A DESCRIPTION OF THE MANAGEMENT CHARACTERISTICS OF ANESTHESIA CARE DELIVERY IN SMALL, MEDIUM, LARGE, TEACHING AND NON-TEACHING HOSPITALS IN THE U. S. NAVY.

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ABSTRACT

The purpose of this study is to describe the management characteristics of anesthesia care delivery by Certified Registered Nurse Anesthetists (CRNAs) and anesthesiologists in small, medium, large, teaching, and nonteaching hospitals in the United States Navy. The study describes the relationship between the management characteristics and practice patterns of anesthesia providers in U. S. Naval Hospitals in the Continental United States (CONUS) and Outside Continental United States (OCONUS). No data has been found in the literature to describe the management characteristics and practice patterns of Navy CRNAs and anesthesiologists in the delivery of anesthesia. The research instrument was a 45-item questionnaire developed by the author, along with two other Student Registered Nurse Anesthetists researchers, mailed to the Chief CRNAs at 20 CONUS and 9 OCONUS naval hospitals where anesthesia services are currently provided. The questionnaire provided data on demographics, practice patterns, provider responsibilities, and management and personnel characteristics of anesthesia care delivery in U. S. Naval Hospitals. Descriptive data from 23 of 29 Departments of Anesthesia (79%) were analyzed and data reported on management and practice characteristics of anesthesia care by military CRNAs and anesthesiologists Navy wide. The data describes the ratio of Navy anesthesiologists to CRNAs, practice patterns of Navy CRNAs, productivity measurement, daily and monthly work schedules, and anesthesia staffing call assignments of Navy CRNAs and anesthesiologists.

Key Words: United States Navy Anesthesia Care Delivery Management Characteristics Military Practice Patterns Naval Hospitals Supervision CONUS OCONUS Navy CRNAs Navy Anesthesiologists

A DESCRIPTION OF THE MANAGEMENT CHARACTERISTICS OF ANESTHESIA CARE DELIVERY IN SMALL, MEDIUM, LARGE, TEACHING AND NON-TEACHING HOSPITALS IN THE U. S. NAVY

by

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PREFACE

This research was conducted to provide information on the management characteristics of anesthesia care delivery in small, medium, large, teaching and nonteaching hospitals in the United States Navy. The data obtained will be provided to the Nurse Anesthesia Consultant to the U. S. Navy Surgeon General upon request.

DEDICATION

To Debra La Thaye Wiggins, my wife, and In Memory of my two precious nieces and nephew, Brandy Wiggins, Taylor Wiggins, and Sara-Frances Wiggins, I dedicate the creation of this thesis for helping me to keep my perspective as to what is really important in life and beyond. I love you all and will miss the laughter, smiles, and warmness my two nieces and nephew engraved on my heart and soul.

I would like to thank the members of my thesis committee for their time and mentoring in guiding this study to reach its completion. In particular, my sincere appreciation and whole-hearted gratitude to my thesis chair, Maura S. McAuliffe, CRNA, Ph.D., LtCOL, USAF, NC, for her foresight, dedication, and time throughout this endeavor.

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CHAPTER I - INTRODUCTION

Background

Certified Registered Nurse Anesthetists (CRNAs) are a successful group of professional advanced practice nurses (APNs) who have been practicing the art and science of anesthesia care delivery in the United States for more than 100 years. A CRNA is a registered nurse who is highly educated and competent to engage in all aspects of the practice of nurse anesthesia (Jordan, 1994).

The American Nurses Association (1995) defines APNs as registered nurses who have completed a graduate level education or certified in an area of specialization, or both. The APN is an umbrella label given to registered nurses who have met these advanced educational and clinical practice requirements. Under this label are the four specialty areas of Certified Registered Nurse Anesthetists (CRNAs), Certified Nurse Midwives (CNMs), Nurse Practitioners (NPs), and Clinical Nurse Specialists (CNSs).

Today, CRNAs provide more than 65% of the 26 million anesthetics administered to patients in the U. S. each year (American Association of Nurse Anesthetists (AANA), 1996a). CRNAs are the sole anesthesia care providers in 70% of the rural hospitals in the U. S. (AANA, 1998a). CRNAs administer a diversity of anesthesia care, from minor to major surgical interventions, and practice in every setting in which anesthesia care is administered including traditional hospital surgical and obstetrical delivery suites, ambulatory settings (commonly referred to as same-day surgery), Preferred Provider Organizations (PPOs), Health Maintenance Organizations (HMOs), the U. S. Armed Forces (Navy, Army, Air Force), U. S. Public Health Service (USPHS), and the Veterans Affairs (VA) Medical Treatment Facilities (MTFs). A 1990 study on the manpower needs for nurse anesthetists conducted by the National Center for Nursing Research, U. S. Public Health Services (USPHS) Department, estimated the human resources need of CRNAs by the year 2010 would be greater than 35,000. This is an increase of over 35% of the 26,000 CRNAs currently practicing in the United States (Jordan, 1994).

Anesthesiologists, or physician anesthetists, are medical doctors with post-graduate (residency) training in anesthesiology. Residency training in anesthesiology consists of four years of supervised experience in an approved program after a degree in Osteopathy (DO) or Doctor of Medicine (MD) has been obtained. On completion of the required residency training in anesthesiology, the physician can voluntarily take an examination from The American Board of Anesthesiology. Successful completion of the examination results in the issuance of a primary certificate confirming that the physician is a Diplomat, often referred to as board certified by The American Board of

Anesthesiology. The examination is strictly voluntary, and a physician with four years of residency training from an approved anesthesiology residency program can practice anesthesiology without participating in the written and oral board examination (Stoelting & Miller, 1994).

"Anesthesia, or anesthesiology, is the art and science of rendering a patient insensible to pain by the administration of anesthetic agents and related drugs and therapeutic procedures" (Jordan, 1994, p. 4). Anesthesia care delivery and anesthesia-related care represent the services that anesthesia professionals (i.e., nurse anesthetists and physician anesthetists) provide on assignment, request, or referral by the physician, patient, or other professional health care providers authorized by law to facilitate diagnosis, therapeutic, or surgical procedures. In some circumstances a consultation for pain management associated with obstetrical labor and delivery, respiratory and ventilator management of acute and chronic problems, or management of acute or chronic pain through the diagnosis or performance of selected therapeutic procedures or blocks can be referred to or requested of the anesthesia care provider (Jordan, 1994).

Military Medicine

The primary mission of military medical professionals is to keep American service members ready to fight. As of March 31, 1996, the Department of Defense (DoD) employed a total of 1.5 million active duty service members in the Navy, Marine Corps, Army, Air Force, and Coast Guard, with another 1.7 million in the Ready and Standby Reserves. According to the Defense Manpower Data Center, the total number of military retirees from all services was 1.5 million as of June 30, 1996. The DoD provides medical care to millions of eligible beneficiaries around the world. As of March 1996, the total worldwide beneficiary population eligible for medical care was 8.4 million (DoD, 1996).

The DoD operates 107 hospitals and about 656 independent clinics in its health care system (US Medicine, 1997). The president's fiscal year 1999 (FY99) proposed medical budget is $10.1 billion, which is $300 million less than the FY 1998 budget. Fiscal year 1999 budget for the defense health care program will include funding for health care to beneficiaries over age 65. An additional $566 million is requested to fund managed care support contracts for DoD's TRICARE (formerly CHAMPUS) health maintenance plan and to direct care in DoD MTFs. American Forces Press Service (Gillert, 1998) reported major program decreases in the health care budget for FY 1999 reflect a smaller beneficiary population, one time FY 1998 expenses associated with TRICARE contract implementation, congressional increases, and savings earned through management incentives.

A major trend of the DoD health care effort is the establishment of a worldwide TRICARE military health care plan. The establishment of TRICARE is due to rapidly rising health care costs. The closure of military bases along with their hospitals has required the DoD to look for new ways to provide health care benefits. TRICARE is the DoD response to providing these health care benefits. TRICARE is the medical program for active duty members, eligible family members, non-Medicare eligible military retirees and their family members and survivors of all uniformed services. TRICARE is designed to provide expanded access to care, assure a high quality managed-care health care program, control health care costs for patients and taxpayers, and improve medical readiness (DoD, 1995). Officials expect TRICARE to be fully operational by the end of FY 1997 (DoD, 1996).

Mission of the U. S. Navy Medical Department

The mission of the Navy Medical Department is to ensure the health of our Navy and Marine Corps personnel so they are mentally and physically ready to carry out the worldwide mission of the DoD. This mission involves establishing, managing, and executing policies and procedures in support of operational readiness in any environment. The mission also includes health promotion, care and treatment of sick and injured active duty personnel, education and training programs for medical department personnel, mission-relevant medical research; and the prevention and control of disease and injury. As resources permit, the health care, support, and treatment of eligible dependents of active duty and retired members. Treatment is also offered for on-the-job injuries and illnesses of federal civilian employees of the DoD (BUMED, 1990).

U. S. Navy Medical Department Staff Corps Officers

Regardless of which staff corps an individual serves, whether it is medical, dental, medical service, or nurse, all Medical Department officers share the same responsibility: to provide the best and most effective possible medical support to enable the Navy to fulfill its commitments to national defense. Medical Department officers all share a common dual obligation: their role as providers of services in the health care delivery system and their responsibility as professional military officers. Through the demonstration of competence and a mature perspective, the Medical Department officer is given the ultimate in career development opportunity - increased responsibility. This achievement may be recognized by such indicators as the level of organization to which one is assigned, span of control, potential impact of decisions made, or magnitude of program resource management. Responsibility is typically commensurate with the officer's grade or rank. Promotion is based upon an officer's past performance and estimated potential for future performance at levels of greater responsibility (BUMED, 1990).

U. S. Navy Nurse Corps

The Navy Nurse Corps was officially established by an act of Congress on 13 May 1908. Since then, Navy nurses have steadily advanced in professional and military standing. Nurse Corps officers serve worldwide: working with the fleet aboard large naval ships (e.g., carriers, hospital ships, etc.); flying with the injured from regions of battle; establishing clinics, hospitals, and nursing schools in remote areas of the world; and practicing, teaching, and supervising in federal MTFs of all sizes (BUMED, 1990).

