Enhancing Nursing Role Effectiveness Through Job Redesign

Deborah White RN, PhD (Principal Investigator)
Karen Jackson RN, MEd (Co-Investigator, Project Manager)
Jeanne Besner RN, PhD (Co-Investigator)
Esther Suter PhD, MSW (Co-Investigator)
Diane Doran RN, PhD (Co-Investigator)
Linda McGillis Hall RN, PhD (Co-Investigator)
Karen Parent RN, PhD(c) (Co-Investigator)

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Acknowledgements:

Research Investigator Team:

Debbie White RN, PhD	Associate Professor	Faculty of Nursing, University of Calgary
Jeanne Besner RN, PhD	Director	HSWRU[†], AHS[*], CZ**
Karen Jackson RN, MEd	Research and Evaluation Consultant	HSWRU, AHS, CZ
Esther Suter PhD, MSW	Research and Evaluation Consultant	HSWRU, AHS, CZ
Diane Doran RN, PhD	Professor and Lawrence S. Bloomberg Limited Term Professor, Patient Safety	Faculty of Nursing, University of Toronto
Linda McGillis Hall, PhD, FAAN	Associate Professor, Associate Dean of Research & External Relations	Faculty of Nursing, University of Toronto
Karen Parent RN, PhD(c)	Lecturer	Physical Medicine and Rehabilitation, Queen's University

Advisory Committee:

Noreen Linton	Executive Director and Associate Chief Nursing Officer	Chief Nursing Office, AHS, CZ
Kate Chidester	Director	Professional Practice and Development AHS, CZ
Holly Knight	Manager	Professional Practice and Development, AHS, CZ
Monique Assi	Manager, Complex Chronic Conditions	Chronic Disease Management, AHS, CZ
Dr. Sandra Delon	Director	Chronic Disease Management, AHS, CZ

Linda Stanger	Executive Director	College of Licensed Practical Nurses of Alberta
Dr. Lorraine Watson	Associate Dean, Undergraduate Program,	Faculty of Nursing University of Calgary
Dr. Debbie McNeil	Director	Decision Support Research Team, AHS, CZ
Dr. Lynn Redfern	Director of Policy and Practice	College and Association of Registered Nurses of Alberta
Dr. Trish Reay	Assistant Professor	Department of Strategic Management and Organization, School of Business, University of Alberta
Tracy Wasylak	Vice President, South Health Campus	AHS, CZ
Dr. Patrick Wong	Physician	Family Medicine, AHS, CZ

Project Staff:

Brae Surgeoner	Research Analyst	HSWRU, AHS, CZ
Kevin Gerrits	Research and Evaluation Consultant	HSWRU, AHS, CZ
Steven Friesen	Research Associate	HSWRU, AHS, CZ
Laura Lagendyk	CoMPaIR Research Program Manager	Medical Services, AHS, CZ
Rebecca Carter	Research Analyst	HSWRU, AHS, CZ
Nicole Toner	Graduate Student	Faculty of Nursing, University of Calgary
Melissa Hyman	Research Analyst	HSWRU, AHS, CZ
Haneen Omar	Research Analyst	HSWRU, AHS, CZ

[†] Health Systems and Workforce Research Unit
* Alberta Health Services
** Calgary Zone

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EXECUTIVE SUMMARY

There is evidence to suggest that registered nurses spend insufficient time performing key functions associated with their defined role.[1] The current practice of registered nurses is largely focused on the performance of tasks and activities related to meeting patients' bio-medical needs.[2-4] Insufficient attention is given to enabling patients and families to attain maximum health and well-being, which constitutes the essence of professional nursing practice.[5-7] The lack of focus on optimal role enactment represents an underutilization of nursing knowledge and skill and potentially compromises the quality of care.

The design of work can contribute to underutilization of professional knowledge and skills.[8] The primary objectives in this research were to optimize enactment of the roles of registered nurses (RNs) and health care aides (HCAs) through job redesign and to determine the impact of job redesign on patient, provider, and unit outcomes. This study was conducted on two general medical patient care units in the Calgary Health Region in Alberta. Quantitative and qualitative methods were employed and data were collected on the "Redesign" and "Control" Units prior to and following the implementation of redesign initiatives.

Although some structural and functional changes were made to work processes over the course of the study, the goal of achieving optimal enactment of registered nurses' role was not accomplished. Progress was made in improving the utilization of HCAs and enhancing their perception of being valued as members of the nursing team. While the study failed to accomplish many of the intended goals, much was learned about the factors that are critical to the success of any initiative aimed at improving utilization of the health workforce.

The use of a population needs based approach to examine nursing providers' roles (i.e., RNs, licensed practical nurses [LPNs] and HCAs) helped validate the gap that existed between ideal (i.e., optimal) and actual nursing practice and enabled staff to better understand how optimal enactment of their respective roles could positively influence patient and family outcomes. This, combined with observation data that revealed that RNs spent a considerable amount of their time performing work that could in many instances be performed by other members of the health care team reinforced the inefficiency and ineffectiveness of the service delivery model (i.e., modified primary nursing) that characterized the Redesign Unit. The conclusion drawn from this study is that a collaborative practice model incorporating RNs, LPNs, and HCAs is most likely to optimize the utilization of all members of the nursing team, at least for the type of patient population that was the focus of this study.

A key lesson learned is that engagement and commitment of leaders at all levels of the organization is needed to address the current underutilization of health care workers. As the study evolved, it became clear that significant change in the utilization of the health workforce cannot occur as long as the focus of the change initiative is a single patient care unit or program. A systems approach to workforce optimization is needed, guided by a clear vision that is understood and championed by leaders at all levels and a well articulated strategic plan. Failure to recognize in advance the extent of organizational support that would be needed to effect any change in role enactment at the service delivery level limited the job redesign approach that was attempted in this research.

KEY MESSAGES

Optimal nursing role enactment requires an understanding of the characteristics and health needs of the patient population receiving care

- Nursing providers' roles in preventing illness and injury and promoting health and well-being requires elaboration of the profile of patients being served on the patient care unit or in other health care settings. Preventing avoidable complications or injuries requires an understanding of real or potential risk factors associated with particular population groups such as the elderly.
- Provider knowledge, skills, and abilities must be "matched" to the health needs of the population served in order to mitigate real or potential risk factors and prevent avoidable complications and injuries.
- Staffing decisions (i.e., determining the right number and mix of personnel) must be based on an understanding of population health needs.
- An understanding of the health needs of the patient population enables providers to make care decisions that are focused on meeting patient health needs rather than on simply "doing the tasks."

An all RN staffing model does not promote optimal nursing role enactment

- When there is no potential to redistribute to other members of the health care team regulated work activities such as routine medication administration or treatments, as well as unregulated activities such as personal care, those tasks and activities must be performed by RNs. Routinely performing tasks and activities that could be done by others takes RNs away from essential role functions such as comprehensive assessment, patient and family teaching or support, discharge planning, and coordination of care.

Optimal nursing role enactment requires a collaborative practice approach to care delivery

- Optimal nursing role enactment is enhanced in an environment in which care is provided collaboratively with other providers and with patients and families.
- A collaborative practice approach requires that providers understand each others' role accountabilities and their respective contribution to the care of patients and families.
- A collaborative practice approach requires that providers have knowledge and skill related to shared decision-making (e.g., providers and patients are involved in decisions about the plan of care), communication (e.g., what information needs to be communicated), conflict resolution, and negotiation skills.

Successful job redesign at the unit or program level is contingent upon a systematic approach to change and expertise in change management at all levels of leadership.

- When embarking on job redesign, it is important that leaders at both the local (unit) and system (organization) levels have a clear vision of the goal to be accomplished and the outcomes to be achieved.
- Job redesign requires system support and often, redesign of system-wide structures and processes if change is to be implemented and sustained at the unit or program level, as well as throughout the organization. Substantive change in the utilization of health care providers cannot be achieved from a purely "bottom up" approach. The involvement and commitment of executive leaders is a critical success factor.
- Job redesign requires a participatory approach involving patients and families, staff, managers, and senior leaders. A network or alliance of providers, managers, and other

leaders who share ideas, expertise, experiences, and practical approaches is a useful mechanism for engaging providers in the process of reconsidering how they work together in delivering patient care. Redesign teams can be a powerful structure to help motivate staff and provide knowledge, skills, and support for change initiatives.

- Strategies aimed at optimizing the utilization of health care providers (i.e., optimal role enactment) should incorporate a concrete and explicit focus on creating opportunities for all providers to acquire the knowledge and skills needed to engage in collaborative practice.

1.0 BACKGROUND

Prior research that explored nurses' perception of their scope of practice[1] suggests that registered nurses (RNs) spend insufficient time performing key functions associated with their defined role, such as comprehensive bio-medical, psycho-social-cultural and spiritual assessment, patient and family education and support, and coordination of care. There is substantial evidence that the current practice of RNs is largely focused on the performance of tasks and activities related to the management of patients' bio-medical needs[2-4] with little attention paid to optimizing health and well-being through episodes of illness, crisis or transition. This represents an underutilization of nursing knowledge and skill and potentially compromises the quality of care.

The design of work can contribute to underutilization of professional knowledge and skills, which may negatively influence job satisfaction.[8] Redesigning the work of nursing providers involves the purposeful creation of professional practice environments that facilitate adherence to standards of practice and promote excellence in patient care. Strategies aimed at optimizing the utilization of the knowledge, skills and capabilities of all healthcare providers are particularly critical to overcoming current and future workforce shortages and improving quality of care.

In this report, we present findings from a research project aimed at optimizing enactment of the roles of two groups of nursing providers - RNs and health care aides (HCAs) - through job redesign.

1.1 Hypotheses

It was hypothesized that:

- As a consequence of job redesign, nursing providers (i.e., RNs and HCAs) would spend time more appropriately enacting the key clinical role functions and activities associated with their respective roles.

- Increasing the amount of time that RNs' spend on clinical role functions such as patient and family teaching and support would increase patients' and families' knowledge and capacity to more effectively manage their health condition. Enhanced self-care capacity would then reduce the likelihood of readmission to in-patients or visits to the emergency department within 90 days of discharge.

- Specific attention to identifying real or potential bio-medical, psycho-social-cultural and spiritual risk factors would result in establishment of appropriate monitoring and surveillance by nursing providers, to prevent avoidable complications and mitigate adverse events.

- Improved utilization of the two groups of nursing providers would lead to enhanced job satisfaction, thereby contributing to reduced absenteeism.

1.2 Research Questions

The following questions guided the research:

1. How can job redesign be used as a strategy to optimize nursing role enactment?

2. What is the impact of job redesign on:
   a. Nursing role enactment (i.e., RN and HCA roles)?
   b. Provider outcomes (i.e., job satisfaction, job autonomy, role tension)?
   c. Unit outcomes (i.e., length of stay and in-patient readmission and emergency department visits within 90 days of discharge as well as sick time and overtime)?
   d. Patient and family outcomes (i.e., self-care capacity and perception of quality of nursing care)?

2.0 METHODS

2.1 Study Design

A quasi-experimental, mixed methods design was used in this study. Utilizing an action research approach, researchers and staff on one medical unit (the Redesign Unit) aimed to fully enact the roles of RNs and HCAs through the *redesign of functional and structural work factors*. A second medical unit served as the Control Unit in the study.

2.2 Data Collection

Quantitative data, which included observation data, provider and patient questionnaires, and patient information drawn from corporate databases were collected on both units at two different time frames: prior to redesign (November 2005) and following redesign (October 2007). Quantitative data were supplemented with qualitative data obtained through individual interviews with nursing providers and meetings of members of the change team. Throughout the duration of the study, contextual information such as bed capacity pressures, staff shortages, and staff mix changes was captured on both units to enable description of factors that could influence the job redesign effort as the project evolved.

2.2.1 Observation Data

The work of RNs and HCAs on both medical units was observed and recorded using a methodology called Function Analysis[TM] (FA). Using personal digital assistant (PDA) technology, trained observers documented both health care providers' use of time across a variety of predefined activities associated with provider role functions and other work activities. Observers received instruction from a FA expert during a one-half day training period. At random times during the training and data collection periods, the FA expert monitored the observers as they recorded the activities of RNs or HCAs to ensure internal consistency among the recorders. The FA technology was developed and previously tested for reliability and validity by one of the co-investigators.[9-12] The collection of observation data occurred during each of five consecutive day and evening shifts. In total, 71 RN and 33 HCA shifts (79 unique individuals) were observed as they carried out their regular work activities.

The Nursing Role Effectiveness Model (NREM)[13] provided the framework within which to categorize clinical nursing role functions. The model incorporates five elements of registered nurses' role

functions, including comprehensive assessment from which monitoring and surveillance needs are determined, individual nursing interventions, coordination of care, and patient and family teaching. Although the NREM is directed at the clinical role functions of RNs, the activities of HCAs were also examined using similar role function categories. Understanding the flow of work is essential to job analysis as it informs the potential redesign of unit and system structures and processes of care that enhance optimized role enactment.[14] Consequently, activities such as travel (e.g., to and from the patient bedside or other units), interruptions in the delivery of care, administrative activities, documentation, hand washing, and organization of the patient's room or patient care unit (spatial organization) were also captured through the FA process. Examples of the aggregated observed activities of RNs and HCAs are presented in Appendix B, Table B.1.

2.2.2 Interview Data

While the specific activities that nursing providers perform are clearly visible (e.g., medication administration and patient teaching), nursing practice is guided by a knowledge base that is not directly observable. Therefore, RNs and HCAs who agreed to be observed were also interviewed to elicit information about judgments and decisions involved in delivering care. Although LPNs were not included in the nursing staff mix on the Control Unit at the onset of the study, they were introduced during the study period. Several of them therefore participated in the final set of interviews. A semi-structured questionnaire guide was utilized by interviewers (who were also observers) who received instruction in interviewing techniques during a half-day session. A total of 77 interviews were conducted.

2.2.3 Questionnaire Data

Provider Questionnaires: All nursing providers (RNs and HCAs) employed on the two units (whether or not they agreed to be observed and interviewed) were invited to complete questionnaires that captured demographic and job related data. Two previously validated tools, the Lyon's Role Tension Index[15] and the Job Diagnostic Survey[16] were used to capture participants' perceptions of factors associated with job satisfaction. While the intended sample size was 120 respondents, only 111 participants completed questionnaires.

Patient Questionnaires: A convenience sample of patients on each of the units was asked to complete a demographic and two validated questionnaires. Survey tools included the 21-item version of the Patient Judgment of Hospital Quality (PJHQ)[17-19] and the 12-item Therapeutic Self-Care Tool (TSCT).[20] Although the intention had been to collect data from 200 patients, only 148 completed all questionnaires.

2.2.4 Corporate Data

Population needs driven approaches to patient care require sound knowledge of the characteristics of particular populations, so that risk factors can be identified and mitigated through appropriate monitoring and surveillance and interventions can then be implemented by the right mix of staff, who possess the knowledge and skills needed to ensure achievement of intended patient health outcomes. Calgary Health Region (the Region) administrative databases were used to abstract (using Toad for Oracle v9.1) descriptive information about structural elements of the patient units (e.g., workload index and acuity), as well as provider (e.g., sick time and overtime) and patient outcomes (e.g., in-patient readmission and emergency department visits within 90 days of discharge and length of stay on the

unit). In addition, patient data including age, medical diagnoses, co-morbidities recorded subsequent to admission, discharge disposition, and referral to resources such as home care were used to create a profile of the "typical" patient population for each unit.

2.3   Study Sample and Setting

2.3.1 Providers

A convenience sample of RNs and HCAs on two medical units in a large tertiary hospital in Calgary, Alberta participated in the study. The mean age of providers who completed questionnaires was 43 years. Eighty percent of the participants were female, 27 percent had a bachelor's degree in nursing, 38 percent an RN diploma, four percent a bachelor's degree or higher in another field, and 12 percent an LPN certificate. Approximately one-third of the total sample had more than 10 years of clinical experience, though there was wide variability across the sample. Provider demographics for both units are provided in Appendix A.

