

Running head: EFFICIENCY AND PROCEDURES RELATED TO INPATIENT  
OBSTETRIC CARE

Inpatient Obstetric Care at Irwin Army Community Hospital: A  
Study to Determine the Most Efficient Organization

CPT Timothy N. Bergeron, CHE

U.S. Army-Baylor University

Graduate Program in Healthcare Administration

A Graduate Management Project

Submitted In Partial Fulfillment of Requirements for

MASTERS IN HEALTH ADMINISTRATION

March 2001

Report Documentation Page				Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.						
1. REPORT DATE <b>MAR 2001</b>		2. REPORT TYPE <b>Final</b>		3. DATES COVERED <b>Jul 2000 - Jul 2001</b>		
4. TITLE AND SUBTITLE <b>Inpatient Obstetric Care at Irwin Army Community Hospital: A Study to Determine the Most Efficient Organization</b>				5a. CONTRACT NUMBER		
				5b. GRANT NUMBER		
				5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) <b>CPT Timothy N. Bergeron</b>				5d. PROJECT NUMBER		
				5e. TASK NUMBER		
				5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Irwin Army Community Hospital 600 Cassion Hill Rd Fort Riley, KS 66544</b>				8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) <b>US Army Medical Department Center and School Bldg 2841 MCCS-HRA (US Army-Baylor Program in HCA) 3151 Scott Road, Suite 1412 Fort Sam Houston, TX 78234-6135</b>				10. SPONSOR/MONITOR'S ACRONYM(S)		
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) <b>23-01</b>		
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release, distribution unlimited</b>						
13. SUPPLEMENTARY NOTES <b>The original document contains color images.</b>						
14. ABSTRACT <b>This study attempts to compare, analyze, and recommend the most efficient model with which to deliver inpatient obstetrics and gynecological services to the served population of Irwin Army Community Hospital. During a time in which the United States Armed Forces continue to experience increased budgetary constraints, the cost of delivering healthcare to military beneficiaries continues to increase. Decreases in the overall military budget after considering the effects of inflation have been translated into ever more severe restrictions on the budgets of military healthcare facilities. At a time when healthcare budgets are facing some of the greatest restrictions in recent memory, the military managed care model, TRICARE, has placed military facilities in competition with civilian institutions for what had previously been a captive market. This competition for enrollees translates into competition for funding as dollars follow patients to the facility of choice. The results of this study serve to identify the most costeffective delivery model for inpatient OB/GYN. As indicated, transformation from the traditional model of inpatient OB/GYN to the more modern LDR/LDRP model would serve to decrease costs and increase patient satisfaction. Increasing patient satisfaction would allow military healthcare to retain beneficiaries and funds that otherwise would be lost to the civilian sector.</b>						
15. SUBJECT TERMS <b>Inpatient OB/GYN efficiency; cost analysi and comparison; implications of TRICARE</b>						
16. SECURITY CLASSIFICATION OF:				17. LIMITATION OF ABSTRACT <b>UU</b>	18. NUMBER OF PAGES <b>85</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>				

ACKNOWLEDGEMENTS

Numerous individuals have given freely of their time, talents, and patience throughout the course of this study without which completion of this daunting task would never have been possible. I would specifically like to express my appreciation to LTC Scott Hendrickson whose infinite patience, encouragement, and motivation while serving as preceptor during this project ensured its completion. A special word of thanks must be given to Lori Russell whose editorial comments and motivational abilities served to greatly enhance this effort. To David Bradley and Dawn Wilmore of Geary Community Hospital, Burma Barfield, MAJ Neva Westhoff, and the staff of Irwin Army Community Hospital's Women and Infant Care Center, I would like to extend my sincere thanks and appreciation for the education they provided on the practical applications of theoretical concepts. Finally, I would like to thank my wife Christina and daughter Sidney "The Bean" for their unwavering support, sense of humor, understanding, and ability to keep me focused on the truly important aspects of life throughout this lengthy process.

Abstract

This study attempts to compare, analyze, and recommend the most efficient model with which to deliver inpatient obstetrics and gynecological services to the served population of Irwin Army Community Hospital. During a time in which the United States Armed Forces continue to experience increased budgetary constraints, the cost of delivering healthcare to military beneficiaries continues to increase. Decreases in the overall military budget after considering the effects of inflation have been translated into ever more severe restrictions on the budgets of military healthcare facilities. At a time when healthcare budgets are facing some of the greatest restrictions in recent memory, the military managed care model, TRICARE, has placed military facilities in competition with civilian institutions for what had previously been a captive market. This competition for enrollees translates into competition for funding as dollars follow patients to the facility of choice.

The results of this study serve to identify the most cost effective delivery model for inpatient OB/GYN. As indicated, transformation from the traditional model of inpatient OB/GYN to the more modern LDR/LDRP model would serve to decrease costs and increase patient satisfaction. Increasing patient satisfaction would allow military healthcare to retain beneficiaries and funds that otherwise would be lost to the civilian sector.

## TABLE OF CONTENTS

	<u>Page</u>
<b>ACKNOWLEDGEMENT.....</b>	<b>2</b>
<b>ABSTRACT.....</b>	<b>3</b>
<b>LIST OF FIGURES.....</b>	<b>6</b>
<b>LIST OF TABLES.....</b>	<b>9</b>
<b>INTRODUCTION.....</b>	<b>10</b>
Conditions Which Prompted the Study.....	15
Statement of the Management Question.....	22
Literature Review.....	23
Purpose.....	36
Hypothesis.....	36
<b>METHODS AND PROCEDURES.....</b>	<b>37</b>
Subjects or Events.....	37
Study Design.....	37
Type of Analysis.....	38
Schedule of Procedures.....	39
Reliability and Validity.....	39
<b>RESULTS.....</b>	<b>40</b>
<b>DISCUSSION.....</b>	<b>45</b>
<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>53</b>
<b>LIST OF REFERENCES.....</b>	<b>57</b>
<b>APPENDIX.....</b>	<b>60</b>
A. Graphical Comparison of Key Management Indicators.....	60
B. Computed Key Management Indicators.....	70
C. Facility examples taken from a traditional model of inpatient OB/GYN.....	78
D. Facility examples taken from an LDR model of inpatient OB/GYN.....	82

Page

E. Facility examples taken from an LDRP model of inpatient OB/GYN.....	84
--	----

LIST OF FIGURES

	<u>Page</u>
Appendix A	
1 Comparison of single-use obstetric rooms with multiple-use (LDR/LDRP) rooms as related to overall productivity per room.....	60
2 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total number of births (FY 2000).....	61
3 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total expenses (FY 2000).....	62
4 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to average length of stay (FY 2000).....	63
5 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total cost per bed day (FY 2000).....	64
6 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total cost per disposition (FY 2000).....	65
7 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total expenses per birth (FY 2000).....	66
8 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related average cost of nursing staff by type of staff member (FY 2000).....	67
9 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to staff cost per delivery (FY 2000).....	68
10 Comparison of single-use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to available staff members per delivery (FY 2000).....	69

Page

Appendix C

1 Photomicrograph of an example of a labor room at Irwin Army Community Hospital.....	78
2 Photomicrograph of an example of a delivery room at Irwin Army Community Hospital.....	78
3 Photomicrograph of an example of a recovery/transition room at Irwin Army Community Hospital.....	79
4 Photomicrograph of the nurse's station on the labor and delivery deck at Irwin Army Community Hospital.....	79
5 Photomicrograph of the post partum care ward at Irwin Army Community Hospital.....	80
6 Photomicrograph of an example of a private, post partum care room at Irwin Army Community Hospital.....	80
7 Photomicrograph of an example of a semi-private, post partum care room at Irwin Army Community Hospital.....	81

Appendix D.

1 Photomicrograph of an example of a labor, delivery, recovery room at Mercy Health Center.....	82
2 Photomicrograph of an example of a post partum room at Mercy Health Center.....	82
3 Photomicrograph of the nurse's station and The Women's Center ward at Mercy Health Center.....	83



Page

Appendix E.

1 Photomicrograph of an example of a labor, delivery, recovery, and post partum room at Geary Community Hospital.....	84
2 Photomicrograph of an example of a labor, delivery, recovery, and post partum room at Geary Community Hospital.....	84
3 Photomicrograph of The Women's Center ward and nurse's station at Geary Community Hospital.....	85
4 Photomicrograph of the nurse's station with view of the entrance and observation window to the NICU at Geary Community Hospital.....	85

LIST OF TABLES

	<u>Page</u>
Appendix B.	
1 Cost comparison of Douglas General Hospital Birthing Center with Eight Other Hospitals.....	70
2 Benefits of Single Room Maternity Care.....	71
3 Key Management Indicators for Irwin Army Community Hospital.....	72
4 Key Management Indicators for Bayne-Jones Army Community Hospital.....	73
5 Key Management Indicators for General Leonard Wood Army Community Hospital.....	74
6 Key Management Indicators for Mercy Health Center.....	75
7 Key Management Indicators for Stormont-Vail Regional Health Center.....	76
8 Key Management Indicators for Geary Community Hospital.....	77

Inpatient Obstetric Care at Irwin Army Community Hospital: A  
Study to Determine the Most Efficient Organization

Introduction

The arrival of a new baby is one of the most unique events associated with the human experience. Unlike almost any other service provided by a healthcare facility, obstetric care has been transformed into a supporting service centered on the patient whose efforts are, to a great degree, the determining factor in a successful outcome. This contrasts sharply with the more traditional healthcare model in which the patient seeks out the expertise of a trained physician and healthcare facility employing them to perform some type of medical intervention designed to resolve a specific medical diagnosis. Until the early 1980s it was thought that the delivery of a child was a medical procedure not unlike any other procedure performed by healthcare professionals. Most hospitals provided obstetric services in a manner similar to that of a surgical operation. Physicians viewed the process of childbirth as a medical procedure requiring surgical type sterility, thus facilities were designed to accommodate this type of process. During the early 1980s expectant families began to realize that childbirth was not a medical procedure but rather a natural, family focused

event celebrated since the dawn of time in which medical personnel and facilities should play a subordinate, facilitating role becoming noticeable only in the event of an emergency. Healthcare facilities and providers began to experience a shift in demand for obstetrical care from those facilities providing physician centered care to those facilities providing care based on a more family/mother focused model. In order to remain competitive, facilities began to recognize that a new approach to hospital based obstetric care was needed (Gilder, 1986).

There are approximately 3.9 million live births in the United States every year. The average facility cost of these births range from \$2,842 for a normal vaginal delivery to \$5,133 for a Cesarean procedure exclusive of physician charges. In order to capture this large healthcare market, healthcare organizations began to remodel facilities designed to appeal to expectant mothers shopping for maternity services (Perry, 1990).

Beginning in 1982, the United States saw the development of a new concept in childbirth, the Labor, Delivery, and Recovery room (LDR), and the Labor, Delivery, Recovery, and Postpartum room (LDRP). These new facilities represent a significant shift from the traditional thought process surrounding the provision of inpatient obstetrical services in a facility. In the LDR concept, the laboring mother is admitted to a room designed to provide for three of the four stages of the childbirth process,

labor, delivery, and recovery, in a private room designed to most closely resemble a warm, homelike setting. In comparison, the LDRP concept is designed to accommodate all four stages of childbirth: labor, delivery, recovery, and postpartum care in the same private, warm, comforting, homelike setting.

It is calculated by the American Hospital Association that there are 3,584 hospitals in the United States offering obstetrical unit services and that of these, 3,400 report that they have some form of single room maternity care. As this concept of care continues to develop, the trend among hospitals has been toward the LDRP concept. This model of care is reported to result in greater patient and family satisfaction levels as well as promoting a more efficient delivery of services by reducing the overall number of healthcare providers needed during the continuum of care. Additionally, patients experience added benefits from this new delivery system by allowing for continuity of provider and support staff throughout the inpatient stay. With the majority of expectant mothers willing to shop for the most comfortable setting in which to give birth, a willingness to consider and begin construction of a single room maternity concept is considered vital to the continuation of the inpatient obstetrical service within a facility (Perry, 1990).

In addition to an expected increase in demand experienced

at facilities offering the new LDR/LDRP concept, facilities converting to this new design may attract a better payer mix of patients willing to expend financial resources to experience the relaxed, more comfortable setting this new model of care offers. Facilities may demonstrate an increase in efficiency found by cross training its nursing staff in all of the stages of childbirth. The LDR/LDRP model focuses on a continuity of staff associated with each patient. That is to say that staff providing care for a patient during the labor stage of childbirth will continue to care for that patient/family until discharge from the facility. This ability of the nursing staff to handle all aspects of inpatient obstetrics stands in sharp contrast to the previous model where nursing staff members were able to perform those functions associated with only one of the steps in the birth/recovery process. There is evidence that a facility willing to upgrade to this more advanced model of facility design and patient care will experience the added advantage of being able to attract a more competent, experienced staff desirous of employment in a more state of the art facility (Reimer, Schick, 1982).

