

Running head: INNOVATION ON A HOSPITAL PERINATAL UNIT

U. S. Army-Baylor University
Graduate Program in Health Care Administration

Innovation on a Hospital Perinatal Unit:
Cell Phone Use by Nurses

Thomas J. Petrilak
Lieutenant Commander, Medical Service Corps
United States Navy

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Abstract

The nursing shortage in the United States has a direct impact on all aspects of health care throughout the nation. Consequences of this shortage affect cost, job satisfaction, turnover rate, recruitment effort, and ultimately the quality of care provided to the patient. Many initiatives are underway to confront this shortage. One area of focus is the reduction of nurse time spent performing functions that could be accomplished by hospital support staff. This study evaluates the impact and effect of cell phone communication technology on reducing nurse task frequency and time spent on activities that could more appropriately be accomplished by hospital support staff. The study evaluates the cost benefit of cell phone deployment and its impact on nurse task frequency and satisfaction.

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Innovation on a Hospital Perinatal Unit:

Cell Phone Use by Nurses

Introduction

The Johns Hopkins Hospital was dedicated in 1889 and became the first medical institution in the world to combine a medical school's education with a hospital's medical practice. Since then, The Johns Hopkins Hospital has become a leader and model for medical education, research, and patient care. Central to the hospital's mission is the treatment of the indigent sick of the city without regard to sex, age, or color. This was memorialized in an 1873 letter from Johns Hopkins to the Board of Trustees that stated:

The indigent sick of this city and its environs, without regard to sex, age, or color, who may require surgical or medical treatment, and who can be received into the Hospital without peril to the other inmates, and the poor of this city and State, of all races, who are stricken down by any casualty, shall be received into the Hospital, without charge, for such periods of time and under such regulations as you may prescribe (Hopkins, 1873).

This purpose remains today and resonates in The Johns Hopkins Hospital mission statement "To provide the highest quality care and service for all people in prevention, diagnosis and

treatment of human illnesses" and "To provide facilities and amenities that promote the highest quality care, afford solace and enhance the surrounding community."

The Johns Hopkins Hospital is a voluntary, nonprofit hospital located in east Baltimore, Maryland that serves a local, national, and worldwide population through a wide variety of inpatient, outpatient, and diagnostic services. The main hospital houses a 1,039 acute-bed facility and includes the Brady Urological Institute, The Wilmer Eye Institute, The Johns Hopkins Comprehensive Cancer Center, and The Children's Center. The hospital employs over 7,700 employees and generated \$701.7 million in revenue for the year 2000. During that year the hospital recorded 41,176 admissions, 646,792 outpatient visits, and 81,281 emergency visits. Through the years The Johns Hopkins Hospital has served as the model for academic medical centers and continues to lead the world in medical research. Over the past ten years the hospital has been recognized by U. S. News and World Report as number one on the list of "America's Best Hospitals" ("Honor Roll," 2001). Nonetheless, world-renowned status, a rich history of excellence, and prestige second-to-none, has not insulated the hospital from the effects of the current nursing shortage or the implications of an aging nurse workforce. The hospital currently has 18.3 percent of its nursing positions unfilled, has experienced 15.8

percent turnover in nursing staff, recently documented staff nurse satisfaction rates ranging from 55 to 67 percent, and spent \$20 million in the first three months of the current fiscal year for nursing staff through temporary agencies. The hospital is aggressively addressing these issues through several initiatives. This project examines one aspect of one of those initiatives, reduction of registered nurse time spent on non-nursing functions on the labor and delivery unit.

Background

In June 2001 the American Hospital Association reported 126,000 open positions for registered nurses in the United States (American Hospital Association, 2001). This represents 7 percent of the estimated 1.8 million nurses in the United States. Buerhaus, Staiger, and Auerbach (2000) predict the registered nurse workforce will closely meet projected requirements through the year 2010, but will then fall 20 percent below requirements by the year 2020. At the same time the age of the registered nurse workforce is creeping upward to where more than 40 percent of registered nurses are expected to be over 50 years of age by the year 2010. According to Buerhaus et al. (2000) the age of the registered nurse workforce does not begin to move downward until after the year 2020.

Monitoring this trend in the state of Maryland, The Association of Maryland Hospitals and Health Systems (MHA)

reports that Maryland hospital registered nurse vacancy rates rose from 11 percent in 1999 to 13.9 percent in the year 2000, and that the average time to fill a registered nurse vacancy took 10 days longer in the year 2000 than in the year 1999 (Widespread Hospital Workforce Shortages, 2001). The Association of Maryland Hospitals and Health Systems also found that vacancy rates among nursing assistants grew to 15.2 percent, and vacancies among dietary aides and housekeeping staff were growing as well (Widespread Hospital Workforce Shortages, 2001). Maryland hospitals estimate that it costs between \$30,000 to \$50,000 to fill each nursing vacancy (MHA News, 2000), and in a case study published by H*Works (Lee, 2001) costs associated with a 14 percent registered nurse vacancy rate at a 700-nurse hospital were predicted to exceed \$3 million. Each of these nursing shortage factors resulted in overall nursing costs in Maryland hospitals rising nearly 12 percent in the year 1999 (MHA News, 2000).

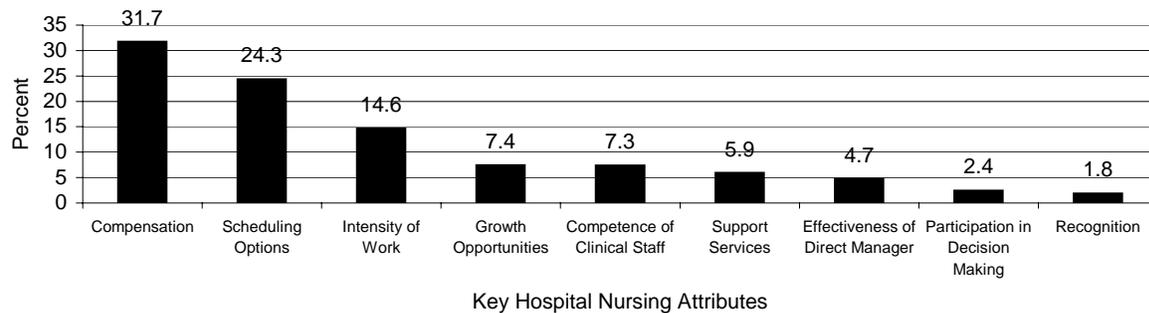
The Johns Hopkins Hospital has 1,526 nurse full-time equivalents (FTEs) budgeted for fiscal year 2002. The current overall nurse vacancy rate for the hospital is 18.3 percent. Actual vacancy rates vary by service from a high of 26 percent on one service to a low of zero percent on others. Temporary agency registered nurse use is one method of accommodating for vacancies but is costly. It is not uncommon to pay as much as

three times the in-house salary for temporary nursing services. In 2001 temporary agency registered nurse use cost the hospital \$17 million. Due to the continued and worsening nurse shortage more than \$20 million has been spent on temporary agency nurses for the first quarter of 2002 alone.

Nurse turnover rates pose additional challenges to hospitals as well. A national survey of registered nurses conducted by The Advisory Board revealed that 42 percent of nurses expected to leave their current jobs within three years, regardless of age or tenure (The Nurse Perspective; Drivers of Nurse Job Satisfaction and Turnover, 2000a). The same survey reports that 19 percent of surveyed nurses reported changing jobs within the past two years, and more than 64 percent of hospital nurses have considered leaving their current hospital (The Nurse Perspective; Drivers of Nurse Job Satisfaction and Turnover, 2000b). High rates of turnover drive up the costs for temporary workers, recruitment, and training while weakening staff integrity and overall cultural cohesion.

Maryland hospitals currently experience a nurse turnover rate of 14.2 percent. The overall nurse turnover rate at The Johns Hopkins Hospital is 5.8 percent with the highest rate of turnover found in the surgical group. Top contributors for nurse departure identified in a national study by The Advisory Board's Nursing Executive Center are shown in Figure 1.

Figure 1. Relative Importance of Key Hospital Nursing Attributes (Average Importance out of 100).



Job dissatisfaction is a major contributing factor to nurse turnover. The likelihood of a nurse considering leaving their current job nearly doubles when satisfaction moves from "very satisfied" to "somewhat satisfied" (The Nurse Perspective; Drivers of Nurse Job Satisfaction and Turnover, 2000b). The most recent staff satisfaction survey at The Johns Hopkins Hospital revealed staff nurse satisfaction rates ranging from 55 to 67 percent depending on the service.

As previously stated, current expenditures for nursing staff from temporary agencies is rising rapidly. Temporary agency nurse costs have exceeded all 2001 temporary nurse costs in the first quarter of 2002 alone.

In an effort to address the short-term needs and long-term changes required to correct this important issue The Johns Hopkins Hospital and Health System has focused efforts to

address this from both a human resources and nursing practice perspective within the organization. The categories of compensation, growth opportunities, competence of clinical staff, and recognition contained in Figure 1 are being addressed through human resources intervention while scheduling options, intensity of work, support services, effectiveness of direct manager, participation in decision making, and recognition are being addressed by the directors of nursing from a nursing practice perspective.

From the human resources perspective a Workforce Planning Team is evaluating and modifying recruitment and retention strategies including compensation and benefits, work schedule flexibility, employee recognition, and staff development to name a few. In addition, aggressive nurse recruiting trips have been carried out throughout the United States and overseas in an effort to bring more nurses into the organization. To date these recruiting trips have resulted in an additional 200 nurses agreeing to join the hospital over the next 18 months. The Vice President for Nursing is actively engaged with hospital leadership as well as with local, state, and national leaders in developing a comprehensive approach to address the national nurse shortage.

From the nursing practice perspective both long-term solutions and short-term fixes are being explored. The Director

for Oncology Nursing is leading a team comprised of all nurse directors to explore and develop new nursing models that will maximize and optimize the available support staff and technology to reduce workload demand on registered nurses. At the same time the Chief Financial Officer (CFO) for The Johns Hopkins Hospital and Medical School has convened a group of senior hospital leaders for the explicit purpose of reducing registered nurse demand by 10 percent. This is similar to the "stretch target" set by Robert Kiely at Middlesex Hospital to "cut the budget of every department in this institution by 25 percent" (Lumsdon, 1994). The Chief Financial Officer set this goal as an immediate response to higher than projected costs for temporary agency nursing and in recognition of the fact that the nursing shortage is projected to continue into the out years. Group members include the Chief Financial Officer, the Vice President of Nursing for The Johns Hopkins Hospital, the Director of Nursing for Perinatal Services, the Director of Nursing for Oncology Services, the Director of Nursing for Medicine, and the Director of Nursing for Surgery. Other members include the Chief Information Officer, and Senior Director for Outpatient Services who co-chairs the Johns Hopkins Innovations Steering Committee. Initial efforts of this group are focused on reviewing and evaluating the Patient Care Delivery Model (PCDM) in place at The Johns Hopkins hospital, as

described in Appendix A, to determine its usefulness and applicability in the current environment. If the model is found to be flawed, corrective action or development of a new model is expected. While accomplishing this review and evaluation, opportunities for improvement that may potentially result in reducing registered nurse demand are expected to be brought to the group for consideration. The Chief Financial Officer has promised that financial support will be available for initiatives that show potential to work toward the 10 percent reduction in nurse staffing demand. Particular emphasis by this group has been placed on the potential to apply new technology or new staffing models to achieve the goal.

The Patient Care Delivery Model was an outgrowth of the "team nursing" concept of the late 1980's and was adopted by The Johns Hopkins Hospital in 1996. The basic concept of the model is that nursing units be comprised of teams that will attend to all the unit needs from housekeeping to discharge planning. Two levels of nurses, Nurse Clinician I and Nurse Clinician II, routinely attend to direct patient care needs. A third level nurse, the Nurse Clinician III, accomplishes discharge planning and provides overall unit coordination and management.

Preliminary study of the Patient Care Delivery Model conducted on the perinatal, surgical oncology, general oncology, and the medical intensive care units found that the components

of the model were in place and being used. However while in theory, in practice the model was found to be impractical since the supervisory and managerial responsibilities required of the Nurse Clinician III always take a back seat to patient care and are frequently left undone. Compounding this is the fact that many of the Nurse Clinician III nurses have no desire or training to perform the required supervisory and managerial functions imposed by the model. Therefore, the model being dependent on unwilling, untrained, and ineffective managers for success is not functional. As a result, the Vice President for Nursing has made the development of new care delivery models one of Johns Hopkins nursing strategic goals for fiscal year 2003.

A second objective of the Patient Care Delivery Model evaluation was to obtain and identify potential opportunities to quickly reduce registered nurse demand through technology, human resource, work process, or facility innovations. After a series of discussions that included structured and unstructured brainstorming sessions, focus groups, and solicitation of staff suggestions a list of potential opportunities for improvement was compiled and is contained in Appendix B. After reviewing the results of the sessions each unit leader worked with unit staff members to prioritize the suggestions and decide on a course of action.

Perinatal unit leaders and staff decided to focus first on reducing the frequency and time nurses spend on tasks that could be performed by other staff members, such as restocking the patient room with supplies, cleaning the patient room, searching for supplies on the unit, moving supplies or equipment to or from the unit and calling other departments for service. Both the unit leadership and staff wanted to test the application of wireless communication devices to enhance communication and provide direct contact with support staff in an attempt to reduce the time nurses spent accomplishing tasks that could be performed by support staff. After completing the wireless communication initiative the perinatal group would move on to conducting a thorough evaluation of the effectiveness and efficiency of the supply system supporting the perinatal unit in an effort to further reduce registered nurse task and time spent on supply-related issues, to recapture unit space dedicated to supply storage, and to reduce unit inventory cost. The effects of both of these efforts were expected to have a positive impact on both the intensity of work and support services reported in Figure 1.

Literature Review

The current nurse shortage in the United States and its predicted future condition is well documented by Buerhaus et al. (2000) where it is predicted that the registered nurse workforce will closely meet projected requirements through the year 2010, but will then fall 20 percent below requirements by the year 2020. At the same time the age of the registered nurse workforce is creeping upward to where more than 40 percent of registered nurses are expected to be over 50 years of age by the year 2010, and the age of the registered nurse workforce does not begin to move downward until after the year 2020. Nevidjon and Erickson (2001) identified the following key factors, which are contributing to the shortage and differentiating it from past shortages: 1) Aging of nurses. 2) General workforce shortages in ancillary professions and support labor. 3) The global nature of this shortage along with fundamental changes in how patients are cared for in a managed care environment, including decreased length of hospital stay, and more acute care in the ambulatory and home settings. They have suggested both short-term and long-term strategies to mitigate the problem while emphasizing that the ultimate solution lies in transforming the nursing profession to a desirable career choice.