Navy nurses teach and supervise professional and paraprofessional personnel, such as new nurse corps officers and hospital corpsman who may have had little or no previous experience caring for the sick and injured. They also function in billets or positions as staff nurses, unit managers, clinical nurse specialists, department heads, program administrators, and as executive and commanding officers. Navy nurses also function in roles as primary health care providers such as nurse anesthetists, nurse practitioners, and nurse midwives (BUMED, 1990).

Today, the Navy Nurse Corps has about 3,000 officers (DoD, 1996) on active duty in the rank or grade of ensign through rear admiral.

Mission of the U. S. Navy Nurse Corps

The mission of the Navy Nurse Corps is twofold. First, officers in the Nurse Corps provide professional nursing services to all active duty personnel and eligible beneficiaries as authorized by law. These professional nursing services are delivered in a variety of settings along a continuum of care ranging from the fleet and battlefield to a shore-based tertiary care facility (BUMED, 1989).

The second mission of Navy Nurse Corps officers is the provision of basic and advanced instruction and supervision of hospital corpsman in the practice of nursing (BUMED, 1989).

Expanded clinical roles and leadership of Navy nurses are based on this mission in the advancement of their careers.

Philosophy of the U. S. Navy Nurse Corps

Navy nurses function and practice in collaboration with other health care team members. As naval officers, Navy nurses' principle area of expertise is in the profession of general or advanced practice nursing. The Navy Nurse utilizes the nursing process, along with the physical, biological, social, and behavioral sciences, to assess, diagnose, plan, implement, and evaluate the nursing care given to each patient or beneficiary. To facilitate the

highest possible level of wellness for those receiving nursing care, the Navy nurse employs an independent, dependent, and interdependent decision-making process (BUMED, 1989).

Delivery of nursing care is provided in conjunction with other health care providers. The Blueprint of Navy Nursing (BUMED, 1989) describes this process of health care delivery as the team approach defined as the circle of care. The team is primarily composed of the nurse, physician, allied health personnel, and hospital corpsman. The circle of care is complete with the patient being at the core of the circle (Appendix C). The needs of the patient drives the provision of health care. The strong feeling and sense of caring permeate the entire circle. Collaborative practice links the team members of the circle of care and is based on the assumption that all disciplines have unique contributions that help the patient gain or maintain an optimal state of health and well-being. Each member of the circle of care possesses a special skill or set of skills that, when combined with the skills of other members of the team, provide multiple paths to wellness for the health care beneficiary. The hallmark of this process is teamwork. The collaborative efforts of the Nurse Corps officers greatly enhance the delivery of health care. Navy nurse anesthetists are within the circle of care in the delivery of anesthesia care to all eligible beneficiaries in the military health care system.

Navy Nurse Anesthetists: Subspecialty (1972)

The Navy nurse anesthetist is an exceptional provider of anesthesia care delivery as an advanced practice nurse in the military. Navy nurse anesthetists serve dual roles, both as a professional Nurse Corps officer and a naval officer. Navy nurse anesthetists must be certified by the American Association of Nurse Anesthetists (AANA) as a CRNA before being clinically privileged for independent practice in the delivery of anesthesia (BUMED, 1990).

Navy nurse anesthetists are called upon to provide support for military deployments around the world. Military medical personnel including Navy nurse anesthetists provided health care for more than 50,000 Haitian and Cuban refugees at Guantanamo Bay Naval Base, Cuba. They deployed to provide support to the American service members in Haiti. Since 1993, military medical personnel from all branches of the service have supported the United Nations peacekeeping force in Zagreb, Croatia. A major health care effort has been to provide medical support to American service members deployed to Bosnia as part of Operation Joint Endeavor (DoD, 1996).

Navy Nurse Anesthetists Performance Elements

Navy nurse anesthetists are not only exceptional in the dual role they serve as professional advanced practice nurses and military officers, but in the performance elements required to function as a team member. The performance elements set forth by the Bureau of Medicine and Surgery (BUMED, 1990) for a Navy nurse anesthetist are:

> function in an expanded and specialized area of nursing; possesses the knowledge and clinical skills to accept and provide anesthesia services to patients requiring anesthesia care management. Administers general and regional anesthesia procedures to patients; maintains complete and detailed records of patients' progress during anesthesia; instructs nursing personnel in resuscitation, airway management, and respiratory care; manages resources for the department; provides post-anesthesia follow-up for patients; and provides support to surgical teams and to deployed fleet and marine force units as required (p. 12).

Navy Nurse Anesthetists Assignment Possibilities

The assignment possibilities for Navy nurse anesthetists include (BUMED, 1990):

1. Lieutenant Commander (O-4)/Lieutenant (O-3) & below:
    a. On graduation - Medium or Large MTF
    b. Staff Anesthetists - Small, Medium, or Large MTF
    c. Fleet Surgical Support Team (FSST)
    d. Carrier ship assignment
2. Commander (O-5):
    a. Phase II Training Site Coordinator
    b. Independent solo or duo Anesthetist(s)
    c. Phase II Clinical Instructor - Naval School Health Sciences (NSHS) Detachment
3. Captain (O-6):
    a. Director, Navy Nurse Corps Anesthesia Program
    b. Administrative Director of Anesthesia - Medium or Large MTF
    c. Senior Nurse Anesthetist - Large MTF

A primary goal of the Director, Naval Medical Department is to ensure that the most effective practitioners, leaders, and managers are identified and provided with the appropriate experience in preparation for an assignment to a key position within the Medical Department (BUMED, 1990).

Professional Definitions and Qualifications of Navy CRNAs

Navy CRNAs possess a specialized body of knowledge that enables performance of their peacetime and mobilization roles that differentiates them from their civilian colleagues. The U. S. Navy relies upon solo CRNA providers in contrast to the typical civilian hospitals' Anesthesia Care Team (ACT) approach. Navy CRNAs fill operational assignments, because civilian CRNAs cannot be deployed (OASD [HA], 1994).

Navy CRNAs in the Navy Medical Department are either active duty, composed of the full-time commissioned officer force or reserve, whose mission is to augment and mobilize the active duty force in time of a national emergency (Levine, 1994).

The armed services nurse corps provides support programs for active duty nurses for the long-term, full-time educational preparation of nurse anesthetists through civilian and military universities (Levine, 1994). The educational program utilized in the Navy to train nurse anesthetists is called full-time duty-under-instruction (DUINS). Active duty Navy nurse anesthetists are currently prepared in a graduate program at either, the Uniformed Services University of the Health Sciences (USUHS) or Georgetown University. USUHS Graduate School of Nursing is the only military nursing school in the United States (Willis & Carpenter, 1997). Navy CRNAs educated at Georgetown University falls under the direct administration of the Navy Nurse Corps Anesthesia Program (NNCAP). The length of each program varies from 27 to 30 months, consisting of a didactic phase (Phase I) and a clinical phase (Phase II). The USUHS curriculum includes military readiness education, in addition to nurse anesthesia education, thus preparing a nurse in the uniformed services to function in a way that civilian nurse anesthetists education programs cannot (Levine, 1994). Navy CRNAs trained at these two universities are granted a graduate level education. A master's of science degree in nursing is conferred upon completion of all requirements.

Military CRNAs are also acquired by direct accession from civilian-trained nurse anesthesia programs through the Armed Forces Health Professions Scholarship Program (AFHPSP) or Full-Time Out-Service Program (FTOS).

To qualify as a CRNA in the Navy Nurse Corps, all the eligibility requirements required to practice anesthesia in the civilian sector must be met.

Jordan (1994) listed the following requirements that must be met to become a CRNA:

1. Graduate from an approved School of Nursing and hold current state licensure as a registered nurse.
2. Graduate from a nurse anesthesia educational program accredited by AANA Council on Accreditation (COA) of Nurse Anesthesia Programs or its predecessor.
3. Successful completion of the certification examination administered by the AANA Council on Certification of Nurse Anesthetists or its predecessor.
4. Comply with criteria for biennial recertification.

As of January 1, 1998, a Master's degree will be the entry-level qualification for CRNA certification (AANA, 1996c).

Scope of Practice of Navy Nurse Anesthetists

Navy CRNAs practice according to their anesthesia expertise, state statues or regulations, and the policy or guidelines as set forth by their institution. The scope and practice of Navy CRNAs encompass the professional functions, privileges, and responsibilities associated with nurse anesthesia practice. This scope of practice of anesthesia care delivery is performed in collaboration with other legally authorized and qualified professional health care providers (Jordan, 1994).

The scope of practice and role delineation between Navy anesthesia providers is an elaborate and ongoing process. Currently, the AANA sets practice guidelines for CRNAs, while the American Board of Anesthesiology (ASA) sets the practice guidelines for anesthesiologists. The practice of CRNAs is a "specialty recognized within the profession of nursing and is not a medically delegated act" (Jordan, 1994, p. 4).

Rationale and Significance of the Problem

A description of differing management characteristics of anesthesia care delivery of the Navy CRNA and anesthesiologist was not found in the literature. Since military anesthesia providers share a unique role in the delivery of anesthesia care, the importance of describing these characteristics may assist in documenting educational

needs, practice patterns, provider responsibilities, and value of each anesthesia provider to the Navy Medical Department. A description of these characteristics may also be beneficial in relating how job responsibility, motivation, and quality of worklife affect the role assignment of Navy nurse anesthetists and physician anesthetists in providing anesthesia services in Navy MTFs.

A number of studies have been conducted to determine how job satisfaction and the turnover rates of nurse anesthetists relate to certain aspects of the work and the work environment. A 1993 study by Loeffler, entitled Job Satisfaction and Turnover of Nurse Anesthetists, of 139 CRNAs, who responded to the Minnesota Satisfaction Survey, found moral values, social service, ability utilization, and achievement as the components of the job that are most satisfying. The highest satisfaction factors reported were independence, security, responsibility, activity, creativity, and variety. The most important factor reported by Loeffler relating to the job satisfaction of the CRNA was respect and recognition and autonomy and independence.