2.3.2 Patient Population Profile

Within the Calgary Health Region, 42 percent of in-patient bed days are occupied by patients over the age of 65 years. More than 65 percent of patients discharged from each of the study units in the 16 months preceding onset of the study were over the age of 70 years. On the Redesign Unit, approximately 70 percent of all patients had one or more frequently recurring diagnoses (e.g., chronic obstructive pulmonary disease, dementia, disorders of the urinary system, heart failure, malignant neoplasm, diabetes, pneumonia, atrial fibrillation, hypertension, and/or anemia). The average length of stay for patients was approximately 10.7 days with a median of 6.1 days. Fifty-five to 65 percent of patients returned to their own home after discharge. Slightly more than half of these patients were referred to a source of support such as home care at the time of discharge. Approximately 34 percent of all patients returned to the emergency department and approximately 26 percent were readmitted to in-patients within 90 days of discharge from the Redesign Unit. The median time from discharge to hospital readmission was 28 days.

2.3.3 Patient Participants

The average age of participants who completed questionnaires was 68 years, the majority were married, and about one-third had post secondary education. More detailed demographic information about these patients is presented in Appendix A.

2.4   Data Analysis

Quantitative data were cleaned and descriptive and inferential statistics were calculated using Stata SE 10.0. Linear regression analyses were performed to provide tests of statistical significance ($\alpha = 0.05$) and to look at differences in patient, provider, and unit outcomes attributable to job redesign. An interaction term was modeled as the effect of being on the Redesign Unit post redesign. The difference between units was modeled as a bivariate outcome with the Control Unit as the reference group. The difference between the pre and post redesign time period was also modeled as a bivariate value with the pre redesign time period as the reference group. The analysis of the observation data excluded time spent on personal breaks as well as other activities related to the study (e.g., time for interview and

questionnaire completion). Consequently, the average amount of work-time observed was 6.52 hours for RNs and 5.81 hours for HCAs.

Interview transcripts were coded using the QSR N6[©] program to facilitate data management and the collaborative approach to analysis involving members of the multidisciplinary team participating in the project. Data analysis was completed through a series of iterative phases as described by Crabtree and Miller[21] which involved (a) a reflective process in which the analysis team linked data collection to data analysis, (b) organizing the data using a combination of two qualitative analysis styles: template coding and immersion and crystallization,[21, 22] (c) connecting the organized data in patterns and themes, (d) corroborating and legitimating the themes by visiting and re-visiting the interview data to confirm the strength and accuracy of the emerging themes, and (e) representing an account of the analysis through written reports that were reviewed and revised through face-to-face team discussions.

3.0 RESULTS AND DISCUSSION

The primary intent in this research was to facilitate optimal role enactment of RNs and HCAs on one medical unit through job redesign. While strategies to redesign functional and structural work factors were implemented in order to support optimal role enactment, the full intent of the research was not achieved. That is, the enactment of full scope of practice for nursing providers was not realized, for reasons discussed later in this report. Nonetheless, the research was successful in (a) validating previous research findings about the underutilization of nursing providers by quantifying the actual amount of time nursing providers spend in the performance of various elements of their roles, (b) explicating the elements of a systematic approach to enhancing nursing role enactment, and (c) identifying facilitators and obstacles to redesigning the work of nursing providers. The following sections focus on describing the approach to job redesign utilized, including discussion of successes and failures, as well as the learning that emanated from this effort.

3.1 A Systematic Approach to Job Redesign

Job redesign as a strategy for optimizing utilization of the workforce requires organizational commitment and involvement. As with all change management initiatives, job redesign should be guided by a set of core principles. These include (a) articulation of a clear vision,[23, 24] (b) engagement of staff throughout all stages of the redesign process,[25-28] and (c) attention to the influence of the context in which the change takes place[29] and integration with organizational structures and processes.[24, 27]

3.1.1 Articulating the Vision

Prior to engaging in job redesign efforts, researchers engaged staff and managers on the Redesign Unit in dialogue about *current and desired* nursing role enactment. As a preliminary step, previous research findings were presented, highlighting the inordinate amount of time spent by RNs on the performance of tasks and activities related to the bio-medical management of patients.[1-4] Ideal nursing practice, as reflected in practice standards, the nursing code of ethics, and job descriptions was contrasted with actual practice described by nurses involved in earlier research.[1] Team members were reminded that RNs were expected to (a) conduct comprehensive patient assessments focused on identifying real or potential risk factors, (b) develop a plan of care that includes establishment of appropriate monitoring and surveillance to mitigate complications or adverse events, (c) help patients and families achieve maximum self-care capacity through relevant teaching, support, and referral to needed community

supports upon discharge, (d) communicate with other members of the health care team to ensure a coordinated approach to care, and (e) implement and evaluate nursing interventions. In addition, efforts were made to standardize the practice of HCAs in relation to monitoring urinary intake and output, skin care, and documentation.

The gap between the vision of ideal nursing role enactment and actual practice was reinforced by presenting to staff the patient profile data for the unit, as well as discussing baseline (i.e., pre redesign) data obtained through analysis of the work of RNs and HCAs (observation and interview). For RNs on the Redesign Unit, observation data confirmed that limited time was spent on patient and family assessment and support (4.6%) while considerable time was devoted to activities of daily living (ADL) and personal care (13.0%), bio-medical assessment (8.0%), and medications and treatments (13.2%), activities that in many cases were clearly within the scope of practice of licensed practical nurses (LPNs) or HCAs. Observation data confirmed that a majority of HCA time on the Redesign Unit was spent in ADL and personal care (33.5%), and cleaning and organizing (12.3%) the environment (i.e., patients' rooms or the unit). The observation data also revealed that a substantial amount of RN time was spent in activities such as travel (10.7%), documentation and review of patient information (20.9%), spatial organization of the unit and patient room (6.1%), and administrative tasks (3.2%). A summary of time spent on various activities related to clinical role functions and other work is presented below.

Table 3.1: Redesign Unit – RN and HCA Time (Minutes) Spent on Activities Related to Clinical Role Functions and Other Work on an Average Shift Pre Redesign

Activity Categories	RN Work Pre Redesign	HCA Work Pre Redesign
Coordination of Care	45.78	68.82
Patient and Family Assessment and Support	16.79	42.89
Bio-medical Assessment	28.58	N/A
Medications and Treatments	47.95	N/A
Activities of Daily Living and Personal Care	47.15	120.71
Mobilization	5.19	0.09
Engagement	9.98	N/A
Spatial Organization and Cleaning and Organizing	22.13	42.07
Documentation and Information Review	76.32	6.16
Administration	11.44	5.58
Wash Hands	12.92	6.68
Travel	48.63	56.69

Interview data clearly corroborated what was learned from the observation data.

> *I get report and that gives me some idea of what their needs are from that. And then I do a head to toe assessment and kind of confirm or modify what my expectations are based on that report. The decision point is [based on] who requires the most help first, like because I have four patients, I have to prioritize which one needs to have what done and when. And around here, the priority tends to be first thing in the morning they get breakfast right away, so you get them set up for breakfast and get all their pills that they need to have first thing in the morning. And make sure they take them, although that didn't work with one of the patients today [laughs] and then when some people are eating, then you can work with other people that aren't eating. You*

can do some of their personal hygiene and a basic assessment and stuff while those other people are busy eating. And that sort of thing (RN62, Redesign Unit – pre redesign).

I'd say your priorities of course are patient assessment, getting our meds out is a priority---providing care. Like tonight all of those things are important, but I'm just trying to think how to---I mean tonight is a night where I'd say the biggest priority was the patient; managing my patient's airway that had the trach. Who needed suctioning fairly frequently and so his respiratory status was tenuous and you needed to really watch him closely…Well the lower priorities are actually just the human interactions and conversations (RN60, Redesign Unit – pre redesign).

You just move to the next priority and try to put your mind in this priority . . . because the one-to-one [care] is not considered a priority. It's just to fill in when you have time. But the priorities are the toileting, to put them to bed, undress them, show them to eat, bring them fluids during your shift you know? Walk them . . . (HCA30, Control Unit – pre redesign).

Staff buy-in to the need for change in practice was strengthened through presentation of evidence about the impact of sub-optimized role enactment on patient outcomes and quality of care, as well as discussion of best practices related to discharge planning and chronic disease management, derived through literature review. Staff learned that in the geriatric population, social isolation, depression, and low health literacy were predictors of hospital readmission. Those facts, combined with data revealing that at least one-third of patients on the unit were likely to be re-admitted to in-patients and/or seen in the emergency department within 90 days of discharge reinforced the importance of attending to the social determinants of health during patients' stay in hospital. The use of data in "telling a story" about quality of care on the unit heightened staff awareness of gaps in their practice.

After I looked at the data, I thought, boy, there is a lot of room to do a lot of things---to change a lot of things for the better or to start getting things where you could focus more on what we're supposed to be doing a lot of the time. That's what I thought. I thought there are a lot of areas that we could look at to get us doing our jobs better for what we're supposed to be doing (Change Team Member, April 27, 2006).

The evidence informed approach used in this research to obtain staff engagement in optimizing the utilization of nursing providers highlighted the importance of presenting a compelling rationale when articulating a vision for change.

3.1.2 Staff Ownership and Engagement

Redesign experts agree that change is most easily implemented when it is the result of a participatory process involving those directly affected by the change.[30] A change team comprised of RNs, HCAs, managers, and researchers was formed. The mandate of the team was to plan and implement desired changes. Professional practice consultants from the College and Association of Registered Nurses of Alberta (CARNA) and the College of Licensed Practical Nurses of Alberta (CLPNA) as well as other professional colleagues (e.g., social workers), and representatives of senior management (e.g., directors) were invited to attend change team meetings as appropriate. To set the stage for successful redesign, the critical elements of effective group work were discussed and team building exercises were implemented as a means of building trust and respect among RNs and HCAs. Recognizing the importance of continuous communication and sustained momentum during change, the change team

met biweekly over a four-month period. The change team was the primary vehicle for exchange of information and regular communication about the research project to staff on the unit. An integral member of the change team was an experienced RN (clinical leader) who supported the researchers two days a week with planning and implementing study related activities on the unit. The importance of this role is reflected in the following comment made by a member of the nursing team on the Redesign Unit.

> *Well [clinical leader] was quite key, I felt. And I remember when the buddy system started, I was on one day when she was working, and she explained to us how it was going to work and there were a couple of modifications from the very beginning of it . . . but anyway, that was good and it was communicated quite well anyway by [clinical leader], and probably by others (RN209, Redesign Unit – post redesign).*

Using a combination of observation data, research literature, and presentations from experts in gerontology, the change team was instrumental in working with unit staff to identify priorities related to enhancing nursing role enactment (e.g., completing geriatric specific assessments), implementing new unit and system structures and processes (e.g., improved communication and safe transitioning of patients), and attending to space and technology issues (e.g., availability and functionality of equipment and mechanisms for reducing travel time). While evidence and best practice literature facilitated buy-in, the change team and the clinical leader were key to facilitating staff engagement and ownership in effecting the changes that occurred over the duration of the project.

3.1.3 Contextual Influence

Organizational literature highlights the critical role of system structures and processes in supporting change and quality improvement initiatives in health care organizations.[31-33] Barach and Johnson[34] in particular note the importance of recognizing that local or system level changes can facilitate or impede planned change initiatives. Throughout this study, researchers focused on tracking and documenting elements in the practice environment that could negatively or positively influence job redesign efforts. The study was conducted during a period of intense activity in the Region. For example, hospitals experienced significant capacity pressures (i.e., bed shortages) as a result of rapid population growth in the city, which led to the introduction of "over capacity" strategies that placed additional pressure on staff, at a time of concurrent staff shortages. Staff was left having to do more with the same number of personnel, contributing to excess overtime, particularly over the summer months when vacation requests added to the critical shortage. As a result of hospital expansion, the Redesign Unit was relocated from one floor to another mid way through the study. A new computerized patient care information system was introduced resulting in major training requirements for staff and workflow process redesign. This was a significant change that required the focused energy and commitment of the staff. The Redesign Unit also experienced a complete change in first line management toward the end of the study. As can be expected, these factors caused considerable stress on the Redesign Unit making it difficult to implement the type and depth of practice change that had been anticipated at the start of the study.

3.1.4 Moving Forward

Early on, it became apparent that a number of interdependent elements needed to be strengthened if optimal *enactment of RN and HCA roles was to be achieved*. These elements included *unit and system structures and processes* and factors related to *space and technology*. It was also recognized that

positive changes in these areas could be celebrated as quick wins that would further facilitate staff engagement and ownership and help maintain momentum for change.

Unit and System Structures and Processes: It became obvious from comments made during interviews with staff that teamwork on the unit needed to be enhanced. Staff acknowledged they worked in silos and many felt that the quality of care provided could be improved through more effective teamwork.

> *Well depending on the kind of illnesses that the patients have, you can spend a lot of time with certain patients. And depending on which team of your nursing staff you're working with, can make things easier or harder for you. It just depends on who all is a team player and who isn't . . . when you're working with someone that isn't, it really affects your job, because you pick up all their slack (HCA39, Redesign Unit – pre redesign).*

> *Good help would be great. Like to have a partner to work with, you know what I mean? Like we have a lot of sick people and we haven't had very good working relationship with the other girls and all that (HCA36, Redesign Unit – pre redesign).*

By involving staff and managers in discussing and interpreting data from interviews and observations, questions were raised as to whether the staff mix and model of care on the unit were best suited to meeting the health needs of the patient population. The modified primary nursing care model typically involved assignment of a specified number of patients to RNs, each of whom was responsible for all of the care delivered to their assigned patients. HCAs supported two or more RNs during the shift, but they rarely worked together as a team to coordinate and implement care. HCAs and RNs started their shift at different times and communication among these providers occurred in an ad hoc and reactive fashion, leading to frequent interruptions over the course of a shift. Although RNs frequently performed regulated or "restricted activities" (e.g., medication administration and routine treatments), it was very clear that many were within the scope of practice of LPNs or other members of the health care team. It became obvious that increasing RN time spent on critical role functions such as comprehensive assessment, patient and family assessment and support, and discharge planning could not be realized simply by attending to structure and process issues, such as reducing travel time and interruptions. Researchers as well as some staff recognized that RNs would only achieve optimal role enactment if LPNs with legislated authority to perform many of the routine restricted activities complemented the nursing staff mix.

Several structural and process changes were implemented to overcome the deficiencies identified during the data collection phase of the study. Structural changes included synchronizing shift start times for RNs and HCAs, allowing them to discuss and plan care for their assigned patients at the beginning of each shift. Process changes included the development and formalization of "buddy teams" in which two or three RNs and one HCA jointly provided care to a group of assigned patients. The formation of buddy teams enabled providers to meet face-to-face to plan, negotiate, implement, and evaluate care for their patients. A business plan was developed to lay the groundwork for the integration of over-complement LPNs (i.e., increasing the number of staff to include LPNs), the short-term secondment of a dedicated nurse educator and increased pharmacist time. The proposed role for the nurse educator was to assist with the orientation and integration of LPNs and to serve as a coach and/or mentor to help members of the buddy team develop skill in shared decision-making and care planning. Increased pharmacy time was requested to help improve patients' knowledge about medication management in preparation for discharge. Unfortunately, senior management was unable to support implementation of the business plan and none of the proposed changes was implemented.

Nonetheless, team building opportunities were offered to help improve the effectiveness of the buddy teams. Learning focused on clarifying the distinct roles of RNs, HCAs, LPNs, social workers, and rehabilitative aides, as well as providing new knowledge about the gerontological population.

Space and Technology: Observation data indicated that both RNs and HCAs spent considerable time in travel (Appendix C, Tables C.2 and C.3), resulting in a mean number of three to four interruptions per hour. Strategies were implemented to encourage the flow of work to be more efficient. These included the relocation of supplies closer to the point of care to reduce unnecessary travel and the establishment of a phone log to reduce interruptions as well as travel to the nursing station. Although more narrow in scope than was intended at the onset of the study, the changes that were implemented led to improved communication and teamwork among buddy teams, an increased focus on patient safety and quality care, and enhanced job satisfaction, trust and respect among team members. Subsequent to the redesign some observers commented that the Redesign Unit appeared less chaotic and better organized compared to the Control Unit. Although failure to introduce LPNs into the staff mix impeded full enactment of the RN role, the study helped focus attention on the importance of the population needs based approach in ensuring that the knowledge and skill of staff are "matched" to the needs of patients.