Irwin Army Community Hospital (IACH) is located at Fort Riley, Kansas. Constructed in 1958 as a 250 bed acute care facility, IACH was designed to support the medical needs of the soldiers and family members assigned to Fort Riley as well as

those eligible beneficiaries within the North East region of Kansas.

The vision of IACH is:

To provide accessible, customer-focused service, high quality standards, and an integrated healthcare system that is shaped to support the soldiers, families, and retirees of America's Army, Fort Riley, and our surrounding communities.

The mission of IACH is:

To manage, maintain, and promote the healthcare needs of soldiers, military families, and retirees; to support the readiness and deployment of a medically protected force; and to empower and value our staff while achieving efficient practices and meeting diverse future requirements.

IACH provides primary healthcare services to a population of over 35,154 with a budget of \$23.5 million. IACH has an authorized staff of 602 employees including 119 officers, 184 enlisted, and 299 civilians. Currently the hospital is staffed by 572 employees, including 112 officers, 155 enlisted, and 305 civilians. The facility's major healthcare product line is centered around its five most popular Diagnosis Related Groups (DRGs) which include, normal newborn, vaginal delivery (without complications), neonate (newborn) with other diagnoses, other antepartum diagnoses with complications, and cesarean section (A. Wallace, personal communication, 24 August, 2000). IACH delivers approximately 790 babies per year using five labor rooms, two delivery rooms, and 18 inpatient, post-partum beds

contained within the Maternal Child Unit located on the 3<sup>rd</sup> floor of the facility. Of the roughly 3,100 admissions per year, 25% are associated with inpatient obstetrics (S. Coangelo, personal communication, 12 September, 2000).

The inpatient obstetrics service currently employs 31 personnel using \$1,066,836.80 of equipment and \$95,247.70 worth of expendable medical supplies on a yearly basis to provide inpatient services to mothers and newborns. (S. Marshall, personal communication, 20 September, 2000).

#### Conditions which prompted the study

With the end of the Cold War, the United States was forced to reevaluate the continued spending levels associated with the maintenance of a large standing armed force. Military planners and congressional leaders determined a smaller, lighter, more reactionary force was indicated. Designed to emphasize more automation and less reliance on large numbers of soldiers, military structures faced significant decreases in the numbers of active duty troops.

As national priorities shifted away from military readiness in response to a perceived decrease in external threats to national security, the military began to experience a corresponding decrease in funding. In response to decreases in



congressional appropriations for national defense, the Department of Defense found it necessary to reevaluate internal funding priorities. As mandated manpower numbers declined and in order to align fiscal policy with the newly published priority placed on technology in lieu of human numbers, the Department of Defense began to increase spending on programs designed to modernize its aging weapons inventory. This modernization program was intended to provide a more lethal force while decreasing the required number of troops necessary to accomplish published national objectives.

As the total number of active duty military troops continued to decline, military service planners began to shift funding priorities away from those institutions designed to provide support to what was now a smaller number of troops. Military healthcare institutions began to experience increasing pressure to decrease the number of personnel and funds needed in fixed facilities that provide medical support to what was becoming a smaller number of active duty troops and families. Military Treatment Facilities (MTFs), however, provide care not only to active duty troops and their family members but also to a large number of retirees and other eligible beneficiaries. As these retirees aged, the numbers seeking treatment in federal military facilities and the severity of illness requiring treatment began to grow at an astonishing rate, requiring not

less funding and fewer personnel to provide for this mission but rather an increasing amount of both.

The demand for medical care within the military health system continued to grow as the number of military hospitals and providers continued to decline in concert with the overall decline of the active force. In response to this decreasing medical capability and the increasing medical cost associated with the treatment of family members, retirees, and eligible beneficiaries, the Department of Defense adopted the civilian model of healthcare provision using the Health Maintenance Organization (HMO) method of administration in an attempt to reign in the cost of military medical care. Under this new system known as TRICARE, eligible beneficiaries of the military medical system may choose from among three different healthcare options. These three options are; TRICARE Prime, TRICARE Extra, and TRICARE Standard.

Patients electing to receive care under the TRICARE Prime option are treated in a system most closely resembling that of a civilian HMO. Prime enrollees are enrolled with a primary care manager (PCM) in the MTF at no cost or with a primary care provider contracted for a nominal charge payable at each visit. Active duty family members enroll at no cost while retirees and their families pay an annual enrollment fee of \$230 for the individual or \$460 per family (TRIWEST Healthcare Alliance,

1998).

The second option, TRICARE Extra, is similar to a civilian health plan known as a preferred provider organization (PPO). Beneficiaries electing care from this option choose a civilian primary care provider from a network of local physicians maintained by the regional TRICARE contractor. While the cost associated with TRICARE Extra is greater than Prime, additional provider choice is available.

The third option available in the TRICARE system is known as TRICARE Standard. This option provides beneficiaries with the opportunity to choose any civilian primary care physician certified by TRICARE. This additional choice, however, comes with the highest personal cost to the patient. Some physicians chosen by military beneficiaries may not accept the reimbursement rates provided by the TRICARE system and may bill the patient directly for charges above that paid by TRICARE.

This move by the Military Health System to the managed care model described above is expected to provide cost and staff savings as well as increases in patient satisfaction. The TRICARE system adopted by the military, if operated as advertised, lends itself most appropriately to the LDR/LDRP model of inpatient obstetrics. As documented in current literature, the experiences of The Kaiser Permanente Medical Care Program in the Northern California Region demonstrate the

close compatibility of managed care and the LDR/LDRP model of obstetric care.

Kaiser found that the Labor and Delivery Service Unit Model, a substratum of the LDRP model, was crucial in determining: "(a) appropriate distribution of staff based on historical trends; (b) acceptable levels of base staffing by shift; and (c) the most effective use of standby staff" (Jones, D., 1992, P. 133). This model for a labor and delivery unit provides a process by which health care organizations may more appropriately allocate nursing resources. Use of this model may also provide critical management information required by administrators for the operation of a cost-effective labor and delivery service while providing quality, safe care (Jones, 1992).

Currently military treatment facilities are funded based on historical data. Under this system, yearly budgets are determined from funding levels for the previous year plus or minus a percentage based upon overall funding availability within each service's medical community. It is widely believed within the military health system that as the military moves to transform itself into a replica of the full civilian affectation of the HMO, one would expect to see funding for individual military treatment facilities based upon the gross number of beneficiaries enrolled in TRICARE Prime within the MTF. This

method of reimbursement is known as capitation.

The yearly decreases in funding (relative to inflation) for the provision of medical services provided within the Department of Defense have forced many military treatment facilities to reduce or defer purchases of capital equipment or compliance with stated replacement or improvement goals indicated by the facility's physical plant. As military treatment facilities continue to defer the purchase of state of the art medical equipment and are unable to financially support upgrades or improvements to their physical plant, facilities find themselves less and less able to provide services at what are considered in the civilian community as the standard of care.

Inpatient obstetrical care has long been regarded as a primary introductory service provided by many healthcare facilities. It is through this service that many healthcare decision-makers (mothers) are introduced to a facility and its capabilities. If this introduction/impression proves to be positive, many mothers could continue to utilize the facility for the provision of other healthcare needs. As military healthcare moves towards full capitation, and with the increased choice available through the TRICARE system, a military facility unable to provide the most modern standard of care or deliver a quality service equal to that provided in the local civilian network will experience a loss of enrolled members from its

TRICARE Prime base to the local economy. This projected loss of patients due to antiquated services, equipment, techniques, or facilities has been studied and documented recently by James Hutton and Lynn Richardson. Their thesis introduces the theory of atmospherics or the effort to design an environment capable of producing specific emotional effects in a buyer, thereby serving to enhance purchase probability. The conclusion of their study suggests that if a patient is more satisfied with a facility's physical structure and environment, she is far more likely to be satisfied with the complete service encounter. This increased satisfaction results in increased loyalty and patronage by the patient and decreased intentions to avoid the facility or switch to an alternate service provider (Hutton, 1995). With the implementation of TRICARE, and the continued transformation of the military healthcare system into the full manifestation of the capitated HMO model, one may expect this loss of enrollees to result in less funding in future years. As an organization's funding is decreased, fewer services and facility improvements are provided leading to an even larger disparity between the local civilian medical market and the military treatment facility. One would expect that this increased difference would lead more beneficiaries to become dissatisfied with the services and facilities offered in the MTF resulting in an increased number of beneficiaries choosing to

exercise their option of choice on the civilian market. This pattern of patient flight could eventually lead to the downsizing or closure of a military treatment facility.

Currently, Irwin Army Community Hospital is configured in the traditional obstetric model popular in the 1950s consisting of separate rooms dedicated to each stage in the birth process: Labor, delivery, recovery, and postpartum care. This configuration carries with it the appropriate unique and independent staffing levels to provide care in each of these rooms. This model is in direct contrast to the model currently in use in the local community whose healthcare facilities have invested in the LDR/LDRP model.

#### Statement of the Management Question

As the percentage of national resources dedicated to national defense continues to decline, the amount of resources dedicated to the military beneficiary continues to decrease at an ever-accelerating rate. This decrease in funding results in the deferment of capital improvements and purchases to existing facilities and equipment. Continued neglect of military healthcare facilities may result in a sustained decrease in the quality of care offered to beneficiaries of the military healthcare system.

The provision of inpatient obstetrics using the newest

model of LDR/LDRPs represents the current civilian standard of care in healthcare delivery to patients as well as serving to increase patient and family satisfaction. In the civilian healthcare environment the LDR/LDRP concept of childbirth represents the most efficient and competitive model for the delivery of inpatient obstetric care to a served population.

The questions this study will attempt to answer are:

1. What are the costs and efficiencies associated with the current practice patterns of inpatient obstetrics (labor, delivery, and postpartum care) at Irwin Army Community Hospital?
2. What costs and benefits could be realized relative to a move from current obstetric practices to the new LDR/LDRP standard of care?
3. What implications are associated with continued current methods of practice?

### Literature Review

Since 1982, 94.9% of the roughly 3,584 hospitals offering maternity care in the United States now do so using some form of single room maternity concept. This willingness to adopt a more modern approach toward inpatient obstetrics represents a realization that patient choice/satisfaction and competition will play a major part in the success or demise of any



hospital's obstetric service (Perry, 1990).

Each facility must fully examine the specific market in which they are operating before making a determination regarding the conversion of existing facilities into the new LDR/LDRP concept. A review of current literature reveals several broad business factors that may be positively impacted during a conversion to an LDR/LDRP operational model.

One of the first, most important considerations or objectives when considering the expenditure of funds on improvements to services or facilities is the corresponding increase in market share or additional business realized as a result of the expansion or improvement. In the case of a conversion to an LDR/LDRP inpatient obstetric service, a facility would hope to increase its share of the existing market within its served population area. According to a study conducted by Ross Planning Associates, of the roughly 256 hospitals opting for conversion to the new model of care, 49% demonstrated an increase in market share, with the average increase reported to be 21%. The largest gain experienced by any facility was 69% (Perry, 1990). This difference between those facilities employing the traditional single use room and those facilities doing business with the more advanced multi-use rooms is demonstrated in figure 1 (see Appendix A) (Perry, 1990).

Today most hospitals understand that our nation's mothers make the majority of their family's healthcare decisions (Hutton, Richardson, 1995). It is widely believed that

satisfied maternity patients are likely to return to the same hospital. When one considers all of the ways a potential customer comes into contact with a patient care facility, a birth is perhaps one of the most potentially joyous, positive experiences available. This positive experience provided in a manner that exceeds the expectations of the patient results in an incredible amount of goodwill and patient loyalty. In the case of Porter Memorial Hospital located in Denver, Colorado, the transition to a single room maternity concept resulted in the attraction of several obstetrics practices. These practices agreed to switch their birthing hospital to Porter resulting in an increase from 600 births in 1987 to 1320 births in 1988. Porter expected to improve this birth rate to 2000 births in 1989 (Perry, 1989).

The success described in the cited example above is not unique to Porter Memorial Hospital and is more the rule rather than the exception. Saint Luke's Hospital in Denver, Colorado was experiencing a loss of market share in its obstetric/gynecological service. By changing its method of delivery to include LDRP facilities and services, the hospital realized an increase in its birth rate of 3% in the first year and are now fielding calls from expectant mothers at the rate of 12 per month inquiring about obstetric physicians who choose to use the facilities of Saint Luke's (Riffer, 1986).