The American Hospital Association (American Hospital Association, 2001) reported 126,000 open positions for

registered nurses, which represents roughly 7 percent of the estimated 1.8 million nurses in the United States. The Association of Maryland Hospitals and Health Systems has discussed the seriousness of the current shortage in the State of Maryland and presented bleak future forecasts reporting that overall nursing costs in Maryland hospitals rose nearly 12 percent in the year 1999 due mainly to costs between \$30,000 to \$50,000 to fill each nursing vacancy. Lee (2001) reported the cost associated with a 14 percent nurse vacancy rate in a 700-nurse hospital as exceeding \$3 million.

Lanser (2001) has studied nursing dissatisfaction as it relates to retention and presents examples of hospitals with exemplary employee satisfaction results to identify working solutions. The Advisory Board has identified Strengthening New Hire Support Systems, Addressing the Top Three Drivers of Nurse Departure, and Developing Frontline "Chief Retention Officers" as a comprehensive approach to deal with nurse recruitment and retention in the current environment (The Nurse Perspective; Drivers of Nurse Job Satisfaction and Turnover, 2000a) and provides twenty-five conclusions from their Managing in an Era of Shortage study (Today's Study in 25 Conclusions, 2001).

Application of wireless cell phone communication technology in the health care setting has been successful at reducing non-nurse related tasks and increasing nurse satisfaction at Beth

Israel Deaconess Medical Center in Boston, and Inova Fairfax Hospital in Virginia (Wireless technology: Cell phones may improve hospital communication, reduce delays, 2000). A case study of the Inova wireless communication rollout documents the improved communications and time saved by staff since using the new system (Wireless technology: Cell phones may improve hospital communication, reduce delays, 2000). A best practice for use of wireless portable communication systems was published by The Advisory Board and was used as a guide for this project (Practice #14; Portable Communication System, 2001). The Emergency Care Research Institute (ECRI) has recommended that current restrictive hospital cell phone policies be relaxed to allow their use in certain situations and has published a suggested cell phone and walkie-talkie policy for use in healthcare facilities (Health Devices, 1999). Irnich and Tobisch (1999) concluded that the prohibition of mobile phones in patient wards is not justifiable in terms of compromising patient safety. Turcotte and Witters (1998) found that in-house ad-hoc testing conducted by the Johns Hopkins Clinical Engineering Department was an effective tool in assessing and preventing Electromagnetic Impulse (EMI) problems.

Research Objective

The objective of this study was to perform a management project that would evaluate the impact and affect of cell phone

communication technology on reducing nurse task frequency and time spent on activities that could more appropriately be accomplished by hospital support staff.

Research Design

Comparative analysis of cell phone plans available for this study, projected cell phone usage rates, and projected return on investment (ROI) for each plan were prepared and are shown in Appendix C.

Pre and post-deployment staff task frequency and time on those tasks was documented through both direct observations on the labor and delivery unit by the writer and through staff self-reported task frequency reports using the form contained in Appendix D. The form was divided into the eleven functional categories as described in Table 1.

Table 1. Major Realms of Tasks and Associated Task Descriptions.

Functional Category	Task Descriptions
Direct	Bath/Elimination Assessment Giving Meds/IVs Treatment-Hands-On Treatment-Equipment Assist Unit Procedure Ambulation of Patient Patient Teaching/Communication
Planning	Care Planning Care Coordination Discharge Planning
Patient Support	Medication Preparation Linen Change/Making Beds Monitor Watch

	Blood/Urine Test Meal Assistance
Communication	Professional/Clinical Family Staff/Student Education Scheduling Shift Report
Documentation	Flow Sheets/Charting Taking Off Orders Chart Maintenance Reports for Nursing Preceptor Information Computer
Transportation	Patient Within Unit Patient To/From Unit Supplies On Unit Supplies/Equipment To/From Unit Meds/Specs On Unit Meds/Specs To/From Unit Walking Self On Unit Searching for Chart Searching for Supplies
Meetings	On Unit Education Off Unit
Unit Care Activities	PYXIS/Inventory/Narcotics Check Equipment Restock Room Supplies Cleaning Patient Room/Unit
Managing Others	Calling Other Departments for Service Delegating/Following-Up
Ready & Waiting	Ready & Waiting
Personal Time	Personal Time

All 32 staff members on the perinatal unit between the dates of August 20, 2001 and August 26, 2001 completed the pre-deployment self-reported task frequency reports, and all 32

staff members on the perinatal unit completed the post-deployment self-reported task frequency reports between the dates of February 4, 2002 and February 10, 2002. Staff breakdown is shown in Table 2.

Table 2. Perinatal Unit Staff Breakdown.

Staff Type	# Staff
Nurse Clinician III	1
Nurse Clinician II	11
Nurse Clinician I	6
Clinical Technician	7
Personal Service Coordinator	2
Support Associate	5
Total	32

All staff members who used the cell phones during the pilot completed the Cell Phone Feedback Survey shown in Appendix E. The feedback survey was designed to collect the staff member's perception and comments regarding the cell phone's impact in the areas of job accomplishment, patient care, and overall unit effectiveness.

Safe use of the cell phones considered for use on the labor and delivery unit was thoroughly researched and fully evaluated by The Johns Hopkins Central Engineering Services department who is responsible for conducting such evaluations and authorizing

or restricting cell phone use within the facility. After testing the devices to be used using the protocol described by Turcotte and Witters (1998), approval was given to use Motorola 120c cell phones on the unit.

The Advisory Board best practice for portable communication systems ("Practice #14: Portable Communication System," 2000) served as a guide for deployment of cell phones to staff on the perinatal unit.

Research Findings

Cell Phone Plan Choice. Verizon Wireless was considered the preferred vendor for in-house communications. At the time of this study Verizon offered four basic monthly service plans that included various levels of service ranging from 50 to 600 monthly minutes. Comparative analysis of cell phone plans available for this study, projected cell phone usage rates, and projected return on investment (ROI) for each plan are shown in Appendix C. The "Home 50" plan offered 50 minutes of airtime for \$14.99 each month. The "Home 250" plan offered 250 minutes of airtime for \$24.99 each month. The "Home 400" plan offered 400 airtime minutes for \$33.99 each month, and the "Home 600" plan offered 600 airtime minutes for \$39.99 each month. In addition, Verizon was offering "free" weekend and night minutes with each plan and free phones with new service activation.

Verizon also offered free on-site training for all staff members who would use the phones and access to an on-site technical representative who would program the phones to restrict use only to and from hospital-related phones and who would assist with the cell phone deployment.

Airtime minutes available from each plan were evenly distributed over a 30-day period to determine the number of airtime minutes available for use on each phone each day during a 30-day period. As shown in Appendix C, the "Home 50" plan would yield 1.67 minutes per day. The "Home 250" plan would yield 8.33 minutes per day. The "Home 400" plan would yield 13.33 minutes per day, and the "Home 600" plan would yield 20 minutes per day. The effect of the "free" airtime minutes on weekends and evenings resulted in allowing all of the day's allocated airtime minutes to be dedicated to the day shift while the weekend and evening shifts would have unlimited "free" airtime.

Discussion of the anticipated number of minutes required on each shift was closely examined by the labor and delivery unit leadership and staff who determined that of the four plans available, the "Home 400" plan that yielded 13.33 airtime minutes each day plus "free" weekends and evenings would be adequate.

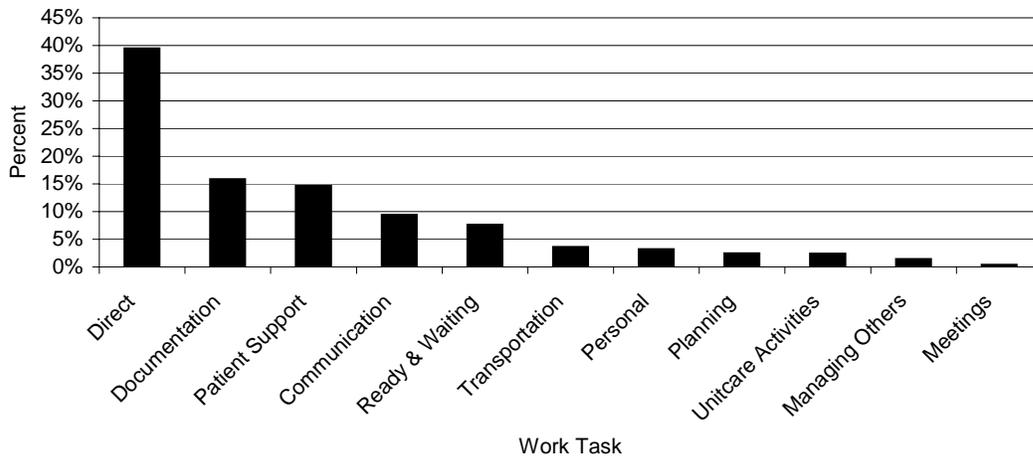
In order to provide a conservative estimate of the time saved through use of the cell phones and calculate an expected return on investment it was assumed that one minute of cell phone use would save one minute of nurse time. It was understood that this was a conservative estimate and later on-site observations revealed that nurses actually spend an average of five minutes on each non-nursing task meaning that a one-minute phone call would actually result in a savings of four nurse minutes.

Having decided upon the "Home 400" plan the 13.33 minutes of daily airtime was multiplied by the 6 nurse phones that would be issued to yield 79.98 phone minutes available for nurse use each day. This was then multiplied by 7 days to show a yield of 559.23 phone minutes available for nurse use each week. This was then multiplied by 4 weeks to show a yield of 2,236.92 phone minutes available for nurse use each month, representing roughly 37.1 hours of nurse time. Since the objective of this management project was to evaluate the impact and effect of cell phone communication technology on reducing nurse task frequency, time savings from cell phone use for other staff members on the labor and delivery unit who were part of the study were not considered in calculating projected savings. However, the costs of those phones were included as a required expense.

Projected Return on Investment. In order to calculate a projected Return on Investment the average nurse salary of \$24.00 per hour was multiplied by the 37.1 hours estimated to be saved by nurses using the cell phones resulting in \$890.40 of potential saved nurse salary each month by using cell phones. The \$549.84 monthly cost for all 16 cell phones to be issued to unit staff was then subtracted from the \$890.40 of potential monthly nurse salary savings to result in a projected 38.2 percent return on investment by choosing the "Home 400" plan.

Pre-deployment Task Frequency. Pre-deployment staff task frequency results are summarized in Figure 2.

Figure 2. Pre-Deployment Average Daily Self-Reported Task Frequency for Nurse Clinician I and Nurse Clinician II on the Labor and Delivery Unit.

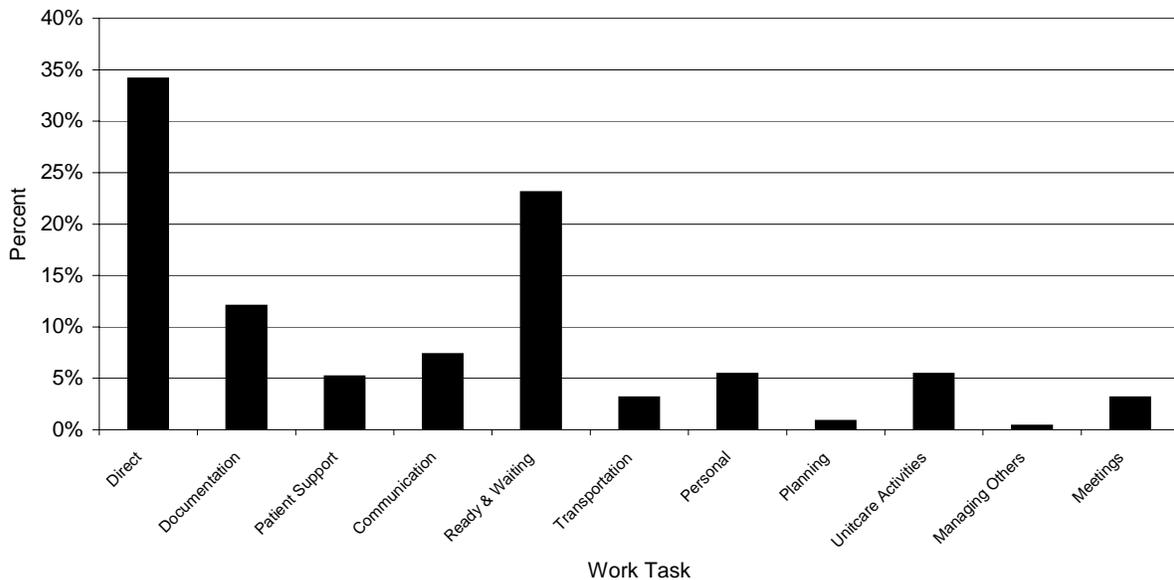


The first three tasks in Figure 4, direct, documentation, and patient support are considered patient related activities

and represent 71.7 percent of the total nurse task frequency during the period of the study. Ready and waiting and personal activity are considered as idle time and accounted for 10.7 percent of nurse task frequency. This left 17.6 percent of the activity frequency that was considered to be non-patient related in the areas of communication, transportation, planning, unitcare activities, managing others, and meetings.

Post-deployment Task Frequency. Post-deployment staff task frequency results are summarized in Figure 3.

Figure 3. Post-deployment Average Daily Self-Reported Task Frequency Percentage for Nurse Clinician I & Nurse Clinician II on Labor and Delivery Unit.