Enactment of Roles: Patient profiling increased staff awareness of the high prevalence of elderly patients with multiple chronic diseases and of the relatively low level of expertise in gerontology that existed among the health professionals working on the unit. Nursing staff readily acknowledged the need to improve patient outcomes (e.g., 90 day readmission rates) by increasing their knowledge of common risk factors occurring in the gerontological population and targeting monitoring and surveillance to mitigation of those risks. RNs recognized that insufficient attention was being paid to conducting comprehensive patient assessment (including psycho-social domains), patient and family teaching and support, and discharge planning. A number of strategies were implemented to overcome the gaps identified. A laminated pocket sized card was created to help buddy teams focus their assessment and plan of care on the needs of the patient population. An education session led by a geriatric nurse practitioner was provided to increase team members' knowledge of gerontological risk factors. Additionally, a visual display of 'did you know' facts related to the needs of the elderly population was posted in high traffic areas. In-services were held for HCAs who identified a need for increased competency in skin care and more standardization in charting urinary intake and output. RNs proposed the establishment of in-services and workshops as a mechanism for gaining skill in geriatric assessment, which was identified as a new, required competency for all RNs on the unit. Unfortunately, plans for implementation of any formal educational session were thwarted by staff shortages and lack of resources (e.g., educators).

3.2   Successes and Failures

While job redesign and change management principles guided this research project, a number of unanticipated factors inhibited full achievement of intended outcomes. While some gains were made in improving the efficiency of unit structures and processes, the intent of moving RNs and HCAs to full scope of practice (i.e., ideal role enactment) was never attained. A number of contextual factors, including staff shortages, the adoption of a region wide computer-based patient care information system, changes in first line management, and the lack of systemic support for the changes proposed at the unit level created barriers to attaining full enactment of the RN role on the unit. A key lesson learned is the importance of organizational vision and support for any changes planned at the local or unit level. The nature of the change that was envisioned for this project proved very difficult to achieve, in large measure because it was not recognized *a priori* just how significant was the need for

commitment and support for change at all levels of the organization. That being said, several successes were celebrated throughout the study.

Unit and System Structures and Processes: The implementation of buddy teams increased RNs' and HCAs' sensitivity to the health needs of their patients and enhanced their understanding of colleagues' workload. HCAs felt more valued as colleagues by being assigned to a defined team and most nursing providers perceived that buddy teams had positively impacted communication, teamwork, understanding of others' roles, coordination of care, and job satisfaction.

> *Yeah I think it [buddy teams] has really strengthened the teamwork, and I think there's more job satisfaction, just being in the know a little bit more about what's going on with another group of patients. And it's definitely been good. And there's been a little bit more of getting to know each other too with it . . . (RN209, Redesign Unit – post redesign).*

> *I love the time we had The Power to Change Team. I think that was one of the best things that ever happened . . . I feel like we are more a part of the team . . . Before we had the Power to Change, it was a different. The HCAs and the RNs didn't work as how we work now (HCA201, Redesign Unit – post redesign).*

> *I mean I'm certainly more comfortable with my buddy's patients as well, because you do get to know them, and certainly if you know the patients, I guess, if you have to make any decisions while your buddy is on break, it's easier to make that decision. In terms of patient needs or if they need medication you don't have to say, "Okay, wait till So and So comes back" (RN208, Redesign Unit – post redesign).*

Teamwork contributed to enhanced communication, improved coordination of care between the RNs and HCAs, and reduced the amount of time spent looking for colleagues to assist in delivery of patient care.

> *And sometimes the doctor comes in the room and the nurses don't even know. And if I'm there as an HCA, I could go to the nurse and say, "Dr. Such and Such is here and he's in the room." And then the nurse would come in and see the doctor. That's an example. And normally I wouldn't know that before [changes implemented by the Change Team] (HCA201, Redesign Unit – post redesign).*

> *Patients are getting looked after, people aren't stressed out, we're not running around, trying to find each other, because we basically know where each other is at (Change Team Member, February 15, 2007).*

Moreover, enhanced communication between providers improved everyone's knowledge of the patient and contributed to more confident, better decision-making about care.

> *I think so. I think it's not so much the patient care, but your support systems seem to have been better. Like I know when I'd come from primary care nursing as well from my other jobs in the hospital and I found it more stressful than actually having somebody that I could sit and bounce ideas from . . . Granted, there's still staff I won't bounce ideas off (RN204, Redesign Unit – post redesign).*

> *Yes, that's been very helpful [team rounds], it feels like we know more about more of the other patients now. So if we're called on to do something, it's not a big surprise and doesn't cause too much anxiety (RN209, Redesign Unit – post redesign).*

The positive reflections about the value of the buddy teams obtained through qualitative interviews were validated by the significant increase in general satisfaction among providers revealed through analysis of the survey data (Appendix D, Table D.2).

While there were successes in redesigning unit structures and processes, there were also challenges. It had been envisioned that a nursing staff mix consisting of RNs, HCAs, and LPNs working in buddy teams would allow for better utilization of all members of the team, while potentially contributing to better patient, provider, and system outcomes. Senior management did not support hiring LPNs into "over-complement" positions, but suggested that LPNs be integrated into the staff mix as RN vacancies occurred. This was met with initial reluctance by staff who were unclear about the role of LPNs relative to that of RNs and HCAs and undervalued the contribution LPNs could make in the provision of patient care. It was clear that ambiguity among the roles of RNs, LPNs, and HCAs needed to be overcome before an effective collaborative practice model could be achieved on the unit. While ongoing staff shortages eventually improved receptivity to "trialing" the introduction of LPNs into the buddy team, shortages created difficulty in recruiting a sufficient number of them to populate the buddy teams in a manner that could make any measurable difference. As a result, optimization of the RN role could not be achieved, since RNs had to continue performing regulated tasks and activities that could otherwise have been carried out by LPNs and due to workload pressures, were unable to dedicate more of their time to the role functions more appropriately associated with their own role.

> *Staff has repeatedly said they do not want another provider to pick-up after. This includes LPNs as regional policy states that LPNs, even full scope of practice LPNs have to have stable patients with no unforeseeable changes in their condition . . . The RNs have been very vocal about this. Over and over again I hear I do not want another service provider (Change Team Member, November 8, 2006).*

> *I think the staffing bug stung us. Like try to get the RNs to do more full scope when you have eight, ten, twelve patients on any given shift. And you're trying to have---and like sometimes we're short HCAs. And the problem is that you're still doing, because you have to. You have to do those task-oriented things and we tried to move forward with addressing some of the psychosocial, spiritual, cultural issues and that type of thing. And some days we have time for that when we're fully staffed, and I think more people are thinking about that kind of stuff more with the discharge. But we've also gone backwards in a way with some of the discharge planning (Change Team Member, December 18, 2007).*

As time evolved, it became increasingly apparent that buddy teams involving RNs and HCAs needed further development to accommodate day-to-day fluctuations in staffing. As well, it was clear that "buddy teams" needed to evolve to a more comprehensive model of collaborative practice. Staff found it difficult to share responsibility for making decisions about patient care. They identified a need for more competence in negotiating the assignment of care among members of the buddy team, communicating effectively, and managing conflict. It was also clear that ongoing role ambiguity reduced the effectiveness of teamwork. There clearly was a need for staff to be given time to reflect on and learn about optimal enactment of their roles and build competence in collaborative practice. Nonetheless, failure to recognize *a priori* the need for development of an enterprise wide continuing

education strategy focused on helping professionals better understand their own and others' roles limited the potential for achieving optimal enactment of nursing roles as an outcome of this study.

Space and Technology: A number of efforts were made by staff to improve workflow and reduce interruptions. These included making supplies and linens available closer to the point of care and appointing a designated family member as the "conduit" for sharing information. Although analysis of post redesign data failed to demonstrate significant reductions in nurses' travel or in interruptions compared to pre redesign, the data could not be meaningfully interpreted since the patient care unit was relocated to a new wing of the hospital during the study. Differences in spatial design and in the number of beds on the unit prevented adequate comparisons across the two data collection points.

Enactment of Roles: A major goal in this study was to increase the amount of time RNs appropriately spent performing functions associated with their role and to decrease time in activities that could be performed by other members of the nursing team. For example, it was expected that HCAs would spend more time in personal care, activities of daily living, and patient mobilization with delegation of those tasks to them from the RNs. Although significant differences ($\alpha = 0.05$) were not seen in the amount of time spent in activities associated with various RN role functions on the Redesign Unit, it was noted that when compared to the Control Unit post redesign, there was less of a decrease in the amount of time RNs spent on patient and family assessment and support. In light of the critical staffing shortages that occurred on the Redesign Unit during the study, these data are encouraging since they suggest that there may have been increased awareness on the part of RNs of the importance of focusing on these role functions. Although none of the changes in distribution of time were statistically significant, some of the structural and process changes made on the unit (e.g., linen carts made more readily accessible, cleaning of rooms delegated to HCAs) may have allowed RNs to distribute their time more appropriately (Appendix B, Table B.2). A statistically significant decrease in the amount of time spent by HCAs in "coordination of care" was noted on the Redesign Unit post redesign. The synchronization of shift start times between RNs and HCAs and the formation of buddy teams reduced the need for ad hoc communication about patient care needs (i.e., coordination of care) throughout the shift, which likely accounted for the observed differences (Appendix B, Table B.3).

3.3 The Influence of Job Redesign on Outcomes

It was assumed from the outset that redesigning the work of RNs and HCAs would result in improved patient, provider, and unit outcomes. In actual fact, very few changes were observed in any of these outcomes over the two observation periods. Although the results were disappointing, it had become clear as the study progressed that since efforts to redesign the work of nursing providers had not been successful, the lack of significant change in outcomes was predictable.

Patient Outcomes: Patients rated their satisfaction with quality of care at the upper end of the scale (i.e., excellent, very good or good) on the Control and Redesign Units over both observation periods (Appendix D, Table D.1). This finding is consistent with other research that typically demonstrates high levels of satisfaction with care among older adults.[18, 35] A majority of patient participants also rated their self-care capacity as high during both periods of observation, although a significant decrease was noted in the mean Therapeutic Self-Care Capacity (TSCT) score for patients on the Redesign Unit at the second data collection point. Since this tool measures patients' knowledge about medications, treatments, disease process, and self-care ability, this finding is difficult to reconcile with the previous observation that RNs' focus on patient and family assessment and support may have increased over the course of the study.

Provider Outcomes: Despite the lack of substantive change that occurred in role enactment, it is encouraging to see that significant differences were noted in the general job satisfaction subscale

(Appendix D, Table D.2) over the two observation periods on the Redesign Unit. This is likely attributable to improvements made in communication between RNs and HCAs and to the formation of buddy teams which allowed nursing providers to more readily discuss patient concerns with each other, increasing their sense of comfort in managing complex patient situations.

Unit Outcomes: The rate of hospital readmissions within 90 days of discharge remained unchanged over the observation period. Approximately 34 percent of patients discharged from the Redesign Unit returned to the emergency department and approximately 26 percent were readmitted to in-patients within 90 days of discharge. There was no significant decrease in length of stay on the Redesign Unit (Appendix D, Table D.3). No significant difference was noted in sick time or overtime between the Control and Redesign Units post redesign (Appendix D, Table D.4).

3.4   Influence of Context on Outcomes

As previously noted, a number of contextual factors were at play on the Redesign Unit over the course of this study. A new patient care information system was introduced in the Region, requiring that staff devote a significant amount of time to learn and adapt to a new approach to documentation. Construction of a new wing of the hospital adjacent to the study unit created a noisy, cluttered, and often chaotic environment. Rapid increases in the Calgary population created intense pressure on hospital beds, resulting in the introduction of "overcapacity" beds despite a growing nursing shortage. The unit not only experienced a change in first line management, but was also relocated to a new site in the hospital. These changes had a major impact on the ability to maintain and sustain the few structural and process changes that had been introduced over the course of the study. Many of the structural and process changes that had been implemented were short-lived. Due to staff shortages, the designated clinical leader was unable to continue providing education and coaching to support changes in nursing practice and change team meetings were discontinued for approximately six months.

> *Everything [implemented changes] basically stalled out because we were totally in survival mode. Like some day you'd show up and there would be like three nurses and an HCA and 32 patients (Change Team Member, December 18, 2007).*

Work pressures diminished staff commitment to the change process and made it increasingly difficult for the change team to engage in two-way dialogue with other staff on the unit. Over time, an "us" versus "them" division emerged between members of the change team and other staff.

> *It's a huge problem and I think it's easy for the staff to dump on the change team . . . we're supposed to have all the solutions and they're not going to give us a hand in helping and finding anything out. And that's frustrating, because when I'm the only change member on an evening shift and I'm getting---I haven't even been on the floor yet and I'm being attacked (Change Team Member, July 5, 2007).*

Over time, it was recognized that a clear vision for, and organizational commitment to optimized role enactment was needed if change at the unit level was to be sustained. Staff needed time away from the unit to learn about their own and other colleagues' roles and to develop skill and competence in working collaboratively. They wanted assurance that the changes in practice being proposed at the unit level were supported by leaders throughout the organization. It was clear that an organizational strategy for workforce optimization was needed, focused on addressing interprofessional role clarity and on developing continuing education programs to enable staff to develop the knowledge and skill needed to

more fully enact their respective roles. It was also evident that significant resources would be needed to support and maintain new models of care delivery on patient care units. It was unreasonable to expect that any change in professional practice would occur in the absence of organizational supports and champions to mentor and coach staff at the unit level, across all shifts. RNs in particular expressed frustration with the lack of forward movement and the overwhelming presence of barriers.

> *I just think its still kind of vague as to---like people want to know how is this going to affect what I do on a daily basis (Change Team Member, June 8, 2007)?*

> *I don't think it's crystal clear to anyone and so how to encourage and stimulate a group towards change that is vague is really challenging (Change Team Member, July 5, 2007).*

> *I know there's a huge amount of effort and time and research that's gone into all of this. It's valid, it all makes sense, it all needs to happen . . . but all we're hitting is walls (Change Team Member, February 1, 2007).*

> *Enough is enough . . . let's get something happening out here . . . (Change Team Member, February 1, 2007).*

The role of the researchers in this study was to support the need for change by providing evidence of the gap that existed between ideal and actual professional nursing practice and highlighting the potential for improving the quality of care for patients served on the unit. The creation of population profiles and presentation of data documenting the amount of time RNs and HCAs spent on various functions associated with their respective roles created the "burning platform" that was needed to engage staff in the change process. While it was relatively easy to identify what structural (e.g., location of supplies and equipment) and process changes (e.g., reducing interruptions) could be made, it was naïve to have assumed that changes in practice (i.e., in role enactment) would naturally follow. The importance of leadership at all levels of the organization and the need for development of an organizational strategy to guide implementation of changes in practice became evident as the study progressed. Clearly, it will not be possible for any organization to address the current underutilization of the health workforce without articulation of a clear vision for change and establishment of synergistic "bottom up" and "top down" strategies to support needed changes. Resources must be committed to enable and sustain change at the unit or program level (e.g., coaches and/or mentors to facilitate change in practice), and system wide changes must also be implemented. For example, the current ratio of RNs to LPNs and HCAs (i.e., about four to one) in the Region made it impossible to implement the staff mix that evidence suggested was needed on the Redesign Unit to allow the RN role to be optimally enacted. Over the long term, organizational decisions must be made about what is an appropriate ratio of each type of provider needed to optimize the nursing workforce and plans must be put in place to achieve that goal. First line managers can do little to implement the staff mix model that best meets the needs of their patient population when access to the "right" providers is severely limited.