Increases in market share are only one aspect of the business equation in which hospitals are expected and have shown improvements since the introduction of the LDR/LDRP model.

Facilities have benefited from an increase in business from managed care firms. Managed care companies, eager to reduce the cost of care provided to members of their plans have embraced those facilities employing the newest methods of obstetric care. This new practice pattern has been shown to reduce the cost of care to the patient, paid ultimately by the managed care firm to which the patient belongs (Perry, 1989).

As mentioned above, the birth process is potentially one of the most joyous events in the lives of the customers of a facility, it is also one of the most devastating for patients experiencing a less than perfect outcome. Another benefit of the LDR/LDRP concept is the documented reduction in legal action filed by parents for negative outcomes experienced during the birthing process. It is believed by the administrators of Chicago's Michael Reese Hospital and Medical Center that the introduction of a new three million dollar New Life and Maternity Center will serve to reduce the number of malpractice claims filed against the facility and its practicing physicians. The LDR facility takes a humanistic approach to maternity care, the pleasant surroundings and the relaxed demeanor of the staff foster an overall sense of well being and control for the expectant family. This sense of control and relaxation has resulted in a decrease in the overall numbers of legal actions filed against the facility and staff for less than perfect outcomes (Carter, 1986). Dr. Edward Linn, representing the hospital, notes that patients seem to take more responsibility for outcomes, which previously would be seen as mistakes

occurring during delivery, rather than factors that may have been present during the gestational period prior to admission.

The business of obstetrics doesn't have to be seen as a money loser for a facility. Combining good management and business sense with enough demand, obstetrics will contribute to the profitability of ancillary services such as radiology and anesthesia. In addition, hospitals aren't likely to receive the higher reimbursements offered by gynecological admissions unless they offer obstetrics because many physicians prefer to admit their entire caseload to the same facility. A study performed by Health Care Innovations showed that women's healthcare services account for 8.4% of a hospital's total revenue and 18.5% of its profits (Perry, 1989).

Available literature describes documented evidence indicating health benefits afforded to infants and mothers when facilities convert to the LDR/LDRP method of care. In recent years professionals have explored some of the positive results experienced through the use of "alternative" approaches to birthing. Facilities have been able to monitor the distinct physical, psychological, and social advantages gained by altering medical procedures that restrict or prohibit varied positions in labor, the exclusion of those supportive persons who are close to the laboring woman, or early parent-infant contact (DeVries, 1979). In response to recent research indicating the benefits to infants and patients listed above, several professional organizations have issued policy statements endorsing innovative childbearing practices. The American

College of Obstetricians and Gynecologists, The American College of Nurse-Midwives, The American Academy of Pediatrics, The American Nurses Association, and the Nurses Association of The American College of Obstetricians and Gynecologists as well as the American Medical Association have all prepared formal statements supporting family centered maternity and newborn care in hospitals and encourages hospitals to reassess their practices and policies (DeVries, 1979).

Fran Martin, head nurse of the Victorian General Hospital in Victoria, Canada, cites growth in demand for home birth as the catalyst for a change to the LDR concept in her facility. Patients seem to have expressed their dissatisfaction with the "regimented armed forces exercise" model of care demonstrated by the traditional obstetrics delivery system. Martin believes that home births are a means used by patients to exert more control over the birth process. Patients are attempting to insure a warm comfortable setting where family and friends may participate in the birth experience. This increase in home births has raised concerns within facilities regarding the safety of home delivery. This concern is centered not only on the lack of medical sterility and infection control but also addresses the lack of specialized medical equipment and trained personnel. Home births are recommended for non-high risk pregnancies only but as noted, during the birth process anything is possible. During a normal home delivery, patients tend to rely on the skills of the certified nurse midwife. Although these professionals are well trained in the birthing process

they lack the specialized skills required in the event of an emergency procedure. Facilities like Victoria General Hospital have converted to the LDR model not only to recapture the business lost to home births but also as a method of insuring the public's health. Providing homelike facilities and control in the appropriate medical setting serves to allow access to the best of both worlds and increases the likelihood of a positive outcome for the patient while building trust in and loyalty to the facility (Hughes, 1981).

According to a study performed by the Tacoma General Hospital, one of the challenges experienced by facilities utilizing the traditional four room model popular in the 1950s is the increased volume and intensity of noise and light. It was found that infants suffer adverse effects from exposure to high levels of both light and noise. These difficulties range from problems sleeping and adjusting to a home environment to learning disorders, blindness, deafness, and other serious health problems. Sylvia Conley, clinical director of the women and newborn services at Tacoma General Hospital leveraged these findings into a unique opportunity to create a truly state-of-the-art facility for the infants and families served by the hospital (Smith, 1999).

In addition to the physical and psychological problems associated with recovery in the traditional maternity setting described above, the management and clinical staff of Northwest Hospital, located in the Puget Sound area of Seattle, Washington felt that by moving the mother from the labor room to a delivery

room at the point of birth might place both the mother and the infant at greater risk for a less than optimal outcome. Senior management felt that by disconnecting the mother from monitors, moving her at the height of her pain, disengaging the supporting family members, and the corresponding staff flux during this time served to increase the stress of both the expectant family and the facility staff thus increasing the possibility of a negative birth experience (Deliganis, 1990).

At the Tallinn Children's Hospital in The Republic of Estonia, the concept of family centered inpatient obstetrics has been taken one step further than the relatively simple LDR/LDRP model accepted in most facilities in the United States. At Tallinn, mothers are admitted to what would in this country be considered a traditional LDR/LDRP room. This room provides the same warm, homelike atmosphere and relaxed approach to patient care demonstrated in the United States, however, Tallinn mothers are encouraged to assume most of the traditional nursing functions provided by most modern maternity hospitals. Mothers are encouraged and expected to provide all of the infant's care while in the hospital until the time of discharge. Nurses perform the more complex tasks associated with providing medical care to the infant including administering drugs and injections, and assisting with radiographs, ultrasonography, and the collection of urine and blood samples. It has been demonstrated that mothers who participate or accept a more active role in the hospital care of their infants were rewarded by increased benefits in the development of their child including improved

weight gain, fewer infections, decreased need for aggressive medical care, and improved social and psychological development. This more active role in caring for their children also provides the mother an increased sense of confidence and control by exposing her to the unique habits and personality traits of her child while still under the supportive supervision of the facility's professional nursing staff (Levin, 1994).

In addition to a facility benefit realized by increased market share within the community and the benefit demonstrated in the improved health of the infants and mothers served, the transition from traditional inpatient obstetric care to the LDR/LDRP model allows a facility to reexamine current staffing requirements. As documented in current literature, a conversion to the LDR/LDRP care model may allow facilities to provide the same quality of professional care to each patient while utilizing fewer Full Time Equivalent staff members (FTEs).

St. Mary's Hospital, in Minneapolis, Minnesota converted to an alternative birthing technique they call The Birthplace at St. Mary's. This conversion resulted in 18 LDRP rooms, two delivery rooms for more complicated cases, and one operating room used to perform cesarean sections. The new design combined the customary divisions of maternity care into one space and allowed the facility to decrease the space requirement of the service by 12,000 square feet. This reduction in overall square footage resulted in a decrease in indirect costs associated with the operation of the inpatient maternity service but questions regarding staffing efficiencies became a target of study



(Gerlach, Schmid, 1986).

The study conducted for St. Mary's Hospital by Eunice Lawrence examined five categories and the corresponding numbers relevant to each of the categories including number of c-section patients, number of high-risk deliveries, number of low-risk deliveries, number of premature labor patients returning home undelivered, and the estimated total number of deliveries per year. Based upon the data obtained in the study it was determined that the facility needed 26.6 FTEs of Registered Nursing (RN) time to adequately provide for the care of the hospital's served beneficiary population. This staffing level represents a 21% budgetary reduction from previous levels of staffing necessary in the provision of traditional inpatient obstetric care (Gerlach, Schmid, 1986).

The staff reductions described above were made possible through the implementation of process improvements realized by the more convenient design of the facility. With a more compact service area, nursing staff are required to perform professional functions in a more confined space. This smaller working environment allows for a greater situational awareness throughout the unit which was impossible to achieve in the traditional model with a more dispersed patient population. This increase in situational awareness results in a need for fewer nurses to monitor/maintain awareness of the needs of patients on the service. The new facility design also reduces the time nursing staff is required to spend re-supplying the areas used by patients. Since all of the equipment and supplies

necessary in the delivery of care are contained within a central storage area located at the hub of the unit, the childbearing rooms may be re-supplied by the nursing staff requiring less personnel in both the nursing and logistics labor pool (Gerlach, Schmid, 1986).

Because of an active marketing strategy at St. Mary's Hospital, the number of deliveries has increased by 30% from 1285 in 1982 to 1345 in 1984. Although the total number of deliveries per month steadily increased, all other factors remained stable and the facility maintained a level of 30.8 FTEs in the inpatient obstetrics service thus proving the potential for staff reductions by using the LDR/LDRP model. This staffing reduction is made possible by increased efficiencies facilitated by the facility design. Efficiencies are realized by cross-training staff in all aspects of inpatient maternity care. This cross training enables the nursing staff to provide a continuity of care to specific patients throughout that patient's stay. This theme of continuity of care, added to a nursing staff's ability to perform all aspects of inpatient service, is the LDR/LDRP model's secret to staff reductions without sacrificing quality of care or patient interaction time which is seen as the vital underlying theme of the LDR/LDRP service (Gerlach, Schmid, 1986).

A reduction in the number of staff needed is the rule rather than the exception in the alternative birthing center concept. Some facilities have expanded this reduction of staff to include a reduction in the numbers or amount of expensive

professional time spent with an expectant mother during labor. This practice is currently in use in the Douglas Childbearing Center. The Douglas Childbearing Center was opened in November, 1976 at Douglas General Hospital, 20 miles west of Atlanta. The Douglas Center realized a decrease in the number of staff needed during the labor and delivery process through the thoughtful design of their facility, however, Douglas took the alternative concept further by decreasing the number of full time physicians and registered nurses on staff thus reducing the cost of a normal vaginal delivery. The Douglas facility employs one Obstetrician and four nurse midwives. The physician monitors the condition of the mother during the labor process by phone and is in an on call status until birth is imminent. By eliminating the need for registered nurses and by using the physician only during times when his or her presence is absolutely necessary, the facility is able to provide their service at much lower rates than other facilities in the region thus improving their competitive advantage (see table 1, Appendix B) (Clark, Stewart, 1982). This decreased cost of care and lack of significant difference in outcome, combined with the more family friendly, relaxed atmosphere has increased the number of expectant mothers requesting care at the Douglas Center (Clark, Stewart, 1982).

Alternative birthing centers have been found to provide several added benefits to mothers and families other than those described above. There has been an increased effort to transform inpatient obstetric services into more than just a

place to have a baby. Today, birthing centers provide classes designed to educate new mothers and fathers on the new roles they will play as parents. Classes offer techniques on the proper methods for caring for their new addition, themselves, and their marriages or relationships. Integrating these types of classes, supplemented with hospital offered social work services into the labor and delivery preparation process produces families better able to confront the dramatic change in lifestyle experienced after birth. This preparation has reduced demand on the facility's staff resulting in a reduction in the cost of services. This cost reduction enables Valley Birth Center to charge an average of \$300 less than other competing facilities in their California market (Hospital Topics, 1980).

Other amenities offered to mothers by alternative birthing centers, identified in "Maternity patient information; babies that come with instructions for use" (1982), include gourmet food, and letters written by facility staff from the point of view of the newly arrived child. These letters provide tips on how to care for the infant as well as some of the habits or behaviors noted by the facility staff which may prove useful to the mother during the "getting to know each other" period at home.

The alternative birthing center has amassed an impressive number of advocates indicated by the sheer numbers of facilities now embracing the concept. Benefits obtained from the alternative form of inpatient obstetrics are measurable not only in improved market share but also in the improved health of

mothers and infants, more efficient staffing patterns, lower costs associated with the provision of care, reduced stress and more education for new families, and greater levels of patient satisfaction. Additional benefits for facilities, families, staff, and physicians are listed in table 2 (see table 2 Appendix B) (Jones, 1987).

### Purpose

The objective for conducting this study is to determine the most efficient and effective organizational structure for Irwin Army Community Hospital's delivery of inpatient obstetric care. It is thought that the current method of delivering care, in use since the design of the facility in 1958, has become dated and inefficient. If the facility were to better understand the more modern patient care delivery model, LDR/LDRPs, it is believed that a more efficient approach to this service could be provided. The results of this study are expected to include the identification of opportunities for cost savings, staff reductions, increased demand for services, improved patient satisfaction scores, and better quality of care delivered to the patient.