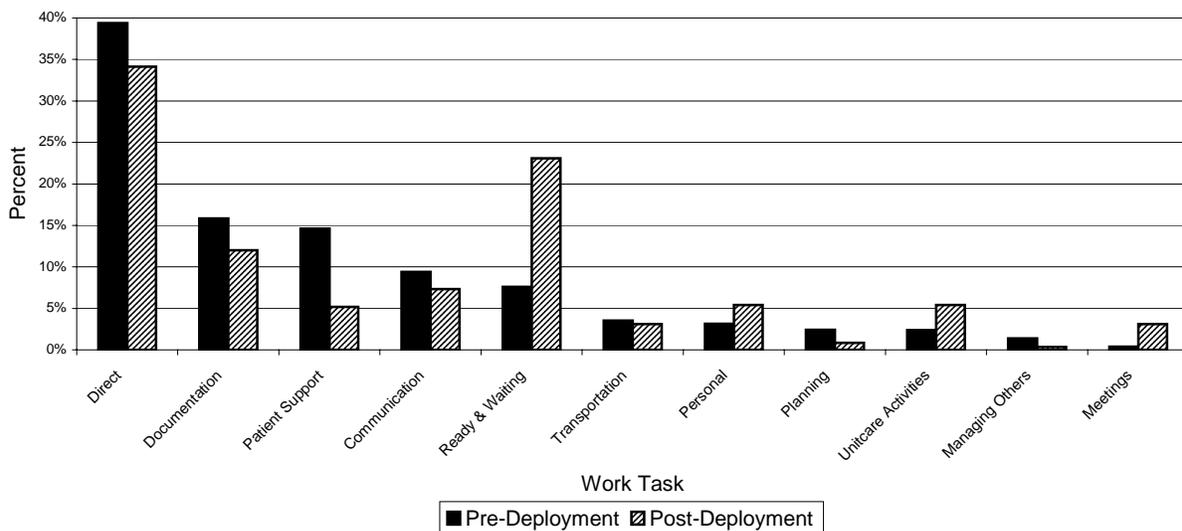
The first three tasks in Figure 3, direct, documentation, and patient support are considered patient related activities and

represent 51.3 percent of the total nurse task frequency during the period of the study. Ready and waiting and personal activity are considered as idle time and accounted for 28.5 percent of nurse task frequency. This left 20.2 percent of the activity frequency that was considered to be non-patient related in the areas of communication, transportation, planning, unitcare activities, managing others, and meetings.

Pre and Post-Deployment Task Frequency Comparison.

Comparison of pre and post-deployment staff task frequency results are summarized in Figure 4. Percent change is shown in Table 3.

Figure 4. Pre and Post-deployment Average Daily Self-Reported Task Frequency Percentage Comparison for Nurse Clinician I & Nurse Clinician II on Labor and Delivery Unit.



Changes in major realms of nurse staff task frequency are shown in Table 3.

Table 3. Changes in Major Realms of Nurse Staff Tasks After Cell Phone Deployment.

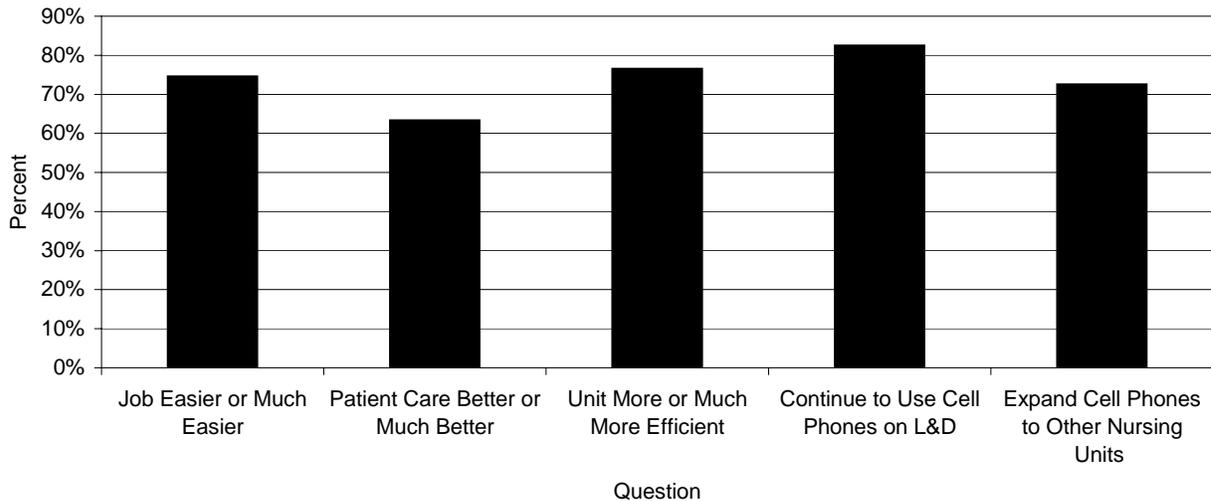
Major Realm	Change in Frequency
Ready & Waiting	+15%
Unitcare Activities	+3%
Meetings	+3%
Personal	+2%
Transportation	0%
Managing Others	-1%
Planning	-2%
Communication	-2%
Documentation	-4%
Direct Care	-5%
Patient Support	-9%

The largest reduction in self-reported task frequency for the nursing staff was a 9 percent decrease in the functional category of patient support, and the largest increase in self-reported task frequency was a 15 percent increase in the functional category of ready and waiting.

Cell Phone Feedback Survey Results. The Cell Phone Feedback Survey was provided to all staff members who used the

cell phones during the study period (n=78). Results are shown on Figure 5.

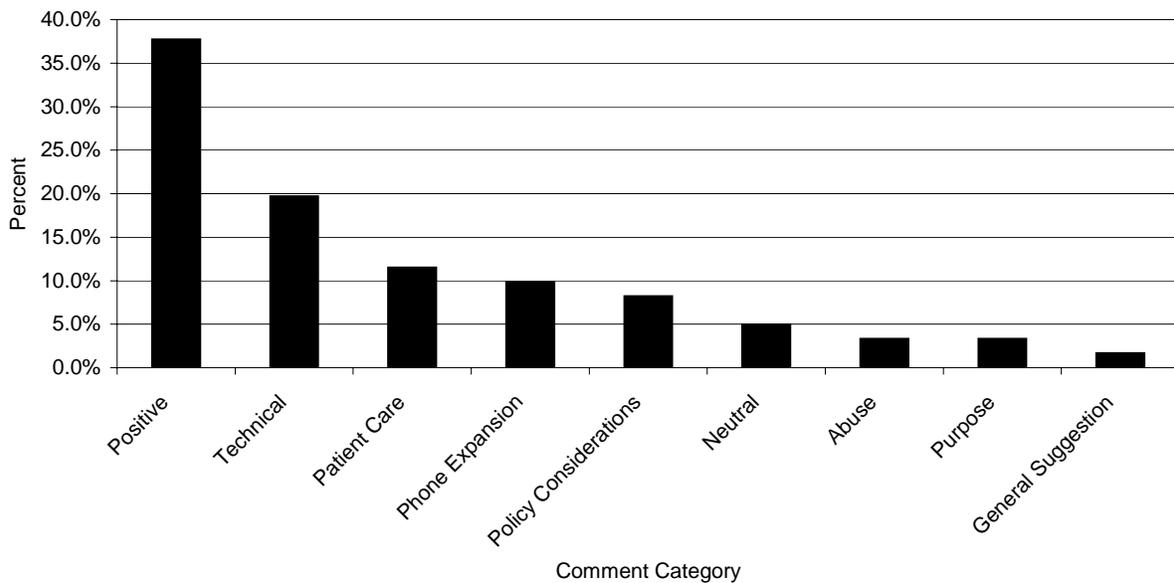
Figure 5. Cell Phone Survey Response to Questions by Percentage



Fifty-one surveys were completed and returned resulting in a 65.4 percent response rate. Of those surveys returned 38 respondents, 74.5 percent, reported that using the cell phone made their job either easier or much easier. Thirty-nine respondents, 76.5 percent, reported that using the cell phone made the unit either more or much more effective. Thirty-one respondents, 63.3 percent, reported that using the cell phone made patient care either better or much better. Forty-two respondents, 82.4 percent, thought that cell phones should continue to be used on the perinatal unit, and 37 respondents, 72.5 percent, thought that cell phones should be expanded to other nursing units.

In addition to assessing the impact of the cell phones on job accomplishment, patient care, and unit effectiveness respondents were asked to submit general comments which are contained in Appendix F and summarized in Figure 6.

Figure 6. Post Deployment Cell Phone Feedback Survey Comments by Category.

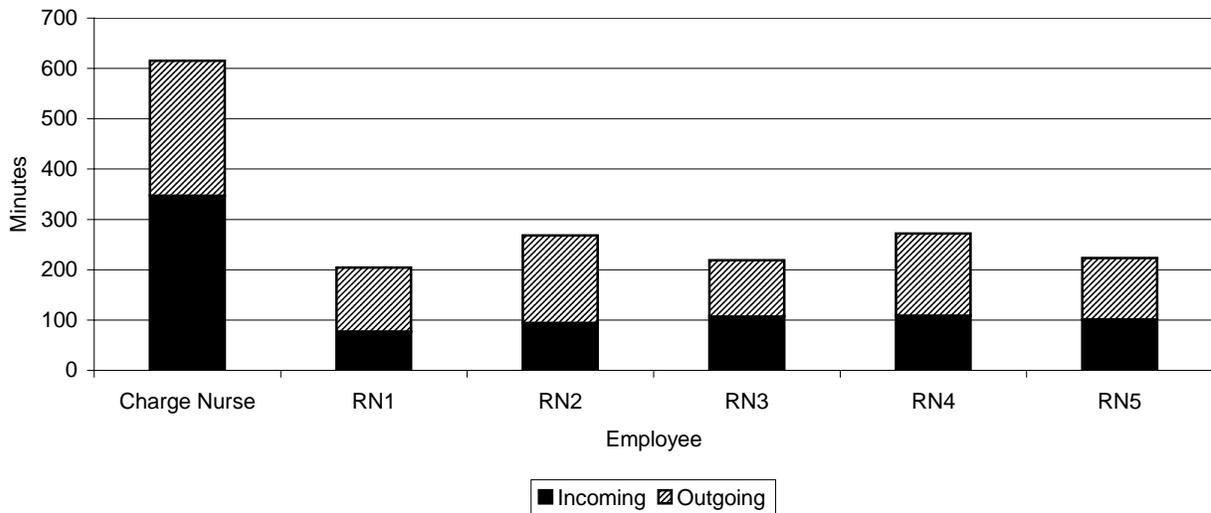


Sixty-one free-text comments were received and categorized into the following nine categories. Positive, Technical, Patient Care, Phone Expansion, Policy Considerations, Neutral, Abuse, Purpose, and General Suggestion. Twenty-three of the comments, 37.7 percent, were positive towards the use of cell phones. Twelve comments, 19.75 percent, discussed technical issues regarding cell phone use and capabilities. Seven comments, 11.5 percent, were related to cell phone impact on

patient care. Six comments, 9.8 percent, supported cell phone expansion. Five comments, 8.2 percent, concerned policy considerations regarding cell phone use. Three comments, 4.9 percent, were considered neutral comments. Two comments, 3.3 percent, discussed staff abuse of cell phones for personal calls. Two comments, 3.3 percent, revealed uncertainty as to the purpose for the cell phones and the study itself. One comment, 1.6 percent, was a general suggestion regarding normal telephones on the unit.

Actual Cell Phone Usage by Nurses. Actual minutes of cell phone use by nurses during the study is contained in Appendix G and summarized in Figure 7.

Figure 7. Cell Phone Usage by Labor and Delivery Unit Nurses for the Month of February 2002.



During the month of the study the Charge Nurse phone was used for 347 minutes of incoming calls and 268 minutes of outgoing calls for a total of 615 minutes during the month. 90.7 percent of the Charge Nurse calls were hospital-related. The RN1 phone was used for 77 minutes of incoming calls and 127 minutes of outgoing calls for a total of 204 minutes during the month. Eighty-four and one-third percent of the RN1 calls were hospital-related. The RN2 phone was used for 94 minutes of incoming calls and 174 minutes of outgoing calls for a total of 268 minutes during the month. Eighty-four and one-half percent of the RN2 calls were hospital-related. The RN3 phone was used for 107 minutes of incoming calls and 172 minutes of outgoing calls for a total of 279 minutes during the month. Eighty-three and one-tenth percent of the RN3 calls were hospital-related. The RN4 phone was used for 109 minutes of incoming calls and 163 minutes of outgoing calls for a total of 272 minutes during the month. Eighty-seven and seven-tenths percent of the RN4 calls were hospital-related. The RN5 phone was used for 101 minutes of incoming calls and 122 minutes of outgoing calls for a total of 223 minutes during the month. Eighty-two percent of the RN5 calls were hospital-related.

In all, nurse cell phones were used for a total of 2,548 minutes, 42.47 hours, of hospital-related calls during the study

period. 85.4 percent of the calls were hospital-related and 14.6 percent were not hospital-related.

Actual Return on Investment. Applying the conservative assumption of one minute saved for each one minute used, the average nurse salary of \$24.00 per hour was multiplied by the 42.47 hours of nurse cell phone use which results in \$1,019.20 of nurse salary savings during the period of the study. The actual cost of \$773.02 for all 16 cell phones used by unit staff was subtracted from the \$1,019.20 of monthly nurse salary savings resulting in a 31.8 percent return on investment.

Limitations of the Study

The routine and predictable nature of the work on the labor and delivery unit is not necessarily illustrative of the work performed on other units in the hospital.

The cumbersome nature of self-reporting by staff members required that pre and post-deployment task frequencies be collected for only a seven-day period. In addition, ten-minute recording intervals were used which allow only an approximation of time spent on the task identified. While multiple activities could be recorded during a ten-minute interval, the time on task was equally allocated to each task accomplished during that period.

Cell phone use for this study was limited to a thirty-day evaluation period that began on the day that wireless devices

were deployed. While generally considered to be an accurate sample of unit workload with comparable daily census, the thirty-day evaluation period may not account for all patient, staff, and environmental variations that could occur over a longer period of time.

Conclusions as to return on investment are based on the assumption that one minute of cell phone use will result in one additional minute of "saved" nurse time. While considered a conservative assumption this might not hold true if there is excessive abuse of the cell phones for non-work discussion.

Summary and Conclusions

This project was conducted as a management study to evaluate the effectiveness of wireless communication technology in reducing nursing time spent on non-nursing tasks. Those aspects of self-reported non-nursing task frequency measured in this study were not significantly affected by cell phone use, and displayed a slight increase. This should not lead to the conclusion that cell phones are ineffective on a nursing unit. More than 70 percent of the staff members reported that the cell phones resulted in easier or much easier job accomplishment, more or much more unit efficiency, and 63 percent said that using cell phones resulted in better or much better patient care. In addition, more than 82 percent of staff members felt that the cell phones should continue to be used on the labor and

delivery unit, and more than 72 percent felt that cell phone use should be expanded to other nursing units. What the study has shown is that wireless communication technology can and should be introduced where appropriate as a tool to help nurses perform their jobs better and to provide better access to other support staff on the unit or in the hospital. The study also revealed that this technology is cost-effective. Projected return on investment was 38.2 percent and actual return on investment was 31.8 percent. This study has demonstrated how wireless technology can be useful to front-line workers in organizations striving to optimize scarce nursing resources, improve internal staff communication and coordination, and improve employee satisfaction.