> *We need a strong manager that has leadership. But our unit really needs somebody that has strong leadership skills right now. Because you know just the general way the unit is going, while the Region and the bed crunch---we need somebody that's a strong leader right now and isn't afraid to deal with the conflicts that have been simmering for months and years in some cases. We really need somebody to deal with a lot of these issues and stuff on the unit. And so we can move forward (Change Team Member, February 15, 2007).*

. . . you have to have total unit buy-in to the concept or it ain't going to work. If you have resistance, and that's including the management people as well, then it [change] doesn't work (RN207, Redesign Unit, post redesign).

Although staff on the Redesign Unit acknowledged that "things needed to change," the researchers failed to recognize at the outset that unit level change simply could not be achieved without organizational support for and commitment to the vision of enacting full scope of practice. Due to shortages and inability to staff "over complement" for a period of time, it was impossible for staff to devote the time and energy that would have been needed to effect the changes in practice they desired. The resources that would have been needed to successfully achieve the intended outcomes for this study were neither anticipated at the outset nor available over the duration of the project. Staff expectations were raised but never met, leaving them feeling overwhelmed and exhausted. In retrospect, it is clear that the amount of time and the commitment of resources required to achieve full enactment of professional roles was seriously underestimated.

Practically it's not going to happen [full enactment of role]. Not unless something really changes, where we suddenly start hiring nurses to fill all the holes We tried to make changes]--- we started---but because of lack of staff we hardly did anything (Change Team Member, February 1, 2007).

It [staffing shortage] certainly halted---I think we were able to maintain a number of the gains we had made. But the gains we had made had primarily been in HCAs scope, so it really didn't let us get started in what could we do with the RN scope. And what we can do with the LPN (Change Team Member, July 18, 2007).

In summary, it was not possible to optimally enact the role of RNs in this study, although significant progress was made in improving the utilization of HCAs and enhancing their perception of being valued members of the nursing team. The contextual challenges that inhibited successful achievement of intended outcomes in this study are no doubt similar to those present in most health care settings. Although it is widely recognized that the current workforce is underutilized,[36-38] this study highlighted the significant effort that will be required if we hope to achieve optimal utilization of our health human resources.

4.0   LEARNINGS

Although there is growing awareness of the need to better utilize all members of the health care team, surprisingly little attention has been paid to redesigning current models of care delivery as a means of optimizing the utilization of the health workforce. This study has revealed that while job redesign is not for the faint of heart, it is necessary and can be achieved, particularly when guided by a few key principles. The following summarizes the key learnings emerging from this study.

4.1   Population Needs Driven HHR Management

A population needs based approach is needed to link health human resource (HHR) planning and management to achievement of intended patient outcomes. The role of RNs is to optimize patient and family health and well-being through episodes of illness, transition, or crisis. The intended outcomes of care provided by RNs include optimal recovery from illness, prevention of avoidable complications or injuries, and enhanced self-care capacity, among others. The patient profile created for the study unit

revealed that a majority of patients were elderly, had one or more chronic diseases, and experienced a high rate of in-patient readmissions and emergency department visits within 90 days of discharge. Observation data revealed that few, if any, staff on the unit had expertise in gerontological assessment and that RNs spent relatively little time in determining what risk factors associated with the gerontological population needed to be mitigated with appropriate monitoring and surveillance. Furthermore, RNs had little time to focus on patient and family teaching and support, since much of their time was spent in the performance of tasks and activities that could have been performed by LPNs or other members of the health care team. Patient profiling revealed a potentially higher incidence of post-admission co-morbidities than should have been expected and the potential for improving patient outcomes. It was clear that RNs spent an inordinate amount of their time addressing the bio-medical needs of patients and insufficient time supporting patient self-care capacity enhancement. The data highlighted RNs focus on tasks and activities and brought to the forefront the potential for optimizing patient outcomes. Evidence of the gap between ideal and actual practice enabled staff to better understand how optimal enactment of their role could positively influence patient and family outcomes.

4.2   Nursing Staff Mix

The role of LPNs as integral members of the nursing staff mix emerged during the Second World War in response to a shortage of RNs that occurred as nurses went to serve overseas. Many, if not most LPN positions disappeared from acute care during the 1980s, with the introduction of primary nursing, an adaptation of the earlier "total patient care" model in which the care of a defined number of patients was assigned to one nursing provider, usually a RN. The primary nurse may be supported by HCAs, but is generally accountable for the provision of all regulated activities, including administration of routine medications and performance of all required treatments. While this model does not necessarily impede optimization of the RN role, it does have the potential to increase RNs' focus on the performance of medically related tasks when workloads become excessive and there is insufficient time to address anything but the bio-medical needs of patients. The primary nursing or total patient care model becomes both ineffective and inefficient during times of nursing shortage, since it takes RNs away from performing key functions associated with their role, while they perform work that could be assigned to others. The inefficiency and ineffectiveness of a staff mix comprised only of RNs and HCAs was clearly revealed on the general medical unit that was the setting for this study. While the observation data revealed that RNs spent a considerable amount of their time performing work that in many cases could have been assigned to other members of the health care team, they had insufficient time to attend to the mitigation of risk factors and enhancement of self-care ability among patients and their family members. It could be assumed that this underutilization of the RN role might well contribute to the high rate of in-patient readmissions and emergency department visits and for some of the post-admission co-morbidities that were documented in this study.

4.3   Service Delivery Model

LPNs were reintroduced into acute care with the growing shortage of RNs that began in the mid 1990s. Compared to earlier decades, both LPNs and RNs had undergone substantial change in basic educational preparation and LPNs had become regulated health care providers. Yet, little attention was paid to redesigning the work of RNs and LPNs as they began to work together. The "primary nursing model" continued to predominate and like RNs, LPNs were assigned to care for their own defined group of patients, generally those considered stable and predictable. Given the model of service delivery (i.e., modified primary nursing) and the fact that workloads increased as the nursing shortage worsened, both groups of nursing providers tended to focus on tasks and activities related to the bio-

medical needs of patients, blurring the distinctiveness in their respective roles. Not surprisingly, the reintroduction of LPNs was met with resistance by RNs who perceived that LPNs were taking over their jobs. Furthermore, RNs' lack of understanding of the knowledge and skill of recently educated LPNs led them to underestimate the contribution they could make in the provision of care. As this study demonstrated, however, LPNs are part of the solution to enabling RNs to more fully enact their role, but given the complexity and acuity of patients typically admitted to tertiary care hospitals, LPNs will continue to play a limited role in those environments unless new models of service delivery are introduced. The observation data gathered in this study suggest that inefficiencies are inherent in any model of service delivery that assigns "total care" for a group of patients to either a RN or a LPN. As long as regulated nursing providers spend a considerable amount of time routinely performing work that could be assigned to other unregulated members of the health care team, there is underutilization of that provider. Conversely, if LPNs are excluded from the nursing team, RNs inevitably spend time performing regulated functions that are well within the scope of practice of LPNs. The conclusion drawn from this study is that a collaborative practice model incorporating RNs, LPNs, and HCAs who together share responsibility for managing the total health care needs of a defined group of patients is most likely to optimize the utilization of all members of the team, *at least for the type of patient population that was the focus of this study*. Clearly, more research is needed to determine what might be the most appropriate model of care delivery with patient populations and contexts of practice that differ from those in this study.

4.4   Engagement and Commitment of Leaders

A key lesson learned from this study is that engagement and commitment of leaders at all levels of the organization will be required to address the current underutilization of health care workers.[31-33, 39] Alignment around a common vision is critical in setting the stage for development of organizational strategies needed to support structural (i.e., new models of service delivery) and functional (i.e., interprofessional role clarification and optimization) practice changes needed at the unit, departmental, or program levels. Job responsibilities and competing priorities make it extremely difficult for first line managers and staff alone to implement the changes needed to promote excellence in clinical practice, without substantial organizational support. For example, difficulty in recruiting LPNs made it impossible for the Redesign Unit to implement the model of care delivery that evidence suggested was needed to optimize the utilization of RNs. Yet, the patient care manager had no authority to consider redeployment of staff from other patient care units or departments in order to implement an "optimal" staff mix and service delivery model. Short and long-term health human resource planning to address the potential imbalance in the overall ratio of LPNs to RNs in the system is a responsibility that must be assumed at a senior executive level in the organization. It was very clear from this study that the goal of establishing new models of service delivery that better meet the needs of patients and populations across the continuum of care will never be attained without the development of an over-arching organizational strategy that brings together key leaders from support (e.g., HHR, professional practice development) and operational (e.g., hospital vice presidents, program directors) departments who together plan for and support the changes needed to optimize utilization of the health care workforce.

4.5   Re-education of the Current Workforce

This study also underscored the need for development of continuing education programs to enable current health care providers to better enact their roles and develop the knowledge and competency required for effective collaborative practice. Professional practice in many health care organizations has not kept pace with changes made in the academic preparation of the health workforce over the past several years. New graduates may experience dissonance between what they learn about their professional role as students and what they actually observe in the practice setting. The focus on bio-medically related tasks and activities documented in this study reflects what has become "standard practice" for many RNs, which does little to advance the profession in the interest of the public. This and other research conducted by the Health Systems and Workforce Research Unit has highlighted substantial role ambiguity within and across the health professions. Since a strong sense of professional identity is a prerequisite to effective collaborative practice, attention must be paid to re-educating health professionals about their own and their colleagues' roles, if optimal utilization of the health care workforce is the goal. This will require that time be allocated for staff to reflect on the changes needed in practice, to learn new behaviours and to evaluate the impact of the changes made in practice. This study also highlighted the importance of building capacity for managing change among leaders, particularly first line managers who deal on a day to day basis with the emotional responses associated with change at the service delivery level.[24, 29]

4.6   Summary

This study reinforced the importance of organizational commitment to workforce optimization initiatives and the need for skill and expertise in change management at the service delivery level to support and maintain changes in professional practice. Key questions to consider before undertaking redesign of jobs (i.e., functional) or service delivery models (i.e., structural) include the following:

- Is job or system redesign clearly linked to improvements in patient, provider, and system outcomes?
- What system supports are needed to facilitate change at the service delivery level?
- Have sufficient time, resources, and expertise been allocated to the change process?
- Is the plan for measuring the outcomes of change in place and are the outcomes measurable?

5.0   FUTURE RESEARCH

This research underlined the importance of using a population needs focused, patient and family centred approach to health human resources planning and management. What emerged as an optimal model of service delivery (i.e., RN, LPN, and HCA collaborative practice model) seems appropriate for managing the health care needs of medical patients admitted to a tertiary care hospital for treatment of chronic diseases and associated co-morbidities. Since the model was not fully implemented, no conclusion can be drawn about its effectiveness in improving health outcomes for patients or promoting enhanced role enactment or job satisfaction for providers. More research and systematic evaluation are needed to determine whether this model would be appropriate with different population groups, to assess what would be the optimal ratio and mix of nursing providers (i.e., RNs, LPNs, and HCAs) needed to meet patient health needs in the most cost-effective manner and to examine how best to

incorporate other health workers (e.g., allied health professionals, support workers) into the collaborative practice model.

6.0 IMPACT

In several ways, this study failed to accomplish intended outcomes. The goal of optimizing RN role enactment could not be realized, since lack of access to sufficient numbers of LPNs pre-empted establishing and "testing" the collaborative practice model the data suggested was ideal for meeting the needs of the patient population. Excessive workloads, changes in first line management, lack of supportive resources (e.g., dedicated clinical educators and/or mentors), and relocation of the unit made it difficult to maintain the few structural and process changes that were implemented over the course of the study. Yet, this research has had significant impact locally, provincially, and nationally. Through wide dissemination of findings at local and national meetings as the study progressed, it became very clear that the issues arising from this project resonated with nurses and decision-makers across the country. There was widespread validation that RNs' focus on tasks and activities related to bio-medical management of patient health needs was common. It was confirmed that modified primary nursing was a predominant nursing care model across the country. Many nursing leaders agreed that the current ratio of LPNs to RNs, and to some extent of HCAs to regulated nursing providers acts as a barrier to implementing new models of collaborative nursing practice that would better meet patient health needs while optimizing the utilization of all nursing providers. There is also strong acknowledgement of the need to clarify nursing and other provider roles as a necessary step to developing collaborative practice models that better utilize all members of the health care team, including physicians and support workers (e.g., clerical and housekeeping staff). The population health needs driven approach used in this research provided concrete evidence of the need to re-orient nursing practice to achieve improved quality of care and enhance job satisfaction. This approach has been recognized as an essential element of workforce planning and work redesign in Alberta and beyond. Although not successful in achieving the intended aims of this study, the research team is now applying the learning from this study to support the development of enterprise wide strategies for moving the workforce optimization initiative forward in a more coordinated fashion.

7.0 STUDY LIMITATIONS

Our analysis was based on a relatively small number of RNs and HCAs working in a particular service delivery model on two acute care units in a large urban tertiary treatment facility. The findings are therefore not generalizable. As is the case with observational studies, there is also the potential that bias may have been introduced by participants knowing their practice was being monitored, particularly affecting the activities of nursing providers on the Redesign Unit. It must nonetheless be said that when the results of this study have been presented in a variety of locations across Canada and internationally, a common response has been, "you are describing exactly what practice is like in my place of work." This lends validity to the findings of the study and increases assurance that the conclusions drawn are not spurious.

8.0 CONCLUSION

The purpose in the current study was to address the underutilization of RNs and HCAs through application of job redesign principles. Observational and quantitative data not only validated prior perceptions of nurses, but also allowed the gap between "ideal" (i.e., optimized) and actual nursing

practice to be quantified. Evidence of the gap that exists between optimal and actual role enactment increased nursing providers' awareness of the need for change in practice and raised expectations that those changes would be implemented, with consequent improvements in patient outcomes and enhanced quality of worklife. Those expectations were not met.

As the study evolved, it became clear that significant change in the utilization of the health workforce cannot occur as long as the focus of the change initiative is a single patient care unit or program. A systems approach to workforce optimization is needed, guided by a clear vision that is understood and championed by leaders at all levels and a well articulated strategic plan. Failure to recognize in advance the extent of organizational support that would be needed to effect any change in role enactment at the service delivery level limited the job redesign approach that was attempted in this research.

The growing shortage of health professionals and recent economic downturn will continue to place increasing pressure on health care organizations to manage their resources efficiently and effectively. This study has demonstrated that significant potential exists to improve the utilization of nursing and other health human resources by clarifying professional roles and responsibilities and implementing new, collaborative models of care delivery. Although the proposed model was neither implemented nor evaluated, the findings from this study will hopefully provide the stimulus needed to experiment with new, population based, patient and family centred approaches to redesigning how health care professionals work together in improving outcomes at the patient, provider, and system levels.

The boundaries that have traditionally existed across professional groups are difficult to modify and unfortunately, historical beliefs about scope of practice issues are not easily overcome. Changes in skill mix tend to be viewed as top down management decisions that are made primarily in an effort to reduce costs. The introduction of providers perceived as having less knowledge and skill is considered a risk to patient safety and quality of care and is often resisted by professionals and their unions. Despite the challenges inherent in moving toward establishment of collaborative practice models that make better use of all health care providers, the reality is that there is no choice. There is general consensus that the current shortage of health care providers will worsen over the coming years, creating a larger threat to sustainability of the health care system than the economic downturn we are now experiencing. Ensuring the viability of the health care system is a responsibility shared by all health care professionals, but the ultimate accountability for leading the way rests with the senior leadership within practice, academic, regulatory, and policy organizations. That is the leadership challenge before us, but it will require individual commitment and collaborative effort to move beyond talking about the issues to actually making change happen.

APPENDIX A

Demographics of Providers and Patients

Provider Demographics

RNs and HCAs were asked to complete a demographic questionnaire that included questions related to their age, gender, education, years of nursing experience, continuing education hours, professional designation, and position status (full-time and part-time).

