment even when operating within the same market. While this approach is still relatively new, the results from existing research are mixed (Delery and Doty, 1996). Moreover, the alternative models are typically statistically derived from existing firm practices rather than from an underlying theoretical logic of alternative forms of practice complementarity.

Finally, some models specify contingencies under which different work organization practices would be most effective. One source of contingency is organizational strategy. This stream of research proposes that certain competitive strategies “fit” with specific work organization methods (Schuler and Jackson, 1988; Arthur, 1992; Delery and Doty, 1996). For example, innovating firms should adopt human resource strategies which promote long term commitment and creativity among employees. In contrast, firms operating within steady product markets should adopt human resource and work organization strategies focused on cost containment and employment stability (Delery and Doty, 1996). The key to organizational performance, therefore, is a match between corporate strategy and work organization practices.

The problem with this approach is that corporate strategy may only be loosely linked with necessary work practices. For example, an innovating firm may choose among dramatically different ways of organizing work. In one firm, managers may organize product development teams focusing on collective creativity while in another product development may be based on matching a few exceptional developers with others acting in supporting roles (Burton, 1996).

These are very different ways of organizing work and human resource practices within a single competitive strategy and may reflect the inconsistent findings in the contingency literature (Becker and Gerhart, 1996). In contrast, I believe that we need to integrate an understanding of the work process itself and the nature of production into the work organization and human resource literature. It is this aspect of an organization which must be supported by work practices.

A few recent projects have focused more precisely on the relationship between manufacturing strategy and work organization (MacDuffie, 1995; Berg et al., 1996, Youndt, et al, 1996). In these models, researchers describe specific production characteristics linked to work organization and human resource practices. In one of the first studies examining production strategies, MacDuffie (1995) explores the relationship between manufacturing based on minimal buffers with group production, decentralized decision making, extensive training, and contingent compensation. He finds that the joint effect of the work organization and production strategies is greater than the independent effect of adopting either strategy separately. In a similar approach, Berg et al., (1996) link the use of team work in apparel firms with a production strategy based on rapid response to external product demands.

In a separate examination of alternative manufacturing strategies, Youndt, et al (1996) identify three manufacturing strategies theoretically linked to different human resource strategies: cost, quality, and flexibility. According to existing theory, a low cost strategy would be most successful when linked to an “Administrative” human resource approach based on minimal training, individual rewards, and narrow, standardized work. In contrast, both a quality-based strategy and a strategy based on flexibility should yield the highest performance when linked to a “Human-Capital-Enhancing” human resource strategy with careful selection, significant training,

and group rewards. In their analysis examining the relationship between manufacturing and human resource strategies, Youndt, et al. (1996) find that the observed gains in performance when firms adopt a quality-based manufacturing strategy are driven by the corresponding adoption of a human-capital-enhancing approach to human resource practices. This supports the contingency based approach to human resource practices rather than the universalistic models previously discussed.

The success of the capital-enhancing and high performance work practices within the described manufacturing systems, rests on their ability to enable employees to address ambiguity in production and directly integrate developing information into production decisions. Within these models, employees are given direct responsibility for gathering and integrating critical information into the production process (Levine and Tyson 1990; Bailey, 1992) for use in mutual monitoring (Barker, 1993; Ichniowski, Shaw, and Prensushi, 1996), quality control and problem solving (Bailey, 1992; Adler, 1992; MacDuffie, 1995), and increased flexibility through decentralized decision making and coordination (Aoki, 1988; Berg et. al., 1996; Gittell, 1996). It is this relationship between employee skill and problem solving capacity within an ambiguous production environment which yields observed gains in organizational performance.

While the recent research has expanded the scope of work organization literature by linking practices with specific production characteristics, it still suffers from several factors potentially limiting its generalizability across settings. Nearly all of the existing research has been conducted within the manufacturing sector focusing on low to semi-skilled workers, working on assembly-line production systems (for example, automotive assembly, steel production, garment assembly). As a result, while ambiguity increases within the production process, the information used by employees is easily standardized. Moreover, the types of

production systems examined have led researchers to focus only on front-line employees and not address work organization across multiple employee groups and changes to production as the division of labor is altered among groups with diverse skills.

Several years ago, Galbraith (1973) proposed that we must look at the nature of work and information during production. Galbraith (1973) suggests that information demands within production would alter the nature of work organization practices. I suggest that we must look not only at the amount of information necessary but also the characteristics of information within the production process. On the basis of field work within hospitals, I believe that two characteristics of information in production, information decay and information saliency, shape the relationship between work organization practices and critical outcomes. Prior to discussing specific aspects of work organization and information characteristics in production, I will first describe in-patient hospital care to highlight the role of information, labor, and skills in the production process. This will then serve as a basis for discussing alternative production systems and the division of labor and skill through the lens of information in production.

The Production of Patient Care - An Information-Based System

On initial observation of hospital work, one sees care providers managing a series of tasks throughout a patient's stay. Nurses conduct procedures, such as inserting intravenous lines or catheters, distribute medications, comfort patients and assist them in going to the bathroom, and educate patients and their families about medications, care at home, and when to call for assistance once discharged.

The conduct of these tasks and their success, however, rests on the constant accumulation and utilization of information. Accurate information is critical for determining which

medications to prescribe, how to care for a patient, when to comfort a patient, and the extent of self-care a patient can conduct once discharged. Throughout a patient's hospital stay, care providers continuously update and revise information reflecting the characteristics of a particular person at a specific point in time. As a patient's condition progresses the value of existing information decays, and new information must be collected. Once available, this information is then integrated into nursing and physician decisions and used for determining patient care.

Care providers accumulate patient information through numerous means including direct communication, observation, formal testing, and monitoring. At times, the information is obvious or easily obtained. At other times, the changes are subtle and may not be noticed until after serious repercussions occur. Moreover, it is difficult to establish, a priori, which information will be most important or salient at each point in time for patient care decisions. A patient admitted with one diagnosis may develop new symptoms necessitating a re-prioritization of information for decision making. Skilled providers must recognize new developments and integrate this information into patient care decisions.

The production process in hospitals requires not only the constant accumulation and utilization of information, but also the coordination of care among multiple physicians, nurses, and specialists. One study finds that as many as sixty different care providers treat a single patient during a typical four day length of stay (Lathrop, 1992). For optimal results accurate information must flow smoothly regarding the patient's status, current diagnosis, and treatment plans. Particularly in complex cases with multiple, interacting diagnoses, information must be

collected and communicated among many care providers to ensure coordination and agreement on a treatment path⁵.

The work organization in hospitals is currently undergoing dramatic restructuring as hospital administrators respond to external pressures by cutting production costs (IOM, 1996). Hospital administrators are standardizing the patient care process and changing the employee skill mix and staffing ratios within hospitals. Employees are responsible for more patients while task responsibilities are shifted from highly skilled registered nurses to lower skilled nursing assistants. In addition, patients are being discharged faster leading to an increase in the average acuity of remaining patients. As a result, work practices face increased pressures to ensure the accumulation and communication of accurate information for use in the production system. Moreover, in their drive to cut costs, hospital administrators are having profound effects on the critical work process underlying patient care.

While a public debate has begun regarding the effects of hospital restructuring initiatives, we must understand the relationship between information accumulation and communication and specific work organization practices. Through this process, we can expand the scope of discussion on hospital restructuring and integrate the production demands with cost and quality requirements in the evolving environment.

⁵This same production process, relying on the constant accumulation and communication of information can be observed in a large variety of organizations. In law firms, for example, a lawyer may interview a client, evaluate available information, and decide whether to take the case. Available information must then be integrated with the lawyer's understanding of the appropriate legal precedents and additional information gathered from other's involved with the case. Over time, the case or project may be passed along to another attorney with specific expertise or multiple attorneys may be involved with a complex case. As the case progresses, new information is gathered and integrated into decisions. This new information may include the changing interests or demands of either party, the unfolding dynamics of a trial, or the judge's decisions. Though this is a simple, stylized description of the legal process, it is intended to demonstrate how the underlying production process is similar across different settings (also see Fleck, 1996 for a discussion of informal communication and expertise in financial services).

Information Use in Production

Work process complexity in organizations increases the demands for information processing. This has been observed both by Galbraith in the adoption of broad jobs to ease information processing demands and by researchers on high performance practices where information processing demands increased following a change in production strategies. The issue facing organizations in the determination of work organization and human practices, however, is not merely the amount of information which must be processed but the characteristics of the information necessary for successful production. Two specific information attributes differentiate among production settings and shape the nature of work organization practices: the speed at which the utility of information decays, and the ability to, a priori, establish the saliency of information for decision making.

Information decay reflects the rate at which the utility of existing information for decision making decreases over time. Information decay arises from the need to integrate changing characteristics of a product or customer into production decisions. In some customer service environments, employees collect and use new information from each person they assist. In other situations, critical aspects of a single customer or situation change rapidly requiring employees regularly to collect new information for use in production decisions.

The second information attribute is the extent to which the saliency of specific information for use in production decisions can be determined in advance. In information-based systems, variability in the production process limits the capacity to even set parameters on what information is relevant for decision making. At any point in time, new and unexpected information may arise which supersedes previously established perspectives. Moreover, shifts in information salience occur frequently, rather than exceptionally, during the production process.

Research on organizational technology describes uncertainty as “the variability of the items or elements upon which work is performed or the extent to which it is possible to predict their behavior in advance” (Scott, 1992). I suggest that it is not only variability of items and unpredictability of behavior which is important but also the clarity of potential information which may arise during the production process. It is the need to understand information outside existing parameters rather than simply movement within parameters which distinguishes among different production systems.

While some organizations place full responsibility for production in the hands of a single person, I focus on those settings where production must be conducted across multiple people. As a result of task complexity and work interdependence, multiple people with diverse skills jointly operate the production process (Thompson, 1967). This group nature of production requires organizational members to hand-off information from one to another and appropriately focus attention on the salient characteristics of evolving information thus placing additional information processing demands within organizations.

These production characteristics create a setting whereby work organization practices must enable the constant accumulation and communication of accurate information. While all organizations and production processes rely on information, the specific information attributes shape the role of information within daily production decisions and employee behavior.

To further clarify these information attributes in production, I will describe four production settings along the described dimensions (see table 5.1). These are stylized descriptions and are intended primarily to clarify the role of information in different production systems. In addition, the systems are described in relation to each other and not on an objective scale. Traditional, mass-production manufacturing with long production runs and highly

standardized routines is characterized by the slow decay of information utility together with a clear hierarchy of information. Employees repeat predetermined routines all day and every day. As a car moves down the assembly line, employees do not evaluate the car nor its condition. They conduct a specific routine and wait for the next car. Even if different models move down the same assembly line or if employees rotate jobs, each model or task has predetermined routines associated with it. By separating conception from execution, mass production is designed precisely to remove information and decision making from the production process (Sabel, 1982). This does not mean that the information, as defined by automobile quality, does not vary over time, just that the production system does not integrate this information into decision making.

In contrast, the utility of existing information decays much faster in high performance manufacturing firms with lean production systems and decentralized quality evaluation (Womack, Jones, and Roos, 1990). In such settings, employees continuously assess product quality and respond to deviations from specified parameters. When organizations strive to build in first-time quality rather than conduct post production quality checks, the utility of existing information during production decays quickly. The quality of a vehicle produced yesterday or earlier in the day has little utility to current production decisions. The clearest image of this information decay, is the use of statistical process control to gather quality data during production and each employee's ability to stop production when quality deviates too significantly from desired parameters. Within high performance manufacturing the characteristics and parameters of quality do not typically change. Processes and products are sufficiently standardized so that employees know which information must be collected and used for decision making.

The third example is characterized by the slow decay of information but where the saliency of information cannot be fixed. Most basic research is an example of such a production process. The value of existing data remains over time even if its interpretation changes as new theories arise. More importantly, when observing experimental results or reviewing another's findings, a researcher must be open to unexpected and novel types of information and interpretation. Researchers who focus only on predetermined types of information, will miss critical discoveries.

Most hospital care is an example of the fourth production type where the utility of information decays rapidly and where organizations cannot easily predetermine the saliency of different information. Other examples of this production type include: investment banking, management consulting, and legal services.

Existing research has primarily focused on work organization and human resource practices where information saliency can be predetermined. Even though an extensive research body has developed examining the shift from low to high information decay, I focus on those production settings where information both decays rapidly and where organizations cannot, a priori, establish the saliency of specific information. These information attributes highlight a unique production characteristic and lead to a reanalysis of work practices in organizations⁶.

Work Organization and Human Resource Practices in Information-Based Systems

⁶While information attributes reflect production systems, these attributes do not reflect inherent characteristics of a technical system but the way information is used within a production process. For example, in basic research, some firms may design systems to focus on only predetermined types of information and not allow for unexpected information and interpretation. Overall, research has shown that organizations can use identical technical systems in dramatically different ways (Barley, 1986; Zuboff, 1988) with information attributes of a production system arising from a combination of technical characteristics and strategic decisions.