Recommendations for Future Study

Future study may include exploring other types of wireless communication devices and interfaces that expand beyond simple communication. The potential to employ technology that can accomplish tasks currently done by a person, such as monitoring, documentation, and transcription, coupled with links to existing clinical, decision support, and administrative systems holds great promise to reduce error, eliminate repetition, and enhance information sharing and access. Further deployment and study of such systems will assist in optimizing valuable and scarce

resources and further mitigate the effect of the nursing shortage.

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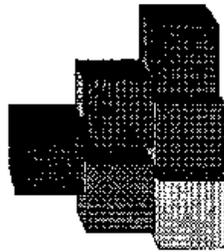
Appendix A: Patient Care Delivery Model (PCDM) Information

The Johns Hopkins Hospital Patient Care Delivery Model



COMMUNICATION PACKET

INDIVIDUALIZED CARE TEAM CONFIGURATION



- Staffing configurations will be individualized within each Functional Unit based on the needs of specific patient populations, case mix, and acuity levels.
- The new Patient Care Delivery Model facilitates a team approach of competent licensed and unlicensed care providers under the direction of a Nurse Clinician.



WHY A NEW PATIENT CARE DELIVERY MODEL?

Increased complexity of patient care needs

- Only the most acutely ill patients, who require a higher level of care, will remain in the hospital.
- Reduced LOS increases workload and requires work to be completed in a shorter time period.
- There is a higher activity per patient day (admission, discharge, transfer and average daily census).

JHH is a high cost hospital

- Education, research and uncompensated care increase costs.
- Outdated facilities require significant renovation to meet regulatory agency standards.
- Inefficiencies with our current care delivery system do not allow us to be competitive and affordable

National Trends

- Proposed decreases in Medicare/Medicaid reimbursement will negatively impact the hospital's revenue
- The growth of managed care in Maryland requires the hospital to control costs in order to remain competitive with area hospitals.
- Federal cutbacks will also decrease the allocation of funds to support research and education.

The delivery of high quality patient care at The Johns Hopkins Hospital must remain the core product of the institution.

PATIENT CARE DELIVERY MODEL

Purpose

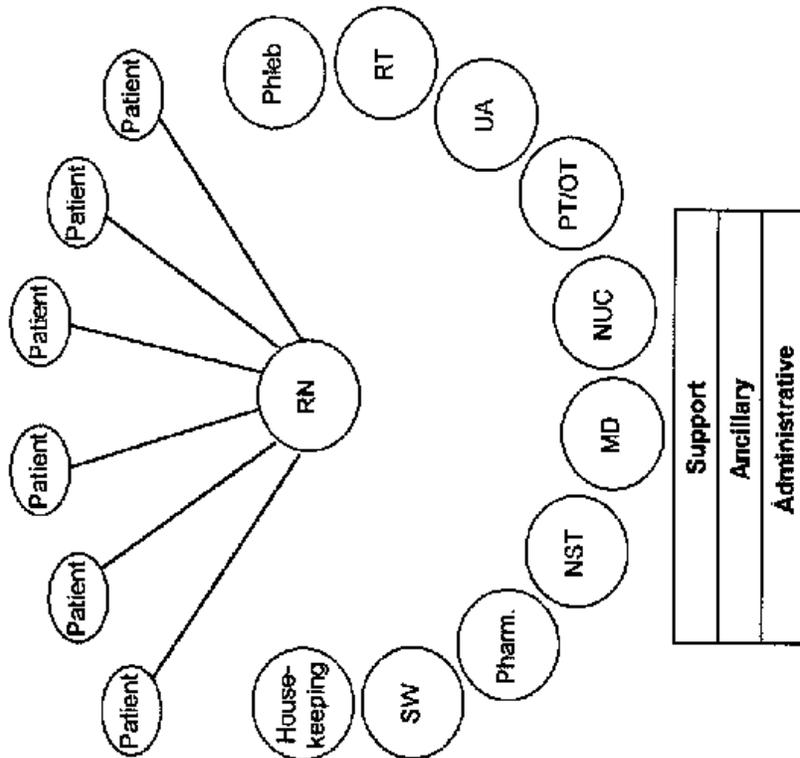
- The Patient Care Delivery Model utilizes a diverse, multiskilled workforce to the fullest extent of competency and education to provide patient centered, unit based care in a cost effective manner that maintains and improves quality of care.
- The Patient Care Delivery Model will be supported by administrative and ancillary systems which are efficient, integrated and interdisciplinary.
- The Patient Care Delivery Model is supported by the utilization of Case Management and Critical Paths to achieve quality clinical and fiscal outcomes.
- The Patient Care Delivery Model will optimize resource utilization to sustain the mission of The Johns Hopkins Hospital.

**The
Johns Hopkins
Hospital
Patient
Care Delivery
Model**



PRESENT CARE DELIVERY MODEL

The present care delivery model needs to be more efficient with consistent communication patterns and better coordination of care, in order to meet future health care demands.



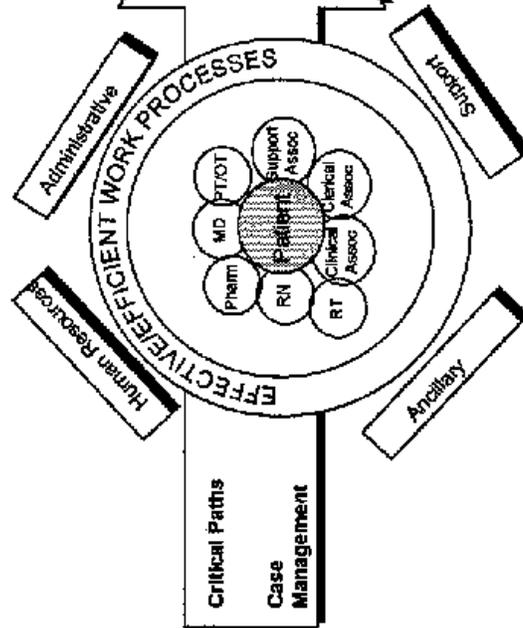
Characteristics of the Present Model

- Complex processes to get things done
- Caregivers spend significant time in non-direct care activities
- Inadequate support systems require caregivers to leave unit
- A significant portion of the work process does not add value to patient care
- Workforce composition does not meet changing health care needs
- Fragmented processes for clinical decision making
- Patient care activities are not completed by the most appropriate workers
- Fragmented communication between caregiver disciplines

THE JOHNS HOPKINS PATIENT CARE DELIVERY MODEL

Characteristics of the New Patient Care Delivery Model

- Patient Focused
- Unit based management of support services facilitates coordination and continuity of patient care
- Facilitates teamwork among unit based personnel
- Optimizes implementation of Case Management and Critical Paths
- The multiskilled workforce is maximized to its fullest extent of competency, education and licensure
- Appropriates patient care activities to the most appropriate worker
- Supports Nurse Clinician role to manage patient's episode of care/unit stay related to clinical/fiscal outcomes
- The ideal Patient Care Delivery Model will be achieved upon full implementation of central support initiatives (e.g., Pharmacy, Distribution, Unit-affiliated PT/OT/RT)



NURSE MANAGER ROLE

The role of the Nurse Manager will continue to evolve with the implementation of the new Patient Care Delivery Model.

Nurse Manager Role

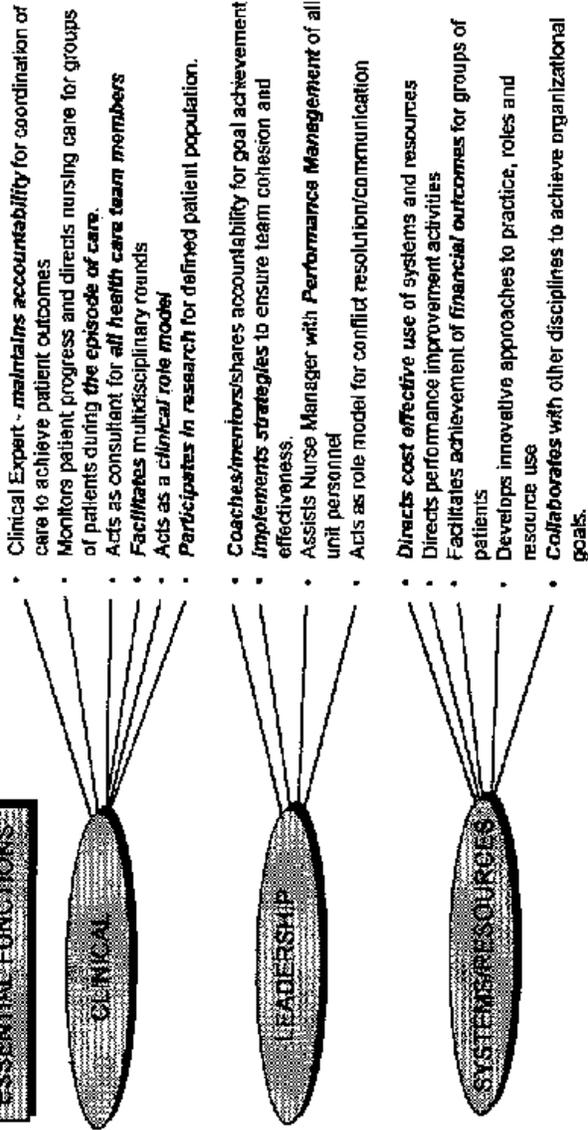
- Develops and maintains a cohesive, productive care delivery team.
- Assumes accountability for *clearly defined* clinical and fiscal outcomes in collaboration with the Nurse Clinicians and the multidisciplinary team.
- Expands areas of responsibility and accountability to include unit based support services (i.e., aspects of environmental services, materials management, dietary).
- Participates in the performance management of unit-affiliated (non-unit based) personnel (i.e. Pharmacist, RT).

NURSE CLINICIAN III

The NCIII is responsible for coordinating the total scope of care for a group of patients to achieve clinical, financial, and organizational outcomes

- provides direct patient care based on the nursing process
- mentors and manages others to promote quality and excellence of care.
- collaborates with and provides leadership for a multidisciplinary health care team to optimize performance.
- promotes improvement in unit and organizational systems to benefit patient care.
- incorporates and operationalizes goals and objectives of the Hospital at the unit level.
- assumes unit management functions as designated by the Nurse Manager.

ESSENTIAL FUNCTIONS



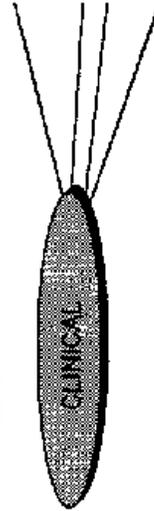
Note: This document is intended to describe the general nature and level of work being performed by people assigned to this care section. It is not to be construed as an exhaustive list of all job duties performed by personnel so classified.

NURSE CLINICIAN II

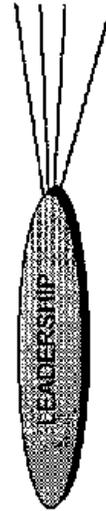
The NCII is responsible for coordinating care for a group of patients on a shift or defined time period to achieve clinical, financial, and organizational outcomes.

- provides direct patient care based on the nursing process
- mentors and manages others to promote quality and excellence of care
- collaborates with a multidisciplinary health care team to optimize performance
- promotes improvement in unit and organizational systems to benefit patient care.
- incorporates and operationalizes goals and objectives of the Hospital at the unit level
- acts in the absence of the NCIII to coordinate total care for a group of patients

ESSENTIAL FUNCTIONS



In the absence of, or under the direction of the NCIII, assumes **accountability** for coordination of care to achieve outcomes for a group of patients
Provides consultation to members of the care team with potential implications for **changing clinical practice**.
 Develops and implements **complex or long range** patient educational plans.



Precepts new staff
Provides leadership for unit projects (chairperson)
 Assists nurse manager with **Performance Management** of all unit personnel
 Acts as role model for unit operations (scheduling, peer review, Performance Improvement, Staff Ed, charge nurse)



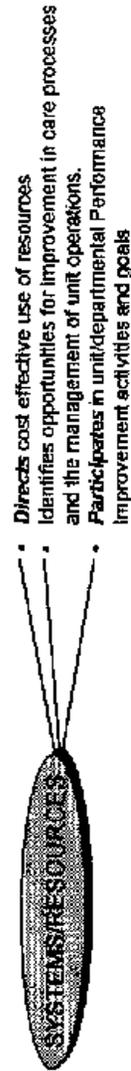
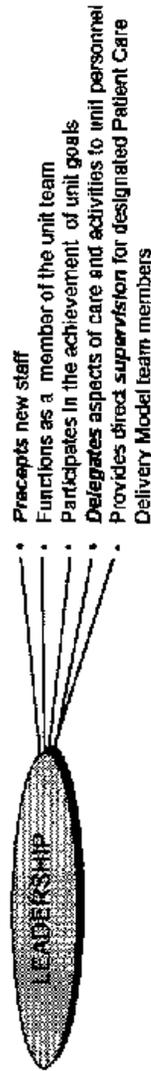
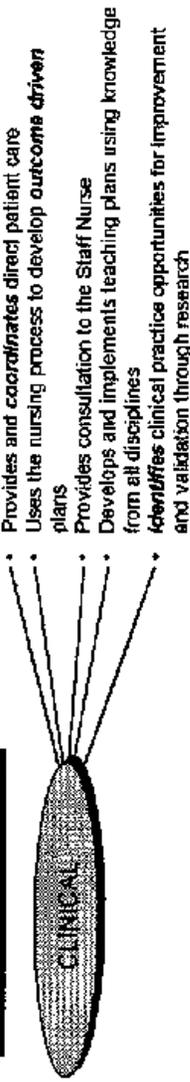
Provides leadership for Performance Improvement/ financial outcomes
 Serves on departmental/central committees

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NURSE CLINICIAN I

- The NCI is responsible for coordinating care for assigned patients on a shift to promote achievement of clinical, financial, and organizational outcomes.
- provides direct patient care based on the nursing process
 - provides direction to other team members to promote quality and excellence of care
 - collaborates with a multidisciplinary health care team to optimize performance and promote improvement in unit and organizational systems
 - incorporates and operationalizes goals and objectives of the Hospital at the unit level

ESSENTIAL FUNCTIONS



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STAFF NURSE

The Staff Nurse is responsible for providing direct patient care based on the nursing process within assigned work periods.