Figure A.1: Control Unit – RNs and HCAs Age (in Years) Pre and Post Redesign
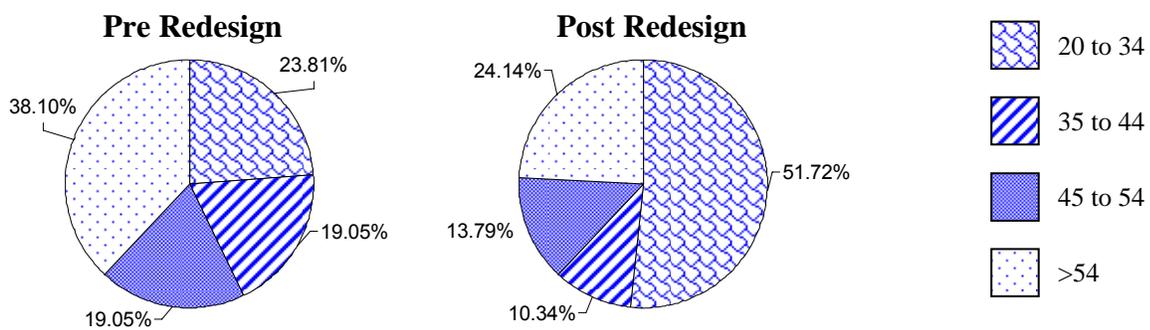
Figure A.2: Redesign Unit –RNs and HCAs Age (in Years) Pre and Post Redesign
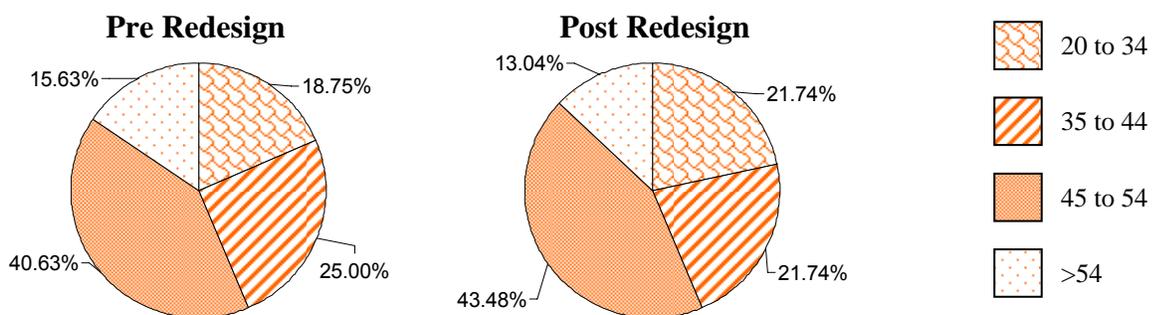
Figure A.3: Control Unit - RNs and HCAs Education Pre and Post Redesign

Pre Redesign

14.29%
14.29%
9.52%
38.10%
23.81%

Post Redesign

20.69%
20.69%
0.00%
31.03%
27.59%

LPN Certificate
RN Diploma
Bachelor Degree in Nursing
Other Bachelor Degree
Other
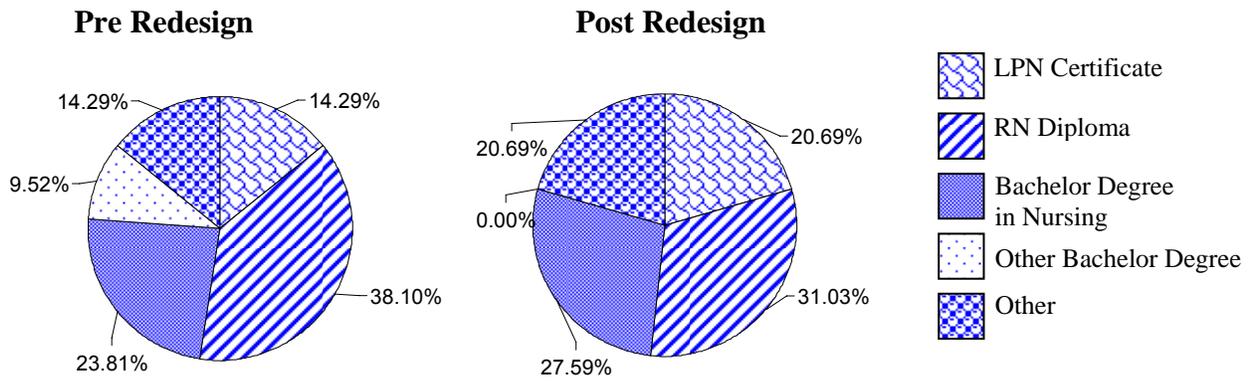
Figure A.4: Redesign Unit - RNs and HCAs Education Pre and Post Redesign

Pre Redesign

6.06%
18.18%
0.00%
48.48%
27.27%

Post Redesign

7.69%
26.92%
30.77%
7.69%
26.92%

LPN Certificate
RN Diploma
Bachelor Degree in Nursing
Other Bachelor Degree
Other
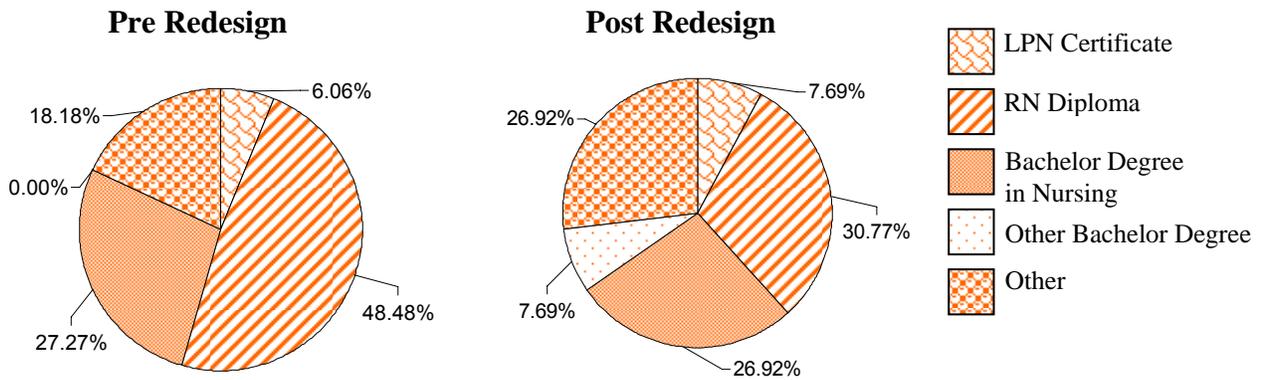
Figure A.5: Control Unit - RNs and HCAs Number of Years in Practice Pre and Redesign

Pre Redesign

9.52%
23.81%
0.00%
4.76%
61.90%

Post Redesign

31.03%
31.03%
17.24%
17.24%
3.45%

Legend:
- 0 to 2
- 3 to 5
- 6 to 10
- 11 to 15
- > 15
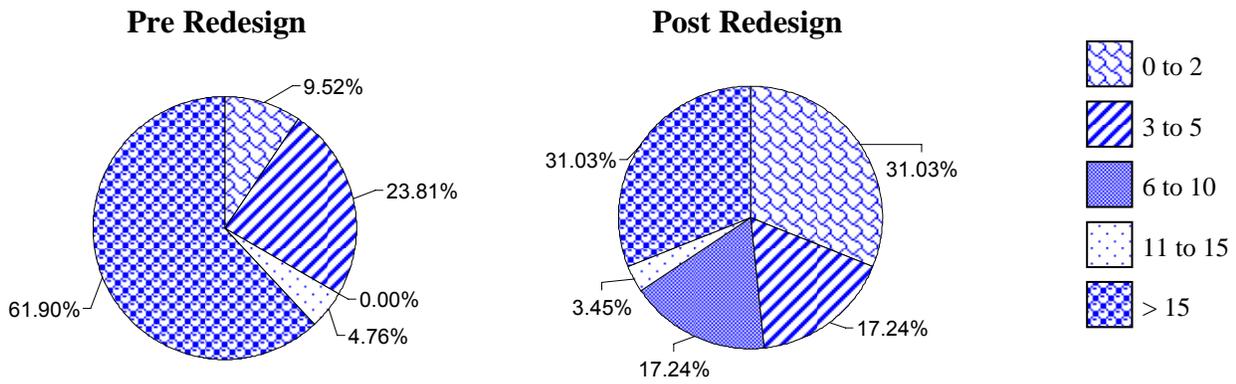
Figure A.6: Redesign Unit - RNs and HCAs Number of Years in Practice Pre and Redesign

Pre Redesign

15.63%
9.38%
18.75%
21.88%
34.38%

Post Redesign

12.00%
16.00%
28.00%
12.00%
32.00%

Legend:
- 0 to 2
- 3 to 5
- 6 to 10
- 11 to 15
- > 15
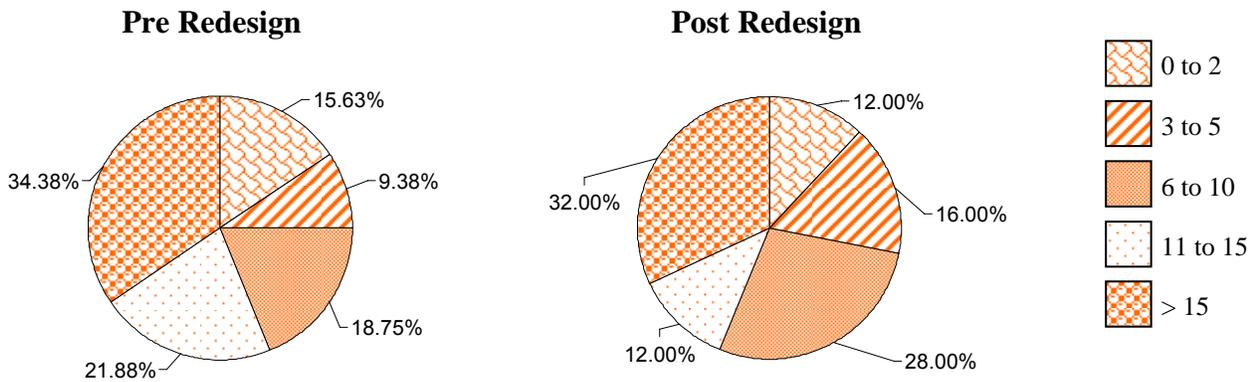
Patient Demographics

Demographic data was captured on all patients who completed questionnaires on the unit. Data included age, gender, education, income, and marital status.

Figure A.7: Control Unit - Patient Age (in Years) Pre and Post Redesign
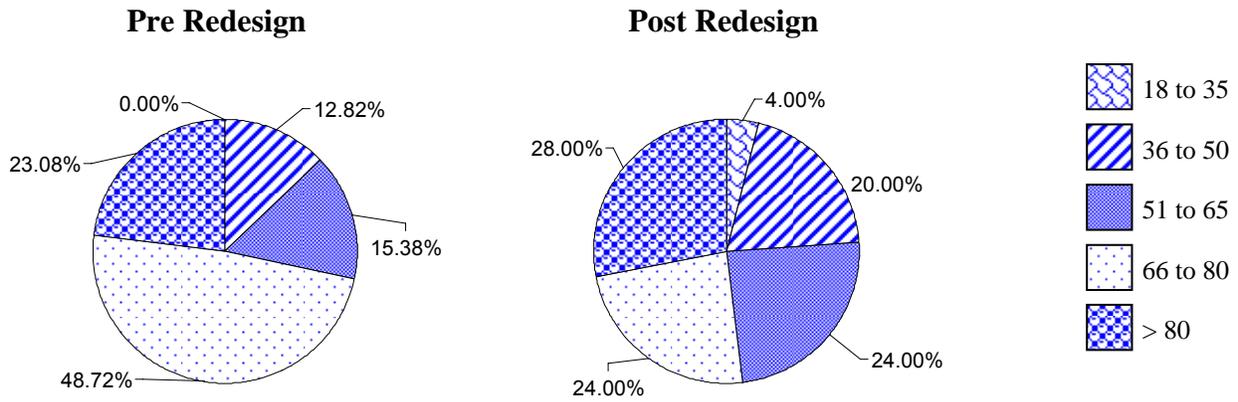
Figure A.8: Redesign Unit - Patient Age (in Years) Pre and Post Redesign
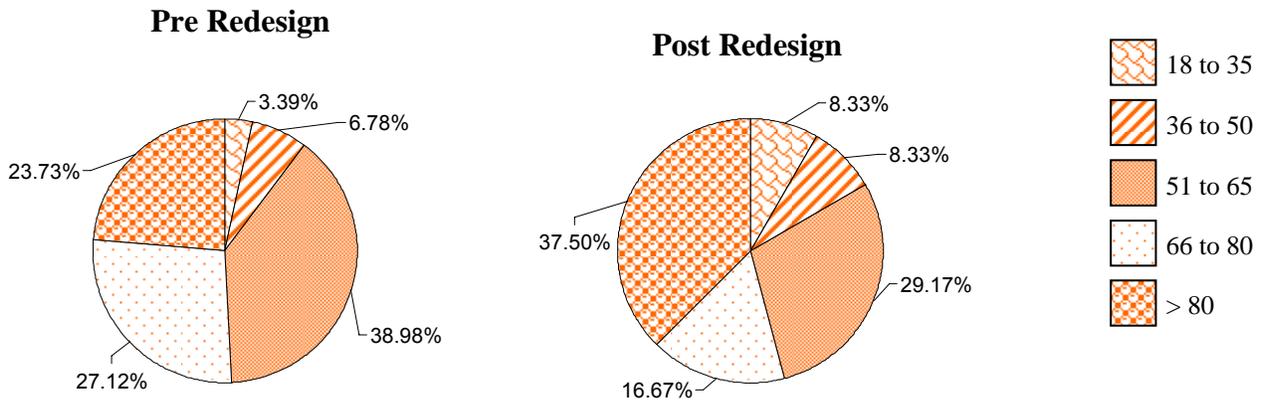
Figure A.9: Control Unit - Patient Income (in Thousands of Dollars) Pre and Post Redesign

Pre Redesign

Post Redesign

Legend:
- < 25
- 25 to 40
- 41 to 55
- 56 to 70
- 71 to 85
- > 85
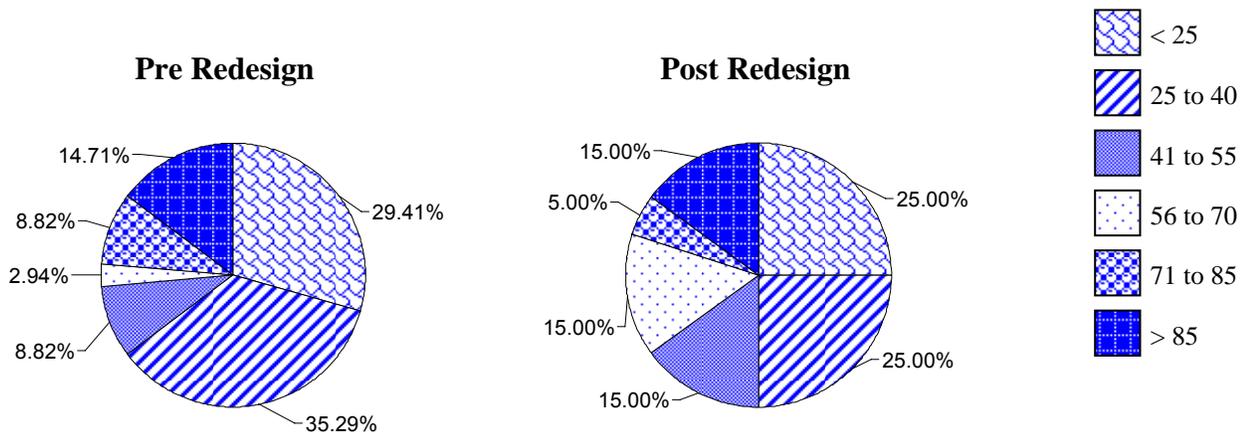
Figure A.10: Redesign Unit - Patient Income (in Thousands of Dollars) Pre and Post Redesign