Many factors affect labor productivity in nursing management. Edwardson (1995) described these factors as motivation, work methods, and control. The overall goal of labor productivity in the health care environment is to achieve the best possible outcome or maximal health status for the patient with the least expenditure of resources. To describe the operational variables of motivation, work methods, and control of Navy anesthesia providers may afford future knowledge regarding labor productivity in relation to the delivery of anesthesia services. To improve the productivity of an organizational function would ensure the success and survival of the organization as well as delivery of a valuable and quality service to the beneficiary. The effectiveness of anesthesia care delivery can best be measured in patient outcome and patient satisfaction. However, it is beyond the scope and aim of this study to describe the relationship between patient outcomes and effective delivery of anesthesia care by various anesthesia providers.

Data from this study could be useful in describing which factors influence the delivery of anesthesia care in naval hospitals. Factors influencing the delivery of anesthesia care in Naval Hospitals could possibly include size of the facility, geographical location of the facility, number and types of anesthesia providers assigned to the facility, and whether it is a teaching or nonteaching facility.

The data collected could be useful in determining future operational and medical readiness needs, staffing assignments, educational or residency programs, provider responsibilities, practice patterns, and workload management characteristics of nurse anesthetists and anesthesiologists in the Navy. The restructuring of the military

health care system, through the initiation of managed-care (DoD, 1995), may influence the direction of how anesthesia services will be provided in the future to beneficiaries. To adequately plan for the delivery of anesthesia care may require a description of which provider may be most practical, beneficial, and economical in providing these services in relation to the needs of the Navy.

Statement of the Problem

For more than 100 years, nurse anesthetists have been providing high quality patient care and anesthesia services. CRNAs can perform the same functions in the administration of anesthesia as anesthesiologists (AANA, 1996b). Navy CRNAs are currently serving as independent, advanced nurse practitioners in Navy Hospitals and in the fleet to provide traditional and combat anesthesia care as well as humanitarian service throughout the nation and world.

CRNAs have the legal authority to practice the delivery of anesthesia in all 50 states without the direct medical supervision of anesthesiologists (AANA, 1996d). However, "many States require that CRNAs be 'supervised' by a 'licensed physician.' No State nurse practice act requires that the supervising physician be an anesthesiologist" (Tobin, 1994).

Currently, no study has been published that demonstrates anesthesia care delivered by anesthesiologists is superior to that delivered by CRNAs. The only published studies that attempt to correlate patient outcomes to anesthesia providers suggest the quality of care is not significantly different. In 1990, the Centers for Disease Control (CDC) proposed a study on the morbidity and mortality of patient outcomes in anesthesia. After a review of the literature by Doug Klauke, MD, Assistant Director for Science, Division of Surveillance and Epidemiologic Studies, Epidemiology Program, CDC, found the incidence of morbidity and mortality of patient outcomes in anesthesia too low to justify a multi-million dollar study (AANA, 1996d).

A 1990 study by the USPHS of the Department of Health and Human Resources examined the results of the manpower needs of nurse anesthetists. The study concluded that a more efficient use of CRNAs, as compared to anesthesiologists, to deliver anesthesia care could save the United States $1 billion annually by the year 2010 (AANA, 1996c).

The most substantial difference between nurse anesthetists and physician anesthetists is their levels of education. Before anesthesia education, anesthesiologists will receive basic medical education, while CRNAs receive basic nursing education. The anesthesia education for the nurse anesthetists and physician anesthetists are

very similar. Both anesthesia providers use the same anesthesia processes in the delivery of anesthesia and related services (AANA, 1996c).

Commander Vance Gainer, Director, Navy Nurse Corps Anesthesia Program, reported in the Navy Nurse Corps Director's Update that the United States is currently short 6,000 CRNAs and that the Navy Nurse Corps is short of meeting the billet requirements for CRNAs (1994). Gainer reported the Surgeon General of the Navy has been urging the development of an initiative called 'The Total Health Care Services Readiness Requirement (THCSRR)' (p. 14). This requirement will call for the Navy Medical Department to base Navy Medicine billets and personnel, including Navy CRNAs, on wartime platform requirements. The billets for peacetime requirements of anesthesia care by Navy anesthesia providers would be performed through TRICARE. For the Navy Medical Department to meet the wartime platform requirements for anesthesia care delivery would require the current billet allowance of 142 CRNAs to increase to nearly 200.

Purpose of the Study

The purpose of this study is to describe the following: a) Which anesthesia provider plans, directs, and controls the daily and monthly assignments; b) which organizational department within the Navy Hospital the CRNA falls under; c) if anesthesiologists supervise CRNAs on a routine basis, and if so, to describe the ratio of anesthesiologists to nurse anesthetists; d) the estimated percentage of time anesthesiologists supervise, or medically direct CRNAs during the administration of anesthesia based upon the Tax Equity and Reform Act (TEFRA) of 1982; e) to describe the anesthesia provider staffing for call; f) what the average number of hours per month CRNAs and anesthesiologists are assigned to pull first call, or duty, for the anesthesia department; and g) how productivity or work is measured in each Naval Hospital anesthesia department (Appendix A).

The data collected can be useful in examining the practice patterns of Navy nurse and physician anesthetists. The data can help to identify barriers in anesthesia practice that possibly exist between Navy CRNAs and anesthesiologists in the delivery of anesthesia care. Additionally, the data can be useful in determining future Navy CRNA workload characteristics, operational readiness, manpower, and educational needs. However, the information obtained concerning Navy anesthesia provider responsibilities, practice patterns, and the management of anesthesia care delivery can be useful in determining how the manpower needs of the Navy Medical Department may be met in hospitals in the Navy.

Major Research Questions

The following research questions have been identified:

1. What are the management characteristics of anesthesia care delivery in small, medium, large, teaching, nonteaching, CONUS and OCONUS naval hospitals?
2. How is the productivity of anesthesia providers measured in the anesthesia departments of naval hospitals?
3. What are Navy anesthesia provider responsibilities and practice patterns in the delivery of anesthesia in small, medium, large, teaching, and nonteaching hospitals in the Navy?

Theoretical Framework

The theoretical framework is McGregor's (1966) theory X and theory Y, and Herzberg's (1966) motivation-hygiene theory.

La Monica (1990) describes the management process and the problem-solving method as the procedures for all management responsibilities. These procedures describe how a manager should function in an organization. The manager plays an important role in facilitating development of standards for a group of workers and modeling behavior that supports the standards of the group. The management characteristics of the people who work in an anesthesia department will provide an understanding of role modeling behavior that supports the standards among nurse anesthetists and anesthesiologists. Describing these characteristics will provide insight into which effective leadership style will produce positive outcomes of anesthesia care delivery to patients to ensure the long range viability of the organization.

Sullivan and Decker (1992) described an organization as a collection of people working together under a division of labor and hierarchy of authority to achieve a common goal. The continued work effort of the group of people under authority towards a goal implies management. This definition of organization by Sullivan and Decker (1992) can be illustrated and applied to the collaborative effort of Navy anesthesia providers in a naval hospital anesthesia department working to achieve a positive outcome for the patient in the delivery of anesthesia care.

McGregor's Theory X and Theory Y

McGregor (1966) outlined a number of assumptions about human nature from the classical organization theory (COT) and nonclassical organization theory (NCOT) called theory X and theory Y assumptions. The COT (theory X) and NCOT (theory Y) are two categories of leadership. The COT was the rule in organizations prior to 1950. The theory X assumptions about human nature as outlined by McGregor from the COT are as follows:

1. People find work distasteful;
2. People are not ambitious and prefer direction;
3. People do not solve organizational problems creatively;
4. People are motivated only by physiologic and safety factors; and
5. People require close control and coercion to achieve goals.

Given these assumptions about human nature, organizations develop the leadership structure and skills to offset these undesirable traits of people so the organizational goals can be accomplished. The COT is a leadership style used by an autocratic employer. Workers were basically told what to do and when to do it. The hierarchy of this traditional organization has a centralized decision-maker and a pyramid form of superior-follower control of the employee (La Monica, 1990). McGregor (1966) contended that the people in these organizations have those traits because the organization made them that way.

The nonclassical organization theory (NCOT) is the basis for contemporary management practices, which evolved from the criticisms of COT. McGregor (1966) proposed theory Y assumptions to contrast the theory X assumptions about human nature. The assumptions proposed by McGregor are as follows:

1. People regard work to be as natural as play, when conditions are favorable;
2. People are self-directed in achieving organizational goals;
3. People are creative in solving problems;
4. People are motivated at all levels of Maslow's hierarchy of needs-physiologic, safety, social, esteem,

and self-actualization; and

5. People are self-controlled if properly motivated.

Organizations that take the nonclassical theory approach to the theory Y assumptions about human behavior design leadership structures to empower the worker to grow within the organization. The aim of this leadership approach is to have people fulfill the theory Y assumptions as outlined by McGregor (1966). These assumptions allow managers in organizations to find out what motivates people and then structure the appropriate leadership style that will foster development of the worker within the organization (La Monica, 1990). The application of McGregor's theory Y as part of the theoretical framework could exemplify the autonomy of Navy nurse anesthesia providers. The application of McGregor's theory Y is an assumption that Navy nurse anesthetists must be self-directed in achieving the mission goals of the Navy Medical Department and the DoD, motivated at all levels of the profession in delivering safe and quality anesthesia care to patients, and self-controlled if they are properly motivated by the management and leadership of the organization.

The leadership style of an organization is dependent upon the personalities of the people within the organization. If a person needs close control or supervision, the autocratic style of leadership may be called for. Because other people may need support from the leaders, a democratic style of leadership may be appropriate. There are people who are self-motivated and committed to the growth of the organization. The laissez-faire leadership style may be applied to these individuals (La Monica, 1990). The assumptions of theory Y permits leaders, or managers, in an organization to respond to the needs of the people as they work to achieve the organization's goal. Navy nurse anesthetists are expected to perform as leaders to demonstrate teamwork, problem-solving, communication, and collaboration. The development of leadership skills is essential for the continued growth of the Navy nurse anesthesia profession.

Why Motivation is the Framework Basis for this Study?