- functions as a multidisciplinary team member to achieve outcomes consistent with the comprehensive plan of care
- delegates aspects of care to assistive personnel to optimize team performance
- participates in activities to achieve clinical, financial and organizational outcomes

ESSENTIAL FUNCTIONS

CLINICAL

- Provides direct patient care
- Plans and implements the nursing process for problems identified within assigned work periods
- Develops and implements patient teaching
- Uses interpreted research

TEAM

- Functions as a member of unit based team
- Contributes to team goals
- Communicates with all Health Care team members
- Provides direct supervision and delegates tasks to assistive personnel

SYSTEMS/RESOURCES

- Practices efficient resource utilization
- Contributes to unit/departmental performance improvement activities/goals

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LICENSED CLINICAL ASSOCIATE

Under the direction of a Nurse Clinician or Staff Nurse, the Licensed Clinical Associate:

- contributes to the assessment, planning, implementation and evaluation to deliver safe therapeutic and age appropriate patient care
- provides input to the health care team to promote wellness, maintain current health and/or intervene in acute or chronic illness.
- participates in unit activities to optimize team performance.

ESSENTIAL FUNCTIONS



- Provides direct patient care in a team relationship with the Registered Nurse
- Contributes to the assessment of patients
- Participates in patient teaching
- Contributes to and implements plan of care for assigned patients.
- Delegates to non-licensed assistive personnel



- Functions as a member of unit based team
- Contributes to team goals
- Communicates with all health care team members
- Delegates tasks to assistive personnel



- Practices efficient resource utilization
- Contributes to unit/departmental performance improvement activities/goals

Note: This document is intended to describe the general nature and level of work being performed by people assigned to this care section. It is not to be construed as an exhaustive list of all job duties performed by personnel so classified.

CLINICAL ASSOCIATE

Under the direct supervision of a Staff Nurse/NC, and taking into consideration the age and developmental needs of the patient, performs delegated patient care activities and procedures. These routine and technical activities may include patient treatments/monitoring, nutritional support, patient mobility and activities of daily living. The Clinical Associate participates in unit activities to optimize team performance.

ESSENTIAL FUNCTIONS

- Performs routine patient care activities
- Observes complex electronic monitoring equipment
- Performs IV therapy activities, EKGs, phlebotomy
- Performs routine respiratory activities, i.e., incentive spirometry, chest physiotherapy, postural drainage, suctioning

- Functions as a member of the unit based team
- Contributes to team goals

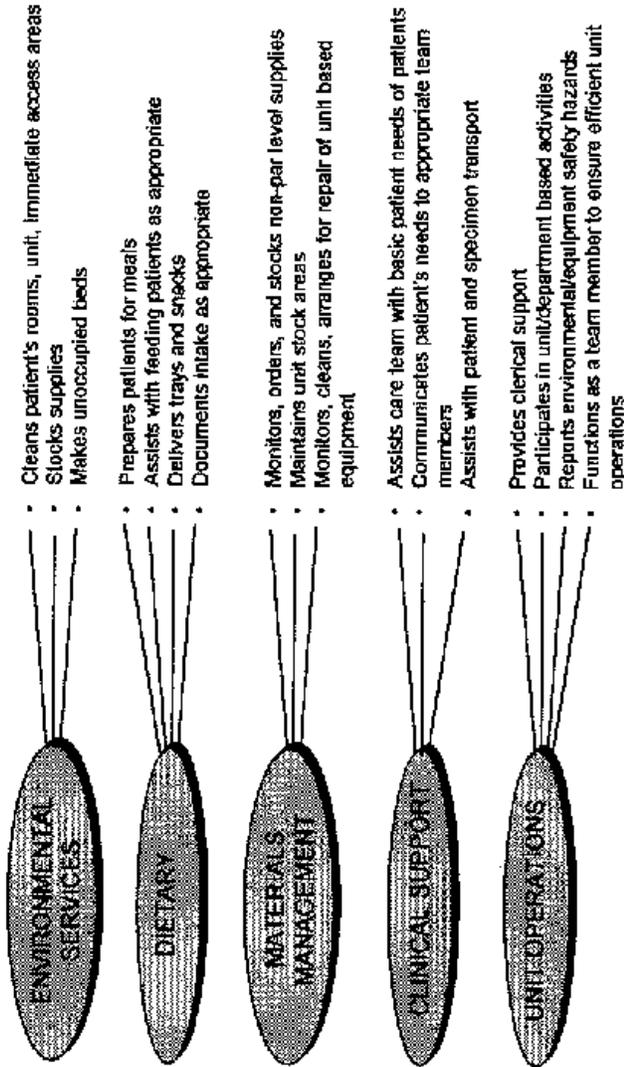
- Participates in unit/department based activities
- Practices efficient resource utilization

Note: This document is intended to describe the general nature and level of work being performed by people assigned to this care section. It is not to be construed as an exhaustive list of all job duties performed by personnel so classified.

SUPPORT ASSOCIATE

Provides a variety of environmental, nutritional, clinical support and transportation services and activities to promote patient comfort and satisfaction. Works under the direction of a Nurse Clinician or Staff Nurse. The Support Associate participates in unit activities to optimize team performance.

ESSENTIAL FUNCTIONS



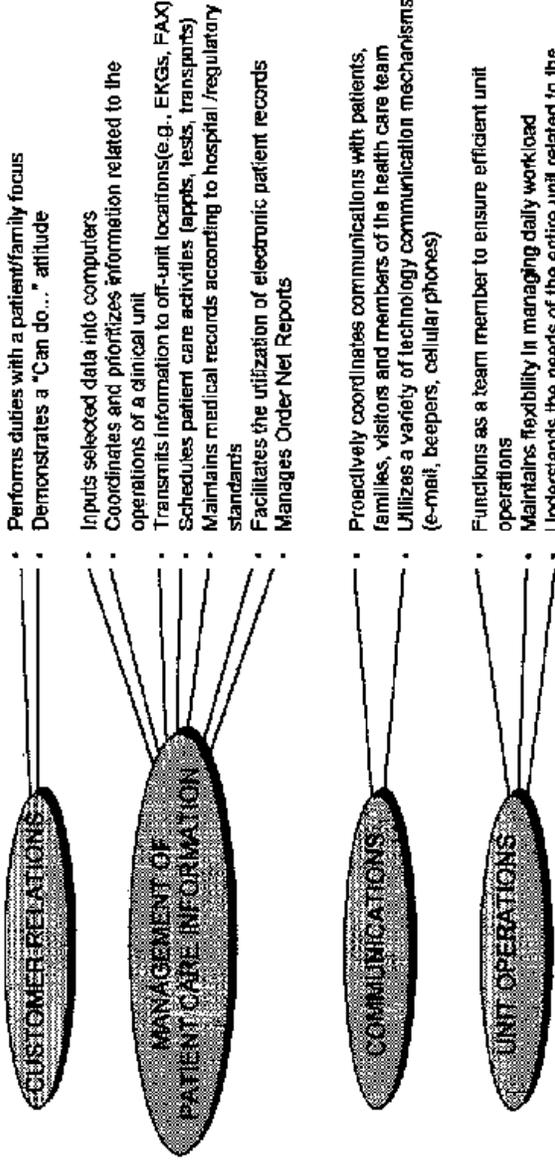
Note: This document is intended to describe the general nature and level of work being performed by people assigned to this care section. It is not to be construed as an exhaustive list of all job duties performed by personnel so classified.

CLERICAL ASSOCIATE

Under the direction of a Nurse Clinician or Staff Nurse, the Clerical Associate:

- serves as a communication resource and coordinator of information for patients, families, visitors and members of the health care team
- performs clerical and support duties necessary to maintain medical records
- performs a variety of integral activities to assist medical, nursing and administrative staff to meet unit, department and institutional needs
- participates in unit activities to optimize team performance.

ESSENTIAL FUNCTIONS



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INDIVIDUALIZED CARE TEAM CONFIGURATION



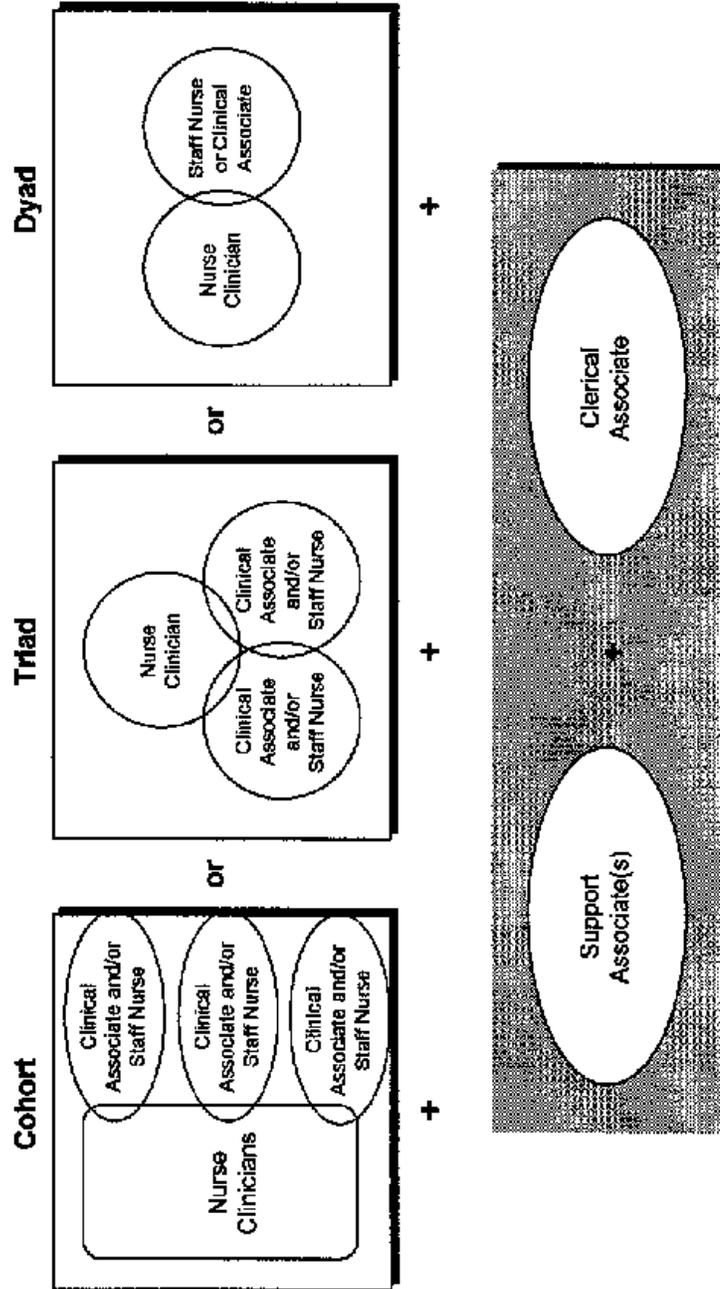
- Staffing configurations will be individualized within each Functional Unit based on the needs of specific patient populations, case mix, and acuity levels.
- The new Patient Care Delivery Model facilitates a team approach of competent licensed and unlicensed care providers under the direction of a Nurse Clinician.



INDIVIDUALIZED CARE TEAM CONFIGURATION

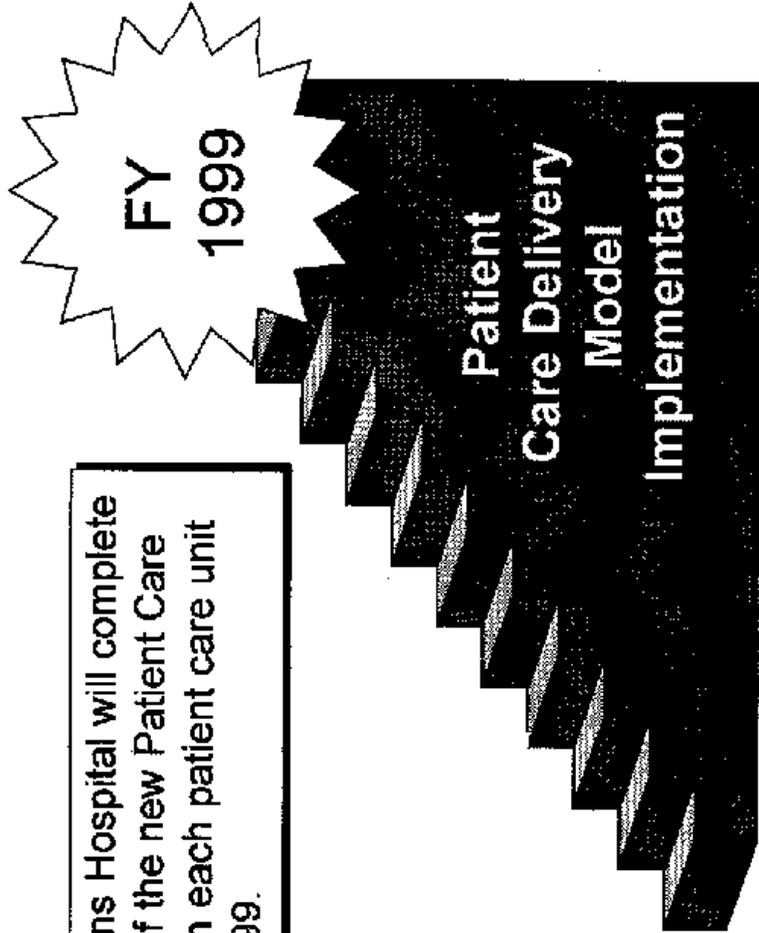
Each Functional Unit will decide which care team configuration best fits the needs of its patient population.

Care Team Configuration Examples



PATIENT CARE DELIVERY MODEL IMPLEMENTATION

The Johns Hopkins Hospital will complete implementation of the new Patient Care Delivery Model on each patient care unit by the end of FY99.