Pre Redesign

Post Redesign

Legend:
- < 25
- 25 to 40
- 41 to 55
- 56 to 70
- 71 to 85
- > 85
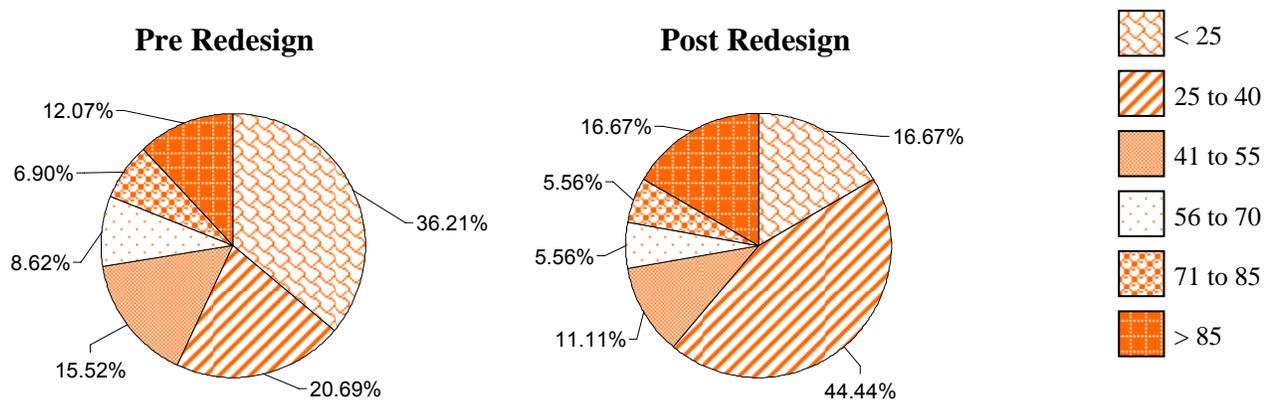
Figure A.11: Control Unit – Patient Education Pre and Post Redesign

Pre Redesign

- 5.13%
- 7.69%
- 15.38%
- 20.51%
- 20.51%
- 30.77%

Post Redesign

- 0.00%
- 19.23%
- 23.08%
- 3.85%
- 11.54%
- 42.31%

Legend:
- < Highschool
- Highschool
- Technical Diploma
- Some University
- Bachelor Degree
- Graduate Degree
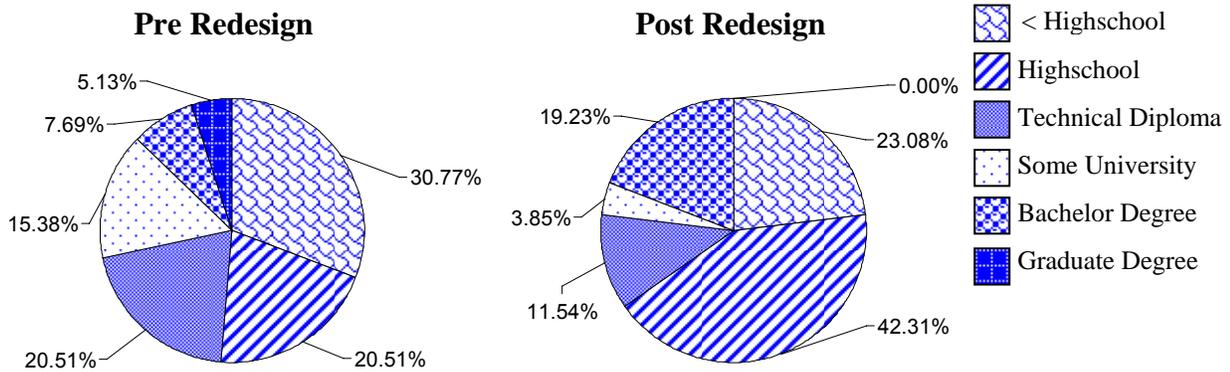
Figure A.12: Redesign Unit – Patient Education Pre and Post Redesign

Pre Redesign

- 5.08%
- 18.64%
- 8.47%
- 10.17%
- 16.95%
- 40.68%

Post Redesign

- 8.33%
- 12.50%
- 12.50%
- 8.33%
- 29.17%
- 29.17%

Legend:
- < Highschool
- Highschool
- Technical Diploma
- Some University
- Bachelor Degree
- Graduate Degree
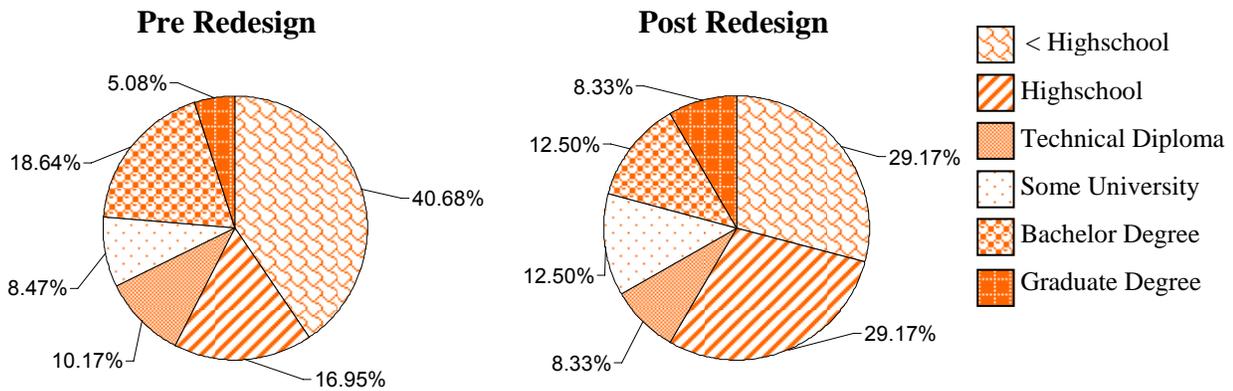
APPENDIX B

Observation data

RN and HCA Observation Data

The work activities of RNs and HCAs on the Control and Redesign Units were observed, recorded and analyzed over two periods (pre and post redesign). Data were collected using Function Analysis[TM] (FA) methodology. Data analysis provided detailed information about the amount and distribution of time nursing providers spent performing various categories of activities related to each of the key role functions captured in the Nursing Role Effectiveness model. The FA methodology enabled researchers to capture data about the focus (e.g., type of interactions) and flow (e.g., interruptions) of work.

Observers were trained to collect data using Personal Digital Assistants. Six activity levels were predefined (a) Level 1 - main activity being performed, (b) Level 2 - mode of communication, (c) Level 3 - identification of the recipient of communication, (d) Level 4 - link to individual patient diagnoses (while this level of data was initially identified as a collection point the data field was not completed as a result of ethics restrictions), (e) Level 5 - direct care activity (differentiated as patient assessment, treatment, and/or knowledge exchange with patients for RNs and personal care of patients for HCAs), and (f) Level 6 - topic of conversation and/or activity. A drop-down menu with a list of items (ranging from 12 to 56 items depending on the level and type of provider) was embedded within each level and facilitated categorization of the observed activity. Direct care activities (Level 5) as well as the topic of conversation and/or activity (Level 6) were aggregated into categories associated with activities related to clinical role functions and other work for RNs and HCAs (Table B.1).

Each observation period consisted of five day and evening shifts. Each observation period occurred over the typical 7.75 hour shift on the units. Time spent on personal breaks, as well as on activities directly related to participation in the study (interviews and questionnaire completion) was excluded from the observation data. The resulting average amount of observation time was 6.52 hours for RNs and 5.81 hours for HCAs.

Descriptive statistics were used to analyze the observation data. Results suggest that RNs perform their work in short bursts of activity. That is, it was revealed that on average, RNs spend less than one minute on any particular activity at a given time. The mean number of interruptions documented at the post redesign data collection period was 3.7 per hour for RNs and 2.8 per hour for HCAs. On both units over both data collection periods, data revealed that most interruptions were initiated by RNs. That is, RNs were most likely to be interrupted by their own colleagues and most of those interruptions occurred while RNs were "travelling" up and down the patient care unit (i.e., in flight).

Table B.1: RNs and HCAs Observed Activities Related to Clinical Role Functions and Other Work

RN and HCA	RN Only	HCA Only	Description
Coordination of Care			All RN activities, including consulting peers, reviewing patient information, processing community referrals, and participating in buddy team or patient discharge rounds. For the HCA this included coordinating basic care with the RN and other HCA, as well as participating in buddy team rounds.
Patient and Family Assessment and Support			Any RN activities, such as conducting psycho-social-cultural and spiritual assessment of patients, discussing patient and family goals, education about hospital care or discharge plans. For the HCA this often included general discussion about how the patient was feeling and questions related to their care.
	Bio-medical Assessment		Any RN activity related to a checking the patient, taking health history, doing physical assessment (including listening to chest, heart, bowel sounds, checking extremities, assessing elimination, level of consciousness, orientation and understanding, and skin integrity).
	Medications and Treatments		Any RN activity related to vital signs, dressing changes, specimen collection, preparation of medications, and administration of medications, inserting and maintaining lines and tubes, and assisting with procedures.
Activities of Daily Living and Personal Care			All RN or HCA activities related to activities of daily living, including bathing, dressing and undressing, skin care, personal care, eating, and feeding.
Mobilization			Any time the RN or HCA is purposefully moving and/or walking the patient as part of their recovery.
	Engagement		This activity is usually at the beginning or the end of the RN's visit with the patient (e.g., "Good morning Mrs. Smith, lovely day…". It is a non therapeutic conversation.
	Spatial Organization		All activities associated with the RN organizing and reorganizing space (supplies, equipment, and furniture), and/or files.
		Cleaning and Organizing	Cleaning the patient room (e.g., organizing, removing debris or cleaning equipment, moving stretchers or beds from room to room).
Documentation and Information Review			All activities related to documentation and reviewing patient information. For the RN this included charting, updating files, filling in forms, and filing on chart. For the HCA this included documentation on whiteboards.
Administration			Any time the RN is filing, faxing, printing, or filing on chart. For the HCA this included collecting diet sheets or filing other forms.
Wash Hands			Any time the RN or HCA washes their hands.
Travel			Any time the RN or HCA is walking throughout the unit (e.g., to the med, linen, and/or supply rooms).

Regression results related to time spent performing clinical role functions and other work activities are presented in Tables B.2 and B.3.

Table B.2: Bivariate Regression Results: RNs Observation Data

Activity Categories	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
Coordination of Care	-15.51* (8.26)[†] [-32.00 to 0.98]^	-0.03 (9.41)[†] [-18.82 to 18.75]^	15.31 (12.03)[†] [-8.72 to 39.33]^	61.29 (7.34)[†] [46.63 to 75.94]^
Patient and Family Assessment and Support	-0.34 (3.38) [-7.08 to 6.39]	-8.94*** (2.75) [-14.43 to -3.46]	8.20* (4.29) [-0.36 to 16.75]	17.13 (2.36) [12.43 to 21.84]
Bio-medical Assessment	3.09 (4.38) [-5.65 to 11.83]	0.02 (3.75) [-7.46 to 7.50]	-6.45 (6.10) [-18.62 to 5.73]	25.49 (2.13) [21.25 to 29.73]
Medications and Treatments	8.14 (5.42) [-2.68 to 18.95]	5.37 (5.10) [-4.80 to 15.55]	-1.95 (7.70) [-17.32 to 13.42]	39.81 (4.11) [31.61 to 48.02]
Activities of Daily Living and Personal Care	-1.52 (5.40) [-12.30 to 9.26]	-13.70** (6.32) [-26.32 to -1.08]	5.26 (7.99) [-10.68 to 21.20]	48.67 (4.49) [39.71 to 57.63]
Mobilization	3.00** (1.24) [0.53 to 5.47]	1.04 (1.22) [-1.39 to 3.47]	-3.09* (1.71) [-6.51 to 0.32]	2.19 (0.83) [0.53 to 3.85]
Engagement	4.57* (2.47) [-0.37 to 9.51]	7.97* (4.60) [-1.21 to 17.14]	-8.20 (5.44) [-19.07 to 2.66]	5.41 (1.20) [3.01 to 7.82]
Spatial Organization	4.09 (2.98) [-1.87 to 10.05]	7.48** (3.50) [0.50 to 14.46]	-10.39* (5.27) [-20.90 to 0.13]	18.04 (2.35) [13.34 to 22.74]
Documentation and Information Review	0.54 (6.59) [-12.60 to 13.69]	15.02 (9.45) [-3.84 to 33.88]	-4.74 (12.53) [-29.76 to 20.27]	75.78 (4.13) 67.53 to 84.03]
Administration	-1.28 (4.27) [-9.80 to 7.24]	3.59 (3.29) [-2.96 to 10.15]	1.34 (5.33) [-9.30 to 11.99]	12.72 (2.60) [7.53 to 17.90]
Wash Hands	8.87** (3.60) [1.69 to 16.04]	-0.51 (0.75) [-2.01 to 0.99]	-6.69* (3.88) [-14.44 to 1.06]	4.05 (0.42) [3.20 to 4.89]
Travel	-0.07 (5.19) [-10.43 to 10.29]	5.59 (5.53) [-5.44 to 16.61]	15.87** (7.17) [1.55 to 30.18]	48.70 (4.48) [39.76 to 57.64]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

Table B.3: Bivariate Regression Results: HCAs Observation Data

Activity Categories	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
Coordination of Care	21.54* (12.46)[†] [-3.94 to 47.03]^	-16.84 (10.88)[†] [-39.09 to 5.40]^	-29.29** (13.73)[†] [-57.38 to -1.21]^	47.28 (9.42)[†] [28.00 to 66.55]^
Patient and Family Assessment and Support	-7.96 (13.38) [-35.32 to 19.40]	-16.11** (6.96) [-30.35 to -1.88]	8.67 (15.34) [-22.70 to 40.03]	50.85 (5.21) [40.19 to 61.51]
Activities of Daily Living and Personal Care	9.28 (17.39) [-26.29 to 44.86]	-2.89 (8.70) [-20.70 to 14.92]	-6.05 (21.30) [-49.61 to 37.50]	111.43 (7.36) [96.38 to 126.48]
Mobilization	-0.04 (0.16) [-0.37 to 0.28]	2.74*** (0.77) [1.16 to 4.32]	-0.66 (1.27) [-3.26 to 1.93]	0.13 (0.13) [-0.14 to 0.40]
Cleaning and Organizing	-13.48* (7.49) [-28.79 to 1.83]	-27.80*** (6.96) [-42.04 to -13.56]	18.34* (10.29) [-2.70 to 39.38]	55.55 (5.83) [43.63 to 67.47]
Documentation and Information Review	3.25 (1.99) [-0.82 to 7.33]	-2.37* (1.37) [-5.18 to 0.44]	8.49** (3.34) [1.65 to 15.33]	2.91 (1.33) [0.19 to 5.63]
Administration	1.10 (4.56) [-8.23 to 10.43]	1.62 (2.69) [-3.89 to 7.12]	10.10 (6.72) [-3.64 to 23.84]	4.48 (1.23) [1.97 to 6.99]
Wash Hands	-4.67** (2.02) [-8.80 to -0.55]	-7.38*** (1.99) [-11.45 to -3.32]	9.34*** (2.68) [3.86 to 14.83]	11.35 (1.87) [7.53 to 15.17]
Travel	-5.93 (8.24) [-22.78 to 10.91]	15.71 (9.50) [-3.72 to 35.13]	-14.43 (11.56) [-38.07 to 9.21]	62.62 (6.65) [49.02 to 76.23]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

Tables B.4 and B.5 summarize time spent on activities related to clinical role functions and other work by RNs and HCAs respectively over the two data collection periods on the Control and Redesign Units to facilitate comparison between the two units. The data in these two tables are based on calculations using the data presented in the bivariate regression tables (i.e., Table B.1 and Table B.2). While these tables do not speak to significance levels, it has been presented in this way to facilitate a quick comparison between the two units over the course of the study. For example, we can see that for the RN activity category "coordination of care" on the Redesign Unit pre redesign, the total number of minutes is 45.78 whereas on the Control Unit the total number of minutes is 61.29. Additionally, we can see that there was an increase in the amount of time post redesign on the Redesign Unit whereas on the Control Unit the amount of time remained unchanged.