As in other production systems, work organization and human resource practices play a vital role in structuring the dynamics of production and outcomes in information-based work settings. By creating a context within which employees operate on a daily basis, practices structure employee's workplace interactions with customers and each other and build opportunities and organizational capacity for the accumulation and communication of information.

Work practices must create opportunities for employees to gather, evaluate, and integrate available information into the production process. In research on manufacturing, broad jobs, achieved through cross-training and job rotation, enable employees to gather necessary information through the course of their work (MacDuffie, 1995). Broad jobs help employees more fully understand the work process, receive feedback from the work itself, and gain an understanding of how observed information fits within overall production needs (Hackman and Oldham, 1980).

The relationship between job structure, employee skill, and information accumulation, however, is more complex than that specified in the traditional work organization literature. In traditional settings examined, particularly within the high performance literature, employees accumulate information through the conduct of their work. As such training for job rotation and statistical process control enables employees to gather the necessary information for refining production routines and improving organizational performance. When the saliency of specific information cannot be predetermined, the accumulation of critical information depends not only on experience in production, as defined by the job structure, but also on the relationship between the division of labor and skills among employees.

Stinchcombe (1990) distinguishes between two distinct forms of knowledge: routines and abstract principles. Routines are sets of behaviors or actions linked together that require minimal evaluation and critical thinking. They may be simple or complex and are typically learned through observation, repetition, and experience. Examples of routines in automotive assembly include: inserting a rear seat or attaching a window. In hospitals, routines include: taking blood, checking blood pressure, and putting a patient into a bath. This is the dominant form of knowledge held by employees in the typical setting studied by researchers of high performance systems and reflects the type of work conducted in those production processes. Abstract principles, in contrast, are fundamental laws, such as human anatomy, chemistry, biology, and thermodynamics that may be applied in diverse settings. Abstract principles are traditionally taught in school and do not inherently require the ability to apply them through work.

In information-based organizations, both of these forms of knowledge are critical in the production process. At times, people simply determine which routine to apply and then proceed through the steps of the routine. At other times, employees use knowledge of abstract principles to understand unexpected information and make decisions about the appropriate course of action. While these two forms of knowledge are defined independently, many tasks require the integration of routines and underlying principles. For example, delivering a baby is a set of routines with critical decision points requiring knowledge of abstract principles.

As wages rise for skilled employees relative to lower skilled workers⁷, managers may strive to “rationalize” jobs and more narrowly define roles in accordance to skills and wages. This is occurring in hospitals where responsibility for the conduct of “routine” tasks is being

⁷Research has shown a secular growth in the demand for skilled workers over the past thirty years (Katz and Murphy, 1992).

shifted from highly skilled registered nurses to other less skilled supportive personnel. Instead of a nurse bathing and feeding a patient, this work is conducted by a nursing assistant trained to conduct the specific routines. Traditional, division-of-labor arguments even suggest that task decentralization could increase the quality of care and information accumulated through greater task specialization (Smith, 1937). The problem, however, is that task content does not exist in isolation from employee skill.

In the traditional literature on work place design, jobs are created prior to the employment of specific people (Mooney, 1937; Weber, 1978). Through the hiring process, firms select individuals with appropriate skills for existing jobs. In reality, job definitions are often determined as a result of employee skill (Barley, 1986; Miner, 1987). Conversely, as tasks are transferred from one employee to another, the content of that task shifts according to the skills held by the employee. For example, the content of an introductory microeconomics course varies according to the perspective of the instructor. Moreover, even if two instructors teach from the same syllabus, the nature of the class will still vary according to the interests and abilities of each instructor. The task is the same, yet the content is different. In an examination of the division of labor and technology in industry, Sabel (1982:68) discusses how a skilled worker uses a machine for many more tasks than are possible by an unskilled worker. It is neither the task nor the machine which determines actual work content but rather their intersection with employee skill.

If knowledge of underlying principles changes the content of “routine” tasks by enabling skilled workers to gather unanticipated information, the relationship between task decentralization and outcomes may be reversed. As such, the nature of a “bath” or a “walk down the hallway” changes depending on who is conducting the work. A task becomes a routine rather than an opportunity to use abstract principles for information gathering and decision making. No longer

does a bath serve as an opportunity to examine a patient's skin condition, learn about issues at home, and evaluate the medicine's efficacy, but rather simply as an opportunity to clean the patient. The division of labor and skills among employees determines the quality of information accumulated.

Hypothesis 1: Information quality is improved through centralizing even routine tasks with employees who hold knowledge of underlying principles.

Organizations must also build employees' capacity to understand and evaluate information. Formal employee skills are critical for determining the level and quality of information accumulated. In health care, a current change in the available skill mix from more highly skilled Registered Nurses towards lower skilled employees, such as nurse aides, may result in the accumulation of less accurate information. Even within broad skill categories, more advanced formal education builds the available skill level for use in production.

Informal skill development, though, is critical for working effectively within a particular setting. According to nurse managers, the process of initial skill development for new nurses takes 6 to 12 months. Even for experienced nurses, moving to a new unit requires a relearning of routines and processes. Experience on the unit provides opportunities for developing specific knowledge appropriate for understanding information ambiguities and treating certain diagnoses.

Another form of available skill is distributed knowledge - knowledge held by other members of the group (Barley, 1996). In information-based systems, where production is complex and conducted by a group, the ability to access this distributed knowledge plays an important function in individual skill development and the capacity of employees to accumulate and evaluate critical information. In hospital care, employees, when confronted by a novel or

ambiguous case, seek advice from other more skilled workers. While these narrow forms of knowledge rest within individual workers, others can access this information and skill. The capacity to access distributed knowledge is critical for each person's successful conduct of work. Moreover, accessing distributed knowledge builds unit level skill and the quality of information accumulated.

Hypothesis 2: Higher employee skills increase the quality of information accumulated.

While the division of labor and skills frame the potential for accumulating accurate information, information must be communicated among employees for use in the production process. Practices which increase communication opportunities and openness promote information accuracy.

Traditional organizational theory focuses researchers attention on the value of clear divisions of labor among employees with specific areas of responsibility (Fayol, 1949; Weber, 1978). Even in more recent work redesign and high performance literature, the focus is on shifting task responsibilities from one party to another. This strategy, though, suffers from serious problems in settings requiring information transmission. Clearly defined organizational structures create barriers to communication by building distinct skills, interests, perspectives (March and Simon, 1958), and time horizons (Ancona, 1992).

By defining overlapping job responsibilities among workers, employees share task accountability and coordinate needed activities. These overlapping or fuzzy boundaries among jobs are critical in a dynamic environment requiring constant communication among a diverse group of employees. The resulting interactions build a common language of work and provide

opportunities for communication (Gruenfeld, et al, 1994). In one hospital, I observed a nurse notice problems with the medications prescribed for a patient, raise the issue with a physician, and help solve the problem. In another instance, a nursing assistant and registered nurse used the discussion over the division of daily tasks to confer over patient status and progress.

Hypothesis 3: Overlapping job responsibilities improve the quality of information communicated.

In addition to examining the above work organization and human resource practices, I control for several additional measures which could affect the quality of patient information available on hospital units. These include the number of employees on the unit, complexity of the diagnoses treated, patient average length of stay, staffing levels, employee shift, and the extent of patient continuity of care maintained over time. I also include dummy variables for each unit type except OB/GYN. Each measure, including all dependent and independent variables, is described in Appendix 2.

Summary

The nature of production in information-based system requires a different conception of work organization and human resources practices than that described within the traditional work organization literature. The central role of information accumulation and communication underlying production in these settings requires an examination of organizational practices for multiple employee groups in relation to each other. In addition, we must clarify the nature and

role of skill and its development over time as a source of continuous improvement in organizational capacity to gather and communicate accurate information.

Sample and Methods

The quality of information accumulated has multiple characteristics. These characteristics include the depth of available information for decision making, the breadth of information available, and the accuracy of information communicated. Due to this complexity, I use two different dependent variables to address information quality. The analyses are repeated with each dependent variable to test the hypotheses and ensure appropriate analyses. The first set of analyses examine the ability of organizations to develop and communicate accurate information for use in the production process. Inaccurate information can result in errors in care and delays in responding to developing patient needs. This is measured by looking at the probability of a nurse receiving inaccurate information about her patients over the previous three shifts. The second measure of information quality is examined through the extent to which nurses felt comfortable with the amount of patient information available to them when they began their shift. Together, I believe that these measures address the quality of information available to nurses as they make patient care decisions.

Analyses are conducted on responses from one thousand, one hundred and eighty four (1184) surveys complete by registered nurses⁸. They work on 68 in-patient hospital units in 16 hospitals in the Minneapolis/St. Paul region. Hospital units were selected for participation according to the types of patient treated on the units. Attempts were made to select units which

⁸ The sample included in the analyses is a subset of the total returned nursing unit employees. Analyses were conducted only on surveys from registered nurses working on unit where at least 60 percent of the surveys distributed were returned.

treat similar patient types thus easing control of the “production” process. The overall response rate among nursing unit employees was 69 percent (see Appendix 2 for unit and diagnosis selection process). Answers from nursing unit employees, including registered nurses, licensed practical nurses, and nursing assistants were aggregated to form unit level measures. Table 5.2 provides the means and standard deviations for all of the variables included within the study.

Results

Table 5.3 displays the effects of work practices on the likelihood of a nurse receiving incorrect information about her patients from another nurse over the past three shifts. Logit analyses are conducted with a correction for sample clustering on the basis of unit type. In addition, due to the nature of work organization characteristics, hypotheses 1 and 3 are examined separately.

Maintaining responsibility for routine tasks in the hands of employees with abstract knowledge significantly predicts the probability of receiving incorrect information. By maintaining responsibility for routine tasks in the hands of highly skilled registered nurses, more accurate information is accumulated and communicated among nurses. In contrast, broadening Nursing Assistant job responsibilities for tasks seemingly based on routine knowledge, increases the probability of receiving inaccurate information. When overall job breadth for Registered Nurses is inserted into the analysis instead of the above measures, no significant relationship is found with information accuracy (analysis not shown).

To test for the effect of employee skills on information accuracy, I develop four distinct measures of unit skill to address, skill mix, formal skills, and informal skills. More informal

skill development through mutual learning among Registered Nurses is linked with more accurate information. All other measures of skill were not significant.

In column 2 of Table 3, I include a measure examining the extent of overlap in job responsibilities on the unit. This variable measures the extent to which all employees are responsible for the conduct of routine tasks. Greater overlap in the conduct of routine tasks is linked with more accurate information on the unit. Maintaining responsibility for routine tasks in the hands of both Registered Nurses and Nursing Assistants increases information accuracy. Broader responsibility for Nursing Assistants over routine tasks is significantly related to less accurate information while mutual learning among Registered Nurses is no longer significant. Due to the high correlation between Registered Nurse job definition and task overlap (.94), I removed the former measure from the regression. This correlation suggests that task overlap is achieved through maintaining Registered Nurse responsibility over routine tasks rather than increasing the scope of Nursing Assistant responsibilities.

All of these analyses are conducted controlling for unit size, work process complexity, staffing ratios, ratio of Licensed Practical Nurses, patient care continuity, and patient average length of stay. Dummy variables for each unit type were inserted except Obstetrics/Gynecology.

The analyses are repeated (Table 5.4) after substituting the dependent variable. In the second set of analyses, I examine the likelihood of a registered nurse feeling uncomfortable with the level of patient information available to her when the shift begins. Broader nursing assistant responsibility over routine tasks on the unit increases the probability of an RN feeling uncomfortable with the level of patient information available to her when the shift begins. No significant result is observed based on RN job definition. On the other hand, broader overlap of job responsibilities across unit employees decreases the probability of an RN feeling

uncomfortable with the patient information available. In addition, RNs working on units with higher average RN experience and more informal skill development feel more comfortable with the information available to them.

Overall, the analyses support a more careful description of the division of labor in production systems where work is conducted across multiple people with different skills. Decentralizing even routine tasks to lower skilled employees decreases the quality of information. Moreover, overlapping task responsibilities increases information quality available on the unit. In addition, informal skill development through greater experience on the unit and more mutual learning among registered nurses is critical for information quality.

One difference observed, is the significance of RN job definition in predicting information accuracy and not level of comfort with available information. This difference in outcomes suggests that the two dependent variables may be addressing distinct components of information quality. One possibility is that the level of RN comfort with available information when the shift begins reflects the capacity to openly communicate quality information while information accuracy reflects the ongoing development of information during the shift.

Results on employee skills suggest that the relationship between formal employee skill and the information quality on the unit is limited after controlling for the division of labor among different skill groups. Neither the proportion of RNs with baccalaureates nor the nursing assistant ratio on the unit are significant in the analyses.