The intrinsic and extrinsic satisfaction Navy nurse anesthetists gain from their jobs is an important factor of motivation. Loeffler (1993) described intrinsic motivators as "rewards that originate in the conscious or subconscious mind" and extrinsic factors as "rewards that originate outside the person and prompt specific actions" (p. 72). The importance of understanding motivational factors as each relates to the management characteristics among Navy anesthesia providers is required for the effective delivery of anesthesia care to patients. Understanding the motivational process is essential for Navy anesthesia providers to develop a comprehension of other factors such

as leadership, practice patterns, and incentive systems as they relate to job performance and satisfaction (Sullivan & Decker, 1992). However, this study did not focus on describing motivational factors among Navy anesthesia providers, but recognizes the relationship that exists between motivation and management.

Sullivan and Decker (1992) described three areas that "all motivational theories are concerned with: (a) what mobilizes or energizes human behavior; (b) what directs behavior toward the accomplishment of some objective; and (c) how such behavior is sustained over time" (p. 155). To associate the description of all motivational theories to the context of anesthesia care delivery in Navy Hospitals requires an understanding and description of the management characteristics of Navy CRNAs and anesthesiologists. However, Sullivan and Decker did provide an explanation of some distinct differences between motivational theories. Classifying the motivational theories into two distinct groups of "content theories and process theories" (p. 155) provided an explanation for these differences. Sullivan and Decker defined these two classifications of motivational theories as, "content theories emphasize individual needs or rewards that may satisfy those needs, whereas, process theories emphasize how the motivation process works to direct an individual's effort into performance" (p. 155). For the purpose of this theoretical framework, a content theory of motivation will be used. The content theory for the theoretical framework of this descriptive study will be Herzberg's (1966) motivation-hygiene theory.

Herzberg's Motivation-Hygiene Theory

The motivation-hygiene theory developed by Herzberg (1966) is a two factor theory that explains motivation as identical to job satisfaction. Herzberg regarded job satisfaction and job dissatisfaction as not being on the opposite end of the same continuum, but as two different continua. Factors that lead to no job satisfaction are different in respect to those that lead to no job dissatisfaction.

Herzberg (1966) concluded that intrinsic and extrinsic motivators of job satisfaction were independent of each other. The extrinsic, or hygiene, factors in Herzberg’s analysis meet basic physiologic needs, and if they are not met, are the primary cause of dissatisfaction in the work environment. Herzberg regarded such extrinsic factors of “supervision, company policies and administration, working conditions, job security, satisfactory pay, and interpersonal relations as job dissatisfiers” (p. 74). Herzberg suggested that employees have a need for the presence of these extrinsic, or hygiene, factors not to experience job dissatisfaction. The presence of these extrinsic factors results in an employee who shows up to work, but will not be satisfied with the job or motivated to perform the job.

The intrinsic, or motivator, factors Herzberg (1966) associated as “strong determinants of job satisfaction” (p. 72) were achievement, recognition, work itself, responsibility, and advancement. With these intrinsic, or motivating, factors present, an employee will find satisfaction in the job. The job satisfied employee will be highly motivated to perform effectively and efficiently.

Theoretical Framework Summary

Highly motivated Navy nurse anesthetists may find satisfaction in their job of anesthesia care delivery to patients in the presence of these intrinsic factors described by Herzberg. However, whether the presence of these intrinsic and extrinsic factors exists in relation to job satisfaction or dissatisfaction of Navy nurse anesthetists is not the focus of this descriptive study. Describing the different management characteristics, provider responsibilities, and practice patterns of Navy nurse anesthetists and anesthesiologists can be a useful subject for future research that relates to how intrinsic and extrinsic factors affects anesthesia care delivery in the Navy.

Definitions

American Association of Nurse Anesthetists (AANA): is the professional nurse anesthetists association with a membership representing 96% of active CRNAs practicing in the U. S. and Puerto Rico. The AANA is governed by a board of directors elected by membership (Martin-Sheridan & Wing, 1996).

Anesthesia, or anesthesiology,: “is the art and science of rendering a patient insensible to pain by the administration of anesthetic agents and related drugs and therapeutic procedures" (Jordan, 1994, p. 4).

Anesthesia Care Teams (ACTs): is a type of group practice in the delivery of anesthesia. The ACTs are typically composed of CRNAs who administer anesthetics with direct medical supervision from an anesthesiologist; however, the team may include student registered nurse anesthetists (SRNAs), anesthesiology residents, and anesthesia technicians or assistants (Fassett & Calmes, 1995). The AANA does not give credence to the belief that all CRNAs must practice in an anesthesia care team approach with anesthesiologists (AANA, 1996b).

Anesthesiologists, or physician anesthetists,: are medical doctors with post-graduate (residency) training in anesthesiology. Residency training in anesthesiology consists of 4 years of supervised experience in an approved program after obtaining a degree in osteopathy (DO) or Medicine (MD) (Stoelting & Miller, 1994). Although the term anesthesiologist may also be applied to the CRNA, often referred to as nurse anesthesiology, the terms anesthesiologists and physician anesthetists will be used interchangeably to refer to a medically prepared anesthesia provider.

Autonomy: is the quality of being self-directing in the conduct of an anesthetic (Loeffler, 1993). Characteristics of an autonomous position allows and encourages an individual to participate in determining the work scheduling and anesthesia case assignments, performing the pre-anesthesia examination and evaluation, prescribing the anesthesia care plan, performing the induction and emergence of anesthesia, monitoring the patient during anesthesia, being physically present and available in the diagnosis and treatment of emergencies during intraoperative and postoperative anesthesia care, and participating in the postanesthesia care responsibility.

Certified Registered Nurse Anesthetists (CRNAs): denotes a graduate from an approved School of Nursing who holds a current state license as a registered nurse, is a graduate from a nurse anesthesia educational program accredited by the AANA Council on Accreditation (COA) of Nurse Anesthesia Programs, has successfully completed the certification examination administered by the AANA Council on Certification of Nurse Anesthetists (CCNA), and complies with criteria for biennial recertification (Jordan, 1994). The terms CRNAs and nurse anesthetists will be used interchangeably to refer to a nursing-prepared anesthesia provider.

Clinical privileges: are mechanisms applied in hospitals to authorize health care providers, including CRNAs, to practice according to bylaws established by the medical staff within the facility (AANA, 1996b).

CONUS and OCONUS: are acronyms used by the U. S. Navy to denote Continental United States and Outside Continental United States.

Management characteristics: for the purpose of this study include "planning, organizing, directing, and controlling activities used to accomplish organizational objectives" (Edwardson, 1995, p. 380).

Medical direction: is defined as anesthetics and anesthesia-related care prescribed by anesthesiologists and administered by CRNAs.

Medical Treatment Facilities (MTFs): will refer to those CONUS and OCONUS hospitals in the U. S. Navy that provide anesthesia services as part of the medical services available to beneficiaries. Currently the Navy operates 29 naval hospitals worldwide. The individual naval hospitals will be designated as small, medium, and large based upon data collected regarding the number of inpatient beds assigned to a facility. The naval hospital will be designated as teaching or nonteaching based upon whether or not the facility has an established nurse anesthesia or anesthesiology residency training curriculum.

Motivation: in the management process is usually influenced by the mobilization of human behavior, what influences that behavior towards a goal, and how that behavior can be sustained over a certain period of time (Edwardson, 1995).

Productivity or labor productivity: is a difficult term to define in the health care delivery system. Edwardson (1995) used a basic definition of productivity taken from economic theory as the ratio of output per input. The concept of productivity for the purpose of this study will be described as the workload and management characteristics that contribute to the delivery of anesthesia care among Navy CRNAs and anesthesiologists such as provider responsibilities and practice patterns. The overall goal of labor productivity in the health care environment is to achieve the best possible outcome or maximal health status for the patient with the least expenditure of resources.

Anesthesia provider responsibilities and practice patterns: is defined in relation to which anesthesia provider plans, directs, and controls the daily and monthly assignments; which organizational department within the Navy Hospital the CRNA falls under; if physician anesthetists supervise CRNAs on a routine basis, and if so, the ratio of physician anesthetists to nurse anesthetists; the estimated number of ASA I to ASA V surgical cases a physician anesthetists provides supervision, or medical direction, of CRNAs during the administration of anesthesia based upon the Tax Equity and Reform Act (TEFRA) of 1982; the usual anesthesia provider staffing or call assignment; and the average number of hours per month CRNAs and anesthesiologists are assigned to pull first call, or duty, for the anesthesia department.

Role assignments: are patterns of behavior with established norms that have a prescribed set of behaviors and provide a range of choice with the respect to styles, methods, and activities (Edwardson, 1995). A working definition of the clinical role assignments of the Navy nurse anesthetists was explained in the performance elements established by BUMED (1990).

Responsibility: is having to account for one's own action (Webber, 1984). Navy nurse anesthetists and anesthesiologists share a common dual obligation: their role in the delivery of anesthesia care and their responsibility as professional military officers.

Supervision: of CRNAs by physician anesthetists can be interpreted by the many degrees of supervision possible. Supervision is defined by Webber (1984) as "the direction and inspection of work, actions, or performance of others" (p. 691). A continuum of supervision exists, which may range from CRNAs who are completely

autonomous without medical supervision, to CRNAs who are supervised by physician anesthetists during the intraoperative phase of anesthesia care delivery. Navy CRNAs have the opportunity to practice autonomously aboard ships in the fleet, at remote CONUS and OCONUS locations, or on the battlefield without the direct supervision of physician anesthetists.

Teaching and nonteaching MTFs: will be based upon the data collected indicating if the individual facility instructs or directs a nursing or medically-based type of anesthesia curriculum.

Assumptions

The management characteristics among Navy CRNAs and anesthesiologists may vary based on the current billet assignment of anesthesia providers in small, medium, large, teaching, and nonteaching, CONUS and OCONUS naval hospitals.

Limitations

The research will only include CONUS and OCONUS naval hospitals and cannot be generalized to the other military branches of the uniformed services (Army and Air Force), U. S. Public Health Service, or to the civilian population.

The research will be limited by the willingness of the Chief CRNAs to participate and disclose the information on the Anesthesia Care Delivery Questionnaire (Appendix A).