Table B.4: Comparison of RNs Time Spent on Activities Related to Clinical Role Functions and Other Work Pre and Post Redesign (Average RN Shift)

Activity Categories	Redesign Unit Pre Redesign	Redesign Unit Post Redesign	Control Unit Pre Redesign	Control Unit Post Redesign
Coordination of Care	45.78	61.06	61.29	61.26
Patient and Family Assessment and Support	16.79	16.05	17.13	8.19
Bio-medical Assessment	28.58	22.15	25.49	25.51
Medications and Treatments	47.95	51.37	39.81	45.18
Activities of Daily Living and Personal Care	47.15	38.71	48.67	34.97
Mobilization	5.19	3.14	2.19	3.23
Engagement	9.98	9.75	5.41	13.38
Spatial Organization	22.13	19.22	18.04	25.52
Documentation and Information Review	76.32	86.6	75.78	90.8
Administration	11.44	16.37	12.72	16.31
Wash Hands	12.92	5.72	4.05	3.54
Travel	48.63	70.09	48.7	54.29

Table B.5: Comparison of HCAs Time Spent on Activities Related to Clinical Role Functions and Other Work Pre and Post Redesign (Average HCA Shift)

Activity Categories	Redesign Unit Pre Redesign	Redesign Unit Post Redesign	Control Unit Pre Redesign	Control Unit Post Redesign
Coordination of Care	68.82	22.69	47.28	30.44
Patient and Family Assessment and Support	42.89	35.45	50.85	34.74
Activities of Daily Living and Personal Care	120.71	111.77	111.43	108.54
Mobilization	0.09	2.17	0.13	2.87
Cleaning and Organizing	42.07	32.61	55.55	27.75
Documentation and Information Review	6.16	12.28	2.91	0.54
Administration	5.58	17.3	4.48	6.1
Wash Hands	6.68	8.64	11.35	3.97
Travel	56.69	57.97	62.62	78.33

APPENDIX C

Thematic Data Analysis: Provider Interviews

Data from interviews with RN and HCA participants over both data collection periods were analysed through review and coding of transcripts by the researchers over a number of meetings during which key themes were identified and organized into an explanatory framework. Numerous themes were identified, which were often deeply intertwined with one-another. Broad themes that emerged from the data included: getting to know the patient, decision-making, and providing care. Figure C.1 summarizes the key themes and activities that reflect the process of care delivered by RNs and HCAs.

Figure C.1: Work Structures and Processes
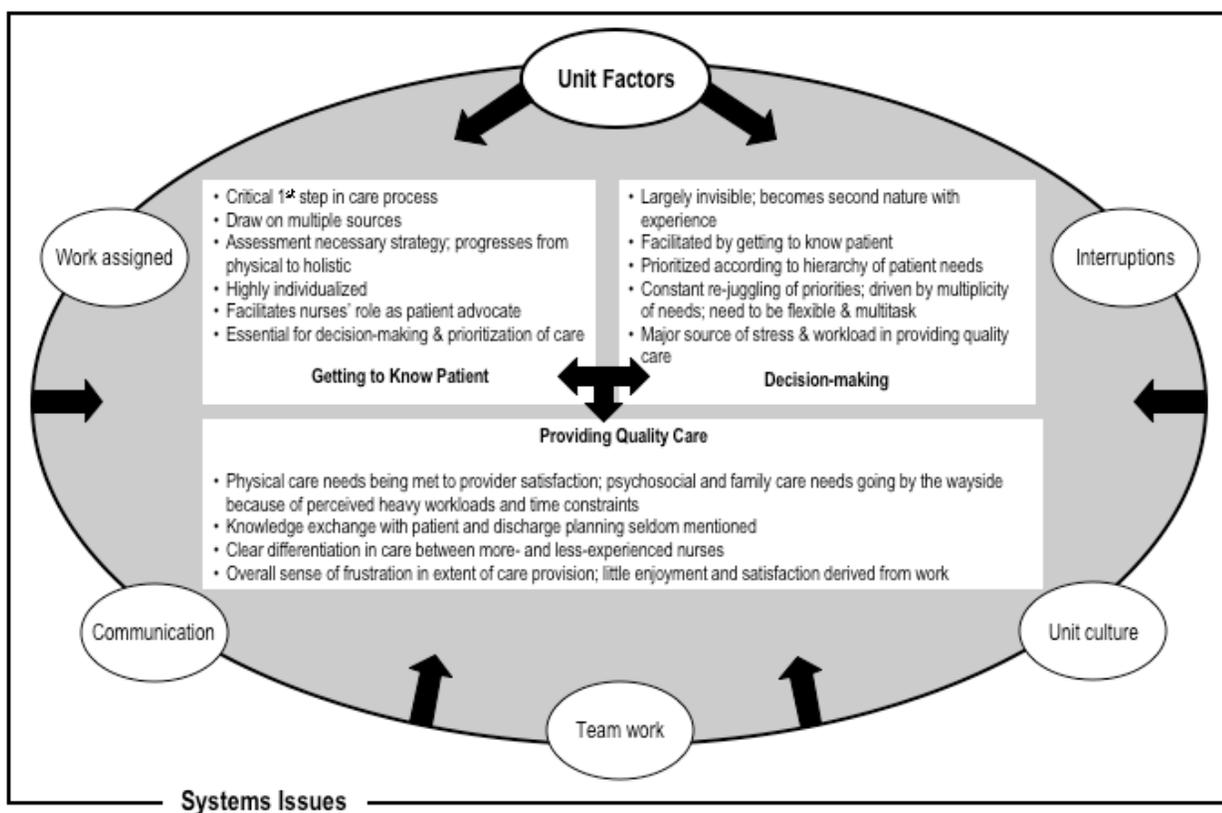
Getting to know the patient was a prominent theme at both observation periods. It reflects the process used by nursing providers to assess patient health needs in order to plan care, particularly with patients who are new to the nursing provider (e.g., on the first shift, after days off, and with newly admitted patients).

> *It's my first evening with them, so I don't really---I haven't looked after them before, so it was really important for me to know what exactly was going on with them in the last 24 hours (RN49, Redesign Unit – pre redesign).*

RNs draw on multiple sources of information to gather information about the patient. These include change of shift reports from staff, patient chart and computer reports, their own knowledge and experience of the patient's medical condition, and/or previous knowledge of or experience with a particular patient.

> *I base it [assessment and decision-making] on the report from the previous shift. What has trespassed and what is about to happen . . . Like I said, with the report that I would get online and verbal from the previous shift...I want to know how they get up; I want to know they take their medications or how they swallow and the whole totality of this patient, all the patients. I want to be there (RN303, Control Unit – post redesign).*

Knowledge and expertise gained through years of clinical practice were often expressed as "feeling," "knowing," or "intuition," and were used to guide patient care. Experienced nursing providers in particular said they made decisions about patient care using processes that had become sub-conscious and automated. Expressions such as "second nature," "without thinking," "gut feeling," and "common sense" often were used in describing the process of patient assessment.

> *I guess after doing this for so many years, you know you come in in the morning and you know okay, this is your routine . . . I guess it's something that I'm used to. You know its just instinct telling me (HCA211, Redesign Unit – post redesign).*

> *You know [how to approach a patient] you almost get a feeling and I think as a human being with other human beings, you get a sense---you know through their body language, how they speak, their facial expression. All these things I think that . . . feedback makes you, helps you determine how you feel you need to approach. So I think it's sometimes an intuitive thing. And I think a lot of times it comes with experience or maybe life experience (RN72, Redesign Unit – pre redesign).*

Knowing the patient emerged as a key element in nursing providers' *decision-making*. Interviews conducted during the second observation period on the Redesign Unit suggested that subsequent to the introduction of buddy team rounds, decision-making and priority setting about patient care had been enhanced once nursing providers began sharing with each other their assessment of patients' health care needs.

> *And I do rounds with the nurses, and then after that, you know because the nurse is going to give you the report if it's a total care or a partial or an assist. That's how I prioritize. If it's a bed rest, if it's not too urgent, I'll do him or her last. And sometimes if the patient is*

ambulatory, once she or he goes to the bathroom, I'll give the AM care right away. So I'm done. I'm done; one down, ten more to go (HCA217, Redesign Unit – post redesign).

Well, you make rounds and then you see what needs to be done first . . . Like the fellow in 14, you know he probably needed---like if he needed some more attention than anyone else, I could deal with it . . . Yeah, right at the beginning, so I wanted to deal with that, get it out of my way, because I knew I was going to get somebody else in. And so those are circumstances that kind of determine how I'm going to work the rest of my shift (RN205, Redesign Unit – post redesign).

Experience seems to be an important factor in increasing RNs comfort in patient care decision-making, which certainly strengthens the argument for placing students and new graduates in buddy teams with more seasoned providers for a period of time.

So that is what you start; you start with the knowledge, before you're able to---you have to use that knowledge, in order to make decisions, set priorities, etc. Probably we don't even realize, as a new graduate, that maybe our priorities aren't what they should be or that kind of thing (RN31, Control Unit – pre redesign).

RNs and HCAs not surprisingly differed in their approach to decision-making and priority setting, reflecting differences in knowledge and professional autonomy. RNs were most concerned about addressing patient well-being and safety and were particularly attentive to the care needs of medically acute patients. Although HCAs were also concerned about safety, their focus was more narrowly on ensuring that patients were kept from physical harm (e.g., keeping patients properly restrained or responding to call bells).

Oh, I check on---I always flick through when I get a few minutes on my lab values for the day and those sorts of things and any new orders. Like I know when Hazel came in here, for example, she used to walk and now, all of a sudden, she just don't walk anymore (RN204, Redesign Unit – post redesign).

Okay, you go into the internal web, the links, you go into just about anything. Protocol, procedures, IV compatibility, drugs, everything is in there. Like I said, with the report that I would get online and verbal from the previous shift. I gather all the information, according to care needs, labs, IVs, treatments, everything (RN303, Control Unit – post redesign).

I'd say your priorities of course are patient assessment, getting our meds out is a priority---providing care. Like tonight all of those things are important, but I'm just trying to think how to---I mean tonight is a night where I'd say the biggest priority was the patient; managing my patient's airway that had the trach. Who needed suctioning fairly frequently and so his respiratory status was tenuous and you needed to really watch him closely. So I would say that, for tonight, was my priority of everything. And then of course your medications, which is a routine thing, but it's still a priority. Your patients need their meds and that is routine, regular thing that is a must do. And then of course your basic care and assessment and of course, charting. Writing things down and making sure that your assessments and pertinent information is documented . . . Well the lower priorities are actually just the human interactions and conversations that you can have with your patient. Most of the time you're really busy, so you don't have time (RN60, Redesign Unit – pre redesign).

The data suggested a somewhat more reactive than planned approach to setting priorities and planning care for the group of patients to whom a nursing provider was assigned. Participants did not make reference to conducting *a priori* assessment of real or potential risk factors to be mitigated as an explicit component of determining what surveillance might be needed over the course of the shift and to whom (i.e., RN or HCA) that responsibility was assigned. Obviously, patient health care needs are complex and can change rapidly over the course of a shift, as can the overall level of activity or complexity on the unit itself. Although care plans must be flexible and adaptable to changing circumstances, it would seem reasonable to assume that "chaos" in the environment could potentially be reduced with a more intentional approach to assigning, planning, and delivering care.

> *I would say coming out on your initial rounds, you know you go and quickly assess the patients . . . my patient load . . . then your priorities do shift always through your shift as well. Like what a main priority may be, if it's completed, then you've got something else. So I would say you're always prioritizing what you're going to do next and what needs to be done first and what can be done later and that sort of thing (RN60, Redesign Unit – pre redesign).*

> *With my patients, the process is complex, and you have to---my problem solving with these patients has to be adaptable, because what I perceive as a problem and what they perceive as a problem are going to be totally different. My problem today was I want you to eat breakfast with one patient and her problem was focusing on her poor daughter and I want to get dressed. So my problem solving skills are very---I have to be flexible in determining even what the problem is, and how quickly those problems change (RN311, Control Unit – post redesign).*

> *Probably 90 percent of the time, plan A isn't going to work, so there has to be a plan B and a plan C and a plan D and on and on and on. People are complicated . . . It's not a computer and there isn't an algorithm to figure out how we're all going to work together and meet the same goals. So that's part of my problem solving (RN311, Control Unit – post redesign).*

> *Your routine has changed for something you think is going to take five, ten minutes maybe, and ends up turning into I don't know, maybe fifteen or twenty minutes or something. So it makes a difference...because you can plan your day or lord knows, it always changes, but you can kind of---it gives you an idea of how you can sort of tentatively plan your day (HCA216, Redesign Unit – post redesign).*

Interruptions in work flow were frequently documented, which interfered with nursing providers' thought processes, potentially compromising patient care. Nursing providers were required to decide whether more priority should be assigned to responding to the source of the interruption or to continue with the task at hand.

> *. . . but amongst all that, there are always distractions, there are people in your way or the doctors come and you can't complete what you want to do. So there is always that; having to juggle what you're doing and go back and try and make sure that you don't forget to do anything along the way (RN24, Control Unit – pre redesign).*

RNs acknowledged that while the physical or basic aspects of "*providing care*" (a major theme) tended to be met, there was little time to address the psycho-social-cultural and spiritual needs of patients and families, due to excessive workloads. RNs were not alone in feeling frustrated and dissatisfied with this focus on the bio-medical needs of patients.

Well, I think one thing that would happen if staffing were optimal is that the RNs would have time to do things like look after the psychosocial needs of our patients. And do the discharge planning and teaching and you know, kind of get a handle on that kind of thing. And right now, like I said, it just doesn't feel like we're doing any of that (RN210, Redesign Unit – post redesign).

Yeah, for sure, because you'll do things like you'll get frustrated or burnt out half way through your shift or something like that . . . And your sense of remorse kind of diminishes a bit as you get angrier, you know? . . . Like if you feel like you're in a sinking ship, then you don't really feel like you're getting anything done and you start to feel miserable in a sense or frustrated or whatnot. And it becomes hard to feel sympathetic to different people's needs, you know (HCA307, Control Unit – post redesign)?

Having manageable workloads is obviously part of the solution to full enactment of nursing providers' roles.

I have four patients and that was my saving grace. Four I can control; I can manage, I can get through. Five, is a bit over. And they were all new people. I needed to know everybody. So that was my concern. First day, I do not---mistakes can easily be made (RN79, Control Unit – pre redesign).

The demands of managing a highly acute and complex patient workload were exacerbated by the presence of students or new graduates on the unit. Unfortunately, new graduates were perceived as an added burden, despite the fact that nurturing the next generation of providers is a responsibility inherent in professional practice.

And with the new staff; that's another thing that I noticed is that they new staff all seem to be able to get out of here on time [laughs]. I'm struggling with this one. They all get out, because they're having difficulty bringing in all the theory and all the newness and processing that, and knowing it has to be done in a prompt way. It's the way they're taught, but they don't see the reciprocation yet that is required of them. When they go and ask me if I can start an IV or you know, like I would have to direct them. But they need the experience of watching me working with them at the IV. There's that too. But they don't say, "Now what can I do for you?" (RN207, Redesign Unit – post redesign).

If you're buddied with someone who is very junior, you have expectations. They don't see what you see, then that delays you more, because you end up doing it yourself. You feel very unsafe, being paired off with someone who is very new, who hasn't had experience, who doesn't really see the critical aspect of what you're seeing (RN303, Control Unit – post redesign).

And unfortunately, there's so many new staff here that you're kind of swimming alone. So you have to---myself, I anticipate being on my own, because I can't depend on my fellow co-workers, which isn't very good to say (RN315, Control Unit – post redesign).

Teamwork was seen as an important factor in mitigating heavy workloads, although at the onset of the study, it was apparent that sharing the burden of work was most likely to occur among "like" professional colleagues (i.e., RN to RN and HCA to HCA) than otherwise (e.g., RN with HCA or

social workers, physicians, etc). Forming "buddy teams" was explicitly selected as a strategy for improving communication and teamwork on the Redesign Unit. It was therefore encouraging to note that most interviewees believed that teamwork had been enhanced over the course of the study with consequent improvement in patient health outcomes.