### Hypothesis

H<sub>0</sub>: The current delivery and facility design for the provision of inpatient obstetrics at Irwin Army Community Hospital is representative of the most efficient organization.

H<sub>a1</sub>: The organization and delivery of inpatient obstetrics can be

improved to provide a more comprehensive, efficient, lower cost service to served beneficiaries.

## Method and Procedures

### Subjects or Events

In order to complete this study, six healthcare facilities were investigated: Irwin Army Community Hospital at Fort Riley, Kansas, Geary Community Hospital in Junction City, Kansas, Mercy Health Center in Manhattan, Kansas, Stormont-Vail Regional Health Center in Topeka, Kansas, General Leonard Wood Army Community Hospital at Fort Leonard Wood, Missouri, and Bayne-Jones Army Community Hospital at Fort Polk, Louisiana. Additionally, information obtained from the specific military treatment facilities listed above was obtained based upon a demonstrated similarity of served populations and inpatient obstetric censuses.

### Study Design

Non-experimental research is typified by the review and study of a problem or question without the manipulation of data or variables. This study is classified as non-experimental and more specifically as a descriptive analysis because of its depiction of current events as they occur in the present without attempting to influence any of the variables inherent within the description (Thompson, 1999). The types of data collection used in this study include observational studies, site visits,

personal correspondence, and the review of documents used to determine the staffing, facilities design, and cost of inpatient obstetrics at each of the different healthcare facilities.

#### Type of analysis

Designed as a qualitative analysis, this research project utilizes several approaches to investigate management questions. This study uses such data gathering techniques as; in-depth interviewing, elite interviewing, observations, blueprint examination, and document analyses. While the interviews, observations, and document/blueprint analysis provide data on current procedures and practices, a comprehensive literature review serves to add validity and bolster collected qualitative information by providing the national, theoretical, and accepted clinical and business practices of industry inpatient obstetrics (Cooper, Schindler, 1998).

The study, as designed, relies on the above mentioned techniques to gather data relevant to an in-depth analysis of the most efficient organizational model for the delivery of inpatient obstetrics. The data gathered attempts to show the model that provides the most efficient use of staff, facilities, and equipment to render to most patient pleasing environment in which to deliver a child. The study uses the gathered data and analyses in an attempt to show the ramifications of continued current operations at Irwin Army Community Hospital as compared to the operational projections for the facility if a shift to the LDR/LDRP inpatient model is attempted with regard to

staffing, patient satisfaction, facility design, equipment cost, and overall patient treatment cost.

#### Schedule of procedures

Numerous personal interviews throughout Irwin Army Community Hospital's Department of Obstetrics began in early September of 2000. A review of current operations was conducted to determine the cost and usage of supplies and equipment, staffing, and facility overhead in order to examine the current cost of the average normal vaginal and cesarean section delivery.

Interviews were also conducted with various members of the management staff of both Geary Community Hospital and Mercy Health Center. The purpose of these interviews was to gain a basic understanding of the issues and history surrounding the current method of care delivery and to facilitate interviews and data collection from each facility's staff. Data was obtained from Stormont-Vail Regional Medical Center and from the staff of both Bayne-Jones Army Community Hospital and General Leonard-Wood Army Community Hospital relevant to their operation, costs, and staffing relevant to each of the facilities OB/GYN service. Efforts to amass additional literature relevant to the study's purpose met with success and proved useful in determining the status and existence of current statistics and data documenting experience with the LDR/LDRP model.

#### Reliability and Validity

As defined in Business Research Methods (Cooper, Shindler,



1998), validity refers to the extent to which a test measures what we actually wish to measure while reliability has to do with the accuracy and precision of a measurement procedure. This study attempts to determine the appropriate method of delivering inpatient obstetric care to a served beneficiary population using such metrics as the total cost per episode of care, cost per disposition, staff mix and cost, and cost per bed day. Reported patient satisfaction was reported by each facility and is cited but is not numerically included due to the lack of numerical records kept regarding this variable by some of the facilities included within this study. The data used to calculate these measures was obtained from hospital chief executives, department chairs, or subject matter experts for each of the fields investigated. This data was then verified by each of the civilian facility's chief financial officer to ensure accuracy of the data, and compared to regionally published data reported by the Kansas Hospital Association. The U.S. Army Medical Command's regional consultant for data quality, currently employed in house, validated data obtained from Irwin Army Community Hospital, Bayne-Jones Army Community Hospital, and General Leonard-Wood Army Community Hospital.

## Results

A total of six healthcare institutions were included within the framework of this study. Data was obtained from the Medical Expense and Performance Reporting System (MEPRS) database

maintained within each of the military facility's resource management departments. Using this database the researcher was able to extract data points which provided an extremely detailed depiction of the inpatient obstetric service offered by each military facility. The MEPRS database is able to consolidate the operation of each segment of the organization, thus providing a broad indication of where within the organization leadership must concentrate to eliminate inefficiency. During this study, MEPRS was used to extract hundreds of data points for each of the three military institutions relevant to the cost, staffing, and workload of the inpatient labor, deliver, and postpartum care service. Data were obtained from the accounting department of each of the three civilian institutions participating in this project. It was discovered that the data maintained by each of the three civilian institutions, while detailed regarding the statistics necessary for patient billing, was much more limited when attempts were made to extract similar points of comparison to those maintained in the MEPRS database. Because of this, and in an effort to preserve the manageability of the study, the data obtained from each of the six institutions was consolidated to arrive at eight common points of specific management information. By examining these common points, it is believed that one may gain an understanding of each of the facilities, the benefits associated with the operation of each of the models, and a general understanding of the differences between them.

As shown in tables 3 through 8 contained in Appendix B, the

eight management indicators investigated during the course of this study include total expenses, workload (expressed in bed days), dispositions, births, average length of stay, selected personnel (staff mix and cost), total cost per bed day, and total cost per disposition.

Each of the eight indicators included within the study are interrelated and are affected by changes in each of the other seven. This means that the facility and its indicators must be viewed as a whole and none of the indicators taken separately give an accurate representation of the true nature of the facility. It is only when taken together that the total picture of the state of the institution may be understood.

While each of the eight performance factors are important, and as indicated must be viewed within the context of the other seven, several are deemed more indicative of performance. The reader's attention is directed to the factors of number of births, total expenses, average length of stay, selected personnel, total cost per day, and total cost per disposition.

As the purpose of this study is to determine the most advantageous method of providing inpatient obstetrical care to a served beneficiary population, the institutions of the study were grouped into each of the three types of delivery models. Irwin Army Community Hospital and Bayne-Jones Army Community Hospital represent the standard delivery model, General Leonard-Wood Army Community Hospital and Mercy Health Center represent the LDR model of delivery, and Stormont-Vail Regional Medical Center and Geary Community Hospital represent the LDRP model of

delivery.

Within the standard delivery model, Irwin Army Community Hospital (IACH) had 933 births, total expenses of \$2,622,307.30, an average length of stay of 2.97 days, a total cost per bed day of \$688.99, and a total cost per disposition of \$2,043.89.

Within the same group, Bayne-Jones Army Community Hospital (BJACH) had 649 births, total expenses of \$2,471,884.93, an average length of stay of 2.43 days, a total cost per bed day of \$800.74 and a total cost per disposition of \$1,943.31.

General Leonard-Wood Army Community Hospital (GLWACH), an example of a LDR facility had 377 births, total expenses of \$1,641,121.55, an average length of stay of 2.31 days, a total cost per bed day of \$973.96, and a total cost per disposition of \$2,248.11. While Mercy Health Center, also utilizing an LDR delivery model, posted 775 births, total expenses of \$1,165,917.40, an average length of stay of 2.04 days, a total cost per bed day of \$366.76, and a total cost per disposition of \$747.38.

Considered the most progressive of the delivery models, the LDRP model represented by Stormont-Vail Regional Medical Center had 1,979 births, total expenses of \$7,226,547.00, an average length of stay of 1.72 days, a total cost per bed day of \$588.29, and a total cost per disposition of \$1,014.39.

Finally, Geary Community Hospital recorded 242 births, total expenses of \$348,093.00, an average length of stay of 4.79 days, a total cost per bed day of \$300.34, and a total cost per disposition of \$1,438.40 (all figures listed are totals for

fiscal year 2000).

Total expenses are defined as the total amount of funding provided by the facility and necessary to support the level of demand experienced by the organization for the service offered. This statistic is dependent upon yearly demand expressed here in number of births and number of bed days.

Workload (expressed in bed days) is a measure of productivity or activity. This performance indicator represents the occupation of one of the facility's beds for one day by one patient. This factor depicts the number of days a patient is required to remain within the facility for a given procedure and varies based upon the severity of the procedure, the willingness of the payer to continue paying for the service, competition, and the public demand for and capacity of the facility.

Dispositions reflect the total number of cases performed during the fiscal year by the service. This indicator differs from total number of births by recording both births and other procedures cared for by this unit of the facility. It is here that one may determine how much of the service is dedicated to the provision of inpatient care for issues relating to feminine health. By comparing both the total number of births to the number of dispositions one may gain an understanding of how much of the service is dedicated to the birthing process.

Average length of stay (ALOS) is a figure derived by dividing the workload by the total dispositions reported by the service. This figure allows one to gain an appreciation for the average number of days the average patient remained the

responsibility of the service during the fiscal year.

Under the category Selected Personnel, the total number of full time equivalent employees (FTE) employed by the inpatient OB service is shown as is; the average cost per employee, the total cost spent during the fiscal year on that type of employee, the computed cost for that category of staff per disposition, and the computed cost per bed day.

The total cost per bed day is a computed cost that details the cost of operating the unit for each bed day demanded. As a demand based metric, this statistic decreases as the number of bed days increases reflecting a greater efficiency as a greater amount of service is extracted for each dollar of input.

Finally, the total cost per disposition is similar to the total cost per birth. A computed statistic, total cost per disposition is a measure of the number of dollars required to move one patient through the service. Included within this measure are all procedures cared for by this service not merely those procedures relevant to the birth of a child.

Figures 2 through 10 in Appendix A present a graphical representation of these results. The results are also presented in tabular format in tables 3 through 8 in Appendix B for each facility and type of delivery model included within the study.

## Discussion

The results of this study reveal that the operational efficiencies realized through the use of an LDR or LDRP model of

inpatient OB/GYN are superior to the those experienced by facilities operating similar services using what is considered the more traditional delivery model. These findings are consistent with other studies mentioned in the literature review. As depicted, comparisons between the 3 models indicate that LDR/LDRPs tend to; reduce costs, reduce lengths of stay, increase staff support to admitted patients, and increase patient satisfaction.

As indicated in figure 4 Appendix A, the average length of stay for patients treated in a LDR/LDRP delivery model is lower than that found in the traditional model. Observing figure 4 one will note a general negative cost trend indicated by a decrease in length of stay. Facilities transitioning to one of the newer delivery models have found that they are able to reduce the average number of days a patient spends in the hospital. This reduction is of significant benefit to both the patient as well as the facility. By reducing the number of days a patient spends in a facility, one reduces the amount of expense the facility must incur to support that patient. This reduction in expenses results in an increase in profit in an age of tight fiscal policy practiced by insurance companies, managed care organizations, or in some cases patients who pay for the cost of treatment. Many corporate payers have resorted to the use of a Diagnoses Related Group (DRG) system of payment that sets allowable charges in advance of treatment for specific medical conditions. By limiting the amount of funds expensed by the facility in the treatment of a patient, an organization is

able to retain a larger portion of this set payment as profit. Many healthcare institutions today are forced to reduce the number of days a patient remains in the facility not only to sustain profitable operations but also to compete for patients with other healthcare facilities. With the advent of managed care and with an increased focus on cost as well as quality, many patients and third party payers have become much more aware of the cost of medical care. Given the increase in competition experienced within the industry, payers tend to make decisions regarding the location of care based, to a greater degree, on cost.

Closer examination of figure 4 indicates that the general negative slope of the average cost line, as estimated by the length of stay, rises sharply for the LDRP category of facilities. This increase is due to an average length of stay reported for Geary Community Hospital that is significantly longer than those reported by other facilities within the study. It is believed that other factors relating to the environment in which this facility must operate serve to increase the organization's length of stay. Located in rural Kansas, Geary Community Hospital serves a population whose demographics are significantly different than that served by the other facilities included within this study. Issues such as patient education and additional health concerns may serve to increase average length of stay for this facility.

Examining this issue from the patient's perspective, a decrease in the amount of time spent in a healthcare facility



may, contrary to popular opinion, be viewed as a benefit to the patient. Hospitals are, by the very nature of their mission and in spite of the best efforts of the facility staff, extremely dangerous institutions. Patients hospitalized over a longer period of time are at increased risk for nosocomial infection, medication error, or other hazards not found in a residential setting.