Summary

This chapter described the background and roles of Navy anesthesia providers in the Navy Medical Department, and their responsibility in providing anesthesia care to all beneficiaries. The emphasis of this study on Navy nurse and physician anesthetists is placed on each profession's role in the mission of promoting operational and medical readiness in peacetime and wartime. Data about provider responsibilities based upon ASA Patient Classification System of Physical Status, practice patterns in the delivery of anesthesia care, and how that anesthesia care is managed in each naval hospital has not been found in the literature. Data collected from this study concerning Navy anesthesia provider responsibilities, practice patterns, and management of anesthesia care delivery may be useful for future reference in determining how those needs may be met in small, medium, large, teaching, and nonteaching, CONUS and OCONUS hospitals in the Navy.

CHAPTER II - REVIEW OF THE LITERATURE

Introduction

In this chapter the review of literature is based on published information relating to nursing management, anesthesia provider practice patterns, work methods, and labor productivity measurement. The current literature review evaluates the relationship between the many variables affecting job satisfaction of nurse anesthetists. Factors that affect job satisfaction, impact of those factors on labor productivity, motivation, nursing management, and provider mix will be discussed as found in the literature review. The majority of published literature is limited to studies on the practice of nurse anesthesia in the civilian community. However, the review of literature examined the concepts of motivation, management, productivity, supervision, and provider mix. These concepts will be used to describe the information as it relates to the practice of anesthesia care delivery of Navy nurse and physician anesthetists.

Labor Productivity Measurement

Many managers in the health care industry would probably tend to agree that improving productivity is vital to the success of any health care organization. Edwardson (1995) diagrammed the factors affecting labor productivity in a model (Appendix D), and proposed that nursing labor productivity is a "function of the characteristics of personnel, the technology employed, and management practices" (p. 376). The management factors of nursing labor productivity identified by Edwardson includes “planning, directing, and controlling activities used to accomplish organizational objectives” (p. 380). Motivation, work methods, and control were the operational variables of management that most directly affect labor productivity. These operational variables of labor productivity were subdivided as:

1. Motivation:
    a. Leadership Strategies.
    b. Supervision Strategies.
2. Work Methods:
    a. Organization of Work.
        1. Role Assignments.
    b. Effectiveness of Effort:
        1. Use of time.

3. Control:

    a. Work Measurement.

    b. Scheduling.

Many other operational variables were described in Edwardson's model of Factors Affecting Labor Productivity, but only the factors outlined above will be reviewed and applied in this descriptive study.

The following management and workload characteristics of Navy nurse and physician anesthetists are the operational variables for this study, as described in relation to Edwardson's (1995) operational variables of labor productivity: motivation, work methods, and control.

The concept of labor productivity, termed as the production of nursing output (Edwardson, 1995), embraces both the effectiveness and efficiency of quality anesthesia care delivery by Navy nurse anesthetists.

Work Methods and Provider Mix

Work methods described by Edwardson (1995) are divided into two categories of variables: work organization and effectiveness of effort. The organization of work has been studied and published extensively in the literature. The work organization of Navy CRNAs and anesthesiologists attempts to assure the highest quality of anesthesia care benefit in relation to cost-efficiency and cost-effectiveness of human and physical resources. Several work method approaches by anesthesia providers exist or have been attempted such as independent CRNAs or anesthesiologists, anesthesia care teams, and varying ratios of anesthesiologists to CRNAs such as 1:2, 1:3, or 1:4, (Fassett & Calmes, 1995).

The AANA (1996b) does not support the belief that CRNAs must practice with anesthesiologists in an ACT approach. Some licensing laws regulating nurse anesthesia practice require CRNAs to work under the supervision or medical direction of a physician such as a surgeon, dentist, podiatrist, or other health care provider. The licensing statutes do not require CRNAs be supervised by an anesthesiologist during the administration of anesthesia. Even the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) does not require CRNAs to be supervised by an anesthesiologist (Fassett & Calmes, 1995).

The ASA defined the policy of ACTs as:

> [A]nesthesia care personally performed or medically directed by an anesthesiologists, a physician who has completed an approved residency in anesthesiology, constitutes the practice of medicine. Certain aspects

of anesthesia care may be delegated to other properly trained individuals. This group of people, medically directed by an anesthesiologist, comprises the anesthesia care team (AANA, 1996b).

A 1992 study by the General Accounting Office on costs of anesthesia found the anesthetics delivered by ACTs were more expensive than those administered by independent CRNAs or anesthesiologists (Fassett & Calmes, 1995).

The Navy relies upon independent CRNAs in contrast to the typical civilian hospitals' ACT approach (OASD, 1994). Patient outcomes data has consistently shown that the anesthesia care delivery by independent CRNAs is of the same high quality as that of independent anesthesiologists or by CRNAs who work with anesthesiologists (AANA, 1996b).

Another way to describe work methods is to consider the effectiveness of effort (Edwardson, 1995). Effectiveness of effort studies have not been found extensively in the literature. Effectiveness of effort is how time and sequencing of activities are the "byproducts of work measurement studies used to develop patient classification systems" (p. 381).

The Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) established criteria for anesthesiologists (AANA, 1996b) in order to be paid by Medicare for supervising or medically directing CRNAs. The maximum number of concurrent cases one anesthesiologist can provide medical direction to CRNAs to receive reimbursement is a 1:4 ratio. The ASA advocated medical direction of all CRNAs at a 1:2 anesthesiologist:CRNAs ratio (Gunn, 1996).

TEFRA (1982) criteria established that the medical direction of ACTs were as follows (AANA, 1996b):

1. Performs a preanesthesia examination and evaluation;
2. Prescribes the anesthesia plan;
3. Personally participates in the most demanding procedures of the anesthesia plan including induction and emergence;
4. Ensures that any procedures in the anesthesia plan that he or she does not perform are performed by qualified anesthetists;
5. Monitors the course of anesthesia administration at intervals;
6. Remains physically present and available for immediate

diagnosis and treatment of emergencies; and

7. Provides indicated postanesthesia care.

The TEFRA (1982) criteria was established due to the abuse by anesthesiologists for billing Medicare for supervising CRNAs when the anesthesiologists may not even have been in the hospital. The TEFRA (1982) criteria held anesthesiologists accountable for the services and procedures of anesthesia care delivery provided they work along with or employ CRNAs or both (AANA, 1996). These regulations were originally developed to prevent Medicare fraud, but have been interpreted as "standards of care and the economic incentive to provide medical direction" (Fassett & Calmes, 1995, p. 118). A study by Fassett and Calmes found that in an urban community hospital there was a general consensus among nurse anesthetists and anesthesiologists that only one-fourth of the anesthetics administered required either medical direction or the assistance of another anesthesia provider. Gunn (1996) stressed that this number reported by Fassett and Calmes would probably vary in other facilities depending on provider opinions, patient population served, and workload characteristics of the institution.

The misinterpretation of the TEFRA criteria as standards of care has led to restrictions on CRNAs practice. These restrictions do not allow CRNAs to perform all the components of anesthesia care delivery they are legally authorized to perform (AANA, 1996b). Military anesthesia providers are not on a fee-for-service basis as are civilian anesthesia providers, so the incentive to abuse the system through billing for payment does not exist. A description of which Navy anesthesia provider performs these anesthesia services and procedures may be of future value and reference in determining practice patterns and provider responsibilities.

Role Assignments of Anesthesia Providers

Patterns of behavior that have been established as normal are referred to as roles. Edwardson (1995) described these roles as a set of prescribed behaviors that provide an area of choice in respect to activities, methods, and styles. Self-expectations and expectations of others are two types of role expectations. Role expectations may vary in their importance as motivators in an organization. Understanding role assignments among Navy anesthesia providers may serve as a catalyst in the development of educational strategies to produce positive effects on role perceptions and assumptions of Navy CRNAs.

Control

A study by Rosenbach and Cromwell (1988) found that when CRNAs and anesthesiologists work together, the most complex cases were assigned equally among the two types of providers. They also found that independent

CRNAs performed less complex anesthesia services than CRNAs and anesthesiologists working together. The decrease in complexity of cases of independent CRNAs reported by Rosenbach and Cromwell only represented 6% of surgical procedures requiring anesthesia services. However, independent CRNAs performed emergency anesthesia cases more often on a percentage basis than independent anesthesiologists and CRNAs working with anesthesiologists.

Control in management pertains to such variables as work measurement and scheduling. "Work measurement is a method to determine the work characteristics under stable conditions using a time device and performance rating adjustment" (Edwardson, 1995, p. 382). Work measurement of the anesthesia care delivery of all small, medium, large, teaching, and nonteaching naval hospitals was assessed and described based on the responses from the Chief CRNAs. The Chief CRNAs was asked to explain how productivity or work is measured in their anesthesia department by one of the following criteria; a case-by-case count, episodes (i.e., 3 hour intervals), or time factors (i.e., minutes, hours, or days). The Chief CRNAs of each naval hospital was asked to describe the percentage of time an anesthesiologist(s) supervises or medically directs a CRNA(s) during anesthesia administration based on the ASA Patient Classification of Physical Status. Classification systems have been developed to more accurately and objectively quantify the physical condition of patients (Giovannetti, 1978). This information may be of future reference to determine anesthesia providers staffing requirements and provider mix of an individual naval hospital.

Staffing and scheduling decisions in anesthesia departments are areas of control given to the manager of the department. The decision-making process of scheduling anesthesia providers to surgical suites and cases may be based upon the staffing level, provider mix, patient classification, or the experience of the anesthesia provider. The daily and monthly work schedule is an impetus in controlling the patient flow of the anesthesia department as well as providing an incentive to promote positive motivators among the group.

Motivation

Motivation is an operational variable discussed by Edwardson (1995) in describing the management factors that affect labor productivity. As stated previously, motivation and job satisfaction has been studied and published extensively in the literature. Several theories of motivation have been published to help understand the complex nature of the relationship between motivation and job satisfaction. Herzberg's (1966) motivation-hygiene theory is one such theory developed to discuss the extrinsic and intrinsic factors of motivation in relation to job satisfaction

and job dissatisfaction. Most studies of motivation attempt to provide an understanding of the factors believed to be associated with increased or decreased motivation, and with the management practices that may interfere or enhance motivation. Describing the relationship between motivation and job satisfaction among Navy nurse anesthetists is not within the context of this study. However, describing the management characteristics of Navy anesthesia providers may be an impetus for future research to relate or describe the determinants of job satisfaction and the factors of motivation among Navy anesthesia providers. Herzberg's motivation-hygiene theory will be used as the theoretical framework for this descriptive study.