Appendix B: Opportunities for Improvement

Location Name	Category	Observation/Input	Proposed Fix
MICU	Facilities	RN must leave room to take waste to central area for elimination.	Potentially revamping room to accommodate.
	Facilities	Nurses are unable to answer the phone when the lab is calling with results because they are in an isolation room completing a procedure.	Purchase phones for each room or portable phones for nurse use.
	Facilities	Sufficient space for appropriate medication storage device needed (lock and key system, combo lock, etc.).	Find, purchase and utilize medication storage bins in each room.
	Human Resources	Lack of recruiting efforts for CTs. RNs have to unnecessarily use other RN capacity to assist with tasks best supported by others.	Develop rapport w/military branches, especially locally. Develop potential resource pools.
	Human Resources	Stress management initiatives.	Address issue in appropriate manner, even if it is providing the information of a resource that may be utilized by the staff.
	Human Resources	SA not used to capacity. Witnessed RN discussing if SA would be interested in helping with patient care. Gave appearance that job assignments were optional.	Create teams that would include all personnel. One SA could be assigned to 3-4 rooms, and perform duties more related to patient support.
	Human Resources	Scheduling for night shift an issue for some.	May even want to consider validity of 12-hour shift. Is there any benefit, or is it expecting too much from the personnel?
	Human Resources	MICU lost point of care pharmacist. Witnessed second phone call to pharmacy after placing order to 2-dose line. Order was placed @1000, and second phone call was at 11:13.	Revisit POC pharmacist?
	Human Resources	Frustration on all levels of staff w/respect to pay issues. SAs are wanted to help provide patient care, but are paid at low wage level.	Consider pay increases.
	Human Resources	CTs spend a great deal of time feeding patients.	Develop the SA staff and the create care teams that can address feeding and other responsibilities.
	Human Resources	Close to two-hour delay to move body to morgue.	Can a support associate help with patient/body transport? Evaluate current process.
	Human Resources	Not enough family/staff support on the MICU.	Possibly have a social worker dedicated to the MICU?
	Human Resources	RNs and others having to leave unit for extended periods of time to transport patients to and from testing, which further taxes the nursing staff.	Develop dedicated teams--excluding RNs if possible--that transport patients, even if that team exists only for a day.
	Human Resources	Staff motivation and cohesion is of concern.	Determine how best to communicate amongst staff. Lack of communication seems to be a root cause of a lot of employee dissatisfaction.
	Human Resources	Recognition system should be in place to praise in public the efforts of the outstanding performers.	Create a reward/recognition system that is routinely employed to showcase the efforts of the outstanding performers for a particular unit.

	Human Resources	Patient room cleaning delayed longer than three hours.	Evaluate the current bed turnaround proves and incorporate a sense of responsibility, accountability, and initiative into the job of the support staff.
	Human Resources	Establish set schedules for Support Associates.	Communicate to staff scheduling methodology and be consistent in its application.
	Human Resources	RN has to leave Eclipsys machine to read information from machines and then come back to the computer to enter information.	If there is a team approach, the SAs could be used to assist in the process.
	Human Resources	Clinical staff difficulty in managing non-clinical staff.	Hire dedicated office manager that can deal with non-clinical staff and who has the capability to schedule testing, etc.
	Human Resources	PDCM implemented, "team-based" approach. RNs broken down into categories, NI, NII and NIII, but is not applicable in all units.	Propose that staff be placed into teams, so the SAs can be better utilized.
	Human Resources	Witnessed instances where nurse left floor to run lab specimens to stat lab while SAs were conversing amongst themselves.	Evaluate job description for SAs and ensure that they are fulfilling responsibility. RN must delegate appropriate duties.
	Other	Supply closet, while well stocked, is not necessarily stocked with the appropriate items. Witnessed nurse leave room on four occasions for supplies.	Revisit the items stocked in the scan module. May want to add or subtract items.
	Other	Not enough isolation room chairs.	Purchase fold up chairs for each room.
	Processes	Transportation of patients to CT scan/MRI often difficult due to lack of personnel.	Team approach may be a good solution. Create daily a patient transport team.
	Processes	Ability exists to enter information on wrong patient in Eclipsys system.	Pursue system "fix." Can be as simple as a sticker on top left corner that asks, "is this your patient's name?"
	Processes	Unit Clerk is away from the phones when she needs to walk to each chart and retrieve a copy of the lab orders every two hours.	Determine a different method of transporting the lab orders from the individual patient rooms and their binders to the unit nurse.
	Processes	Elevator protocol. Is there a way to speed the system up?	Determine if the possibility exists for a staff member to "lock out" others and move their patients more quickly and directly?
	Processes	Nurses are unable to answer the phone when the lab is calling with results because they are in an isolation room completing a procedure.	Have the unit clerk record the results from the lab in a safe and efficient manner for the nurses so nurses do not have to take time away from direct patient care duties.
	Processes	Point of Care Pharmacist was working out very well M-F 8-4:30pm. There was a noticeable difference in the MICU in time spent on pharmacy issues since POC Pharmacist was discontinued.	Bring them back!
	Processes	RN has to call 2-dose hotline for certain medications not on floor.	Another opportunity for headset technology. RN could relay request to administrative assistant, who in turn could call in order.
	Processes	Isolation rooms void of proper supplies resulted in gowned nurses standing in their doorways hoping to catch someone to help bring supplies.	Perhaps there is a way to better utilize a paging system so a nurse in this situation could contact the unit clerk to help coordinate supply needs.

	Processes	Patient confidentiality.	During an in-service, and/or perhaps communicated through a memo, remind staff on situations where patient confidentiality could be compromised.
	Processes	Requisition forms often left blank. RN must fill out basic information.	One solution is to create a column on the order sheet where a RN could list the number of requisition sheets that need to be filled out.
	Processes	Conflict between rounds and supply personnel restocking supply area/scan modules.	Contact the logistics unit and determine what other times are available for them to stock supplies on the unit. Consider just in time system.
	Processes	Communication between three different levels of physicians and RN staff leads to confusion and missed tests that had been scheduled.	Centralize patient scheduling.
	Processes	RN spends time crushing medication for patients so that it can be administered through IV and/or help with oral consumption.	Develop list of medications that could be crushed by pharmacy or stored in liquid form
	Processes	A lot of time is spent on the phone and waiting for appointments with the MRI/CAT Scan.	Chart the flow of scheduling. Work to develop a more efficient process of scheduling testing. Use the unit clerk to schedule appointments.
	Processes	Setting up room for patient for specialty equipment (pump with IV's) may actually waste time if brought into room and not placed in that particular room.	Communicate w/referral sources side preference (one side of room has more space).
	Processes	No time for bathing patients during daytime hours.	No recommended solutions based on input or observation.
	Processes	Gown/un-gown rooms cumbersome. If RN does not have ample supply of a resource once an assessment has been performed they have to ungown and leave the room and then regown when returning.	Headset technology exists and would be useful in many situations, but the Hill-Rom device can serve a similar purpose.
	Processes	Families of patients often come into the MICU looking for a patient who is located in another ICU unit on the 7th floor.	Work with the front information desk and the operator to more accurately direct families to the correct ICU unit on the 7th floor.
	Processes	Lab specimens too big for pneumatic tube system not picked up at regularly scheduled intervals.	Discuss with lab constraints that preclude routine pick-up of specimens and develop a solution so that there is more timely pick up.
	Processes	Lack of appropriate inventory in scan modules.	Perform a reassessment of inventory currently in scan module. Create a suggestion form or tool that can continuously take RN suggestions for additions and deletions from the inventory.
	Processes	Difficult to get RT to follow during rounds. RTs for MICU not assigned to any other unit.	Coordinate when rounds are to be conducted/notification system, and get participation. Better for staff and patient.
	Processes	Discharges/orders, etc. change frequently due in part to the lack of communication between physician and RN.	Have one scheduler--not necessarily a clinical person.
	Processes	Supply personnel bring extremely large carts into hall, blocking foot traffic. Could present a problem if patient crashed.	Bar code supplies--reducing need for carts with so many items. Come at a different time--preferably when less busy.

	Processes	RN/Physician communication not difficult. Patient being prepared for transport may have to wait because tests ordered after rounds are delayed in execution.	Create/utilize a checklist that somehow makes it to the coordinator of care (RN/CT).
	Processes	Scheduling patients for transport is decentralized, resulting in a lack of standardization and communication.	Centralize patient scheduling.
	Processes	Hill-Rom locator not being utilized by all staff. Many do not even wear locator device.	Enforce wearing of staff locators. Stress the benefits from utilizing technology.
	Processes	Ointment was noted in chart but there was no specification as to where to apply and it was not directly obvious.	Revisit during documentation training for new residents/interns as well as refresher training.
	Technology	Telephones are not in every room. Most patients do not need, but what about family and staff?	Put phones in every room.
	Technology	Reliance on phones—currently only way to communicate with ancillary support units.	Create/use an email system for the unit to contact pharmacy, PT, and others via email. Handheld devices may be of use--Blackberry?
	Technology	Staff locator not utilized effectively.	Determine if current system is appropriate. If yes, then develop and enforce policy for use.
	Technology	Not effectively utilizing technology to place arterial lines into patients.	Purchase SiteRight, device to make it easier to identify the proper insertion site.
	Technology	Too many lines, etc. in patient rooms.	Utilization of a "smart bed" that monitors some functions may reduce the need for some lines.
	Technology	Unit Clerk is away from the phones when she needs to walk to each chart and retrieve a copy of the lab orders every two hours.	Portable phone with headset for the unit nurse.
	Technology	Physicians still using paper charting while nursing staff is working towards computerization.	Is there a way to encourage and invite the physicians to engage in the computer technology at the bedside? Physician use of EPR?
	Technology	Transfer of patient information from one unit to another does not occur, resulting in RN inputting information into Eclipsys system multiple times.	Determine if supplying unit has ability to transmit patient information to gaining unit.
	Technology	Travel/agency RNs cannot gain access to the EPR. Eclipsys, for some reason, does not always reflect information found in the EPR.	Figure out why Eclipsys info. is not coming up in the system...or...create the option of providing a temporary code for agency RNs.
	Technology	Poor communication between unit and ancillary services.	Develop other means of communication. Utilize capability to email ancillary services with requests.
	Technology	The EKG machine is old and cumbersome in the tight quarters of the MICU.	Adding the extra cables with additional leads would allow for printing of monitoring results from the monitors at the bedside t
	Technology	Tympanic thermometers are in short supply. Supposedly kept in one location, but witnessed the "search" for one when not proper	Buy unit thermometers for each room.
	Technology	RN must write down medications for preparation, then walk back to medication prep area to perform task.	Ensure printing capability for each PC exists. Better solution is to put meds in patient room.
	Technology	Most RNs on MICU feel that the computer based system, Eclipses, is cumbersome, but observation is that it has many capabilities	Ensure that education for Eclipses is ongoing. Recommend that in-service be performed on a regular basis for communication of

	Technology	Eclipses lab information not current, resulting in nurse having to call lab for information/results.	Discuss with lab why Eclipses information is not logged. When information is being logged you can literally see it pop up on t
	Technology	Is patient information available in Eclipsys once entered? There are procedures to follow if info does not appear.	Consult IS. Determine limitations. There may an issue that is workable, but not identified.
	Technology	Pneumatic tube system effective in sending out information to stat lab, but information not "received," causing turn around time to be long.	Discuss issue with stat lab and find out where constraints exist. Develop solution to problem. Good system not fully employed
Oncology	Facilities	Staff have to go to cafeteria for off hours meals	Consider off-hour (with Juice and Java Coffee Shop closed) alternative for food.
	Facilities	Server doors/drawers are left open	Install self-closing door devices
	Facilities	(Staff Comment) Water at sinks is never hot or even warm	Fix
	Facilities	(Staff Comment) Servers too high for shorter people (most of the nurses); also all storage/supplies in any area are too high	(No solution offered)
	Facilities	(Staff Comment) I don't think the air system really works; can increase infections	Recheck the air system
	Facilities	Cleaning services. Housekeeping not performed while floor tech was out unexpectedly. Pertinent cleaning supplies were missing a	Institute a log system to ensure accountability and make sure all tasks get completed. Outsource cleaning to another company.
	Facilities	W5A - Transport in tunnel from Weinberg to JHH MRI/CAT Scan facilities is very unpleasant for the patients. The tunnel is long	Work to beautify JHH tunnel in someway.
	Human Resources	(Staff Comment) Complex patient population with many psychosocial education and discharge needs; many agency nurses on unit	Hire case manager to follow patients from admit to D/C and help coordinate D/C inc. insurance coverage; standardize pt. ed mate
	Human Resources	(Staff Comment) No voice in decision making that affects employees' work situation	For a change, employees should have a say or voice on equipment changes etc. that directly affect them
	Human Resources	(Staff Comment) Benefit package insufficient	Improve incentive to employees; start matching 403k; pay school loans
	Human Resources	W5A: Some of the RNs complain that the unit clerk could be better utilized. She could be of more assistance in preparing the do	Revisit unit clerks roles and responsibilities and new ways she could help the unit be more efficient...i.e. helping to stamp the p
	Human Resources	Support roles are underutilized; in some cases it's performance problems, in others it's lack of supervision or structure	Re-define supports to nursing based on full staffing, and under staffing days; Clinical Associate can support patient baths and AM care.
	Human Resources	Support Associates operate with too much independence resulting in tasks not done or not done timely	Put tasks for the day in 2-hour blocks (8-10, 10-12, 12-2, 2-4); have a report on success of each block to charge nurse 3/day.
	Human Resources	(Staff Comment) Hiring too many consultants who will decide what's good for the employee by observing them on a short-term basis is not the best approach.	It will save a great deal of time and money if the hospital will ask their own employee how to improve their own work situation