The most revealing performance indicators included within this analysis are total cost per disposition, total cost per bed day, and the more specific total cost per birth. Key to this analysis is a review of cost per bed day and cost per disposition. As described in the results section, cost per bed day is a reflection of the total cost incurred by the facility to maintain one patient in one bed for one 24 hour period. This cost may vary as the acuity of the average patient increases or decreases, however, it is felt that within this specific category of medical care and for this specific study, most facilities will see relatively the same mix of diagnoses and patient acuity. Closely related to cost per bed day is total cost per disposition. Cost per disposition refers to the total cost incurred by the facility to care for one patient from admission to discharge. While total cost per bed day provides a good understanding of the average cost per day of care, cost per disposition provides a measure of the average total cost per case.

Related to total cost per disposition but more specific, total cost per birth filters out those procedures not

specifically related to the child birth process and details the cost incurred by the facility to provide birthing services. If one examines the listed performance indicators cited in this study without considering the other metrics provided, one may conclude that a higher cost per bed day observed in hospital A is less desirable than a lower cost per bed day in hospital B. Similarly, one may compare the cost per disposition of two facilities and determine that a lower cost in one facility is desirable to a higher cost in another. While this conclusion would be correct in the narrow sense, additional examination of both of the costs together would provide a more complete comparison of the two facilities or models. While these costs may appear similar they vary in an extremely significant manner. As an example, if we were to compare facility "A" which spends \$1,000 per bed day to maintain a patient to facility "B" which spends \$500 per bed day to maintain the same patient, we might be inclined to conclude that facility "B" is, all other factors being equal, the more appropriate facility in which to receive care. However, by using the cost per disposition performance metric we may shed additional light onto the matter. Given the same facilities described above, if facility "A" has an average length of stay of 2 days and facility "B" has an average length of stay of 5 days, we may conclude that the total cost per disposition for facility "A" is \$2,000 while for facility "B" one would expense \$2,500. By increasing the average length of stay one is able to reduce the cost per bed day but such an action serves to increase the total cost per disposition. This

increase in the average length of stay, as mentioned above, may also expose the patient to additional risk. Therefore, one must examine both the total cost per disposition as well as the total cost per bed day in combination with the average length of stay to make an accurate conclusion as to the true nature of a facility or model in comparison to other facilities or models.

In reviewing the results of this study and examining the graphical representation of those results depicted in figures 5,6,and 7 in Appendix A, one observes a decrease in total cost per disposition, total cost per birth and, total cost per bed day when comparing the traditional model to the LDR to the LDRP model. This reduction in each performance factor as well as the described decrease in the average length of stay discussed above, leads one to believe that the LDR/LDRP model of delivery is superior to the traditional model within the parameters of these metrics.

Staffing patterns and labor costs continue to represent one of the most expensive factors associated with the operation of a healthcare facility. The cost of skilled, professional employees continues to increase, as does the expectation of increased benefits derived from employment. If a facility were to decrease the number of employees necessary to operate a facility or deliver a service, that organization would recognize a substantial decrease in the operational cost of each service unit produced.

Several methods of staff reduction are available to an organization not the least of which is an across the board

reduction in employees. What may be derived from the results of this study, however, are that many facilities transitioning to the newer delivery models have developed a more deliberate method by which to reduce staff and increase quality and competency. While it may seem intuitive that a reduction in staff would lead to a reduction in the ratio of staff available to patients served, the results of this study prove that by changing the staff mix and leveraging the efficiencies of the LDR/LDRP concept, an organization may increase the ratio of staff to patient/delivery while at the same time decreasing total staff numbers.

As shown in figures 8,9, and 10 in Appendix A, by dramatically reducing the total number of licensed practical nurses (LPN) and using the resulting savings to increase the number of employed registered nurses (RN), a facility is able to reduce the overall number of nurses employed while increasing the competency and experience of the staff. This reduction in nursing costs is realized not only as a decreased commitment to monthly wages but also as a decreased obligation to associated employment benefits.

The transition to the LDR/LDRP delivery model enables an organization not only to decrease the total number of staff required in the provision of patient care but also, as described above, to increase the experience and competency of the staff. Because the LDR/LDRP concept combines the functions of separate labor, delivery, recovery, and post-partum rooms which are, in many cases, physically separated from one another and require

the proper staff mix to operate, a smaller number of more experienced staff are able provide the same service. Because of the physical design of the facility, this new staff mix is able to provide an increased level of supervision to each patient.

When examining the difference in the average cost of providing nursing staff for the facilities included within this study the presence of a confounding variable must be noted which serves to increase the documented difference between each of the delivery models. Each of the military hospitals included within the study rely overwhelmingly on hired civilian registered and licensed practical nurses. These staff members, due to the intricacies of the military's civilian personnel office are compensated far in excess of those employed in the surrounding local community. This disparity, as mentioned, will serve to magnify but not invalidate the difference between the civilian and military facilities, and the differences between each of the models presented.

Although not specifically quantified or included within the results of the study, discussions with the leadership of each of the facilities indicate that those facilities offering a more modern approach to the delivery of inpatient OB/GYN observed an increase in the number of positive comments and letters expressing appreciation to the facility and staff following an inpatient experience within the facility. While none of the facilities included within this study maintained recorded statistics detailing the degree to which their served beneficiary population appeared satisfied with the service

offered (specific to the area of interest relevant to this study), organizations committing to the transition reported a general decrease in the number of complaints leveled against the facility as a whole. As stated, these facilities also experienced an increase in the number of positive comments directed specifically at the inpatient OB/GYN service.

### Conclusions and Recommendations

The results of this study indicate that the efficiencies realized by the operation of an LDR/LDRP delivery model are superior to the benefits offered by the more traditional model of OB/GYN inpatient care. This study has demonstrated that, by comparison, the LDR/LDRP model of patient care tends to produce a marked increase in patient satisfaction, a reduction in cost per disposition and bed day, a decrease in the total number of staff required to provide patient care and operate the service, an increase in the amount of patient supervision provided by the nursing staff, and an increase in the amount of experience and competence displayed by the nursing staff.

This study presents compelling arguments advocating a change to a newer patient care model based upon an analysis of business metrics and accounting information. There are other factors present in any decision that serve to increase the complexity of this business analysis. As mentioned early in this study, the leadership of today's armed forces have become much more concerned with the cost of all aspects of military

operations. In an era of increasingly more restrictive fiscal policy regarding the armed services, the drastically increasing cost required to provide basic service and maintain or replace capital assets neglected under former administrations has become a vexing and contentious issue for senior military leaders. It is believed that improvements in quality of life, of which healthcare plays a large role, result in improvements in the retention of quality service members. However, increases in the funding levels required to provide these improvements are extremely difficult to obtain.

The transformation of a facility from a traditional model of patient care to the more desirable LDR/LDRP model requires significant investments in facility redesign, capital equipment acquisition, and construction. Also indicated is a commitment and ability to restructure the existing workforce in support of a newer staff model. Organizational leaders often find it difficult to justify or impossible to obtain a large commitment of funds to support a major innovation which has been shown to reduce costs and improve efficiency in the long term. In many cases it is far less difficult to continue to obligate higher per year costs indefinitely than to invest in a significant transformation cost with the promise of per year savings realized in the future. Military facilities are further hampered in their efforts to affect significant change by what has become an increasingly complex and unwieldy civilian personnel system. The inability to significantly modify the types or numbers of civilian staff employed by a military

medical facility serve to hinder if not preclude timely, decisive change. This organizational reluctance to invest in innovation combined with an inability to make rapid changes in the workforce signals the decline of a facility operating in a competitive environment.

With the advent of TRICARE, the population of many military facilities may choose to seek medical care in civilian institutions, thus forcing the military facility to compete with the civilian sector for what used to be a captive population. While this statement is true in the primary care arena, military beneficiaries may be compelled to receive specialty care in military facilities. This places the military facility in the position of operating a monopoly, effectively controlling this specific market segment. As indicated earlier, however, the birthing process is in most cases the first introduction many beneficiaries receive to the healthcare facility. Positive experiences and modern facilities during this initial impression tend to encourage patients to choose the facility for other primary care concerns.

In conclusion, as indicated by the results of this study and as discussed previously, it is recommended that the modernization and transformation of the current inpatient OB/GYN operation of this facility be undertaken in the near future. Current operations and facilities should be modernized from the traditional delivery model of patient care to the more modern, more efficient LDR/LDRP delivery model. Given the current average inpatient census within the facility, the leadership



structure within the United States Army Medical Command should find the results of this study useful in demonstrating the validity of the adage "you have to spend money to make money." By expending funds today to improve or modernize a facility and its services you gain, recapture, or retain customers who would otherwise be lost to competitors. Ultimately, the command group, soldiers, family members, and retirees within the greater Fort Riley community will benefit from the results of this study. If, used appropriately, the results of this study serve to maintain Irwin Army Community Hospital as an efficient, effective inpatient facility.

LIST OF REFERENCES

Carter, K. (1986). Michael Reese's new birthing suites may curb maternity malpractice suits. Modern Healthcare, 16 (11), 48.

Clark, L., & Stewart, R. (1982). Nurse-midwifery practice in an in-hospital birthing center: 2050 births. Journal of Nurse-Midwifery, 27 (3), 21-26.

Cooper, R. & Schindler, P. (1998a). Design Strategies. In Junior, M. (Ed.), Business Research Methods (6 ed., pp. 129-151). New York: Irwin McGraw-Hill.

Cooper, R. Schindler, P. (1998b). Measurement. In Junior, M. (Ed.), Business Research Methods (6 ed., pp. 166-174). New York: Irwin McGraw-Hill.

Deliganis, S. (1990). Maternity-wing 'face-lift' becomes big renovation to recoup market share. Health Facilities Management, 3 (12), 10-11.

DeVries, R. (1979). Responding to consumer demand: A study of alternative birth centers. Hospital Progress, 60 (10), 48-51, 68.

Gerlach, C., & Schmid, M. (1986). LDRP: Staffing a single care maternity system. Nursing Management, 17 (8), 36-40.

Hospital Topics (1980). Alternative birth center for cesarean delivery opens. Hospital Topics, 58 (3), 20.

- Hughes, M. (1981). The "birthing room" alternative. Dimensions in Health Services, 58 (6), 32-33.
- Hutton, J., & Richardson, L. (1995). Healthscapes: the role of the facility and physical environment on consumer attitudes, satisfaction, quality assessments, and behaviors. Health Care Management Review, 20 (2), 48-61.
- Jones, C. (1987). Developing a successful alternative maternity unit. Health Care Strategic Management, 5 (7), 19-21.
- Jones, D., Famularo, B., Desta, T., Fulgencio, A., & Rotondo, L. (1992). A labor and delivery service unit model for a multihospital health maintenance organization. Nursing Economic\$, 10 (2), 127-134.
- Levin, A. (1994). The mother-infant unit at Tallinn Children's Hospital, Estonia: a truly baby-friendly unit. Birth, 12 (1), 39-46.
- Perry, L. (1989). Nurturing single-room maternity care; catering to a joyous moment can instill in mothers a warm feeling for the hospital. Modern Healthcare, 19 (19), 18-19, 22, 24-25.
- Perry, P. (1990). The Obstetrics Market Matures for LDRs/LDRPs. Health Care Strategic Management, 8 (4), 19-22.
- Riffer, J. (1986). LDRPs up births and cut costs. Hospitals, 60 (20), 76.

Shawnee Mission Medical Center (1982). Maternity patient information; babies that come with instructions for use.

Hospital Marketing, 2nd Quarter (6), 36-37.

Smith, D. (1999). Noises off: Nursery pumps down the volume. Health Facilities Management, 12 (5), 20-24.

Thompson, K. (1999 May). Health Promotion and Wellness Staffing Methods. Unpublished master's thesis proposal, U.S. Army-Baylor University Graduate Program in Health Care Administration, Fort Sam Houston, TX.

TRIWEST HEALTHCARE ALLIANCE (1998). Your military health plan standard extra prime which one is right for you [Brochure]. Falls Church, Va.: Author.