Table 5.5 shows the results on the relationship between information quality, the division of labor, unit skills, and the perceived frequency of medication errors occurring on the unit. Each RN was asked how frequently medication errors arise on their shift. These responses were then aggregated to form a measure expressing the perceived frequency of medication errors on the unit

per month. Regressions are conducted on the unit level leading to an sample of 51 units. Both information quality measures are included in the analyses. In contrast to the previous analyses, information accuracy on the unit equals the percentage of Registered Nurses who said they did not receive incorrect information during their previous three shifts while RN comfort with available information equals the percentage of registered nurses who were not uncomfortable with the patient information available prior to the shift.

Information accuracy on the unit significantly predicts the perceived frequency of medication errors on the unit. More accurate information is linked with fewer medication errors. The percentage of RNs comfortable with the quality of information available is not significant. Moreover, maintaining broad RN responsibility and overlapping job responsibility across employee groups is linked with fewer perceived medication errors on the unit even after controlling for information quality. Nursing assistant job definition does not significantly predict the frequency of medication errors on the unit.

Both formal and informal skill measures are consistently found to be linked with the frequency of medication errors on the unit. Higher formal skill on the unit, as measured through a lower Nursing Assistant ratio and a higher proportion of RNs with a bachelor's degree, is linked with fewer medication errors. In addition, higher informal skills among RNs through greater seniority on the unit is linked with fewer medication errors.

Just as information quality has multiple components, the result of poor information on patient care quality is complex. The significance of information accuracy rather than information comfort may reflect a more dynamic component of mistakes in information resulting in medication errors. As suggested above, information accuracy may reflect the ongoing accumulation and communication of information during the shift. This component of

information accuracy may shape the likelihood of medication errors. In contrast, RN comfort with information available during shift changes may result in adverse outcomes to patients through other processes not examined in this paper.

To confirm the importance of information quality in shaping the quality of care, not only as perceived by nurses, but as experienced by patients, I examine a simple correlation between information quality and patient perception of nursing care quality. Due to the lack of sufficient data, only 14 hospital units had unit level patient perception data. These data are collected by independent firms through a survey distributed to patients after discharge. Overall information accuracy has a .65 correlation with a factor containing several measures of nursing care quality as perceived by patients, while information comfort had a .67 correlation with the same measure. In addition, the frequency of medication errors as perceived by registered nurses has a -.49 correlation with this same measure. The more frequent the medication errors, as perceived by RNs, the lower the quality of care, as perceived by patients. This provides further support of the role of information quality in nursing care quality and the validity of the medication error frequency measure.

Overall, the division of labor and informal among employees in information-based production systems is critical in determining the quality of information transmitted. By maintaining responsibility over routine tasks in the hands of employees with abstract knowledge and overlapping responsibilities across employee groups, organizations can ensure the use of higher quality information in decision making. In addition, informal skill development is critical for improving the quality of information available. These unit specific skills enable RNs to gather and communicate appropriate information desired by fellow employees.

The importance of information quality in such settings is highlighted by the role of accurate information in predicting the frequency of medication errors on the unit. Moreover, available employee skill on the unit is critical in preventing the occurrence of medication errors. For example, just as one nurse I observed prevented a medication error by noticing the prescription of two duplicate medications, the transmission of quality information combined with available skills helps limit preventable patient care problems and not just address them once they arise.

Conclusion

This project investigates the role of work organization and human resource practices in structuring the production process in information-based organizations. These organizations require the constant accumulation, communication, and utilization of information as a basic component of work. Through a detailed investigation of in-patient hospital care, I develop and test several hypotheses looking at the division and integration of labor and skills. I focus on the role of information quality in determining critical outcomes under certain production characteristics - those where the utility of information decays rapidly, where the organization cannot, a priori, establish which information will be most salient for decision making at each point in time, and where production must occur across a group of employees with diverse skills.

Separate analyses show that information quality is linked to two specific work practices. First, maintaining responsibility for routine tasks in the hands of employees with understanding of abstract knowledge. Second, overlapping job responsibilities among employees with different skill levels to build communication and coordination. In addition, informal skill development through experience and mutual learning increases the quality of information available. Finally,

information accuracy, as well as job definitions and available skill on the unit are linked with a critical patient care outcome, the frequency of medication errors in the treatment of patients.

This research attempts to address several critical issues. First, research on work practices must continue to differentiate among production systems and key characteristics of the work process which enable employees and organizations to successfully accomplish desired objectives. Towards this objective, I highlight three critical attributes of the production process, information decay, information saliency, and demands for regular communication, which differentiate among production systems and corresponding work organization and human resource practices.

Second, by examining a production process that occurs across multiple people with diverse skills, I focus on the division and integration of labor and skills within organizations rather than on a single work group. The nature of a task is not distinct from the skills of the person conducting the work. As organizations restructure the division of labor or available skills, they must clarify how these alter the nature of work conducted and critical aspects of the production process. Theories of work organization must also integrate employee skill with the corresponding tasks rather than assume the constant character of work in organizations.

Third, as competition among information-based organizations increases, pressure grows to restructure and devise new organizational forms. Models taken from manufacturing, however, fail to address critical characteristics of these more complex organizations with unique production processes. Decentralizing even routine tasks may result in unexpected costs to the organization and its customers. Moreover, the current debate regarding hospital restructuring fails to include key characteristics of the hospital care production process. By focusing on information accumulation and communication we can move beyond the existing debate among hospital administrators, health insurers, and health care professionals, which focuses solely on

skill mix and staffing ratios and address broader ramifications of work place change in a critical industry.

Chapter 6: Conclusion and Implications for Future Research

This dissertation focuses on the health care industry in the midst of transition. Hospitals are closing, merging, and building integrated delivery networks to increase the cost effectiveness of patient care, in response to changing competitive pressures. A central component of the restructuring undertaken is the development of new staffing and work organization practices. While existing research suggests that changes in hospital work organization will have important effects on outcomes for all parties, hospital administrators have been changing the delivery of patient care with few theoretical and practical models to suggest how different practices will affect critical outcomes.

Within an environment of increasing economic pressure, the relative priority of cost versus quality is at play. While controlling health care costs is an important objective for each provider and the overall industry, a danger arises if cost information is easier to measure than patient care outcomes. As competition intensifies, the ease of measuring cost information relative to the complexity of patient care quality may result in lower quality patient care (Dranove and Satterthwaite, 1992). This study begins to examine the relationship between cost and quality and suggests that, perhaps, tradeoffs exist within an information-based production system, such as health care. These tradeoffs must be understood as part of the decision making process.

An Examination Of Hospital Restructuring

In selecting to study in-patient hospital care, I chose an industry and production process dramatically different from those previously examined. These differences place unique demands

on the work organization practices adopted. More specifically, patient care requires the constant coordination of work and information across several skill groups each responsible for distinct components of the care process. Any shift in work organization for a single group is closely linked to changes for others and affects the overall outcomes of production. By focusing on this interaction, I am able to address how changes in jobs are linked across skill groups and how work organization for several different skill groups interact to shape important outcomes.

Overall, I address two questions central to understanding the processes and outcomes of organizations in transition. First, what determines the types of practices adopted and the ability of firms to adjust practices within evolving contexts? Second, what are the outcomes of different work organization models in hospitals for the quality of care provided? Overall, I find that labor-management relations play a very important role in shaping hospital practices and the ability to flexibly respond to changing competitive and product market characteristics. In addition, I find that different ways of organizing work on hospital units, particularly the division of labor among care providers and the skills available for patient care, significantly shape patient outcomes. These are two different components of organizational performance - the ability to provide high quality patient care and the ability to adjust within evolving environments.

In examining the role of labor-management relations during firm transformation, I focus on the ability of unions and labor-management relations to shape work organization practices and a firm's ability to flexibly respond to changing competitive and market conditions. Building on earlier research on the role of unions within firms, I find that unions have two simultaneous effects on organizational functioning. First, unions promote the interests of their members as observed in their ability to increase staffing intensity within hospitals. Within a rapidly evolving local industry, health care unions in the Minneapolis/St. Paul area have successfully taken wages

out of competition and pushed for more intensive staffing patterns without adversely affecting hospital financial performance. Controlling for hospital and market characteristics, more extensive unionization in the hospitals is linked with higher income per patient day, though the direction of causality cannot be determined.

Second, through the development of cooperative labor-management relations, unions increase management flexibility in changing hospital staffing patterns. As hospital administrators strive to respond to changing demands arising from increased competition, growing managed care penetration, changing government regulation, and new medical technologies, cooperative relations with unions are a key strategic tool to promote flexibility. Through cooperation a dialogue ensues regarding appropriate staffing levels and practices given environmental and patient demands. The result is faster adjustment both to increasing and decreasing staffing intensity. During times requiring increased staffing, unions may successfully counteract pressures on hospitals to maintain lower patient costs. Similarly, when changing competitive and product market conditions require lower staffing levels, the closer communication and trust possible through cooperation may enable management to convince union leaders of the need for faster changes in staffing practices.

By shaping staffing patterns and adjustment flexibility in hospitals, labor-management relations significantly affect hospital performance and strategy. The ability to create opportunities for change or constrain the adoption of particular strategic paths alters the range of strategies available to firms as they compete. For example, the close cooperation between General Motors and the United Automobile Workers enabled the development of Saturn Corporation (Rubinstein, 1996). Without close cooperation, the development of an inexpensive, high-quality, domestically produced car at General Motors may have been impossible. Similarly,

the constraints placed on management practices which arise from traditional labor-management relations rather than the opportunities which cooperation builds hinder the adoption of certain competitive strategies.

The importance of labor-management relations within broader organizational strategy suggests that union leaders and firm managers must carefully determine the relations established and the practices promoted. Unions that push for skill development and flexibility may encourage certain strategic directions compared to unions that push for job control and stability. In addition, managers must strategically determine the nature of relations as part of broader competitive policies. This appears to be the process in Minneapolis/St. Paul where the three main hospital systems have selected different strategic paths for their labor-management relations. Among the three systems, one has actively promoted cooperation at all levels of the organization. Another hospital system has maintained traditional relations with local unions. The third system has established extensive cooperation within each hospital, though it has not built up cooperation at the firm's strategic level. The distinct labor-management strategies appear closely linked to broader competitive strategies of the systems within the local health care market.

Work Organization and Production Outcomes

The second question in this dissertation focuses on work organization models in in-patient, hospital units. This setting contrasts dramatically with those previously examined, such as automobile assembly, steel rolling, and apparel manufacturing. Studies in those settings examine the decentralization of work responsibility to front-line employees as firms move from traditional to high performance manufacturing. Even the service firms examined, such as airlines

or telecommunications, exhibit many similar characteristics of production to manufacturing (Batt, 1995; Gittell, 1996). In these settings, pushing work to front-line employees together with careful selection and extensive employee training, improve both production quality and costs.

In hospitals, the production system is dramatically different. Moreover, initial field research suggested that the “high performance” models developed within manufacturing would operate very differently in hospitals. Overall, I find that two information characteristics, its saliency and speed of decay for use in production, differentiate among production systems and require different work organization models. Hospitals, and other ‘information-based’ production systems are environments where the utility of existing information decays rapidly and where the organization cannot, a priori, establish the saliency of information for decision making. In such a setting, employees must have the capacity to both gather and understand available information. As more work, even seemingly routine tasks, are pushed down to lower skilled workers, the quality of information gathered for decision making diminishes. Mistakes are made in information accumulation and errors occur on the unit. Information mistakes are linked both with the frequency of medication errors on hospital units and patients’ perception of nursing care quality.

This finding that decentralizing routine tasks to nurse assistants decreases the quality of information available for patient care decision making, suggests a potential trade-off between quality and cost of care. Maintaining RN responsibility over routine tasks improves care quality but may also cost more.

One possible alternative to the current restructuring initiatives is to refocus the way organizational leaders determine task decentralization. At Beth Israel Hospital, RNs are responsible for broad patient care. While nurse assistants are used, their range of tasks is

significantly limited. Instead of decentralizing work from RNs to nurse assistants, high RN utilization is integrated with the decentralization of many managerial tasks to RNs. This includes coordinating patient care across multiple settings, developing training and educational material, and overseeing employee staffing levels. The result is that RNs continue to conduct a broad range of patient care responsibilities as well as many managerial tasks on the hospital unit. While specific cost data are difficult to gather, Beth Israel Hospital is typically rated one of the top performing hospitals in the country along multiple measures including financial performance (HCIA, 1996).

This management decentralization results in two benefits to the organization. First, RNs are able to directly address issues as they occur without relying on supervisors for decision making or nurse assistants for necessary information. Questions surrounding patient care are resolved by the RNs with broad knowledge of patients who are granted wide decision making authority. Second, RNs are constantly building their skills and knowledge of medical practices. Through direct contact with physicians and regular communication with each other, RNs learn new medical information and build their skills.