Summary

In this chapter the review of literature was based upon information published in relation to the management of nursing, anesthesia provider practice patterns, work methods, and labor productivity measurement. The current literature review evaluated the relationship between many variables affecting labor productivity of nurses. Factors that affected job satisfaction, impact of labor productivity, motivation, nursing management, and provider mix were discussed after reviewing the literature. Information obtained from the literature review was applied to the context of Navy nurse and physician anesthesia providers for the study. Review of literature found several concepts of motivation, management, productivity, supervision, and provider mix. Concepts of labor productivity and factors affecting labor productivity were used to describe the information as it related to the practice of anesthesia care delivery of Navy CRNAs and anesthesiologists.

CHAPTER III - METHODOLOGY

Introduction

In this descriptive study, Navy anesthesia providers and anesthesia departments in small, medium, large, teaching, and nonteaching, CONUS and OCONUS hospitals in the U. S. Navy was examined.

Research Design

This descriptive study examined the management and workload characteristics of Navy anesthesia providers. The data collected pertained specifically to practice patterns and provider responsibilities of anesthesia care delivery in CONUS and OCONUS naval hospitals. Abdellah and Levine (1986) defined descriptive research as "primarily concerned with obtaining meaningful and accurate descriptions of the phenomena under study" (p. 12). Descriptive research identifies the "what is" (Loeffler, 1993, p. 27).

As per the Uniformed Services University of the Health Sciences (USUHS), Form 6004 (IRB), Research Involving Human Subjects, and the United States Navy, OPNAV Form 5214/10, Coordination and Control of Personnel Surveys, approval to use the data collection instrument was requested and approved from each agency (Appendix G).

Sample

The participants in this study consisted of all U. S. Naval Hospital Departments of Anesthesia located in the CONUS and OCONUS that offer anesthesia services provided by Navy nurse and physician anesthetists. There are currently 20 CONUS and 9 OCONUS naval hospitals providing anesthesia care delivery worldwide.

Measurement

The research instrument used was a 45 item questionnaire (Appendix A) approved by the Uniformed Services University of the Health Sciences (USUHS), Institutional Review Board (IRB) and the Bureau of Naval Personnel (BUPERS), Washington, DC. The data for this study were collected in October and November 1997 using a mailed questionnaire.

A packet containing a cover letter requesting participation and stressing the confidentiality of the study (Appendix B), along with the approved survey instrument, was mailed to the Chief, Certified Registered Nurse

Anesthetists (CRNAs), of all 29 (CONUS) and (OCONUS) U. S. Naval Hospitals. A current listing of naval hospitals was obtained from the U. S. Medicine Directory of Federal Medical Treatment Facilities (US. Medicine, 1996).

The Chief CRNAs completed the questionnaire on demographics, anesthesia practice patterns, anesthesia provider responsibilities, and management and personnel characteristics of anesthesia care delivery provided to all eligible beneficiaries. A follow-up reminder was mailed to the participants who did not returned the survey within 2 - 4 weeks after the survey packet was originally mailed.

The data collection tool was designed by the author in collaboration with two other student nurse anesthesia researchers. The data collection tool consisted of 45 questions divided into four categories; demographics, management, personnel characteristics, and practice patterns. The data obtained from the management category was used to compare and describe significant data on the management characteristics of anesthesia care delivery in small, medium, large, teaching, and nonteaching CONUS and OCONUS naval hospitals. Several questions from the personnel characteristics and practice pattern categories providing relevant statistical background information were included in this study. The categories relating to personnel characteristics and practice patterns of anesthesia care delivery were analyzed by the thesis chairperson, Maura S. McAuliffe, CRNA, PhD, LtCol, USAF, NC (personal communication, September 18, 1996).

Protection of Human Rights

All information and responses provided was held in strict confidentiality. Each questionnaire was coded for tracking purposes known only to the author. No individual respondent, or individual naval hospital was identified in the study. Once the data was collected and analyzed, the survey was destroyed.

Data Analysis

Data collected from the survey was coded, computerized, reviewed, recorded, and verified to ensure accuracy and validity. Statistical analysis was conducted using the Statistical Package for the Social Sciences. The data analysis of the 45 item questionnaire included calculation of frequencies, means, and standard deviations. The data was stratified by the following categories; small, medium, large, teaching, and nonteaching CONUS and OCONUS hospitals. Data collection and analysis were used strictly for content of the thesis to compare and describe the data collected regarding management characteristics, provider responsibilities, and practice patterns of anesthesia care delivery of the above listed categories.

Summary

In review this was a descriptive study using a questionnaire tool designed by the author in collaboration with two other student nurse anesthesia researchers. The purpose of the research instrument was to collect and describe data on the management and workload characteristics of Navy anesthesia providers. The data collected from this descriptive study pertains specifically to Navy nurse anesthetists and physician anesthetists management practices, personnel characteristics, practice patterns, and provider responsibilities of anesthesia care delivery in small, medium, and large, teaching, and nonteaching CONUS and OCONUS naval hospitals. The research tool was mailed directly to the Chief CRNAs of all 29 naval hospitals located CONUS and OCONUS where anesthesia services are provided.

This descriptive research design was approved by the USUHS Institutional Review Board before the collection of data was initiated. This personnel and occupational survey, as defined by Chief of Naval Operations Instruction (OPNAVINST) 5300.8B, Coordination and Control of Personnel Surveys, was approved and authorized before data collection was initiated (Appendix G). The importance of describing these characteristics may be in documenting educational needs, practice patterns, provider responsibilities, and value of each anesthesia provider to the Navy Medical Department. Describing these characteristics may be useful in relating how job responsibility, motivation, and quality of work life affects the role assignment of Navy nurse and physician anesthetists in the provision of anesthesia services in naval hospitals.

CHAPTER IV - ANALYSIS OF DATA

Introduction

In this chapter the analysis and presentation of data will be described in relation to the major research questions outlined in Chapter 1. The first section provides demographic and background data necessary to describe the size, location, and type of each naval hospital. The management, personnel characteristics, and practice pattern sections were used to describe the management characteristics of anesthesia care delivery in relationship to the major research questions. Several participants in the study provided personal responses in relation to many questions that was used to describe the management characteristics of individual Departments of Anesthesia.

Demographic and Background Data

Of the 29 surveys mailed to MTFs, 23 were returned (79%), which reflected the enthusiasm and willingness of the participants to complete the survey. One small CONUS hospital reported that anesthesia services were being provided by an "external partnership with a community hospital" at their institution; therefore they did not complete the survey. Another small CONUS hospital reported "we are using a local, civilian hospital for all our surgical procedures. Therefore, the numbers reflected are those of the civilian hospital." The data collected from this hospital was used to provide some demographic and management statistical information since the institution still provided anesthesia services with Navy CRNAs and anesthesiologists.

The size of the USN hospital was determined from the number of inpatient beds in each facility. They were defined as small (1-100 beds), medium (101-250 beds), and large (more than 250 beds). The number responding by size were 14 small (61%), six medium (26%), and three large (13%) of the 23 respondents (Table 1).

Table 1

Size of U. S. Naval Hospitals Based on the Number of In-patient Beds

Size	N	Range	Mean	Std. Deviation
Small	14	17-90	37	19.8
Medium	6	104-181	139.5	32.6
Large	3	342-446	393.7	52

Source: Anesthesia Care Delivery Survey.

Type of naval hospital was described as teaching or nonteaching. Teaching hospitals were defined as a facility that had an established teaching program in anesthesia for Student Registered Nurse Anesthetists (SRNAs) or anesthesiology physician residents. Six of 23 (26%) responding hospitals indicated they teach anesthesia to SRNAs, while 17 (74%) hospitals did not have a teaching program (Appendix E, Figure 10). None of the small hospitals indicated they teach anesthesia to SRNAs, and three of the six medium hospitals and three of the large hospitals reported they teach anesthesia to SRNAs. One of the 23 (4%) reporting hospitals stated that they teach anesthesia to physician anesthetists (Appendix E, Figure 11) was a large hospital, which also has an established teaching program for SRNAs.

Location of the naval hospital was described as in the continental United States (CONUS) and outside the continental United States (OCONUS). Sixteen of 23 (70%) hospitals were located CONUS and seven (30%) hospitals were located OCONUS.

Additional demographic data used in this study include number of operating rooms in each naval hospital (Appendix F, Table 2), size and location of hospitals with an emergency room (Appendix E, Figure 12), number of full-time, military CRNAs and anesthesiologists (Appendix F, Table 3), and average number of surgical cases per month and year by hospital size, location, and type (Appendix F, Table 4).

The average number of operating rooms for each hospital was obtained from a numerical response provided by the respondents. It is interesting to note the mean of operating rooms (Appendix F, Table 2) as compared to the mean of anesthesia providers assigned to the MTFs. Table 3 (Appendix F) represents the mean of CRNAs and anesthesiologists assigned to hospitals responding to the survey. A larger mean ratio of anesthesiologists were assigned to large hospitals compared to CRNAs 20:9. The mean ratio of anesthesiologists to CRNAs is distributed equally in medium MTFs at 4.5:4.5, and almost equally in OCONUS MTFs at 1.6:1.9. Mean ratios of anesthesiologists to CRNAs assigned to small (1.4:2), OCONUS (1.6:1.9), nonteaching (1.8:2.5) hospitals may indicate that CRNAs have more independence and autonomy in providing anesthesia care at these MTFs. A study cited earlier by Fassett and Calmes (1992) found that only one fourth of the anesthetics administered in urban community hospitals required either medical direction or the assistance of another anesthesia provider. Small CONUS and OCONUS nonteaching naval hospitals could possibly be compared to urban community hospitals in relationship to the number of inpatient beds and anesthesia providers. Gunn (1996) reported that the ASA advocates

the medical direction of all CRNAs at a 1:2 anesthesiologists:CRNAs ratio. TEFRA criteria cited earlier, established Medicare reimbursement of civilian anesthesiologists providing medical direction, or supervision to CRNAs at a maximum ratio of 1:4 (Gunn, 1996). The mean ratio in large MTFs appears to exceed this requirement by almost 2:1 anesthesiologists:CRNAs ratio.