Appendix A

Figure 1

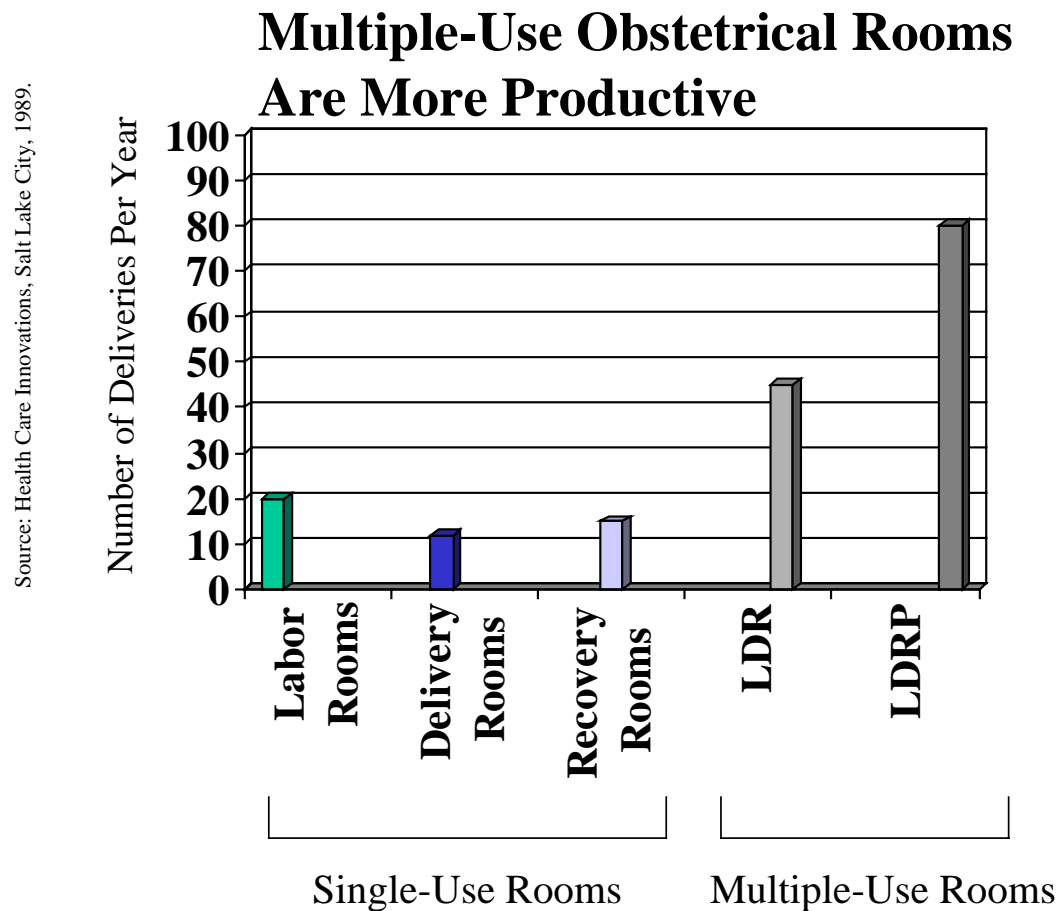


Figure 1. Comparison of Single-Use obstetric rooms with multiple-use (LDR/LDRP) rooms as related to overall productivity per room. (Perry, 1990).

Figure 2

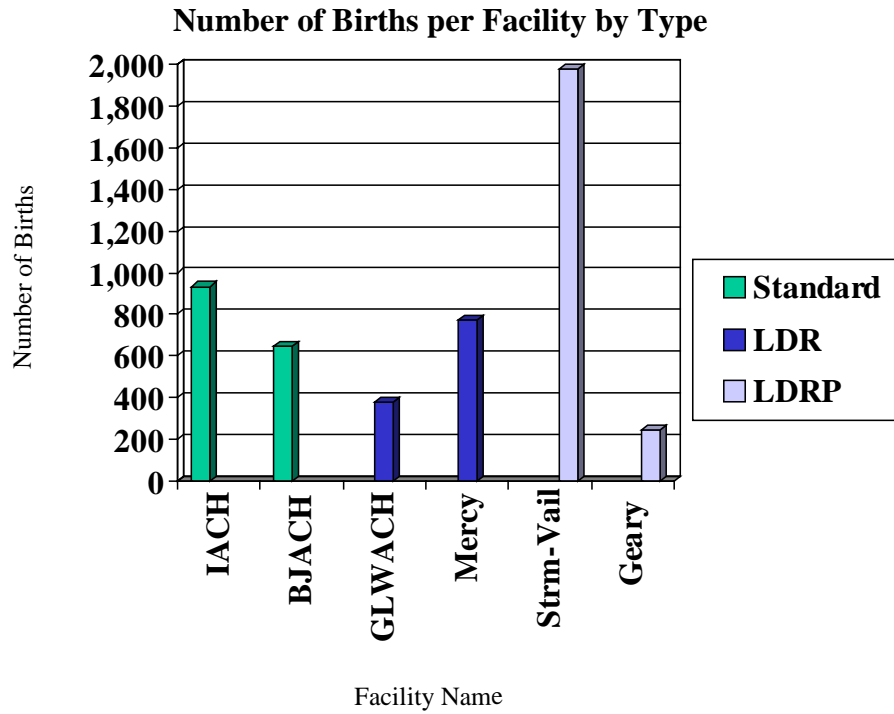


Figure 2. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total number of births (FY 2000).

Figure 3

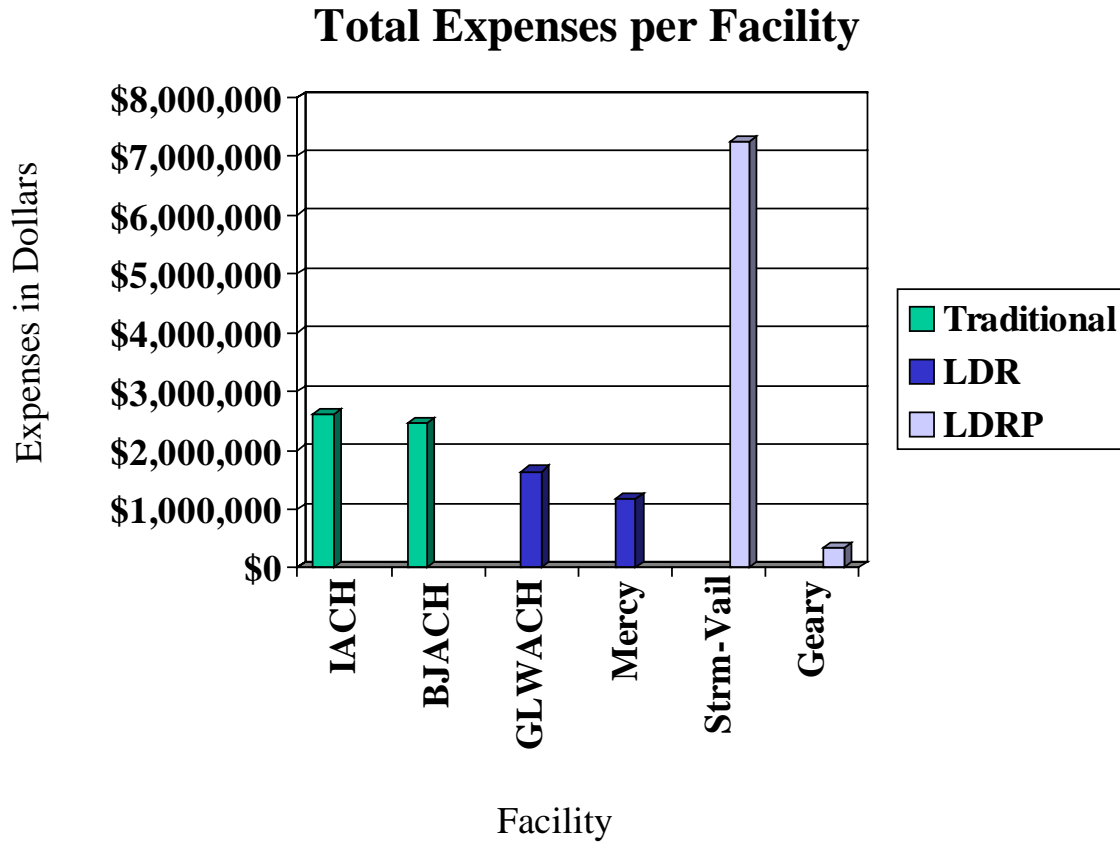


Figure 3. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total expenses (FY 2000).

Figure 4

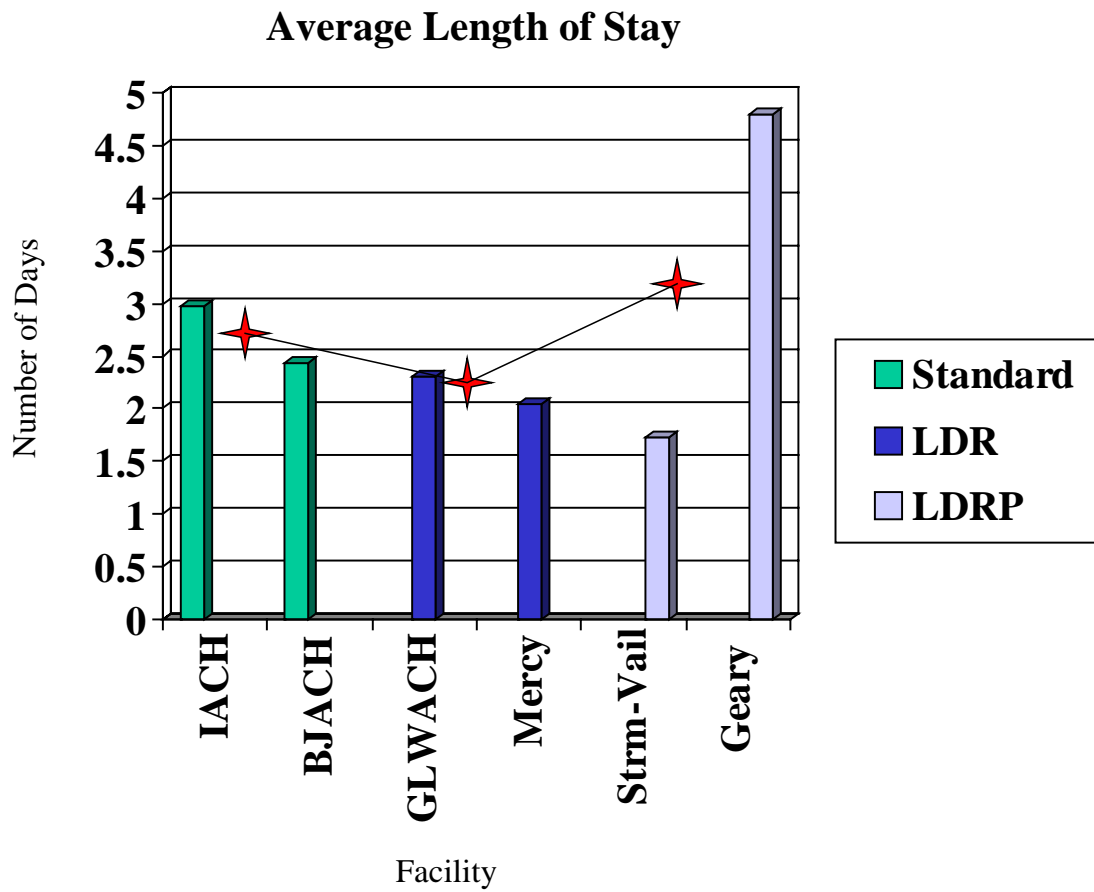


Figure 4. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to average length of stay (FY 2000).



Figure 5

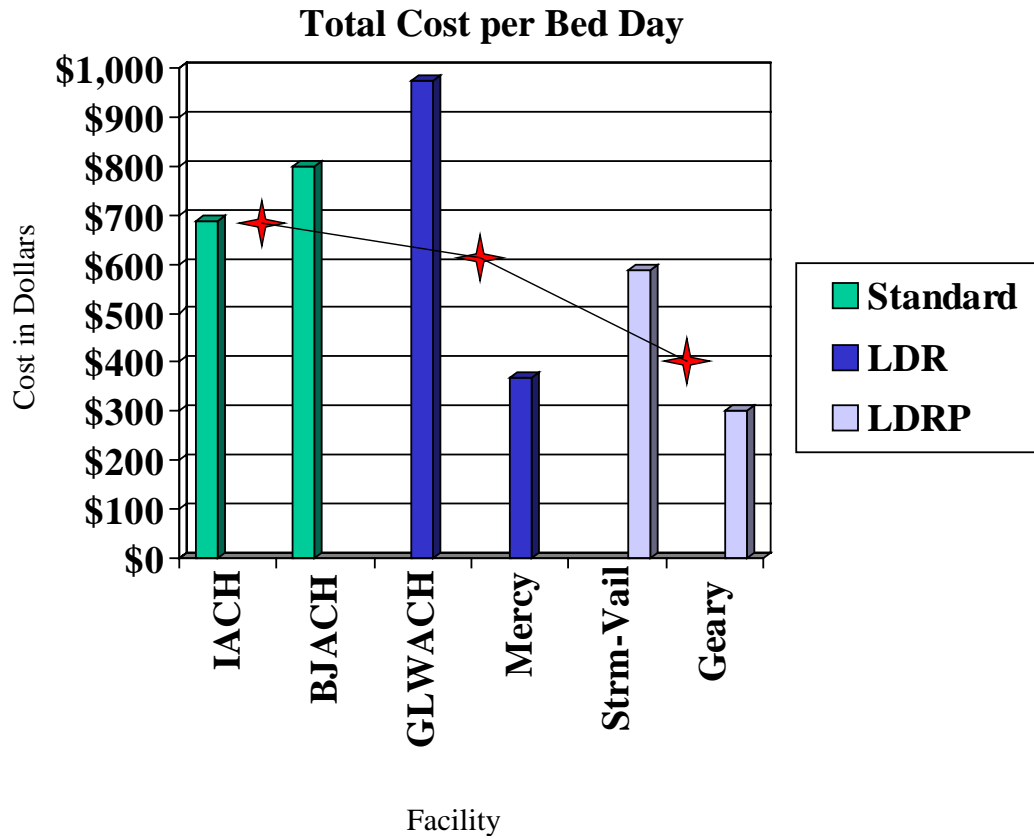


Figure 5. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total cost per bed day (FY 2000).