	Human Resources	(Staff Comment) Using nurses for other functions that is not directly related to patient care isn't good	Figure out ways not to use nurses for business functions of the hospital
	Human Resources	(Staff Comment) Salary can improve	Rather than giving bonuses, increase salaries
	Human Resources	If 50% of your unit's nurses are agency nurses, are we still offering a Hopkins' product? What is the critical mass of JHH RNs	
	Human Resources	W5A: No Clinical Associates/Techs. They could really use that middle support person to assist the RNs with direct patient care,	Incorporate Clinical Associate into the staffing model of W5A.
	Human Resources	Units at JHH self-select the roles they want between the nurse role and the Clerical Associate role.	Develop more objective criteria for building roles within every unit's organization
	Other	Support Services. Cafeteria too far away, wait too long, employees too rude. Meals for patients are often old and cold because of delay in delivery.	Work to improve nutrition services and customer service in the cafeteria. Think about eliminating food service from JHH Cafeteria.
	Other	Coffee. RNs and MDs have to stop at the coffee cart (delaying shift change or rounds) or chose to walk off the unit to get coffee.	Arrange for coffee grounds/packets to be delivered regularly so that staff can quickly and efficiently gain access to much need
	Processes	Visitation policy. Oftentimes visitors can get places that staff and patients cannot. RNs need room to work with and around patient.	Revisit and reinforce visitation policies and procedures. Increase accountability.
	Processes	W5A: There is a great scanning system for charging supplies. But are the directions clear and followed by everyone. Are all item	Gain a better understanding of how the system can and does function and is used. Revisit procedure with RNs. Determine how it c
	Processes	Lack of uniformity in Clerical Associate responsibilities	Define specific duties by time; also ensure that clerical tasks are done such as handwriting lab requisitions for nurses, doing printouts, etc.
	Processes	W5A: Outgoing RNs record shift report into a tape recorder for oncoming RN to listen to while outgoing RNs are finishing up with other duties.	Multiple tapes...one tape per patient (perhaps that would create clutter and lead to lost tapes). Perhaps do nothing; leave procedure as-is.
	Processes	Manual lab ordering with paper requisitions.	Create order entry for labs
	Processes	(Staff Comment) Never have the correct med, or the med arriving in a timely fashion; Pharmacy MAR is often incorrect.	MD order entry systems with interface to pharmacy
	Processes	Treatments can begin around midnight due to MDs writing routinely orders in the late afternoon.	Initiate process between two residents with attending at rounds where one resident writes the orders while the other resident ensures it is correct.
	Processes	MRI/CAT Scan - Outpatient and Medical Practice Clinics occupy all A.M. appointments thus delaying care.	Work to coordinate MRI/CAT Scan schedule with all pertinent parties. Incorporate 'working rounds' so all orders are written, simultaneously.
	Processes	Effectiveness of rounds affected by attending's primary concern - care versus research	Facilitate rounds through pre-printing of lab and Eclipsys summaries
	Processes	Distance between Weinberg and main kitchen, plus meal order processing problems, creates too much cold and wrong food	Consider alternative cold food options (box lunch)

	Processes	(Staff Comment) There should only be one medication system oncology-wide	Get rid of interfaces; consolidate to one system; will yield fewer med errors and create happier more satisfied nurses; reduced
	Processes	W5A: Physicians record MD notes in EPR. Can RNs get access to EPR? They have no way of viewing the physician notes on their pat	Coordinate MD and RN programs and not taking/viewing space electronically so notes and orders are secure but available to all p
	Processes	(Staff Comment) Pharmacy does not correctly stock PRNs in servers; med drawers often unlocked and server doors left open.	Keep drawers and cabinet closed
	Processes	(Staff Comment) Supply items not here take forever to be delivered	Supply Coordinator/Unit Manager to interface with departments to get supplies so nurse doesn't do it; Coordinator would track p
	Technology	(Staff Comment) Computer too slow; too many functions; need to be able to click on icons without flipping back and forth wasting time.	Need state of the art computer to go along with state of the art building
	Technology	W5A: There are five or more computer systems that each nurse is constantly using throughout the day. Each one has a separate pas	Is there a way to have the same password for every program so only one password has to be remembered?
	Technology	W5A and C: Laptop on rounds cart to increase the mobility and use of Eclipses during MD and RN rounds.	Is there a way to link Palm pilots to Eclipses so RNs can take that in the room (click/click/click) input info, then hot sync back to Eclipses.
	Technology	W5A and C: Paging System. Overhead paging system is very disturbing to patients. Locators do not work when RNs are in the hall	Research and investigate opportunities for a different paging/locator/communication device for the unit floors.
	Technology	OCIS handles medicine calculations but the values those calculations are based on (height, weight, etc) are in Eclipses.	Work with IS staff/programmer to facilitate interaction with the programs or design additional screens to better share information.
	Technology	(Staff Comment) Increase communication between MDs and RNs	Distribute text pagers; helps facilitate following out orders
	Technology	W5A: There is no indication when the blood sample for each patient expires in the lab. RNs will wait and wait for requested med	Include a new column of information on the OCIS Blood bank screen indicating the date and time that each patients' blood sample
	Technology	Summaries of info in Eclipsys and labs not easily made available for MDs and residents during rounds	Redo the computer cubby space in the corridors to face out; then MDs and residents can collectively see Eclipsys and lab summaries.
	Technology	(Staff comment) Have MARS on Eclipsys	
	Technology	(Staff Comment) Have all paper forms (in pt binders) in Eclipsys	
	Technology	(Staff Comment) Equipment needed not always in patient rooms	Keep Dina maps with O2 devices in every room; need ability to weigh patients in each room; also BP cuffs
	Technology	(Staff Comment) Call/locator system ineffective; patients complain of noise	Alpha pagers; need communication system that lets staff talk to each other from any location; needs to be quiet; auto. Call to
	Technology	(Staff Comment) One Icon on the computer for all references	
	Technology	Systems used by nurses and MDs are too slow and therefore ill-used	Increase speed of the systems

	Technology	(Staff comment) Have more than one pulse ox on unit.	
	Technology	(Staff comment) A lab label machine that you can enter the date/time and your initials onto and it will print out a label	
	Technology	Staff's knowledge of computer use is limited; e.g. back in and out of programs rather than use Ctl-Alt keys.	Assess key computer/keyboard uses, create an assessment tool for these, and then test staff to identify areas for improvement (
	Technology	(Staff Comment) Drug compatibility; need something that you can record exact drug admin times.	Palm pilot
Perinatal	Human Resources	Differing skill levels, even among CA staff.	Develop staff so that a CA is a CA, and can be utilized in one area that may require additional resources at one point in time.
	Human Resources	Don't see unit integration between RN/CA/SA.	Management should develop team approach.
	Human Resources	Staff does not delegate duties effectively.	Integrate staff.
	Human Resources	12-hour shifts, although preferred by staff, seem to disrupt continuity. Is there a point of diminishing returns during the la	To be determined by staff.
	Processes	SA loads a cart with stock from the supply room that she thinks will be needed to replenish supplies in the individual birthing	Perform check on which rooms were used, then determine which supplies are needing restock, then perform task accordingly.
	Processes	SA assembles clear plastic patient bags which contain: Urine collection cup, Sheet, Transducer belt and Patient gown	Order packs already assembled (standardize w/Bayview/Howard.)
	Processes	Room resupply not standardized.	Develop standardized list/approach to room resupply.
	Technology	Thermometer reading manually entered in chart.	Why not directly interface the thermometer with the electronic chart?
	Technology	Poor communication among staff.	Wireless headsets or similar device between RN and CA/SA to simply call for assistance rather than hunting them down or doing it themselves.
	Technology	Thermometer mounted away from bed by sink.	Relocate thermometer.
	Technology	Keyboard entry labor intensive.	Utilize current technology through employment of voice entry software.
	Technology	QS in use but duplicated with paper charts.	Automate entire process.
	Technology	Staff locator antiquated.	Develop graphic locator w/ touch screen that can then directly communicate w/ staff member by wireless.
	Technology	Staff locator system does not seem to be working. Charge nurse looked for SA on computer, could not find, and had to leave the	Fix current system, or develop system that is better suited to environment.
Surgery/Weinberg	Facilities	Not satisfied w/current level of nutritional support.	What about putting a kitchen dedicated to units w/in Weinberg?
	Human Resources	Additional benefits, to include family.	What kinds of benefits are available to family members currently? What about educational opportunities for children of staff?

	Human Resources	Home care coordinator no longer on unit.	Consider combining the home care coordinator function with the social worker function.
	Human Resources	Poor morale w/respect to pay, especially in light of what agency/travel RNs receive.	Develop scheme to compensate staff for level of effort. Same effort is given twice the reward to someone w/little vested in the organization.
	Other	Linens are substandard.	Worn linens should be replaced, and steps should be taken to ensure status is checked on linen supply quality.
	Other	Six beds closed due to lack of staff.	Review staff and model to try to maximize bed use.
	Other	Pod "D" is utilizing SAs for more direct patient care. To facilitate this housekeeping is being used on that pod.	To see if this is effective, recommend that metrics be developed and monitored to see if this is working before employing on other units.
	Processes	SA/Housekeeping Pilot in process yet no metrics established to evaluate the effect, nor are standard processes in use to proper	Establish protocol for SA/Housekeeping Pilot to ensure it is properly tested and measured.
	Processes	Not sure about supply re-stock system. Did not see par level management at the individual room point.	Investigate supply process further.
	Processes	Excessive delay in getting wheelchairs to unit for patient discharge.	Investigate process for obtaining wheelchairs and address shortfalls. Related to transporter system issue.
	Processes	Staff has requested specialized linen packaging to no avail.	Explore possibility of having linen packaged and delivered as it is needed/used on the unit to reduce linen handling and manage
	Processes	Cot waiting list in use. 3 cots available for 48 rooms?	Either get enough cots to meet the demand, or put convertible chair/beds in rooms.
	Processes	Call-off process not uniform resulting in delayed and partial information flow.	Establish and enforce system for call-off. Use of Ops Nurse pager may be best. May also consider cell phone for Ops Nurse.
	Processes	JHH Transporter system not used.	Investigate why JHH Transporter system is not used and address shortfalls.
	Processes	Lab samples not checked during routine lab rounds.	Establish a process that ensures lab samples are picked up during routine lab rounds.
	Processes	All preprinted forms not placed in chart by pre-op staff.	Establish process to ensure that all forms are included in chart when it is created.
	Processes	Ensure lab support is available.	Instead of calling pod to see if urines need to be picked, come to pick up specimens. Should be a way to electronically "tell"
	Processes	Pharmaceutical reconciliation sheet.	Quantum leap in patient safety team is creating tool to determine if orders should be changed based on what meds were prescribe
	Technology	Hill-Rom not utilized as well as it could be.	Encouraging to hear that everyone wears his or her device, but did not see everyone wearing the device.
	Technology	Operations room has PC, but is not useable because of terminal.	If shared drive were made available, this would be a good place for people to come during a down time to obtain information.
	Technology	Purchasing more Dina Maps may be one answer, but what about "smart bed" technology?	Technology that can monitor vitals and then download that information directly into an electronic record would be a better way
	Technology	NC IIIs carry pagers, and then have to make calls to communicate with caller.	If Blackberry technology is employed nursing staff could access shared drive, send and receive communications, view bed availability, etc.
	Technology	Bed assignment process is all stubby-pencil. Much duplication of work in transcribing data already captured electronically.	Automate bed assignment process. Make seamless from Surgery Coordinator to Ops Nurse to NC III with continuous real-time visibility.

	Technology	Staff scheduling being done manually & with homegrown Excel.	Use commercial staffing program-explore Nightingale pilot in JHH - Place info on shared drive for all to access.
	Technology	Dina Maps used to take vital signs.	Great technology. Push of a button, but availability is limited to one per unit, and by self-admission, people will wait for t
	Technology	Staff schedule done hard copy.	Provide common server space where staff schedule can be posted. Set up email group to auto mail staff rosters.
	Technology	No, or poor, visibility to the on-call roster.	Clerk, etc. has to call down to Centrex to get information because they cannot access information electronically.
	Technology	Inability to "see" patients on other pods w/in surgery.	If a family member presents to the wrong pod the clerk does not know where that patient is located if they are not on that part
	Technology	Currently use paper charts.	Why not use Eclipsys, or some similar system? 24 hr. MAR also takes time.
	Technology	Email system, when working, is becoming more useful to communicate.	Get the system fixed. Attempts have, and are, being made, but it has been down for 3 weeks.
	Technology	Operations nurse, clerk and various staff all seeking information on bed availability and/or what patient should go where.	Create/purchase system that gives the responsible party the ability to "load" patients into a bed. The various staff members c
	Technology	Home Healthcare Referral forms hand-generated and processed through FAX MACHINE	Automate Home Healthcare Referral Process.
	Technology	(Staff comment) Hand held computers to enter data and assessment that then hot syncs with Eclipsys	
	Technology	Computer & monitor in Ops Nurse room dated and monitor is nearly impossible to read.	Install new computer & monitor with network connectivity in Ops Nurse room to facilitate planning, communication, and unit management.
	Technology	Unit "issues" log kept hard copy.	Automate unit "issues" log into a database.
	Technology	Overall lack of equipment support-- BP cuffs, thermometers at bedside for example	Purchase more equipment if feasible.
	Technology	No bedside keyboard entry to patient record.	Install bedside keyboard system and electronic record system on unit.
	Technology	Patient educational videos not available through room television.	Install system to allow patient education videos to be channeled to particular rooms on demand.
	Technology	Physician on-call list hand-generated after several telephone calls.	Establish system to post on-call list on a shared drive where it would be available to all real-time.
	Technology	Inability to effectively communicate information.	Create a shared drive, so that all staff can look at the schedule and other information.

Appendix C: Cell Phone Plan Comparison and Projected Return on Investment

# Phones for L&D Pilot	Plan	Home 50	Home 250	Home 400	Home 600
16	Monthly Service	\$14.99	\$24.99	\$34.99	\$39.99
	Total Monthly Charge	\$239.84	\$399.84	\$559.84	\$639.84
Plan/Minutes		50	250	400	600
Days in Month		<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>
Minutes Available/Day		1.67	8.33	13.33	20
Number of Nurse Phones		<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
Phone Minutes Available/Day		10.02	49.98	79.98	120
Days in Week		<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
Phone Minutes Avail/Week		70.14	349.86	559.23	840
Weeks in Month		<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>
Phone Minutes Avail/Month		280.56	1,399.44	2,236.92	3,360
Total Phone Hours Avail/Month		4.7	23.3	37.1	56
Avg. RN Hourly Salary		\$24.00	\$24.00	\$24.00	\$24.00
Potential RN Hours Saved/Month*		4.7	23.3	37.1	56
Potential Saved RN Salary/Month		\$112.80	\$559.20	\$890.40	\$1,344.00
Cost of Plan/Month		\$239.84	\$399.84	\$549.84	\$639.84
Cost Minus Potential Savings		\$(127.04)	\$159.36	\$340.56	\$704.16
ROI %		(112.6%)	28.5%	38.2%	52.4%

*Based on one minute of saved RN minute for each one minute of cell phone use.