Future Research Questions

The findings from this research raise several additional questions for future examination. First, in this dissertation, I examine strategies and practices adopted by each hospital as independent of the strategies and practices adopted by other local hospitals. In reality, each time a firm adopts a particular strategy or changes work organization practices, it alters the context for other firms. This is particularly true when the market is local and organizational leaders are fully aware of changes adopted by other firms.

On the one hand, practices adopted may act as models for others to adopt. Institutional theory has traditionally used hospitals and schools as the basis for extensive analysis due to the poor understanding of means-ends relations. When people are unable to clearly understand how processes affect outcomes, firms are hypothesized to adopt legitimated practices as signals of quality to external parties. In my analysis, I find wide variation in work organization practices and staffing patterns even among hospitals within similar product markets. While it is possible that practices still act as signals to external parties, it does not appear that hospitals mimic each other in the determination of staffing and work organization practices.

On the other hand, practices adopted by one hospital or the entry of a hospital into a certain product market, may foreclose similar actions by other hospitals in a local market. For example, if one firm has successfully established a strategy based on “high quality and flexibility” can other firms follow similar approaches or must they pursue contrasting low cost strategies to successfully compete? In constrained, competitive markets, firms may need to develop practices in contrast to each other. This may arise from the need to differentiate one firm from another or due to the closure of certain product markets controlled by other parties. Overall, I believe that firms both mimic each other and become constrained by the actions of others. Understanding how this evolves is an important research question.

A second question requiring further research addresses the relationship between the forces operating on hospital restructuring and work organization practices observed on nursing units. Though I do not find that specific staffing patterns determine work organization practices in hospitals, do the determinants of staffing patterns also shape the nature of work organization in hospitals? For example, do unions and labor-management cooperation shape work organization

and the division of labor on nursing units? What is the role of employees on the unit in directly shaping their work and the division of labor?

In addition, do certain work organization practices affect the capacity of hospitals to adjust in response to evolving competitive pressures. Organizational performance depends both on the practices that exist at any point in time as well as the ability to respond to competitive and market changes. As the speed of change quickens, the ability to flexibly respond increases in relative importance to an organization's steady-state performance. In this study, though I examine both components of organizational performance, I do not address the relationship between hospital work organization and adjustment capacity.

The Beth Israel Hospital case study, suggests that organizational flexibility may be related to the availability of a highly skilled, empowered workforce. By decentralizing important managerial tasks to RNs, steady-state quality is improved as well as the ability to adopt change practices and improve performance over time. Registered nurses have been involved in multiple restructuring initiatives including the development of a new out-patient clinic and cost-cutting and quality improvement programs. Beth Israel Hospital has relied on employee ideas to cut their annual budget, save tens of millions of dollars, and remain competitive in a rapidly evolving market.

In addition, a skilled workforce responsible for broad patient care and direct coordination with other care providers may build hospital performance over time. At NUMMI, highly standardized production systems and group problem solving enable the continuous improvement of production routines (Adler, 1992). In hospitals, where care providers must gather and communicate critical information for quality patient care, similar outcomes are achieved through continuous skill development and relationship building. Through direct coordination of care,

employees learn new knowledge about patients and medical practices. In addition, relations are established among employees that ease the communication of information or the expression of uncertainty regarding a patient's condition.

High Performance Practices in Information-Based Firms

In many ways the characteristics of high performance practices developed within manufacturing continue to play important roles in improving organizational performance. An empowered, skilled workforce able to address issues in production as they arise and continue to build production capacity and quality over time is central to a successful work organization model. In examining different work systems and how high performance is maintained, researchers must be aware of the unique production characteristics that shape appropriate work organization practices. In particular, we need to understand the characteristics of information used during production and for productivity and quality improvement. Moreover, the process through which organizations build knowledge and capacity over time as they respond to changing environmental demands may rest on alternative work organization mechanisms in different settings.

Epilogue:

The Continuing Evolution of Hospital Care in Minneapolis/St. Paul

The Minneapolis / St. Paul hospital community is continuing its evolution towards a competitive health care market. During the 1980's hospitals focused on closing beds and merging into systems to save money and increase their negotiating power with HMOs and other insurers. While in competition with each other, the hospitals faced similar agendas and worked together improve their performance and challenge the power of external parties.

Beginning in the mid-1990s, the hospitals entered a new stage in the transition process. The hospitals and hospital systems are now building distinct identities and strategic agendas. Many services provided by the local, hospital trade association for almost twenty years are being decentralized to the hospital systems themselves further reducing common efforts to improve quality and reduce costs. This change can also be observed in the end of community wide labor-management cooperation and multi-employer bargaining. As different hospitals established alternative ways of interacting with employees and their representatives, the practices in one hospital started constraining practices in others. When the hospitals were first developing labor-management cooperation, the small differences that existed did not suggest dramatically different strategies. As some hospitals continue traditional relations with unions and others integrate the unions into strategic decision making, the community wide cooperation constrained both parties and limited the development of their strategies.

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TABLES AND FIGURES

Table 2.1: Proportion of Patients Treated within Intensive Care Units (1985-1994)

Year	Mean	Range	Standard Deviation
1986	.060	0 - .12	.032
1987	.065	0 - .18	.047
1988	.075	.02 - .20	.046
1989	.083	.02 - .22	.049
1990	.089	.04 - .20	.047
1991	.085	0 - .20	.051
1992	.090	0 - .21	.055
1993	.091	.04 - .20	.048
1994	.094	.05 - .25	.058

Table 4.1: Summary Statistics and First Order Correlations

	Mean	S.D.	1	2	3	4	5	6	7	8
1. RN hours/ patient day	13.1	5.89								
2. RN ratio	.75	.09	.55***							
3. Case Mix Index	1.36	.15	.50***	.15*						
4. Total Days	78520	65208	-	-.05	.61***					
5. Percent managed care	34.4	14.5	.28**	-	-.21*	-				
6. Proportion ICU days	.09	.05	.57***	.42***	.00	-.28**	-.26**			
7. RN labor- management council years	2.78	3.87	.15	.15	.64***	.19*	-.14	-.17*		
8. Proportion of groups unionized	.51	.12	.02	.07	.58***	.05	-.02	-.19*	.16*	
9. Proportion of unions with LMC	.22	.34	.10	.07	.27**	-.01	.02	-.12	.44***	.09

* = p < .1
 ** = p < .01
 *** = p < .001

Table 4.2: A Partial Adjustment Model Of Hospital Skilled Staffing Intensity

Variable	RN HOURS / PATIENT DAY	RN HOURS / PATIENT DAY	RN HOURS / PATIENT DAY	RN HOURS / PATIENT DAY
	Base Model			
	Column 1	Column 2	Column 3	Column 4
Lagged Dependent Variable	.7432*** (.0574)	.7710*** (.0956)	.8255*** (.0681)	.6116*** (.0857)
Severity Case Mix Index	3.268*** (.8250)	7.510*** (1.085)	4.316*** (1.025)	5.358*** (1.485)
Patient Service Mix 1	-.2656 (.2555)	-1.181*** (.3151)	-.2303 (.2731)	-1.379** (.6074)
Patient Service Mix 2	.3492*** (.1323)	.7493*** (.1528)	.4428*** (.1509)	.5748** (.2258)
Patient Service Mix 3	.1909 (.1839)	.4919** (.1992)	.2385 (.1876)	.0525 (.2195)
Total Hospital In-Patient Days	.0000 (.0000)	.0000 (.0000)	.0000 (.0000)	-.0000 (.0000)
Percent Of Patients In Managed Care	-.0168 (.0105)	-.0068 (.0121)	-.0119 (.0108)	.0053 (.0157)
RN / LPN Starting Wage Ratio	-2.618 (3.334)	-2.342 (3.225)	-3.810 (3.354)	-6.068 (3.837)
Percent Of Patient Days In ICU	4.374* (2.386)	3.295 (2.797)	3.588 (2.472)	13.87*** (5.028)
Year	.1037 (.0802)	.0974 (.0796)	.1049 (.0787)	.0708 (.0929)
Proportion Of Employee Groups Unionized		-.7032 (1.366)		
Proportion Of Unionized Groups With Labor-Management Comm.		3.719*** (1.261)		
Proportion Unionized X Lagged Dependent Variable		-2.073* (.1205)		
LMC Proportion X Lagged Dependent Variable		-.2605** (.1032)		
RN Union Present			1.639** (.7257)	
RN Union X Lagged Dependent Variable			-.1439** (.0681)	
Number Of Years RN Labor-Management Committee Present				.5235*** (.1832)
Years Of RN LMC X Lagged Dependent Variable				-.0319** (.0136)
Log Likelihood	-89.79	-76.30	-88.28	-59.31
P>Chi2	.0000	.0000	.0000	.0000
No. Of Obs	123	114	123	87
# Of Groups	14	13	14	10
Time Periods	9	9	9	9

Table 4.2(continued) - Determinants Of Skilled Staffing Intensity - Role Of Labor-Management Relations And Competitive Factors

Variable	RN HOURS / PATIENT DAY	RN HOURS / PATIENT DAY
	Column 5	Column 6
Lagged Dependent Variable	.5759*** (.0594)	.5536*** (.0876)
Severity Case Mix Index	6.982*** (1.023)	4.748*** (1.324)
Patient Service Mix 1	-1.608*** (.3366)	-.7575 (.6071)
Patient Service Mix 2	.8745*** (.1526)	.4958** (-.2442)
Patient Service Mix 3	.3780* (.1930)	-.0381 (.2259)
Total Hospital In-Patient Days	.0000 (.0000)	-.0000 (.0000)
Percent Of Patients In Managed Care	-.0017 (.0113)	.0208 (.0184)
RN / LPN Starting Wage Ratio	-.2012 (3.120)	-5.090 (4.348)
Percent Of Patient Days In ICU	2.832 (2.573)	14.37*** (4.998)
Year	.0988 (.0762)	.0370 (.1018)
Proportion Of Employee Groups Unionized	-1.445*** (.4103)	
Proportion Of Unionized Groups With Labor-Management Comm.	16.63*** (6.000)	
LMC Proportion X RN / LPN Wage Differential	-11.01*** (4.096)	
Number Of Years RN Labor-Management Committee Present		1.281 (.9129)
Years Of RN LMC X RN / LPN Wage Differential		-.7797 (.6038)
Log Likelihood	-77.14	-60.55
Pr>Chi2	.0000	.0000
No. Of Obs	114	87
# Of Groups	13	10
Time Periods	9	9

Table 4.3: Hospital Financial Performance

Variables	Income Per Patient Day	Income Per Patient Day	Income Per Patient Day	Income Per Patient Day
	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
	Base Model	Overall unionization and cooperation	RN unionization	RN Cooperation
RN Staffing Ratio	-70.81* (39.11)	-30.74 (37.42)	-80.88** (37.54)	-4.217 (29.04)
RN Hours Per Patient Day	8.759*** (3.052)	4.572 (2.985)	4.732 (3.029)	11.37*** (3.036)
Severity Case Mix Index	127.4** (55.74)	171.7*** (57.42)	113.1** (56.49)	101.1** (51.11)
Patient Service Mix 1	18.61 (21.59)	32.43 (20.80)	6.637 (21.60)	93.65*** (23.20)
Patient Service Mix 2	-1.718 (9.919)	-2.059 (8.980)	19.64* (10.58)	-26.28** (10.51)
Patient Service Mix 3	27.71** (12.49)	31.11** (12.93)	33.18*** (12.75)	50.16*** (11.74)
Total Hospital In-Patient Days	-.0002 (.0003)	-.0009*** (.0003)	-.0000 (.0002)	-.0003 (.0002)
Percent Of Patients In Managed Care	.3393 (.5724)	1.635*** (.5302)	.0758 (.5362)	.6921 (.4729)
RN Wages Per Full Time Equivalent	.0004 (.0012)	-.0022* (.0013)	-.0002 (.0012)	-.0014 (.0013)
Percent Of Patient Days In ICU	-298.2* (170.0)	353.5* (191.4)	-155.1 (178.1)	-462.61** (209.8)
Year	8.810** (4.127)	9.936* (4.098)	11.84*** (4.034)	12.04*** (3.969)
Proportion Of Employee Groups Unionized		154.5*** (27.34)		
Proportion Of Unionized Groups With Labor-Mgmt Comm.		14.06 (13.33)		
RN Union Present			81.01*** (18.78)	
Number Of Years RN Labor-Management Committee Present				3.134* (1.837)
LOG Likelihood	-565.99	-510.99	-562.03	-380.15
PR>CHI2	.0000	.0000	.0000	.0000
No. of obs	124	115	124	88
# of groups	14	13	14	10
time periods	9	9	9	9

Table 5.1: Information Use in Production

Speed of information decay for
use in decision making

		Low	High
Ability to, a priori, establish the saliency of information for use in decision making	High	Traditional, Mass- Production Manufacturing	High - Performance Manufacturing
	Low	Basic Research	Information - Based Production Systems (hospital care)