Figure 6

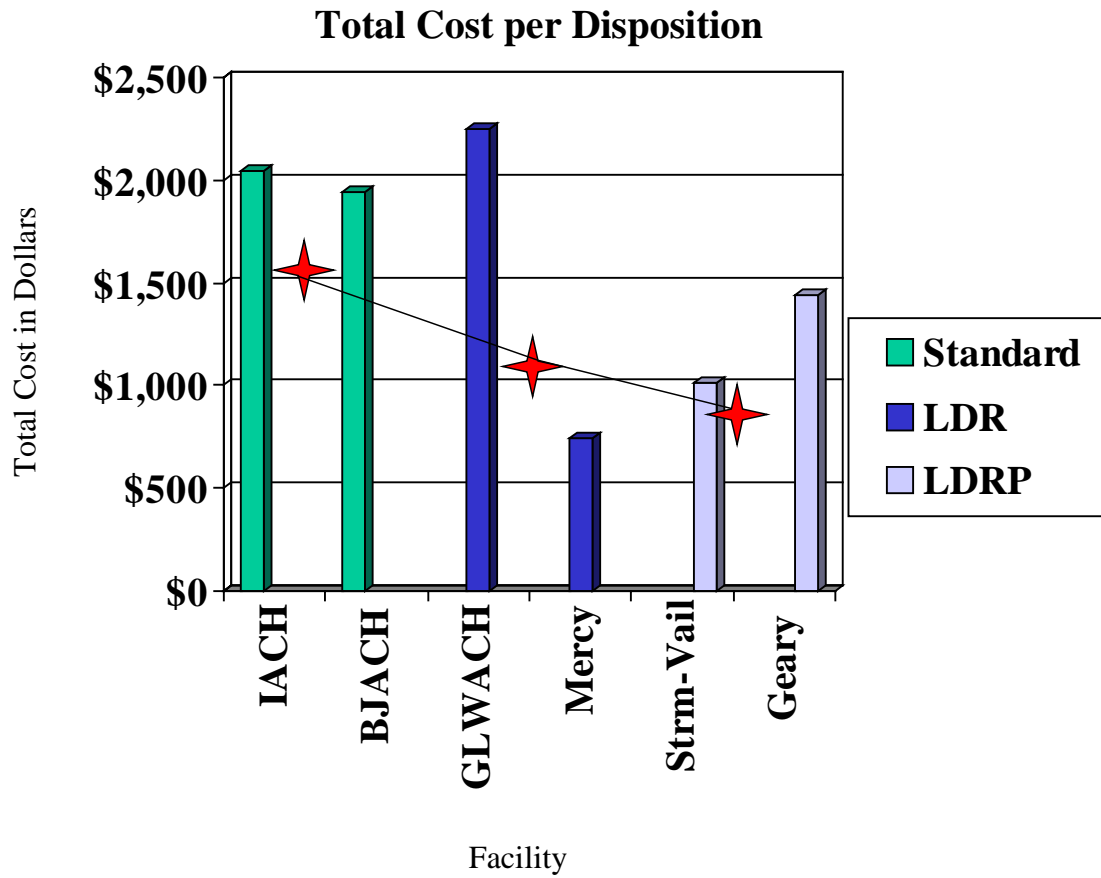


Figure 6. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total cost per disposition (FY 2000).

Figure 7

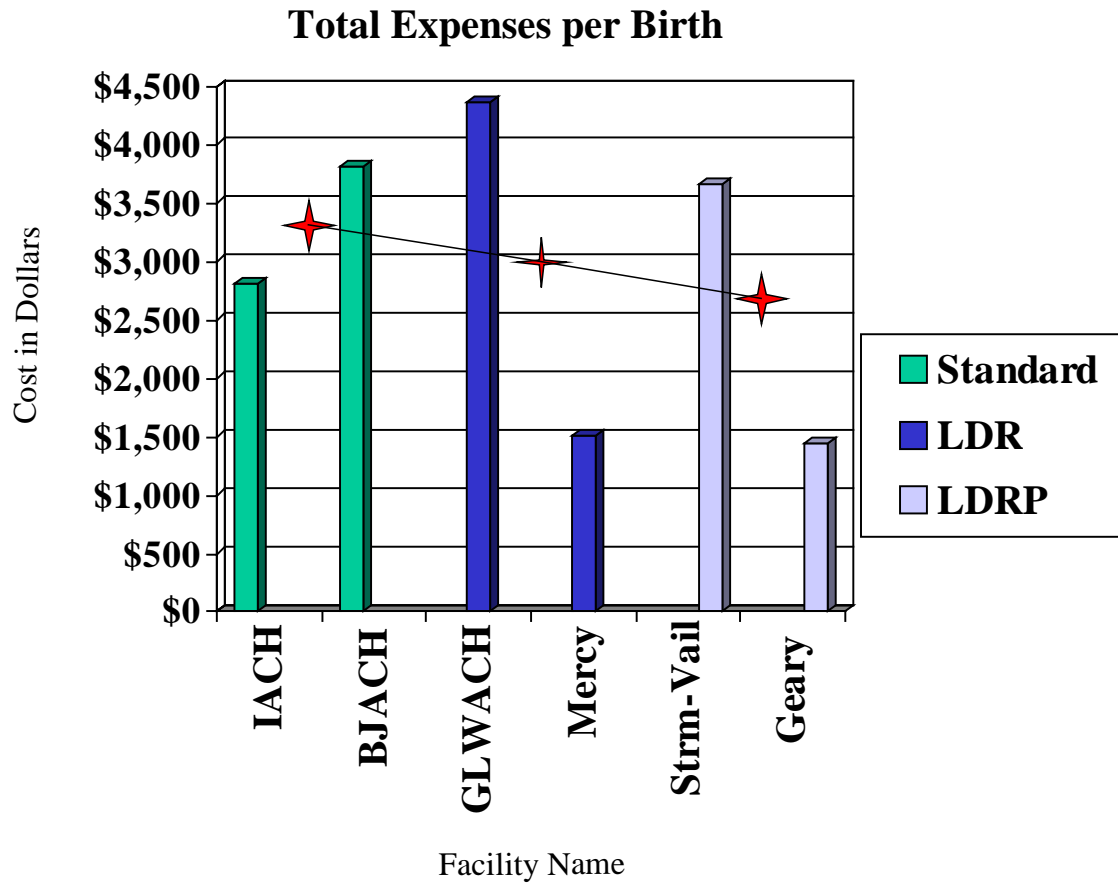


Figure 7. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to total expenses per birth (FY 2000).

Figure 8

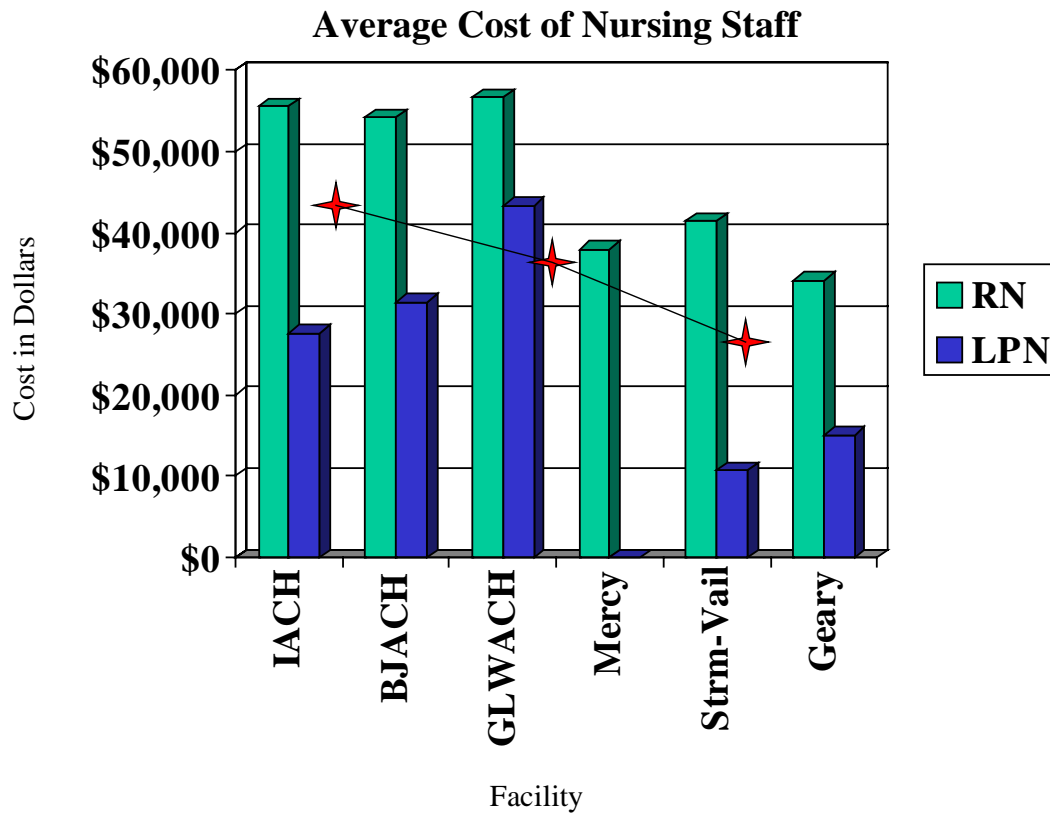


Figure 8. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to average cost of nursing staff by type of staff member (FY 2000).

Figure 9

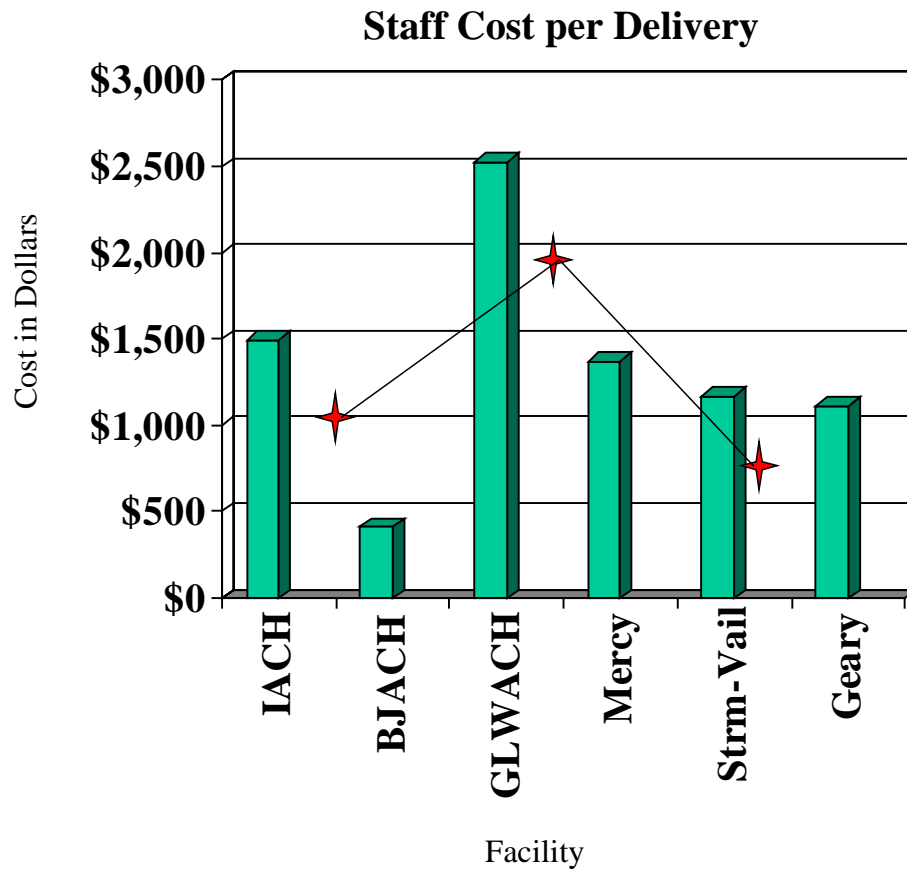


Figure 9. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to staff cost per delivery (FY 2000).