Because CRNAs and anesthesiologists are often called to the emergency room for emergent airway management and other anesthesia-related procedures, a description of the number of facilities operating an emergency room was sought. About 86% of small hospitals, 83% of medium hospitals, and 100% of large hospitals had an emergency room. About 88% of CONUS, 86% of OCONUS, 83% of teaching, and 88% of nonteaching naval hospitals had an emergency room (Appendix E, Figure 3). Rosenbach and Cromwell (1988) study on a profile of anesthesia practice patterns found that CRNAs working alone saw a higher proportion (16.8%) of emergency cases than two other groups in the study of CRNAs and anesthesiologists (11.2%) and anesthesiologist only (10.7%) during a shift. The study concluded that this practice pattern may result from the role of CRNAs providing in-house coverage during the weekend when the anesthesiologists are on call. The study did not identify the location of where emergency cases needing anesthesia was performed. This descriptive study did not seek to identify which anesthesia providers participated in emergency cases, only to describe which facilities had an emergency room.

Due to the changing practice of healthcare, many health care facilities now operate a same-day surgical center. The need to reduce health care expenses of inpatient days following surgery and the improvement of surgical techniques have prompted the establishment of surgical centers in the health care industry. Military MTFs have followed suit in providing this type of surgical option for certain types of surgical procedures in their facilities. Based on the responses from the Chief CRNAs, Figure 13 (Appendix E) illustrates the number of surgical centers operating in small, medium, large, teaching, and nonteaching naval hospitals located either CONUS or OCONUS. The type of surgical centers operating in these MTFs were subdivided into surgical center, same-day surgical center, surgical center and same-day surgical center, and other. Figure 14 (Appendix E) illustrates the types of surgical centers operating by size, type, and location of the hospital. All of the large hospitals operated a surgical center, but only 5 of 14 small (36%) and 1 of 6 medium (17%) facilities reported that they operate a surgical center. One medium hospital did not respond.

The subdivision of surgical centers indicated a majority of the MTFs operate a same-day surgical center (Appendix E, Figure 14). The trend in providing surgical services through a same-day surgical center on an

outpatient basis is a new development in contrast to traditional operating room services provided on an inpatient basis. Faster turnover times in the operating room and the provision of surgical services to a population of outpatient clients will impact how anesthesia care delivery is provided in MTFs. This information may be of future reference in determining anesthesia provider staffing requirements, practice patterns, and provider mix of an individual naval hospital.

One medium hospital reported “Not a ‘separate facility’ rather, a ward within the hospital", and one large hospital responded "Surgical Center (with separate operating rooms) & Same-day Surgical Center (using the hospital's operating rooms). Both are used for Same-Day." Outpatient surgery in one small hospital is the only type of surgical support provided “Our OR’s support only out-patient surgery.”

Management Characteristics of Anesthesia Care Delivery

The purpose of this section is to describe the various management characteristics of anesthesia providers in organizing the day to day activities of the anesthesia department. The management section of the questionnaire was used to collect data to describe the management characteristics of anesthesia care delivery in relationship to the major research questions (Appendix A). A description of the work methods, control, and motivation from Edwardson's (1995) Factors Affecting Labor Productivity model (Appendix D) was utilized in this section based on the responses of each Chief CRNA. Work methods of anesthesia care delivery between Navy CRNAs and anesthesiologists will provided a description of the effectiveness of effort, organization of work, use of time, and role assignments. A description of which anesthesia provider controls the daily surgical case assignment schedule and monthly work schedule will be discussed. Motivation is an operational variable used to describe management factors affecting labor productivity. Several questions were asked about the supervision of Navy CRNAs by anesthesiologists based on a ratio of anesthesiologists:CRNAs and ASA Patient Classification of Physical Status. Many of the Chief CRNAs provided personal responses to individual questions from this section, which were used to further describe the identifiable characteristics of anesthesia care delivery in small, medium, large, teaching, and nonteaching CONUS and OCONUS naval hospitals.

Control of the Anesthesia Department Daily Surgical Case Schedule and Monthly Work Schedule for CRNAs in Naval Hospitals

As previously stated, the staffing and scheduling decisions in anesthesia departments is one area of control given to the manager of the department. Daily and monthly work schedules influence patient flow in the anesthesia departments. Describing which anesthesia provider controls the daily and monthly work schedule may offer an incentive to promote positive motivators among the group of providers. The decision-making process for scheduling anesthesia providers to surgical suites and cases may be based on the staffing level, provider mix, patient classification, or experience of the anesthesia providers.

The Chief CRNAs were asked who (i.e., CRNA, anesthesiologist, or both) determines which surgical cases CRNAs are assigned to on a daily basis. Figure 1 illustrates their responses. The daily schedule in the three large MTFs is controlled solely by the anesthesiologists based on the responses from the Chief CRNAs. As noted previously, the control of the schedule may be due to the higher anesthesia provider ratio of 2:1 anesthesiologists to CRNAs at these large MTFs (Appendix F, Table 3). The large hospitals also serve as teaching hospitals for anesthesiology residents and SRNAs. In six teaching hospitals, the daily schedule is controlled more by anesthesiologists (50%), whereas the CRNAs had control at 17% of these hospitals with both providers controlling the schedule at 33%. However, it is interesting to note in 57% of 14 small hospitals, 67% of six medium hospitals, 56% of 16 CONUS hospitals, and 59% of six nonteaching hospitals, both anesthesia providers participated in controlling the daily work schedule. In seven OCONUS hospitals, control of the daily work schedule is higher for CRNAs in

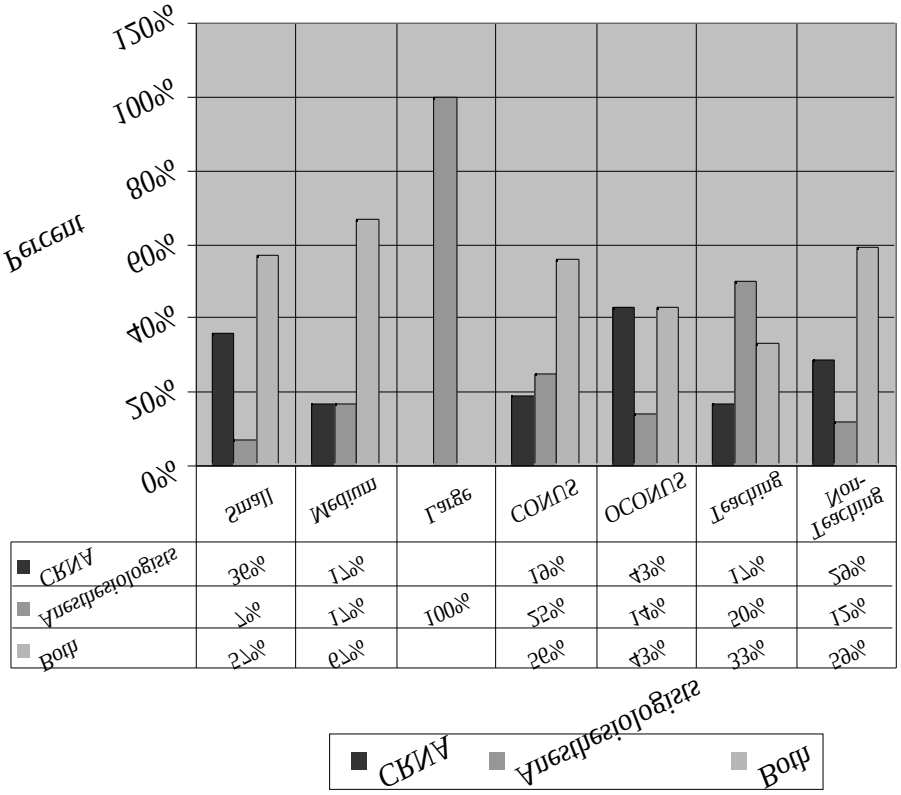


Figure 1.

Anesthesia Provider Assigning CRNAs to Surgical Cases Daily, by Size, Location, and Type of Naval Hospital

43% of these hospitals than anesthesiologists in 14% of these hospitals, and equal for both providers in 43%. The control of the daily work schedule was higher for CRNAs in 36% of 14 small hospitals, as compared to 7% of these hospitals for anesthesiologists. In six medium hospitals, control of the daily schedule was higher for both anesthesia providers in 67%.

The control of the schedule in small and OCONUS hospitals may be due to the higher ratio of CRNAs to anesthesiologists at these facilities (Appendix F, Table 3). Also, one small CONUS and two OCONUS small hospitals reported no anesthesiologists were assigned to their facility.

The Chief CRNA was asked which anesthesia provider (i.e., CRNA, anesthesiologist, or both) controls the monthly work schedule for CRNAs. Figure 2 illustrates their responses. The monthly work schedule is designed to provide staffing for regular working hours and after duty call hours for the anesthesia department. In the sections to follow, a description of staffing for anesthesia call will be discussed.

The Chief CRNAs has control of the monthly work schedule for staff CRNAs in 50% of 14 small hospitals, 57% of seven OCONUS hospitals, and 53% of 17 nonteaching hospitals. In six medium hospitals, the Chief CRNAs controlled the monthly schedule in 50% of the hospitals, and both the Chief CRNA and anesthesiologist controlled the monthly schedule in the other 50% of medium hospitals. Both anesthesia providers had control in 67% of three large naval hospitals, and in one large hospital (33%) the anesthesiologist controlled the monthly work schedule for CRNAs. The control of the monthly work schedule for CRNAs in two of the three large hospitals may be attributed to the higher 2:1 anesthesiologists to CRNA ratio of providers assigned to those hospitals.