Table 5.2: Variable Means and Standard Deviations

	Mean	Standard Deviation	Range
Dependent Variables			
Information Accuracy - individual	0.232	0.423	0 - 1
Information Comfort - individual	0.328	0.470	0 - 1
Frequency of medication errors on unit	3.931	1.426	1.6 - 7.3
Independent Variables			
Information accuracy - Unit	0.797	0.080	.59 - .95
Information comfort - Unit	0.677	0.11	.40 - .94
<i>Registered Nurse Job Definition</i>			
Tasks involving routines	7.289	1.078	5.1 - 9.4
<i>Nursing Assistant Job Definition</i>			
Tasks involving routines	4.743	2.059	0 - 8.0
Overlapping Job Responsibilities	0.559	0.129	.33 - .84
<i>Employee Skills</i>			
Nursing Assistant ratio on unit	0.128	0.072	0 - .268
Formal education	0.339	0.132	0 - 1.0
Seniority on unit	13.23	3.067	6.4 - 22.8
Mutual Learning	3.867	0.195	3.4 - 4.4
Control Variables			
Work process complexity	0.383	0.552	-.84 - 1.5
Average length of stay	4.683	1.255	2.4 - 7.6
Average staffing load	4.64	1.255	1.9 - 9.0
Patient continuity	0.38	0.1129	.18 - .64
LPN ratio on unit	0.10	0.08	0 - .29
Unit size	56.62	24.63	15 - 139

Table 5.3
Determinants of Information Quality on Nursing Units
 Logit analysis on receiving incorrect patient information over last three shifts
 Huber correction for clustered sampling from type of unit

Registered Nurse Job Definition		
<i>Tasks involving routines</i>	-0.2476 * (0.1394)	
Nursing Assistant Job Definition		
<i>Tasks involving routines</i>	0.1933 *** (0.0474)	0.1741 *** (0.0363)
Overlapping Job Responsibilities		-1.301* (0.7477)
Employee Skills		
<i>Nursing Assistant ratio on unit</i>	-0.2236 (0.8899)	-0.4188 (0.6177)
<i>Formal education</i>	0.0429 (0.2035)	0.0139 (0.2143)
<i>Seniority on unit</i>	-0.0305 (0.0209)	-0.0330 (0.0225)
<i>Mutual Learning</i>	-0.7158 * (0.4229)	-0.7096 (0.5616)
Sample Size	1184	1184

* p < .1
 ** p < .05
 *** p < .01

Table 5.4
Determinants of Information Quality on Nursing Units
 Logit analysis on feeling uncomfortable with the patient information
 available when the shift begins
 Huber correction for clustered sampling from type of unit

Registered Nurse Job Definition

Tasks involving routines -0.1616
 (0.1581)

Nursing Assistant Job Definition

Tasks involving routines 0.1047** 0.1237**
 (0.0519) (0.0492)

Overlapping Job Responsibilities -2.3396**
 (0.9695)

Employee Skills

Nursing Assistant ratio on unit -0.0543 -1.0488
 (1.3958) (0.8362)
Formal education -0.8716 -0.8878
 (0.5377) (0.5399)
Seniority on unit -0.0596*** -0.0562***
 (0.0126) (0.0174)
Mutual Learning -1.2152*** -1.2733***
 (0.2769) (0.3139)

Sample Size 1178 1178

* p < .1
 ** p < .05
 *** p < .01

Table 5.5
Perceived Frequency of Medication Errors Per Month on Unit
 Regression analysis on frequency of patient care problems on unit

Information Accuracy	-4.688* (2.495)	-5.501** (2.531)
Information Comfort	-0.2329 (1.684)	0.130 (1.691)
Registered Nurse Job Definition		
<i>Tasks involving routines</i>	-0.2376* (0.1372)	
Nursing Assistant Job Definition		
<i>Tasks involving routines</i>	0.1195 (0.2235)	0.1088 (0.22)
Overlapping Job Responsibilities		
		-2.5282** (1.2335)
Employee Skills		
<i>Nursing Assistant ratio on unit</i>	6.3759** (2.832)	5.2847* (2.8894)
<i>Formal education</i>	-3.2641** (1.3708)	-3.1708** (1.3493)
<i>Seniority on unit</i>	-0.1577** (0.0588)	-0.1480** (0.585)
<i>Mutual Learning</i>	-0.5680 (0.7862)	-0.6239 ()
Adjusted R2	.58	.60
Sample Size	51	51

* p < .1
 ** p < .05

APPENDICES

Appendix 1:

The Case of Beth Israel Hospital

Beth Israel Hospital (BIH) has long promoted the role of nursing in the delivery of care and has enhanced nurses' responsibilities throughout the hospital. Approximately 25 years ago, BIH developed the primary nurse model where a single nurse is assigned to provide/coordinate care for a patient throughout a hospital stay. Over the years this model has evolved, though its basic characteristics remain. While primary nursing continues to be a central characteristic of Beth Israel Hospital nursing, several other factors enable nurses to enhance the high quality medical care they provide. The following case study of one unit at Beth Israel is an attempt to understand the inter-related factors creating this high quality care.

The overall nursing philosophy is based on one central objective: keep skilled nurses involved with clinical care. A problem in most hospitals is that nurses with experience or higher education are transferred from direct patient care to administration leaving only the least experienced nurses in that role. At Beth Israel, nurses with higher education receive additional roles and responsibilities but do not leave direct patient care. Several nurses with Ph.D.'s continue to provide clinical care 2 days per week.

Unit Description

The nursing unit I observed specializes in treating interventional cardiology patients at Beth Israel Hospital. The hospital has been on the forefront of interventional cardiology that encompasses several non-surgical procedures to diagnose and treat heart disease. All of the procedures use a core technology where two catheters are inserted into a patient's vein and artery in the groin and moved up to the heart. Once the catheters reach the heart, the physician first explores the degree of plaque build-up

on arteries and determines whether additional steps are necessary. Based on the plaque's characteristics, the physician may conduct one of several additional procedures intended to remove or minimize the effect of plaque on the flow of blood to the heart. Each procedure, though significantly different in character, uses similar catheters inserted into the vein and artery from the groin to the heart.

The average patient length of stay on the unit is only three days though many return several times over a few years. Some patients are admitted after feeling chest pain while others are admitted based on previous tests suggesting the need for further procedures. The low average length of stay results in a rapid turnover of patients with 6-15 new patients being admitted and discharged on any given day. The patient population is in good physical condition for feeding and bathing themselves, though, as described by one nurse "they may have a heart attack at any moment."

The unit observed serves both in-patient and out-patient care. The unit has 30 beds, three of which are out-patient, though flexibility is used to meet daily demand fluctuations for hospital beds. The simple test for plaque build-up on the arteries is conducted on an out-patient basis with patients being admitted in the morning and discharged in the evening. When additional procedures are conducted, patients will stay over for at least one night.

Nursing model

The nursing model employed in the unit has two basic characteristics. First, patient assignment is controlled to minimize the number of people in contact with the patient. This is accomplished through the primary nurse model where an individual nurse is assigned to the patient as his/her primary care giver responsible for all aspects of care during the shift. A patient will, therefore, have several primary nurses across the different shifts. When a patient gets readmitted into the unit, as happens frequently, there is an attempt to assign the patient the same primary nurses as in previous hospitalizations. Second,

the unit is staffed for peaks of expected demand. There is a clear attempt to make sure that enough nurses are available to maintain the level of care even during peak demand times. As such, nurses are assigned additional responsibilities during low demand periods so that assistance is available when needed. There are no Licensed Practical Nurses or nurse aides on the unit.

Each nurse is responsible for 3 patients, on average, during the day shift. This varies from 2-4 based on occupancy level and the number of nurses available. During any given day, a nurse will have 1-2 admissions and 1-2 discharges. As will be described, each one of these processes takes up a significant amount of nursing time over the course of the day.

Nursing job

In the following section, I describe a primary nurse's job within the interventional cardiology unit. On any given day one nurse also serves as a resource nurse: a position described later.

Upon arrival, the nurse examines a central board to see which patients are assigned to her (all of the nurses on this unit are women) for the day. Assignments may change due to nurse staffing, which patients are being admitted or discharged, and the health status of different patients, among other factors. She then collects the patient charts and reads about new developments over the previous two shifts. Since the nurse tends to be familiar with the patients from previous days, she only needs to read recent developments or review complex material. There are no formal shift meetings by the full staff to discuss each patient as done in many hospitals. During the overlap with the previous shift, nurses may reiterate verbally information contained within the patient chart or explain patient information deemed inappropriate for inclusion in the chart such as family relations or non-'medical' factors. Beth Israel Hospital has integrated patient charts so that all clinical providers write notes together enabling nurses and physicians to review easily all patient developments. Nurses do not have a separate charting

mechanism distinct from other care providers. Typically, the nurses write the longest and most comprehensive notes in the chart.

When the unit resource nurse finds out about an upcoming admission, the patient is assigned a nurse who then becomes fully responsible for all patient contact regarding nursing care including internal and external groups. After this initial assignment, any further questions regarding nursing care are directed to the primary nurse. Upon arrival at the unit, patients are stopped at the front desk who informs the primary nurse. The nurse, then, follows the patient to the room, moves the patient to the hospital bed, hooks up various monitors, takes the patient's pulse, temperature, and blood pressure, and listens to his/her lungs. At this point the nurse decides if the patient needs a "sitter" to watch the patient 24 hours a day and if a nutrition consult is necessary for the patient.

During the day, the nurse takes vital signs, administers medications, provides necessary physical care, such as assisting the patient with the bathroom, shower, teeth brushing, hand washing, and meals when needed. Though most patients do not require this level of care, I observed a few patients clearly needing physical assistance. The nurse also walks patients around when prescribed by physicians after procedures. This role, though, is under contention with physical therapists claiming domain over all physical movement care. When physicians order tests, such as ultrasounds, the nurse determines whether the patient is fit for transportation to the central ultrasound area or if technicians need to bring a mobile machine to the patient.

In this unit certain decision making roles have been standardized and transferred to nurses from physicians. Many of the patients in the unit receive blood thinner to ease the procedure and prevent blood clots. After the procedure, the patient's blood is slowly returned to normal. To control the process, blood tests are conducted at regular intervals with corresponding shifts in medication to control

the process. The expected recovery path has been standardized so that nurses now make changes in medication based on observed test results during recuperation without physician consultation.

Throughout the day, the nurse is constantly observing the patient's condition and providing the patient with information. Several nurses observed, explain the nature of medications, their effect, and other recent developments during routine interactions. Patient education, such as this, is growing in importance. Since economic pressures are forcing hospitals to reduce length of stay, greater pressure is being placed on families to provide care at home. Even before discharge, the nurse may prepare a chart listing all medications the patient will be taking upon going home and discuss these with the patient including their desired effects and potential side-effects on the patient. Though the computer automatically develops a similar chart at discharge, an early conversation about medications eases discharge and family care. It initiates the education process even before discharge when several issues must be addressed simultaneously. In preparation for discharge the nurse also gets all necessary information from the chart ready for the patient. She reads over current medications and double checks to ensure that the physician has written up all prescriptions. The nurse is responsible for making sure that no problems exist with the prescriptions; a repeated occurrence during my observation.

The nurse reviews all medications with the patient and family prior to discharge. This includes all aspects of patient care at home such as mapping out a schedule for taking medications or training the family in the use of a syringe. The nurse is fully responsible for all aspects of discharge. In one case, when an EMT team transferred a patient to a nursing home, the nurse met the EMTs, provided them with all necessary information, and sent the patient off. If the patient requires home health care, the nurse contacts home health agencies and arranges visitation. This responsibility is currently being centralized so that discharged patients needing home care are first offered the hospital's own service before contacting other providers. The nurses' role during discharge highlights their responsibility in

coordinating all external contact for the patient. After one patient was discharged, the family contacted the primary nurse due to a problem filling one prescription. The front desk put the family in direct contact with the primary nurse who proceeded to call the physician and several pharmacies and resolve the problem. As the shift ends, the nurse writes notes in the patients' charts describing the day's events, patient condition, and other pertinent information and verbally updates the patient's primary nurse as she arrives for the next shift.

During the course of the day several people besides nurses provide services to unit patients. These include: nutritionists, who discuss specific nutritional needs with patients; food service workers, who deliver meals to the patients; housekeepers, who clean up rooms; transport personnel, who move patients in and out of the unit; phlebotomists, who take patient blood and bring it to the lab for testing; IV nurses, who insert all intravenous lines into patients; and quality assurers; who examine patient charts to make sure that they are complete meeting insurers' requirements for reimbursement.

Nursing Interaction with each other

Throughout the day, nurses are constantly interacting with each other and supporting each other in their work. As stated above, nurses verbally update each other about patients during shift changes. Nurses also help each other move patients, prepare rooms before a patient arrives, and answer each other's call lights when necessary. In addition, certain nurses are known to have specific areas of expertise over such things as medications or diseases. As a result, nurses regularly ask each other questions regarding their patients' condition, medication, and treatment. This provides a comfortable environment for improving knowledge and skills. The hospital has also develop an internal e-mail system through which nurses communicate with each other about recent developments.