Figure 10

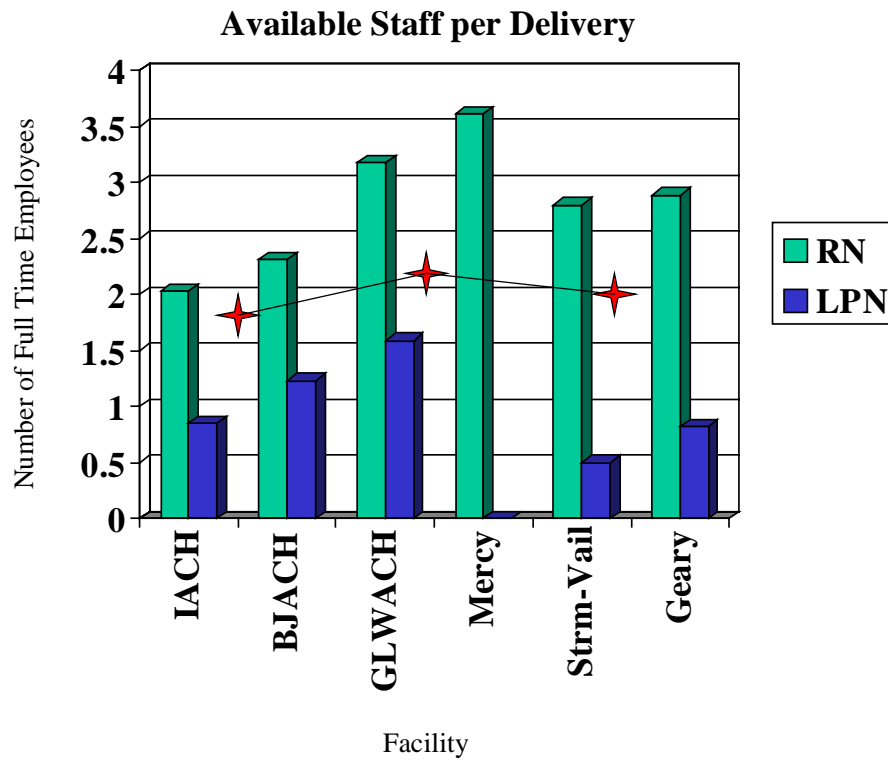


Figure 10. Comparison of Single-Use obstetric room facilities with multiple-use (LDR/LDRP) room facilities as related to available staff members per delivery (FY 2000).

## Appendix B

TABLE 1.

Cost comparison of Douglas General Hospital Birthing Center  
With 8 Other Hospitals

		Cost in Dollars	
		24-Hr. Stay	3-Day Stay
Douglas General Birthing Center		\$ 640.00	\$ 850.00
Hospital	A	\$ 1,200.00	\$ 1,400.00
Hospital	B	\$ 1,170.00	\$ 1,300.00
Hospital	C	\$ 1,100.00	\$ 1,500.00
Hospital	D	\$ 1,150.00	\$ 1,300.00
Hospital	E	\$ 806.00	\$ 1,030.00
Hospital	F	\$ 945.00	\$ 1,000.00
Hospital	G	\$ 1,300.00	\$ 1,600.00
Hospital	H	\$ 900.00	\$ 1,000.00

Note. Estimated costs following normal uncomplicated vaginal deliveries.

(Clark, Stewart, 1982).

Table 2.

Benefits of Single Room Maternity Care

<u>Hospital</u>	<u>Nursing Staff</u>
Increased savings through increased staff productivity	Greater involvement with the family in the childbearing process
Increased efficiency through elimination of unnecessary tasks	Closer and more continuous contact, improving recognition skills of potential problems
Reduced space requirements	Less communication breakdown with decreased transfer of information from one special area to another
Reduced staff turnover because of greater job satisfaction	Elimination of multiple transfer and duplication of paperwork
Decreased risk of patient injury by elimination of multiple transfers	More time available for patient care and education; less time required for cleanup
Increased utilization through consumer response	Increased job satisfaction
Heightened community image and visibility	Special training in obstetrics, pediatrics, and post partum care
<u>Family</u>	<u>Physicians</u>
Decreased disruption of the physical and emotional aspects of childbirth	Rewarding primary care nursing role
Increased opportunity to establish rapport with nursing personnel	Greater involvement with the family
No separation of the mother from her support person or separation of the parents and the baby	Increased patient load and revenue
Reduced risk of injury and infection by avoiding multiple transfers	Less time required to make rounds of all patients clustered in one location
Safe, positive environment conducive to a sense of well-being	Decreased potential for liability from patient injury or infection
Opportunity for more physiologic labor and delivery	Opportunities to educate patients and help parents increase skills and confidence
Reduced hospital cost	More cost-effective care
Greater opportunity to increase parenting skills and confidence through shared responsibility of the baby's care	Positive family feedback

(Jones, 1987)



Table 3

Key Management Indicators for Irwin Army Community Hospital**Irwin Army Community Hospital****L&D and Post Partum Care Ward**

Total Expenses						\$ 2,622,307.30
Workload (Bed Days)						3,806
Dispositions						1,283
Births						933
Average Length of Stay						2.97
Personnel						
	<u>FTE</u>	<u>Cost Per FTE</u>	<u>Total Cost</u>	<u>Cost/Disposition</u>	<u>Cost/Bed Day</u>	
Civilian RN	14	\$ 55,621.64	\$ 778,703.00	\$ 606.94	\$ 204.60	
LPN	5.2	\$ 27,618.80	\$ 138,094.00	\$ 107.63	\$ 36.28	
Military RN	5	\$ 69,565.60	\$ 347,828.00	\$ 271.11	\$ 91.39	
LPN	3	\$ 43,647.33	\$ 130,942.00	\$ 102.06	\$ 34.40	
Total Cost Per Bed Day					\$	688.99
Total Cost Per Disposition					\$	2,043.89

Table 4

Key Management Indicators for Bayne-Jones Army CommunityHospital**Bayne-Jones Army Community Hospital****L&D and Post Partum Care Ward**

Total Expenses	\$ 2,471,884.93
Workload (Bed Days)	3,087
Dispositions	1,272
Births	649
Average Length of Stay	2.43

## Personnel

	FTE	Cost Per FTE	Total Cost	Cost/Disposition	Cost/Bed Day
Civilian RN	7	\$ 54,165.43	\$ 379,158.00	\$ 298.08	\$ 122.82
LPN	5	\$ 31,438.00	\$ 157,190.00	\$ 123.58	\$ 50.92
Military RN	8	\$ 60,302.75	\$ 482,422.00	\$ 379.26	\$ 156.28
LPN	3	\$ 49,140.00	\$ 147,420.00	\$ 115.90	\$ 47.76
Total Cost Per Bed Day					\$ 800.74
Total Cost Per Disposition					\$ 1,943.31

Table 5

Key Management Indicators for General-Leonard Wood ArmyCommunity Hospital**General Leonard-Wood Army Community Hospital****L&D and Post Partum Care Ward**

Total Expenses	\$ 1,641,121.55
Workload (Bed Days)	1,685
Dispositions	730
Births	377
Average Length of Stay	2.31

## Personnel

	FTE	Cost Per FTE	Total Cost	Cost/Disposition	Cost/Bed Day
Civilian RN	10	\$ 56,718.00	\$ 567,180.00	\$ 776.94	\$ 336.61
LPN	1	\$ 43,375.00	\$ 43,375.00	\$ 59.42	\$ 25.74
Military RN	2	\$ 54,342.00	\$ 108,684.00	\$ 148.88	\$ 64.50
LPN	5	\$ 46,445.60	\$ 232,228.00	\$ 318.12	\$ 137.82
Total Cost Per Bed Day					\$ 973.96
Total Cost Per Disposition					\$ 2,248.11

Table 6

Key Management Indicators for Mercy Health Center

**Mercy Health Center**

**L&D and Post Partum Care Ward**

Total Expenses	\$ 1,165,917.40
Workload (Bed Days)	3,179
Dispositions	1,560
Births	775
Average Length of Stay	2.04

Personnel

	FTE	Cost Per FTE	Total Cost	Cost/Disposition	Cost/Bed Day
Civilian RN	28	\$ 37,927.91	\$ 1,061,981.60	\$ 680.76	\$ 334.06
LPN	0	\$ -	\$ -	\$ -	\$ -
Military RN	0	\$ -	\$ -	\$ -	\$ -
LPN	0	\$ -	\$ -	\$ -	\$ -
Total Cost Per Bed Day				\$	366.76
Total Cost Per Disposition				\$	747.38

Table 7

Key Management Indicators for Stormont-Vail Regional Health Center

**Stormont-Vail Regional Health Center**

**L&D and Post Partum Care Ward**

Total Expenses	\$ 7,226,547.00
Workload (Bed Days)	12,284
Dispositions	7,124
Births	1,979
Average Length of Stay	1.72

**Personnel**

		<u>FTE</u>	<u>Cost Per FTE</u>	<u>Total Cost</u>	<u>Cost/Disposition</u>	<u>Cost/Bed Day</u>
Civilian	RN	39	\$ 41,502.74	\$ 1,618,607.00	\$ 227.20	\$ 131.77
	LPN	17	\$ 40,805.12	\$ 693,687.00	\$ 97.37	\$ 56.47
Part Time	RN	7	\$ 10,760.57	\$ 75,324.00	\$ 10.57	\$ 6.13
	LPN	3	\$ 4,587.67	\$ 13,763.00	\$ 1.93	\$ 1.12
Total Cost Per Bed Day						\$ 588.29
Total Cost Per Disposition						\$ 1,014.39

Table 8

Key Management Indicators for Geary Community Hospital**Geary Community Hospital****L&D and Post Partum Care Ward**

Total Expenses	\$ 348,093.00
Workload (Bed Days)	1,159
Dispositions	242
Births	242
Average Length of Stay	4.79

## Personnel

	FTE	Cost Per FTE	Total Cost	Cost/Disposition	Cost/Bed Day
Civilian RN	7	\$ 34,171.14	\$ 239,198.00	\$ 988.42	\$ 206.38
LPN	2	\$ 15,110.00	\$ 30,220.00	\$ 124.88	\$ 26.07
Military RN	0	\$ -	\$ -	\$ -	\$ -
LPN	0	\$ -	\$ -	\$ -	\$ -
Total Cost Per Bed Day				\$	300.34
Total Cost Per Disposition				\$	1,438.40

Appendix C. Facility examples taken from a traditional inpatient OB/GYN model.



Figure 1. Photomicrograph of an example of a labor room at Irwin Army Community Hospital.



Figure 2. Photomicrograph of an example of a Delivery Room at Irwin Army Community Hospital.



Figure 3. Photomicrograph of an example of a Recovery/Transition room at Irwin Army Community Hospital



Figure 4. Photomicrograph of the Nurse's station on the Labor and Delivery Deck at Irwin Army Community Hospital.





Figure 5. Photomicrograph of the Post Partum Care Ward at Irwin Army Community Hospital.



Figure 6. Photomicrograph of an example of a private post partum care room at Irwin Army Community Hospital.



Figure 7. Photomicrograph of an example of a semi-private postpartum care room at Irwin Army Community Hospital.

Appendix D. Facility examples taken from the LDR concept of inpatient OB/GYN model.



Figure 1. Photomicrograph of an example of a labor, delivery, recovery room at Mercy Health Center.



Figure 2. Photomicrograph of an example of a post partum room at Mercy Health Center.



Figure 3. Photomicrograph of the nurse's station and The Women's Center ward at Mercy Health Center.



Appendix E. Facility examples taken from the LDRP concept of inpatient OB/GYN model.



Figure 1. Photomicrograph of an example of a labor, delivery, recovery, post partum room at Geary Community Hospital.



Figure 2. Photomicrograph of an example of a labor, delivery, recovery, and post partum room at Geary Community Hospital.



Figure 3. Photomicrograph of The Women's Center ward and nurse's station at Geary Community Hospital.



Figure 4. Photomicrograph of the nurse's station with view of the entrance and observation window to the NICU at Geary Community Hospital.