> *We can do more as a team than one person can do as an individual. And so, if we're working as a team, the patient may get more mobility, more walking assistance, so that they gain more strength and things like that. And the working together, we can make sure everyone gets those basics of care that prevent the hazards of immobility, like ulcers, skin ulcers and things like that (RN209, Redesign Unit – post redesign).*

> *I think the patient outcomes improve when you're able to work as a team. You know because you're each kind of doing your part to promote their recovery. And if there's some part of the team that is not working or that's --- if the team isn't cohesive, then there's things that kind of fall apart. And I think that affects the patient negatively (RN308, Control Unit – post redesign).*

> *They can be like comfortable, you know? If I am going to do the heavy person by myself, maybe I'm going to damage his skin…But if you work as a team, it's easier, and if I didn't see something, my co-worker can see and we can work. It's good for the patient (HCA314, Control Unit – post redesign).*

> *You can certainly work together to provide maybe better care, especially with heavy patients who need two persons to look after them or you know, you're unsure about medications or things like that or central lines and you can always rely on somebody who knows more, who is more experienced about it (RN208, Redesign Unit – post redesign).*

Participants also believed that a strong team was better able to meet the needs of multiple patients, respond more rapidly to emerging needs, and provide seamless care. Timely and accurate communication among team members was seen as critical to effective teamwork.

> *We are like a team working together. By communicating to each other, we can help each other to do better patient care. And the benefit goes to the patient, so the patient gets like---for instance, if my colleague is too busy with one patient and the other patient needs to get his or her antibiotic and doesn't have an IV access, if she tells me, "I don't have time to go and restart my IV, can you do that for me?" and if I feel confident and I know I can do it, I can go and get her IV done and give her medication, and make sure I sign for it, so she doesn't go and do it again. And I go back to her and tell her that I did this, so she knows that I checked her patient already. So she's comfortable continuing whatever she's doing. So it is very important, yeah, because that affects the patient (RN567, Control Unit – post redesign).*

> *If you have teamwork, then everybody knows what everybody is doing. No one is---it's all about pitching in, because if you're a team, you're pitching in help where ever it's needed. So that means that no patient is going to get left without having care, because somebody is going to step up to the plate to do stuff for them if whoever is supposed to be taking care of them is too busy. So it's really important to have everybody work together. And that's really good for the patient's outcome, because otherwise, they would just have to sit there and wait till their nurse go to them. Whereas other people could come in and help, so it just helps give really good care, equal care for all of the patients (HCA216, Redesign Unit – post redesign).*

Having similar expectations and goals was also identified as enhancing teamwork. During interviews post redesign, it was noted that although communication was often referenced as a barrier to effective teamwork on the Control Unit, participants on the Redesign Unit tended to single out the positive aspects of good communication as enhancing teamwork.

> *The barriers, I suppose, are communication or lack thereof. If you're not communicating the needs to the nursing attendant, they don't always know what the expectations are. So communication is important for teamwork (RN308, Control Unit – post redesign).*

> *And I think everybody communicates really well on this unit, which is really important. I think people are very quick to say yes, I will do that or no, I don't have time to do that. Or this is what I need (HCA216, Redesign Unit – post redesign).*

Participants on both units identified lack of staff, cultural differences, interpersonal issues and/or tensions, and quality of worklife on the unit as barriers to effective teamwork.

> *I mean there are some personality conflicts and I think with the time constraints and just staffing issues, people are a little bit more stressed than they have to be (RN304, Control Unit – post redesign).*

> *And I think too, when people start to get burnt out, they don't have the same capacity as---you heard one RN. Her venting, she vented a lot during supper and I mean I think it's a frustration where there is so much expectation and so much needs to be done and I'm by myself. I am the only one, you know? And that is how she feels. She is responsible for that patient group and she is the only one who really is there to try and meet those needs. And it is, I think long term, it burns people out and people are getting fed up. And you know honestly? That is a part of one of the reasons why I asked her, I don't know. Ten or 11 years being here. I'm tired of it too really. Sad to say, but those are---lots of positive things about our work and our unit and our management, but lots is very difficult too. And then you do, you get tired. You want to see something; do something different. You don't want to continue. Myself, I'm not really happy to continue in this capacity on this particular unit (RN59, Redesign Unit – pre redesign).*

> *It [the team] works pretty well, I think most times. When it's well staffed, it works very well. When it's not well staffed, it doesn't work well (HCA216, Redesign Unit – post redesign).*

APPENDIX D

Patient, Provider, and Unit Outcomes

Patient Outcomes

Self-care capacity is a nursing sensitive outcome linked to role functions such as patient education, family support, and coordination of care.[40] Positive outcomes associated with increased self-care capacity include decreased readmission rates,[41] decreased rate of complications,[42] enhanced coping with or adjustment to illness,[43] and decreased burden of chronic illness.[44] Given that a link has been established between satisfaction with nursing care and patient satisfaction[45] the latter was selected as a patient related measure of the impact of the job redesign initiative.

Therapeutic Self-care Capacity Tool (TSCT): Figure D.1 and D.2 demonstrate that self-care capacity was rated as high by patients at both data collection periods.

Figure D.1: Control Unit - Therapeutic Self-Care Capacity Scores Pre and Post Redesign
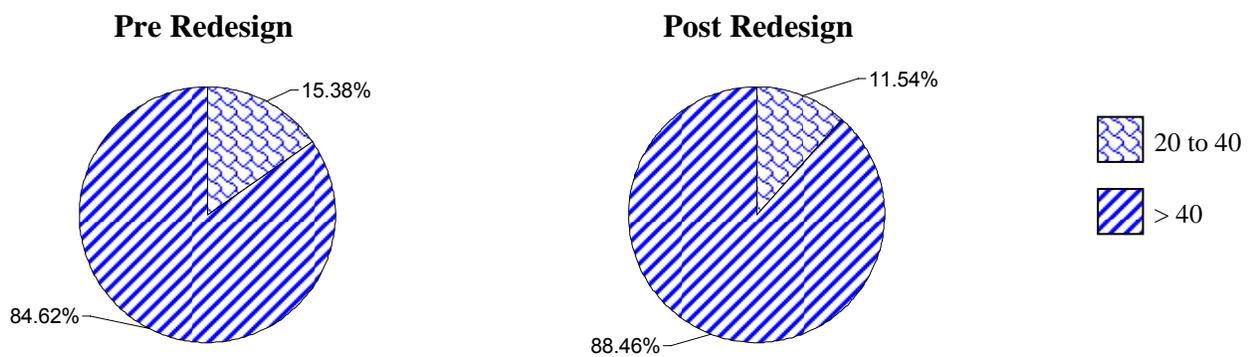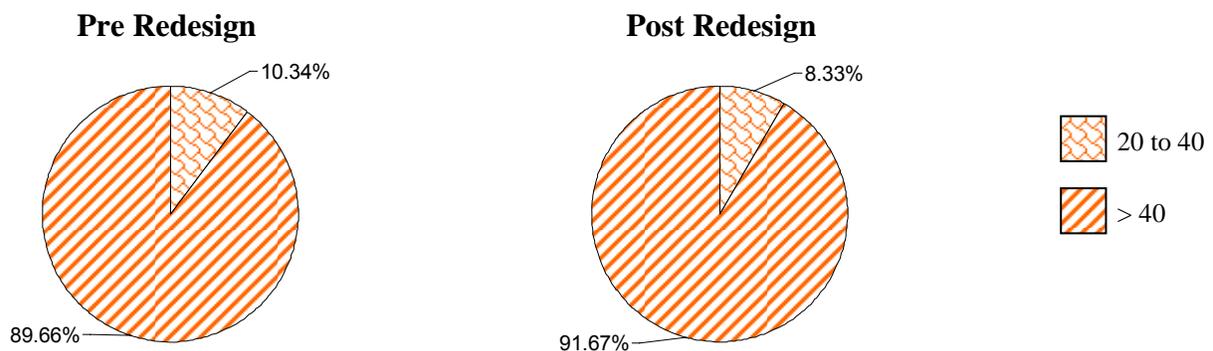

Figure D.2: Redesign Unit - Therapeutic Self-Care Capacity Scores Pre and Post Redesign

Patient Judgment of Hospital Quality (PJHQ): The quality of nursing care subscale[46] was used as a measure of patient satisfaction. As demonstrated in Table D.11, 85 percent of participants rated "Concern and caring by nurses" (i.e., courtesy and respect they were given; friendliness and kindness) as very good to excellent on both units, over both data collection periods. No significant differences were noted between the Control and Redesign Units (Table D.1).

Table D.1: Patient Outcomes

Patient Questionnaires	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
TSCT				
Total Score	0.95 (1.68)[†] [-2.37 to 4.28]^	3.29* (1.95)[†] [-0.56 to 7.15]^	-2.91 (2.6)[†] [-8.06 to 2.24]^	49.21 (1.34)[†] [46.55 to 51.86]^
Mean Total Score	0.18 (0.12) [-0.07 to 0.44]	0.29** (0.14) [0.02 to 0.57]	-0.39** (0.20) [-0.78 to 0.00]	4.15 (0.10) [3.95 to 4.36]
PJHQ				
Overall Quality of Care	0.18 (0.19) [-0.19 to 0.55]	0.20 (0.26) [-0.30 to 0.71]	-0.18 (0.38) [-0.93 to 0.56]	1.92 (0.13) [1.66 to 2.18]
Nursing Care Subscale	0.12 (0.15) [-0.28 to 0.31]	-0.04 (0.19) [-0.42 to 0.33]	0.13 (0.30) [-0.46 to 0.73]	1.94 (0.10) [1.74 to 2.14]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

Provider Outcomes

There is reason to believe that improving nurses' focus on meaningful role related activities can enhance job satisfaction,[47, 48] reduce role tension,[49] increase perceived job autonomy,[50] and decrease nursing sick time, overtime, and turnover.[51] These variables were used as measures of the impact of job redesign on provider outcomes.

Bivariate regression results for the three provider outcomes (i.e., role tension, autonomy, and general satisfaction) are presented in Table D.2. Significant differences were only noted for the general satisfaction subscale.

General satisfaction: A significant decrease in satisfaction over the two data collection periods was documented. However, there was a significant increase in provider satisfaction on the Redesign Unit compared to the Control Unit.

Autonomy: No significant difference in perceived autonomy was noted among participants on the two units. Generally participants perceived they had a moderate degree of autonomy in deciding how to do their work.

Role tension: There were no significant differences in provider role tension. Closer examination of individual items on the role tension scale revealed that a greater percentage of participants on the

Redesign Unit were often bothered by unclear expectations from supervisors. On the Control Unit, a greater percentage of participants expressed concern about: the workload being too heavy, their ability to finish their work, their ability to satisfy conflicting demands, and how the amount of work interfered with how well work gets done. A majority of participants on both units indicated that it was very important for them to have detail about (a) what they have to do on the job, (b) how they are supposed to do their job, and (c) understanding and knowing the limits of their authority.

Table D.2: Provider Outcomes

Provider Questionnaires	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
Lyon's Tool				
Role Tension	-0.01 (0.14)[†] [-0.29 to 0.28]^	0.16 (0.15)[†] [-0.15 to 0.46]^	0.06 (0.21)[†] [-0.36 to 0.47]^	2.58 (0.11)[†] [2.36 to 2.81]^
JDS				
Autonomy	0.29 (0.28) [-0.27 to 0.85]	-0.01 (0.32) [-0.64 to 0.62]	0.25 (0.38) [-0.51 to 1.01]	4.95 (0.25) [4.46 to 5.45]
General Job Satisfaction	-0.48* (0.25) [-0.97 to 0.25]	-0.64** (0.26) [-1.16 to -0.12]	0.74** 0.36) [0.02 to 1.46]	5.15 (0.18) [4.80 to 5.50]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

Unit Outcomes

Unit length of stay (ULOS), emergency (ED) visits and in-patient (IP) readmissions, and RN and HCA sick time and overtime were selected as unit outcomes for this study. As demonstrated in Table D.3, a non-significant decrease in the ULOS on the Redesign Unit was observed at the second data collection period, although there were no statistically significant differences in ED visits and IP readmissions. About 34 percent of patients discharged from the Redesign Unit returned to ED and approximately 26 percent were readmitted to in-patients within 90 days of being discharged.

Table D.3: Unit Outcomes

Unit Outcomes	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
Unit Length of Stay	1.82** (0.38)[†] [1.08 to 2.56]^	0.24** (0.05)[†] [0.14 to 0.34]^	-0.82 (0.62)[†] [-2.04 to 0.40]^	8.16** (0.42)[†] [7.30 to 8.94]^
Emergency Visits	-0.01 (0.01) [-0.04 to 0.01]	-0.00 (0.00) [-0.01 to 0.00]	0.01 (0.02) [-0.03 to 0.05]	0.34** (0.01) [0.31 to 0.37]
In-patient Readmissions	-0.02* (0.01) [-0.04 to 0.00]	-0.00 (0.00) [-0.01 to 0.00]	0.03* (0.02) [0.03 to 0.04]	0.25** (0.01) [0.23 to 0.28]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

No unit differences were noted in sick time, overtime or regular worked hours (Table D.4). However, the percentage of hours paid as overtime significantly increased over time for RNs. The overall percentage of time paid as sick time did not change significantly over the study period. Table D.4 also shows that the percentage of HCA hours paid as overtime significantly increased on the Redesign Unit over the study period.

Table D.4: RNs and HCAs Overtime and Sick Time

Unit Outcomes	Unit Effect Coefficient (SE)[†] [CI]^	Time Effect Coefficient (SE)[†] [CI]^	Redesign Effect Coefficient (SE)[†] [CI]^	Number of People Coefficient (SE)[†] [CI]^	Casual Status Coefficient (SE)[†] [CI]^	Regular Part Time Status Coefficient (SE)[†] [CI]^	Temporary Status Coefficient (SE)[†] [CI]^	Constant Coefficient (SE)[†] [CI]^
RN Overtime Percent	-0.012* (0.007)[†] [-0.026 to 0.002]^	-0.002** (0.000)[†] [-0.002 to -0.002]^	-0.008 (0.008)[†] [-0.024 to 0.008]^	-0.001 (0.001)[†] [-0.003 to 0.001]^	-0.003 (0.008)[†] [-0.019 to 0.013]^	0.036** (0.006)[†] [0.024 to 0.048]^	0.035** (0.010)[†] [0.015 to 0.055]^	0.025 (0.038)[†] [-0.049 to 0.099]^
RN Sick Time Percent	-0.001 (0.006) [-0.013 to 0.011]	0.00 (0.00) [0.00 to 0.00]	0.014* (0.008) [-0.002 to 0.030]	0.00 (0.001) [-0.002 to 0.002]	-0.062** (0.007) [-0.076 to -0.048]	-0.016** (0.006) [-0.028 to -0.004]	-0.042** (0.009) [-0.06 to -0.024]	0.042 (0.034) [-0.025 to 0.11]
HCA Overtime Percent	-0.010* (0.006) [-0.022 to 0.002]	0.000 (0.00) [0 to 0]	0.018** (0.007) [0.004 to 0.032]	0.001 (0.001) [-0.001 to 0.003]	-0.013* (0.006) [-0.025 to -0.001]	-0.004 (0.005) [-0.014 to 0.006]	-0.006 (0.009) [-0.024 to 0.012]	-0.005 (0.016) [-0.036 to 0.026]
HCA Sick Time Percent	0.010 (0.11) [-0.21 to 0.23]	0.00 (0.001) [-0.002 to 0.002]	-0.015 (0.012) [-0.039 to 0.009]	0.001 (0.001) [-0.003 to 0.001]	-0.069** (0.010) [-0.089 to -0.049]	-0.022** (0.009) [-0.04 to -0.004]	-0.015 (0.016) [-0.046 to 0.016]	0.059* (0.027) [0.006 to 0.011]

*p<.1, **p<.05, ***p<.01   [†]Standard Error   ^Confidence Interval

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