Nurses interaction with physicians

All nurses have the responsibility to interact directly with all people regarding patient care. Information does not flow through a charge nurse. Nurses speak directly with each other, patient families, primary and specialist physicians, interns, etc., including physicians inside and outside the hospital. The result is that information is not centralized in the nurse manager or charge nurse but decentralized to the nurses who provide the care. The direct communication also forces nurses to improve their knowledge of the patient's condition and provide clear information when discussing patient care with the physician.

There were several instances during my observation when nurses raised patient care issues with physicians and discussed the nature of appropriate care. One nurse noticed that two medications prescribed for a patient had similar properties. After questioning the intern, who contacted the attending physician, the prescribed dose on one medication was reduced. In another instance, a nurse noticed that several prescriptions needed for patient discharge were missing. There were also several times when nurses knew information about the family or patient which prevented the use of certain medications proposed by physicians. Once this information was considered, the care process was changed.

The nurses also observe and participate with interns and residents as part of morning rounds. For nurses, this serves three objectives. First, they may learn new information about their patients' conditions. For example, the nurse, by learning that a patient will be discharged that day, will restructure her plan for the day, perhaps by beginning discharge work. Second, they expand their knowledge by listening to the intern and resident discussing new research. Third, they may provide the interns and residents with new information about the patients. Typically, this information is provided in a manner intended to not challenge the physicians' decisions. For example, one nurse provided information on a

patient's condition or medication allowing the resident to determine that certain planned care was inappropriate. The nurse may also provide information that a patient told her but not the physician or information received from the attending physician who visited the patient when the staff physician was busy elsewhere. The unique knowledge available to nurses typically arises from their longer and different interaction with the patient.

Resource nurse

The resource nurse position is an assignment held by two or three nurses on a daily, rotating basis. Each resource nurse holds this responsibility for 20-33 percent of her time. The resource nurse job is given to an experienced nurse on the day shift and includes responsibilities for coordinating patient flow for the day. The coordination is with internal hospital units in transferring patients from one unit to another and external hospitals in scheduling transfers into the unit and hospital. Once the nurse finds out who will be admitted during the day, she assigns these patients to nurses on the day and evening shifts based on the primary nursing model.

This nurse also assists others to relieve pressure. The nurse participates fully in the morning rounds with interns and residents to learn about discharges and provide information on the days developments. The focus of the job is to make sure that things get done on the unit and patients are moved through. The objective is to have a full unit yet ensure that patients needing admittance into the unit are not turned away. This results in an attempt to balance known needs and potential demands. After determining patient occupancy, the resource nurse decides whether the evening shift requires all nurses scheduled. If the load is light, the nurse will randomly choose one nurse and tell her not to come in for the shift. This must be taken by the nurse as leave.

Due to the resource nurse's interaction with multiple groups, she conveys information to primary nurses which they may not have learned otherwise. The nurse will also make sure the rooms and nurses are ready for the patients' arrival and cover for others when they are busy by assisting patients and answering call buttons.

Unit Management

Nurse manager

The nurse manager is the unit supervisor in charge of all non-physician employees including nurses, aides if they exist, unit coordinators, and the practice coordinator. The nurse manager is an experienced nurse able to address both clinical and administrative demands. In many ways, the nurse manager on this unit operated as a true team leader of a semi-autonomous nursing unit. Many day to day administrative responsibilities had been decentralized to the resource nurse and individual nurses. When a crisis develops over patient care, the nurse manager sits down with the nurses and discusses potential solutions to resolve the problem at hand. The nurse manager determines long term staffing levels and the desired mix of employees and skills according to budget constraints. The current nurse manager has responsibility for two different units.

Practice Coordinator

The hospital recently developed a new job for in-patient units with the specific objective of removing non-clinical tasks from the nurses. The position was first developed seven months ago and is still undergoing definition by the position holder and the nurses in the unit. Some responsibilities given the practice coordinator (PC), such as ordering supplies, had previously been centralized in the hospital while others remain to be defined. Currently, the PC orders equipment, tracks down patient belongings,

makes sure that maintenance gets conducted, and supervises the unit coordinators. The unit coordinators work at the front desk and serve in a primarily secretarial role though with significant patient contact. The PC is also intended to supervise support staff when they are decentralized to the unit, though in this unit centralized environmental services are still used. Eventually the PC will assist with payroll, nurse scheduling, budget, and planning.

Human Resource practices

Unit Staffing and Schedules

The unit is comprised solely of RNs with at least a bachelors degree. Ten to twelve of the nurses have a master's degree with another eight or nine working towards a master's. Nurse shifts are nine hours long leaving a 30 minute overlap at the beginning and end of each shift to promote interaction and information exchange. There are no nurse aides or Licensed Practical Nurses on the unit. The nurse manager determined this based on the minimal patient need for physical assistance. The unit has several part time nurses on staff all of whom had previously worked on the unit full time. Part time nurses ease cost pressures particularly when a full time nurse is away on maternity leave. Maternity leave is a common occurrence on the unit with most employees being women aged 25-40. There are no agency or temporary nurses on staff at the hospital⁹.

Promotion and pay

As mentioned, the primary objective of the hospital is to maintain skilled and experienced nurses in direct clinical care. As knowledge and expertise develops, the objective is to use this in clinical care

⁹Agency nurses are hired by hospitals to meet immediate short term demands for nurses. Temporary nurses or traveling nurses work in a hospital for approximately three months to meet longer term hospital needs while maintaining flexibility.

and not move the nurses into management. Nurses with advanced degrees, however, are given additional responsibilities in running the unit or may be used temporarily on other units when help is needed. By keeping senior and educated nurses within the unit, the local expertise grows and helps in the informal training of all unit nurses. It also puts knowledge in the nursing staff which would typically only exist among physicians. Promotion requires a combination of experience, skill, and unit involvement though it does not require a graduate degree. All nurses are paid on a salary basis in contrast to hourly-based pay as in most hospitals.

Turnover

The hospital actively tries to keep nurse turnover low. Working at the hospital is generally considered desirable by nurses in the area with the hospital having a strong reputation for the quality of its nurses and the responsibility granted to nurses in the delivery of care. Furthermore, this unit has a good reputation within the hospital leading many nurses to stay on the unit once getting positions there. More than 80 percent of the nurses have been on the unit for over 5 years.

Low turnover serves several purposes for the hospital and unit. First, turnover is expensive. Since each hospital is different, a nurse must learn how the particular unit operates and become comfortable with its procedures before working up to his/her capacity. Typically, new nurses struggle to gain control over the basic requirements of the job. At this point, their job may be seen as completing a set of tasks. As experience grows, nurses become comfortable with the required tasks and take on a more proactive role when treating patients, observing anomalous information, and educating patients through their stay.

Second, the low turnover combined with the primary nurse model helps nurses build deep patient knowledge not present in any chart. Over several admissions, the nurse grows familiar with the patient

beyond the specific medical needs. She may understand what has worked in the past, what type of information the patient desires, what support systems exist for the patient at home, etc.

Third, contact among people promotes greater trust and information exchange. As people get to know each other, they may gain confidence in the other's skills and place greater trust in them for fulfilling greater responsibilities. This works for nurses and physicians with many nurses developing strong relationships with internal and external physicians after years of interaction.

Skill, Information, Communication, and Patient Care

The nurses in this unit have developed extensive knowledge about the patients and the care process. This arises from the interaction of several factors. Low turnover helps nurses build knowledge over time. The primary nurse model enables nurses to grow familiar with the patient over many visits and gain knowledge regarding factors beyond information traditionally available through testing, examination, and short term interactions. The long term tenure on the unit and the professional character of nursing in the hospital promotes communication among nurses in treating patients. This communication is an exchange of expertise among nurses regarding medications, diseases, and complications.

The nurses also learn a great deal from interaction with the physicians on the unit. At the beginning of each morning the nurses participate in the rounds held by the residents and interns during which patient conditions, new medications, and developing procedures are all discussed. The integrated patient charts enable an easy flow of knowledge among clinical providers and promote the reading of nurse and physician notes. One result is that physicians may gain a greater appreciation for nursing knowledge after reading helpful notes.

The nature of this particular unit may also enhance nurses ability to learn a broad range of information and gain deep medical knowledge. The unit observed is a specialty unit with all of the patients admitted for interventional cardiology procedures. The recovery process after these procedures is well understood and the medications used for treating heart disease are limited. As a result, nurses are able to learn medication characteristics and recovery paths and contribute this knowledge during discussions of patient treatment. This knowledge enabled one nurse to notice that two medications prescribed for a patient had common properties leading her to question the use of both simultaneously. Moreover, the common recovery path has enabled the unit to develop a chart whereby nurses automatically alter a medication based on regular lab test results. Nurses on the unit felt that the clear care processes greatly enhance their participation in decision making over patient care in contrast to traditional medical units where patients are admitted for a broad array of diseases and where many more medications are used.

Appendix 2 Definition of Variables for Chapter 5

Dependent variables

Information Accuracy: The dependent variable is each employee's response to the following question. Think about all of the patients you treated over your past three shifts on the unit. In the course of treating those patients, did you receive incorrect information from other nurses who treated the patient? 0 = no, 1 = yes.

Information Comfort: The dependent variables is each employee's response to the following questions. Think about all of the patient you treated over the past three shifts on the unit. In the course of treating those patients, did you feel uncomfortable with the extent of patient information you had when the shift began? 0 = no, 1 = Yes.

Medication error frequency: This measure is a unit level scale developed by averaging the responses to the following questions for all Registered Nurses on the unit.
How often does a patient receive an incorrect medication or an incorrect dosage on your shift? (1-5 based on different frequencies)

Independent Variables

Scores for all of these measures are unit averages.

Abstract Tasks: A score for the number of abstract tasks was developed by summing across all those tasks listed below which the employee is either assigned to do or does as part of his/her or is not assigned to do but does anyway. Maximum score = 10.

Tasks involving abstract knowledge: Give IV push medication, educate patients regarding medications, assess patients upon admission, assess patients during stay, conduct discharge planning, receive physician telephone orders, update physicians on patient developments, round with physicians, direct the work of other employees, and manage care over an illness episode.

Routine Tasks: A score for the number of tasks requiring routine knowledge was developed by summing across all those tasks listed below which the employee is either assigned to do or does as part of his/her or is not assigned to do but does anyway. Maximum score = 10.

Tasks involving knowledge of routines: Transport patients, distribute food trays, feed patients, clean patient rooms, draw blood, bathe patients, insert IVs, maintain IV site care, conduct sterile procedures, take vital signs.

Overlapping job responsibilities: This measure is similar to a Herfindel Index where the percentage of all employees on a unit responsible for a given task is squared, summed across tasks and divided by the total number of tasks. If every single person on the unit is responsible for conducting every single tasks, the index would equal one.

Employee skills: Five separate measures were developed to assess employee skills on the unit.
Skill mix: This is the ratio of employees on the unit who are Nursing Assistants.

Formal education: The percentage of registered nurses on the unit with a bachelor's degree in Nursing. Alternative degrees include a Diploma Degree or an Associate degree which require fewer years of formal education

Unit-based seniority: The average number of years registered nurses have been on the unit.

Mutual learning: The average score for all registered nurses on the unit to the question: I have learned a great deal of specific medical knowledge from nurses on the unit. (1 = strongly disagree, 5 = strongly agree)

Unit information accuracy: The information accuracy measure equals the percentage of Registered Nurses who said they did not receive incorrect information during their previous three shifts.

Control Measures

Unit size: Number of direct care providers (RNs, LPNs, and NAs) on the unit.

Work process complexity¹⁰: Work process complexity is developed by averaging the scores to the following questions for the diagnoses treated on the specific unit. These questions were answered by the Vice President of Nursing / Patient Care at participating hospitals.

1. How often do contingencies arise which require the nurse to exercise judgment during the care routine?
2. How frequently must patient care procedures be conducted?
3. How many different procedures comprise the nursing care routine?
4. How technical is the equipment which must be used?
5. How much does the diagnosis vary according to the number of alternatives there are in nursing care routines for each operate?
6. How much is the nursing care for the diagnosis standardized?

Average length of stay: The average patient length of stay is based on diagnoses included within the study and treated on the specific unit. The measure is weighted according to the number of cases treated in each diagnosis on the unit.

Average number of patients: The average among all Registered Nurses on the unit to the question: How many patients did you treat on your last shift?

Continuity of care: Percent of patients treated on both of the two most recent shifts (RNs only).

Unit type: Each type of unit included in the study was controlled for using a dummy variable. Missing unit type was Obstetrics/Gynecology.

Shift: This is a dummy variable controlling for respondent's shift. 0 = night, 1 = day or evening.

¹⁰Measures of work process complexity adopted from Schoonhoven, et. al, 1980.