Appendix D: Task Frequency Collection Form

Date: _____ Unit: _____ Shift: _____ Name: _____ Position (circle): Charge Nurse RN CT SA

HOUR	MINUTE	ACTIVITY TALLY	BABY		HOUR	MINUTE	ACTIVITY TALLY	BABY		HOUR	MINUTE	ACTIVITY TALLY	BABY		HOUR	MINUTE	ACTIVITY TALLY	BABY	
			MOM					MOM					MOM					MOM	
	:00																		
1ST HOUR	:10				7TH HOUR	:10				10TH HOUR	:10								
	:20					:20					:20								
	:30					:30					:30								
	:40					:40					:40								
	:50					:50					:50								
	:00					:00					:00								
2ND HOUR	:10				8TH HOUR	:10				11TH HOUR	:10								
	:20					:20					:20								
	:30					:30					:30								
	:40					:40					:40								
	:50					:50					:50								
	:00					:00					:00								
3RD HOUR	:10				9TH HOUR	:10				12TH HOUR	:10								
	:20					:20					:20								
	:30					:30					:30								
	:40					:40					:40								
	:50					:50					:50								

DIRECT		PLANNING		PATIENT SUPPORT		COMMUNICATION	
11 Bath/Elimination	21 Care Planning	31 Medication Preparation	41 Professional/Clinical				
12 Assessment	22 Care Coordination	32 Linen Change/Making Beds	42 Family				
13 Giving Meds/IVs	23 Discharge Planning	33 Monitor Watch	43 Staff/Student Education				
14 Treatment - Hands-On		34 Blood/Urine Test	44 Scheduling				
15 Treatment - Equipment		35 Meal Assistance	45 Shift Report				
16 Assist Unit Procedure							
17 Ambulation of Patient							
18 Patient Teaching/Communication							
19 One-on-One Nurse Care							
DOCUMENTATION		TRANSPORTATION		MEETINGS		UNIT CARE ACTIVITIES	
51 Flow Sheets/Charting	61 Patient Within Unit	71 On Unit	81 PYXIS/Inventory/Narcotics				
52 Taking Off Orders	62 Patient To/From Unit	72 Education	82 Check Equipment				
53 Chart Maintenance	63 Supplies On Unit	73 Off Unit	83 Restock Room Supplies				
54 Reports for Nursing	64 Supplies/Equipment To/From Unit		84 Cleaning Patient Room/Unit				
55 Preceptor Information	65 Meds/Specs On Unit						
56 Computer	66 Meds/Specs To/From Unit						
	67 Walking Self On Unit						
	68 Searching For Chart						
	69 Searching For Supplies						
READY & WAITING		PERSONAL		MANAGING OTHERS			
91 Ready & Waiting	101 Personal Time	110 Calling Other Depts. for Service					
		111 Delegating/Following-Up					

Appendix E: Cell Phone Feedback Survey

Cell Phone Feedback Survey

As you know, during the past month we have been running a pilot evaluation of cell phone use on the Perinatal Unit. The evaluation considered self-reported task frequency for each worker before and after deployment of the cell phones and pre and post phone call frequency. Detailed itemized bills for each cell phone are being analyzed to determine usage patterns and to evaluate the cost-effectiveness of the phones.

As important is your feedback and comment on how the cell phones have affected you and the performance of your job. Please take a few moments to answer the brief questions below to help us evaluate the impact of the phones. You may add additional comments on the space provided.

Thank you.

Name: _____ Position (circle): NCI NCII NCIII CT SA

Please circle the response that best reflects your experience.

<p>1. Have you used one of the new hospital cell phones while at work during this pilot study?</p>	<p>Yes No</p> <p><u>If you answered no, please proceed to Comments section and turn this form in.</u></p>										
<p>2. If you used one of the hospital cell phones while at work during this pilot study how did it help you to accomplish your job?</p>	<table style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">1</td> <td style="width: 20%;">2</td> <td style="width: 20%;">3</td> <td style="width: 20%;">4</td> <td style="width: 20%;">5</td> </tr> <tr> <td>It made my job much harder.</td> <td>It made my job harder.</td> <td>It didn't make my job harder or easier.</td> <td>It made my job easier.</td> <td>It made my job much easier.</td> </tr> </table>	1	2	3	4	5	It made my job much harder.	It made my job harder.	It didn't make my job harder or easier.	It made my job easier.	It made my job much easier.
1	2	3	4	5							
It made my job much harder.	It made my job harder.	It didn't make my job harder or easier.	It made my job easier.	It made my job much easier.							

<p>3. If you used one of the hospital cell phones while at work during this pilot study how did it affect patient care?</p>	<p>1 It made patient care much worse.</p>	<p>2 It made patient care worse.</p>	<p>3 It didn't make patient care better or worse.</p>	<p>4 It made patient care better.</p>	<p>5 It made patient care much better.</p>
<p>4. If you used one of the hospital cell phones while at work during this pilot study how did it impact the overall effectiveness of the Perinatal unit?</p>	<p>1 It made the unit much less effective.</p>	<p>2 It made the unit less effective.</p>	<p>3 It didn't make the unit less or more effective.</p>	<p>4 It made the unit more effective.</p>	<p>5 It made the unit much more effective.</p>
<p>5. If you used one of the hospital cell phones while at work during this pilot study do you think that cell phones should continue to be used on the Perinatal unit?</p>	<p style="text-align: center;">Yes No</p>				

<p>6. If you used one of the hospital cell phones while at work during this pilot study do you think that cell phones should be used in other nursing units?</p>	<p style="text-align: center;">Yes No</p>
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Comments:

Appendix F: General Comments on Cell Phone Use

Comment	Category
People abuse the phone (i.e. taking personal calls all day - so when we try to call with a work-related issue the line is busy!	ABUSE
I think they are not useful when certain staff constantly use it for personal reasons. Particular staff are constantly found on it for personal phone calls. Especially unit clerks. They are on the cell phones and state they are unable to answer the L/D phone.	ABUSE
Anesthesia should carry phone as well.	EXPAND
It would be nice to have a text paging option so that we don't have to answer a call (say, if we can't because we are scrubbed or because we are talking with a patient and don't want to be interrupted.)	EXPAND
It would be important, though, to have the following "abilities" if text messaging could be used: 1) A way to know who sent the message. 2) A way for the sender to know the message was received. 3) A way to alert the receiver that the message is urgent (i.e. it must interrupt)(like the NEXTEL 2-Way calling option. 4) A way to be reminded that an unheard or unread message exists. 5) Ideally, a way to read the message directly so that a voice mail doesn't have to be logged into (too much time.)	EXPAND
They would be helpful to have on Osler 2&3 because physicians are not present on these units the way they are in L&D.	EXPAND
We are not using them to their fullest potential - i.e.: we should page anesthesia to our phones.	EXPAND
Post/Ante partum - Charge Nurse should have a phone.	EXPAND
I don't think that they are necessary if they are extremely expensive, but overall I am neutral - favorable towards them.	NEUTRAL
It wasn't very used in my opinion but it should have great quality.	NEUTRAL
I don't exactly think we need them but if everyone else likes them then I don't mind using them.	NEUTRAL
We should have RN's enter their name and phone #'s by patient names on the QS chalkboard because if you (or an MD) are down the hall and you know who you need but not their phone # you have to walk to the desk to get the #.	POLICY
I've had more than one parent or patient think that I was talking on my personal cell phone!	POLICY
Suggest that staff make a short list at beginning of each shift with names & phone (to alleviate the complaint that they can't remember who has which phone.)	POLICY
PSCs could help by transferring unit calls to the staff's phone instead of calling staff member to come to the phone.	POLICY
We need to require that they vibrate - they should not ring in patient rooms.	POLICY
It is very helpful when getting in touch with coworkers off the unit. Contacting the charge nurse immediately.	POSITIVE
It helps when you are able to locate people yourself instead of paging someone.	POSITIVE
Greatly facilitated control & communication.	POSITIVE
A definite improvement in the efficiency of patient care & staff communication & accessibility.	POSITIVE
Saves time; more efficient way to get work done; better communication between staff!	POSITIVE
The cell phones are a great idea.	POSITIVE

I think that the pilot study would be a very good system to cut down or cut out the locator system.	POSITIVE
It is nice to be able to call another RN or the Charge RN with a quick question or to locate someone when they are off the floor.	POSITIVE
I like that it reduces overall noise in pt's rooms.	POSITIVE
The busier the person is, the more effective the cell phones become. If people would utilize them correctly & often so they become accustomed to them they would greatly benefit the unit.	POSITIVE
Those who especially need a phone - Charge Nurse, MDs, Anes team members, Clinical Associates.	POSITIVE
Very helpful - could get to people easier & as charge nurse I was made aware of pt's more effectively.	POSITIVE
I think the phones are particularly good for nurse - doctor communication.	POSITIVE
Also less personal calls answered on regular hospital lines.	POSITIVE
They are difficult to get used to & remember to use, but they do make the unit function more efficiently.	POSITIVE
Much easier to communicate between staff - especially reaching MDs & calling for assistance.	POSITIVE
Easier to contact co-workers without overhead paging disturbing other pts.	POSITIVE
For L&D it was useful to communicate when going for C/S.	POSITIVE
Communication between docs, anesthesia, & RNs was much improved. I really thought it worked much better than paging & standing by the phone! It also helps to call the SA when a room needs to be cleaned etc! Love it!	POSITIVE
I feel the cell phones were very helpful locating the residents when they are off the unit rounding etc. It was also very helpful communicating with co-workers when on different units like the OR. I like the fact that the charge nurse can be located if she steps off the unit.	POSITIVE
They really help decrease RN walking to desk and phone calls to the clerical assoc.	POSITIVE
I found the cell phone to be very helpful toward my job.	POSITIVE
I enjoyed using the phone at times because I did not have to do overhead paging for most of the doctors & workers.	POSITIVE
While you are doing pt care it's not good.	PT CARE
It can be quite intrusive.	PT CARE
Are intrusive, much more than a pager would be.	PT CARE
It may improve patient care by making everyone more readily accessible	PT CARE
It's a problem to receive calls performing Pt. Care.	PT CARE
Interrupts pt. Care	PT CARE
I didn't care for the phone ringing (and needed to be answered immediately) while I was in the middle of pt. care with gloves on.	PT CARE
It is not clear to me why we need them; I.e. what problem do we have which would be solved through the use of these phones?	PURPOSE
Next time, please communicate reason & goal of pilot so people are more receptive & "on-board" with the trial.	PURPOSE
If for some reason we don't get the cell phones - we definitely need more unit phones in hallway, etc.	SUGGEST
The phones do not work well (sound is not clear).	TECH
Scrolling down to find a particular person can be time consuming.	TECH

It's difficult to dial someone if your hands are sterile or if it's an urgent situation.	TECH
I think that annoying rings are very disruptive	TECH
On L&D they need voice activator. Unable to use phone for emergency when both hands are in use.	TECH
We need an activated voice dial for emergencies.	TECH
Still need to use Hollister locators too!	TECH
Sometimes its hard to scroll down names on phone book, is a voice activated dialing system too expensive?	TECH
The alphabetical phone book should have all OB residents under OB not OB intern/Assistant Resident OB.	TECH
Are there less complicated phones - the Nokia 5165 is much easier to use recently dialed numbers and phone book much easier.	TECH
Can we activate touch pad - speed dialing i.e.: Call RN 5 by pushing 5.	TECH
Need to change order of phone book.	TECH

Appendix G: Cell Phone Usage by Nurses in February

410-274-4670 (CHARGE NURSE)	\$37.28	716 minutes	
Type of Call			% of Total Calls
<i>Total Incoming Calls</i>	<i>347</i>		<i>56.4%</i>
<i>Total Outgoing Calls</i>	<i>268</i>		<i>43.6%</i>
<i>Total Calls In February</i>	<i>615</i>		% of Outgoing Calls
Outgoing Calls to JHH Cells		185	69.0%
Outgoing Calls to JH System (955)		34	12.7%
Outgoing Calls to Mailbox/Data		24	9.0%
TOTAL Outgoing Calls to Non-JHH or System Calls		25	9.3%

410-241-2933 (RN 1)	\$38.30	289 minutes	
Type of Call			% of Total Calls
<i>Total Incoming Calls</i>	<i>77</i>		<i>37.7%</i>
<i>Total Outgoing Calls</i>	<i>127</i>		<i>62.3%</i>
<i>Total Calls In February</i>	<i>204</i>		% of Outgoing Calls
Outgoing Calls to JHH Cells		81	63.8%
Outgoing Calls to JH System (955)		18	14.2%
Outgoing Calls to Mailbox/Data		8	6.3%
TOTAL Outgoing Calls to Non-JHH or System Calls		20	15.7%

410-274-4687 (RN 2)	\$37.28	402 minutes	
Type of Call			% of Total Calls
<i>Total Incoming Calls</i>	<i>94</i>		<i>35.1%</i>
<i>Total Outgoing Calls</i>	<i>174</i>		<i>64.9%</i>
<i>Total Calls In February</i>	<i>268</i>		% of Outgoing Calls
Outgoing Calls to JHH Cells		100	57.5%
Outgoing Calls to JH System (955)		34	19.5%
Outgoing Calls to Mailbox/Data		13	7.5%
Total Outgoing Calls to Non-JHH or System Calls		27	15.5%

410-241-3596 (RN 3)	\$37.28	466 minutes	
Type of Call			% of Total Calls
Total Incoming Calls	107		38.4%
Total Outgoing Calls	172		61.6%
Total Calls In February	279		% of Outgoing Calls
Outgoing Calls to JHH Cells		123	71.5%
Outgoing Calls to JH System (955)		20	11.6%
Outgoing Calls to Mailbox/Data		0	0.0%
TOTAL Outgoing Calls to Non-JHH or System Calls		29	16.9%

410-241-4663 (RN 4)	\$37.28	343 minutes	
Type of Call			% of Total Calls
Total Incoming Calls	109		40.1%
Total Outgoing Calls	163		59.9%
Total Calls In February	272		% of Outgoing Calls
Outgoing Calls to JHH Cells		109	66.9%
Outgoing Calls to JH System (955)		23	14.1%
Outgoing Calls to Mailbox/Data		11	6.7%
TOTAL Outgoing Calls to Non-JHH or System Calls		20	12.3%

410-241-6938 (RN 5)	\$37.28	332 minutes	
Type of Call			% of Total Calls
Total Incoming Calls	101		45.3%
Total Outgoing Calls	122		54.7%
Total Calls In February	223		% of Outgoing Calls
Outgoing Calls to JHH Cells		80	65.6%
Outgoing Calls to JH System (955)		20	16.4%
Outgoing Calls to Mailbox/Data		0	0.0%
TOTAL Outgoing Calls to Non-JHH or System Calls		22	18.0%