Appendix 3 Unit and Diagnosis Selection Process

Unit selection was determined through a multi-staged process to ensure comparability. To meet technological and employee skill demands, hospitals regularly send patients with certain diagnoses to specific units. For example, Cardiology patients are sent to units with telemetry equipment, and newborn babies are sent to nurseries. These two types of units require different equipment and employee skills to treat patients. The first step in selecting units was to understand which units received patients with specific diagnoses in each hospital. Administrators in each hospital linked 50 selected diagnoses to specific units in their hospital. Overall, 27 diagnoses in seven service areas (Orthopedic, Cardiology, Obstetrics, Gynecology, General Medicine, and General Surgical) were found to be consistently treated in certain hospital units across participating hospitals. On the basis of this information, those diagnoses consistently treated on certain units and the corresponding units in each hospital were chosen for incorporation in the study.

By selecting units for participation according to the types of diagnoses treated, two important objectives were achieved. First, through diagnosis-based selection, I control for underlying technological, or patient care processes in the unit. The basic, care process of treating cardiology patients is consistent across hospitals and different from delivering babies. Second, since most health care data are collected by diagnosis, selecting units on this basis enables me to match unit practices with public and private financial and outcome data.

Specific diagnoses within the study were selected according to several characteristics deemed important for determining the level of information accumulation and communication required. These characteristics include: the complexity of the care process, the presence of organizational tools to standardize care, and the average patient length of stay (see next page for list of diagnoses included). Several diagnoses from each participating unit, varying along the above characteristics, are included within the study.

Appendix 4
Diagnoses and Average Length of Stay

Diagnosis Related Group	Diagnosis description (organized by service group)	Average length of stay (1994)
Cardiology		
121	Circulatory disorder with ami	6.70
124	Circulatory disorders except ami, with cardiac cath	4.07
127	Heart failure & shock	4.76
138	Cardiac arrhythmia & conduction disorders with cc	3.36
139	Cardiac arrhythmia & conduction disorders without cc	1.84
140	Angina pectoris	2.43
143	Chest pain	1.59
478	Other vascular procedures with cc	7.67
Gynecology		
358	Uterine & adnexa procedure for non-malignancy with complication or comorbidity (cc)	3.92
359	Uterine & adnexa procedure for non-malignancy without cc	2.92
Obstetrics		
370	Cesarean section with cc	5.65
371	Cesarean section without cc	3.79
372	Vaginal delivery with complicating diagnosis	2.69
374	Vaginal delivery with sterilization & or D & C	2.42
Orthopedics		
209	Major joint & limb reattachment procedure of lower extremity	6.22
210	Hip & femur procedures except major joint, age > 17 with cc	6.75
214	Back and neck procedures with cc	6.20
215	Back and neck procedures without cc	2.76
219	Lower extremity and humer procedure except hip, foot, femur	2.51
General Medicine		
98	Bronchitis & asthma	2.66
174	G.I. hemorrhage with cc	4.01
182	Esophagitis, gastroent, and miscellaneous digestive disorders with cc	3.98
183	Esophagitis, gastroent, and miscellaneous digestive disorders without cc	2.57
298	Nutritional & miscellaneous metabolic disorders	2.94
General Surgical		
167	Appendectomy without complicated principal diagnosis	2.04
148	Major small and large bowel procedures with cc	11.55
494	Laparoscopic cholecystectomy	1.61

Appendix 5
Nursing Unit Employee Survey

A. Communication Within the Hospital Unit

1. The following questions examine the nature of communication on the unit within which you work. Please circle the number under the response that best reflects your judgment. In the following statements, "Nurses" refers to both RNs and LPNs. Otherwise, a specific group is specified.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. Communication between nurses in this unit is very open.	1	2	3	4	5
b. I feel that certain nurses in this unit don't completely understand the information they receive.	1	2	3	4	5
c. It is easy to ask advice from RNs in this unit.	1	2	3	4	5
d. The accuracy of information I receive about my patients during shift changes leaves much to be desired.	1	2	3	4	5
e. It is often necessary for me to check the accuracy of information I receive from RNs in this unit.	1	2	3	4	5
f. It is often necessary for me to check the accuracy of information I receive from LPNs in this unit.	1	2	3	4	5
g. It is often necessary for me to check the accuracy of information I receive from Nurse Aides in this unit.	1	2	3	4	5
h. There are no status differences between RNs and LPNs on this unit.	1	2	3	4	5
i. Sometimes, I don't find out about changes in my patients' treatment plans that occurred on other shifts.	1	2	3	4	5

2. The following questions examine the nature of relations and communication with physicians who treat patients on this unit.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. I get information from physicians on the status of patients when I need it.	1	2	3	4	5
b. Physicians who practice on this unit are readily available for consultation.	1	2	3	4	5
c. I usually have a good understanding of physician goals.	1	2	3	4	5
d. Physicians who practice on this unit are open to my opinions on patient care.	1	2	3	4	5
e. Physicians who practice on this unit respect the work I do.	1	2	3	4	5

3. Please rate how likely you are to verbally challenge directly a physician about his/her decision, in the following circumstances.

	Highly Unlikely	Unlikely	Uncertain	Likely	Highly Likely	Not Applicable
a. You disagree with the discharge day chosen by the physician.	1	2	3	4	5	N/A
b. You disagree with the type of pain medication prescribed.	1	2	3	4	5	N/A
c. You disagree with the level of pain medication prescribed.	1	2	3	4	5	N/A

B. Computer Information Systems

One way used to transmit patient information and treatment plans is through computer information systems. The following questions address the type of system used on your unit, your experience on the system, and evaluation of its role.

1. Does your unit have a computer information system for patient care? [1] Yes _____ [2] No _____

2. If yes, have you been trained to use the unit's computer system? [1] Yes _____ [2] No _____

a) Did the training provide you with sufficient skills to use the system? [1] Yes _____ [2] No _____

b) Do you use the unit's computerized information system for the following tasks? Check (✓) all that apply.

- | | |
|---|---|
| <input type="checkbox"/> Receive laboratory results | <input type="checkbox"/> Record patient care |
| <input type="checkbox"/> Communicate with other units | <input type="checkbox"/> Read patient records |
| <input type="checkbox"/> Communicate with nurses | <input type="checkbox"/> Get cost information |
| <input type="checkbox"/> Communicate with physicians | <input type="checkbox"/> Order services |
| <input type="checkbox"/> Receive changes in treatment plans | <input type="checkbox"/> Print discharge instructions |
| <input type="checkbox"/> Learn about policy changes | <input type="checkbox"/> Other _____ |

c) How often do you use the unit's computer system?

- | | | | | |
|---------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------|
| Several times
per shift
1 | About once
per shift
2 | Once every
2-5 shifts
3 | Once every
6-10 shifts
4 | Almost never
or never
5 |
|---------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------|

C. Employee Job Structure and Pathways

Over the past five years hospitals have begun adopting protocols or pathways defining treatment patterns for patients. The following questions explore how the use of critical pathways has affected your job. Care pathways are formal descriptions of a patient's treatment pattern for a specific diagnosis. They typically describe a daily treatment path for the patient and an expected recovery path. In some hospitals they are called protocols or clinical guidelines.

i. Are care pathways used on your nursing unit? [1] Yes _____ [2] No _____

If yes, what percentage of your patients are on pathways?

- | | |
|------------------|-------------------|
| [1] _____ 0 - 9% | [4] _____ 50-74% |
| [2] _____ 10-24% | [5] _____ 75-100% |
| [3] _____ 25-49% | |

2. Please circle the number responding to how you feel.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree	Not applicable
a. Care pathways have improved the quality of care my patients receive.	1	2	3	4	5	N/A
b. Pathways limit my ability to treat patients as needed.	1	2	3	4	5	N/A
c. My job has become more interesting since the adoption of pathways.	1	2	3	4	5	N/A
d. The use of pathways has enabled me to do new types of patient care previously done by others.	1	2	3	4	5	N/A
e. My job has become more routine since the adoption of pathways.	1	2	3	4	5	N/A

3. Have you ever participated on a team developing a care pathway in this hospital? [1] Yes _____ [2] No _____

The following questions examine the nature of your daily job, who you work with, and what you do.

4. What percentage of the time are you assigned to work with the following kinds of employees on your unit?

- _____ % Nurse Aide
- _____ % Licensed Practical Nurse
- _____ % Registered Nurse
- _____ % Respiratory Therapist
- _____ % I do not work with other people

5. With which other parties or groups do you directly coordinate patient care? (Rather than through the charge nurse or other nurse or other hospital employees) Please check [✓] all appropriate groups

- Other hospital units
- The patient's other nurses
- Physicians on staff in the hospital
- Transport workers
- Physical Therapists
- Physicians treating the patient outside the hospital
- Respiratory Therapists
- Home health agencies
- Radiologic/imaging technologist
- Pharmacists

6. Prior to calling a physician regarding new patient developments, are you required to discuss the issue first with the charge nurse? [1] _____ Yes, [2] _____ No

7. Prior to calling a physician regarding new patient developments, do you discuss the issue first with the charge nurse?

- | | | | | |
|-------|--------|-----------|---------|--------|
| Never | Rarely | Sometimes | Usually | Always |
| 1 | 2 | 3 | 4 | 5 |

8. How many patients did you care for on your last shift? _____

9. Of these patients, how many did you care for on your previous shift? _____

10. For the following job components check off (✓) all that apply in each column.

For Example: If you are not currently assigned to transport patients, but do it sometimes, place a check in box (2). If you were responsible for transporting patients two years ago, place a check in box (3), as well.

	You are currently assigned to do	You are not assigned to do but do anyway	You did two years ago but not now
a. Transport patients	(1)	(2)	(3)
b. Distribute food trays	(4)	(5)	(6)
c. Feed patients	(7)	(8)	(9)
d. Clean patient rooms	(10)	(11)	(12)
e. Draw blood	(13)	(14)	(15)
f. Bathe patients	(16)	(17)	(18)
g. Do EKGs	(19)	(20)	(21)
h. Provide respiratory therapy	(22)	(23)	(24)
i. Insert IVs	(25)	(26)	(27)
j. Give IV push medications	(28)	(29)	(30)
k. Maintain IV site care	(31)	(32)	(33)
l. Conduct sterile procedures	(34)	(35)	(36)
m. Educate patients regarding medications	(37)	(38)	(39)
n. Assess patients upon admission	(40)	(41)	(42)
o. Assess patients during stay	(43)	(44)	(45)
p. Take vital signs	(46)	(47)	(48)
q. Conduct discharge planning	(49)	(50)	(51)
r. Receive physician telephone orders	(52)	(53)	(54)
s. Update physicians on patient developments	(55)	(56)	(57)
t. Round with physicians	(58)	(59)	(60)
u. Direct the work of other employees	(61)	(62)	(63)
v. Manage care over an illness episode	(64)	(65)	(66)

11. Do you agree or disagree with the following statements?

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. Good patient care requires a Registered Nurse to provide comprehensive care from bathing to assessment.	1	2	3	4	5
b. Each care provider should focus on his/her key skill areas.	1	2	3	4	5

D. Training and Career Development

1. What is your most recent degree or course work completed?

- | | |
|-------------------------------------|--|
| [1] _____ Some High School | [6] _____ Associates Degree in Nursing |
| [2] _____ High School or Equivalent | [7] _____ B. S. in Nursing |
| [3] _____ Licensed Practical Nurse | [8] _____ Master's in nursing |
| [4] _____ Certified Nurse Aide | [9] _____ Ph.D. in nursing |
| [5] _____ Diploma School | |

2. How many days of formal training (off-the-job courses) did the hospital provide you over the past 6 months? _____

3. The following questions examine training and skill development on the unit.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a.I have adequate opportunities to move into a better job at this hospital.	1	2	3	4	5
b.I have adequate opportunities to develop new skills or deepen existing skills at this hospital.	1	2	3	4	5
c.The clinical manager strongly promotes course taking at area schools and colleges.	1	2	3	4	5
d.I have learned a great deal of specific medical knowledge from physicians on this unit.	1	2	3	4	5
e.I have learned a great deal of specific medical knowledge from nurses on this unit.	1	2	3	4	5
f.I have taught nurses on this unit a great deal.	1	2	3	4	5

4. Please evaluate the importance of the following ways you learn about new medical developments.

- 1 = Very important
- 2 = Important
- 3 = Not important

Write the appropriate number in each box reflecting the importance of that person or method in teaching you about those specific issues. **For example: If Charge Nurses are very important in teaching you about new procedures, write 1 box 3.**

	LPNs	RNs	Charge Nurses	Assistant Head Nurse	Clinical Managers	Physicians	Formal Courses
New procedures	(1)	(2)	(3)	(4)	(5)	(6)	(7)
New medicines	(8)	(9)	(10)	(11)	(12)	(13)	(14)

E. Unit Communication

The following question examines communication and information on your hospital unit. During the course of work, there are times where you probably have questions about certain aspects of care regarding your patients. For example: How to evaluate some change in patient status? What decisions need to be made in response to patient developments. Please think of the first person to whom you would go to under such a circumstance when you need some help or advice. That is, *if you have a question or problem at work about patient care decisions, who would you go to first for help or advice?* (Note: you may think of as many people as you would like within a certain job category.)

Please think of this first person you would go to for help and advice.

What is this person's position	In general, how often do you seek this person's help or advice
1 [] Unit's Clinical Manager	1 [] More than 5 times a shift
2 [] Unit's Assistant Head Nurse	2 [] 2-5 times a shift
3 [] Charge nurse on unit	3 [] Once a shift
4 [] RN on unit	4 [] Once every 2-3 shift
5 [] LPN on unit	5 [] Once every 4-7 shift
6 [] Clinical Nurse Specialist	6 [] Once every 7-10 shifts
7 [] Attending Physician	7 [] Less than once every 10 shifts

If the person above is unavailable, please think of the next person you would go to for help and advice

What is this person's position	In general, how often do you seek this person's help or advice
1 [] Unit's Clinical Manager	1 [] More than 5 times a shift
2 [] Unit's Assistant Head Nurse	2 [] 2-5 times a shift
3 [] Charge nurse on unit	3 [] Once a shift
4 [] RN on unit	4 [] Once every 2-3 shift
5 [] LPN on unit	5 [] Once every 4-7 shift
6 [] Clinical Nurse Specialist	6 [] Once every 7-10 shifts
7 [] Attending Physician	7 [] Less than once every 10 shifts

If both of the people above are unavailable, please think of the next person you would go to for help and advice.

What is this person's position	In general, how often do you seek this person's help or advice
1 [] Unit's Clinical Manager	1 [] More than 5 times a shift
2 [] Unit's Assistant Head Nurse	2 [] 2-5 times a shift
3 [] Charge nurse on unit	3 [] Once a shift
4 [] RN on unit	4 [] Once every 2-3 shift
5 [] LPN on unit	5 [] Once every 4-7 shift
6 [] Clinical Nurse Specialist	6 [] Once every 7-10 shifts
7 [] Attending Physician	7 [] Less than once every 10 shifts

If all of the people above are unavailable, please think of the next person you would go to for help and advice.

What is this person's position	In general, how often do you seek this person's help or advice
1 [] Unit's Clinical Manager	1 [] More than 5 times a shift
2 [] Unit's Assistant Head Nurse	2 [] 2-5 times a shift
3 [] Charge nurse on unit	3 [] Once a shift
4 [] RN on unit	4 [] Once every 2-3 shift
5 [] LPN on unit	5 [] Once every 4-7 shift
6 [] Clinical Nurse Specialist	6 [] Once every 7-10 shifts
7 [] Attending Physician	7 [] Less than once every 10 shifts

If all of the people above are unavailable, please think of the next person you would go to for help and advice.

What is this person's position	In general, how often do you seek this person's help or advice
1 [] Unit's Clinical Manager	1 [] More than 5 times a shift
2 [] Unit's Assistant Head Nurse	2 [] 2-5 times a shift
3 [] Charge nurse on unit	3 [] Once a shift
4 [] RN on unit	4 [] Once every 2-3 shift
5 [] LPN on unit	5 [] Once every 4-7 shift
6 [] Clinical Nurse Specialist	6 [] Once every 7-10 shifts
7 [] Attending Physician	7 [] Less than once every 10 shifts

F. Unit/Station Practices

1. To what extent do you participate in unit decision making over the following issues.

	Never	A little	Sometimes	A lot
a. Setting work schedules	1	2	3	4
b. Care delivery practices	1	2	3	4
c. Training for unit employees	1	2	3	4
d. Job definitions on the unit	1	2	3	4
e. Hiring new unit employees	1	2	3	4

2. Have you every participated on a team to cut hospital costs? [1] ____ Yes, [2] ____ No

3. Have you every participated on a team to improve the quality of patient care? [1] ____ Yes, [2] ____ No

4. The following questions examine the nature of practices on your unit. "Nursing leadership" refers to all members of the unit's nursing leadership (e.g., clinical manager, assistant nurse manager, and charge nurse). The terms "staff" and "unit members" refer to all non-supervisory employees on the unit.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. Unit/station nursing leadership emphasizes standards of excellence to the staff.	1	2	3	4	5
b. Unit/station nursing leadership has provided me with strong technical guidance and advice.	1	2	3	4	5
c. Staff members are held personally responsible for their patient care mistakes.	1	2	3	4	5
d. Unit/station nursing leadership usually makes decisions itself.	1	2	3	4	5
e. Unit/station members are encouraged to ask each other questions.	1	2	3	4	5
f. To the extent possible, unit/station nursing leadership has delegated to me the opportunity to solve my own patient care problems.	1	2	3	4	5
g. Unit/station nursing leadership has discouraged me from taking initiative.	1	2	3	4	5
h. I have been able to influence the thinking and behavior of the unit's nursing leadership.	1	2	3	4	5
i. Medication errors are used as learning opportunities on the unit.	1	2	3	4	5
j. In this unit/station nursing leadership has given me ample opportunities for development on the job.	1	2	3	4	5

5. How often do the following issues arise on your shift?

	Several times per week	About once per week	2-3 times per month	About once per month	Less than once per month	Not applicable
--	-------------------------------	----------------------------	----------------------------	-----------------------------	---------------------------------	-----------------------

a.... You work understaffed	1	2	3	4	5	N/A
b.... A patient receives incorrect medications or an incorrect dosage	1	2	3	4	5	N/A
c.... A patient falls	1	2	3	4	5	N/A
d.... A patient develops a new pressure ulcer or bed sore	1	2	3	4	5	N/A
e.... A blood sample is lost and must be redrawn	1	2	3	4	5	N/A

6. The following questions examine the collection and distribution of information and discretion in the hospital.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a.I have many options in deciding how to do my work.	1	2	3	4	5
b.I have many options in deciding the order of tasks I do during the day.	1	2	3	4	5
c.I have had the opportunity to discuss major hospital decisions that affect me before they are put into practice.	1	2	3	4	5
d.The administration shares information with employees about the hospital's financial performance.	1	2	3	4	5
e.I have enough time to spend with patients to accomplish my job well.	1	2	3	4	5
f.I fully understand my patient's family situation.	1	2	3	4	5
g.I have sufficient time to educate my patients about their medication and care at home prior to discharge.	1	2	3	4	5

7. Think about all of the patients you treated over your past three shifts on this unit. In the course of treating those patients, did the following things occurred.

- a) You received incorrect information from other nurses who treated the patient. [1] Yes ____ [2] No ____

- b) You had to recheck information received from nurses who treated the patients. [1] Yes ____ [2] No ____
- c) You felt uncomfortable with the extent of patient information you had when the shift began. [1] Yes ____ [2] No ____
- d) You were uncertain about a physician's overall care plan in treating a patient. [1] Yes ____ [2] No ____

8. How many unit meetings has the clinical nurse manager held over the past 3 months? _____

9. How is information communicated between nurses during shift changes? Check (✓) all that are used on a daily basis and then circle the primary method.

- On tape
- Direct one to one conversation
- Through patient charts
- Through sh.ft change meeting
- Through Charge Nurse

G. Job Security

1. Think about a situation in which patient occupancy decreases at the hospital.

In this case, will your hospital make an effort to avoid layoffs? [1] Yes ____ [2] No ____

2. In the last 3 years, have you had to change your location, shift, or job title due to reorganization? [1] Yes ____ [2] No ____

3. In the last 3 years, have you had to change your location, shift, or job title due to hospital closure? [1] Yes ____ [2] No ____

	Highly Unlikely	Unlikely	Neither unlikely nor likely	Likely	Highly Likely	Don't Know
a. How likely is it that you will lose your job due to hospital downsizing in the next 12 months?	1	2	3	4	5	6
b. How likely is it that people in your position in this hospital will lose their jobs due to hospital downsizing in the next 12 months?	1	2	3	4	5	6

H. Unit Performance

1. In your opinion, what is the quality of care provided on your unit?

- 1 excellent
- 2 good
- 3 fair
- 4 poor
- 5 very poor

2. How does the current quality of care on your unit compare to that of 2 years ago?

- 1 much better
- 2 somewhat better
- 3 about the same
- 4 somewhat worse
- 5 much worse

I. Satisfaction and Commitment

1. How much do you agree or disagree with the following statements:

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. In general, the administration treats employees fairly at this hospital.	1	2	3	4	5
b. I am willing to work harder than I have to in order to help this hospital succeed.	1	2	3	4	5
c. I feel very little loyalty to this hospital.	1	2	3	4	5
d. I find that my values and this hospital's values are very similar.	1	2	3	4	5
e. Nursing management treats employees fairly.	1	2	3	4	5
f. I trust my supervisor to look out for my interests.	1	2	3	4	5
g. I am constantly running around to get my job done.	1	2	3	4	5

2. Considering everything, how satisfied are you with:

	Very satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Very dissatisfied
a. Your involvement in decisions that affect your job	1	2	3	4	5
b. Your job security in this hospital	1	2	3	4	5
c. Your ability to find another equivalent job	1	2	3	4	5
d. Your opportunities for getting a better job in this hospital	1	2	3	4	5
e. The fairness of your pay and benefits	1	2	3	4	5
f. Your overall work	1	2	3	4	5

3. How often do you experience the following things at work.

	Almost always	Usually	Sometimes	Seldom	Almost never
a. Asked to do more work than I can handle	1	2	3	4	5
b. Emotionally drained at the end of the shift	1	2	3	4	5
c. Physically exhausted at the end of the shift	1	2	3	4	5
d. Need to stay after the shift to finish work	1	2	3	4	5

J. Union Affiliation and Commitment

1. Are you covered by a union contract? [1] _____ Yes, [2] _____ No

2. Are you a member of a union? [1] _____ Yes, [2] _____ No

3. If you are a union member or are covered by a union contract, please check which union.

- 1[] American Federation of State, County, and Municipal Employees
- 2[] Association of Diagnostic Imaging Technologists
- 3[] International Union of Operating Engineers, Local 70
- 4[] Minnesota Licensed Practical Nurses Association
- 5[] Minnesota Nurses Association
- 6[] Service Employees International Union, Local 113
- 7[] Other _____

4. If you are a union member or are covered by a union contract, please answer the following questions about the union's role in the hospital. Please refer to the union you checked above when answering the questions.

	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
a. The union should play an active role in management decisions that affect the way work is done.	1	2	3	4	5
b. The union has been effective in helping workers to share gains from improved hospital performance.	1	2	3	4	5
c. The union should focus only on wages and benefits.	1	2	3	4	5
d. The union has contributed to increased patient care quality.	1	2	3	4	5
e. The union has been helpful in changing the way in which work is done at this hospital.	1	2	3	4	5
f. I am proud to be a member of my union.	1	2	3	4	5
g. It is a good thing for the union to set up joint labor-management committees at this hospital.	1	2	3	4	5
h. I am an active member of my union.	1	2	3	4	5
i. Union leadership is too friendly with the hospital administration.	1	2	3	4	5
j. Union - management relations in this hospital are very good.	1	2	3	4	5

K. Background Information

1. What is your race or ethnicity?

- | | |
|--------------------------------|---------------------------|
| [1] _____ African - American | [4] _____ Asian |
| [2] _____ Hispanic | [5] _____ American Indian |
| [3] _____ White (non Hispanic) | [6] _____ Other |

2. What is your age?

- | | |
|--------------------|-----------------------------|
| [1] _____ Under 25 | [5] _____ 41-45 |
| [2] _____ 26-30 | [6] _____ 46-50 |
| [3] _____ 31-35 | [7] _____ 51-55 |
| [4] _____ 36-40 | [8] _____ 56 years or older |

3. Please check one. [1] Male _____ [2] Female _____

4. What is your current job title?

- | | |
|------------------------------------|---|
| [1] _____ Registered Nurse | [4] _____ Respiratory Therapist |
| [2] _____ Licensed Practical Nurse | [5] _____ Housekeeping Aide |
| [3] _____ Nurse Aide or equivalent | [6] _____ Radiologic/Imaging Technologist |

5. For how many years have you worked in "your current job title"? _____

6. Are you ever Charge Nurse? [1] Yes _____ [2] No _____
If yes, on a given two week schedule, how often are you the Charge Nurse? _____

7. How long have you been working on this unit? _____ years _____ months

8. What percentage of your time do you work on the following shifts? (total should equal 100%)

- Day _____%
- Evening _____%
- Night _____%

9. How long have you worked on this shift? _____ years _____ months

10. What year did you start working at this hospital? _____

11. Prior to working at this hospital, did you work at another hospital? [1] Yes _____ [2] No _____
If yes, which one _____ ; For how many years _____

12. How many hours do you work over a typical two week schedule? _____

13. I average _____ hours of overtime over the course of a two week period.

14. What is your salary over a two week period? _____