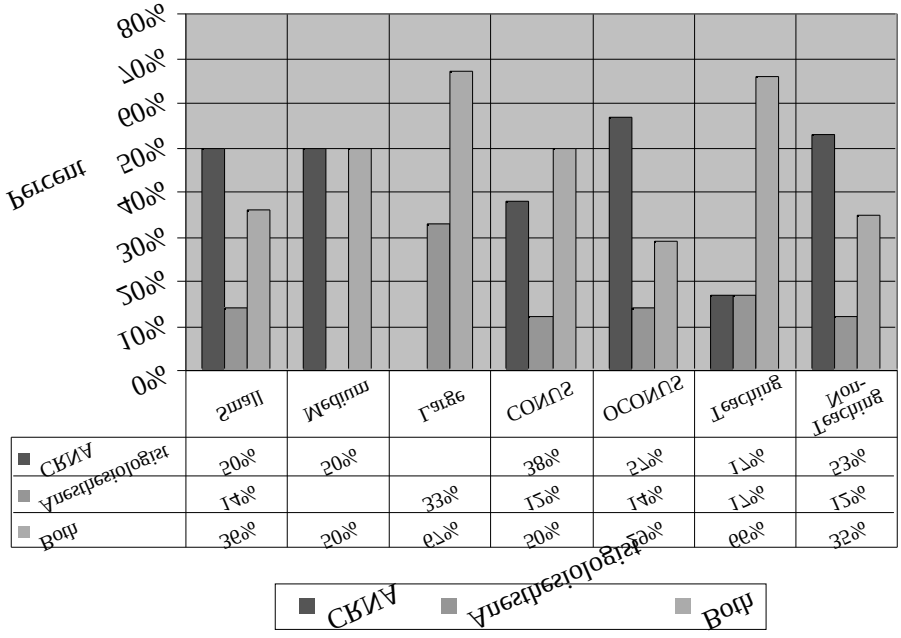


Figure 2.

Anesthesia Provider Controlling the Monthly Work Schedule for CRNAs, by Size, Location, and Type of Naval Hospital

In the 16 hospitals located CONUS, both anesthesia providers controlled the monthly work schedule in 50% of these hospitals. Also, in 66% of the six teaching hospitals both anesthesia providers had control of the monthly work schedule. However, the Chief CRNA and anesthesiologist had control of the schedule equally in 17% of the remaining teaching hospitals. Again, two OCONUS small hospitals and one CONUS small hospital reported no anesthesiologists at those facilities. Therefore, the impetus to control the monthly work schedule in those facilities was the sole responsibility of the Chief CRNA.

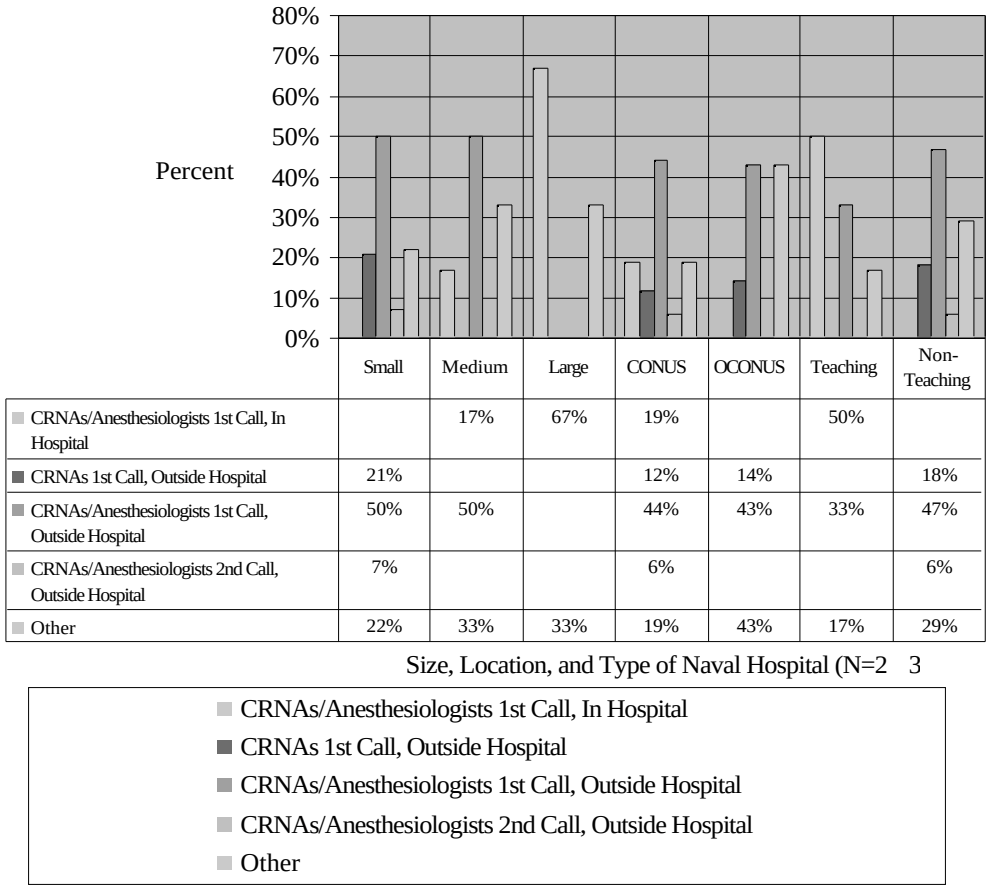
Overall, the control of the monthly work schedule appears to be the equal responsibility of both anesthesia providers based on the responses. With the exception of small, OCONUS, and nonteaching hospitals where the Chief CRNA had control of assigning CRNAs to the monthly work schedule.

Anesthesia Staffing of Navy CRNAs and Anesthesiologists

Assigning Navy CRNAs and anesthesiologists to anesthesia call falls under the control of monthly work schedule. Anesthesia call after normal working hours and during the weekends and holidays allows individual naval hospital anesthesia departments to provide coverage on a 24-hour basis. The Chief CRNAs were asked to respond to two questions about anesthesia call. The first question asked about the usual staffing assignment of anesthesia providers for anesthesia call. The second question asked the Chief CRNAs to provide the average number of hours individual Navy CRNAs and anesthesiologists are assigned to pull first and second anesthesia call for their anesthesia department.

Anesthesia providers staffing assignment for anesthesia call was categorized by first call, in hospital, and second call, outside the facility. However, it was found this question was not structured correctly in regards to the various responses of first and second call in the different anesthesia departments. The answer section of this question did contain a response in the "other" category and asked the Chief CRNA to explain the usual staffing assignment for anesthesia call. Analysis of data from this question provided several different responses from the other category. The data analysis for the staffing assignment of Navy CRNAs and anesthesiologists for anesthesia call was redesigned to include the responses that occurred most often (Figure 3).

The staffing assignment for anesthesia call varied considerably by facility. However, in the categories of small, medium, CONUS, OCONUS, teaching, and nonteaching hospitals reported that anesthesia call for Navy CRNAs and anesthesiologists was mostly first call from outside the hospital. In the large and teaching hospitals category, the anesthesia call for Navy CRNAs and anesthesiologists was mostly first call in the hospital. Navy CRNAs and anesthesiologists assigned first call, in hospital at large and teaching hospitals may be due to the number of surgical cases performed at these facilities on a monthly and yearly basis (Appendix F, Table 4). Also, it may be due to the assignment of anesthesiology residents and SRNAs to anesthesia call in hospital, and due to the various types of other anesthesia services offered at these facilities (i.e., obstetrics, pain service, etc.). The additional types of anesthesia services offered in these facilities, such as obstetrics and pain management, will be described later in this chapter. The most notable category of anesthesia staffing call was in the "other" category for small, medium, large, OCONUS, and non-teaching hospitals. The other category responses for these facilities varied so considerably that no conclusive description could be expressed concisely regarding the staffing assignment for anesthesia call. One small CONUS



	Small	Medium	Large	CONUS	OCONUS	Teaching	Non-Teaching
CRNAs/Anesthesiologists 1st Call, In Hospital		17%	67%	19%		50%	
CRNAs 1st Call, Outside Hospital	21%			12%	14%		18%
CRNAs/Anesthesiologists 1st Call, Outside Hospital	50%	50%		44%	43%	33%	47%
CRNAs/Anesthesiologists 2nd Call, Outside Hospital	7%			6%			6%
Other	22%	33%	33%	19%	43%	17%	29%

Figure 3.

Anesthesia Call Staffing Assignment, by Size, Location, and Type of Naval Hospital

hospital responded, “There are 4 providers (2 CRNAs and 2 physicians). We each take call equally. We may leave the hospital with the beeper as long as we are able to have the patient in the OR in 30 minutes.” Another small OCONUS hospital responded, "CRNA's and MDA's [sic] are equal call standers. 1st call is a 15 minute recall by

beeper not in house. Second call is 1/2 hour call back by beeper. One person (either CRNA or MDA) is 1st call and another is 2nd call." One large teaching hospital responded, “Student nurse anesthetist and/or residents in anesthesia in house. Specialty backup for pediatrics and hearts.”

Since anesthesia providers are assigned to anesthesia call, a question was asked about the number of hours per month for first and second call for individual Navy CRNAs and anesthesiologists. Because of the low response rate of the staffing assignment of anesthesia second call, only the average number of hours per month of anesthesia first call will be described. Tables 6 and 7 (Appendix F) illustrates the mean of the number of hours per month Navy CRNAs and anesthesiologists are assigned first call. The first call mean number of hours per month for Navy CRNAs was 165 hours per month as compared to anesthesiologists 126 hours per month in small hospitals. A mean ratio of 1:2 anesthesiologists to CRNAs was reported in small Naval Hospitals (Appendix F, Table 3). The lower ratio of anesthesiologists in small hospitals appears to be the reason for the higher average number of hours per month CRNAs are assigned to first call. Also, three small hospitals did report that no anesthesiologists were assigned to their facility. In hospitals located OCONUS the mean number of hours per month for first call of Navy CRNAs was 194 hours per month as compared to 184 hours per month for anesthesiologists. The mean ratio of 1.6:1.9 anesthesiologists to CRNAs in OCONUS hospitals could explain the higher number of hours per month Navy CRNAs are assigned first call. As stated earlier, one of the three small hospitals reporting no anesthesiologists were assigned to their facility was located OCONUS. It was interesting to note that the mean number of hours per month of first call for Navy CRNAs and anesthesiologists was equal in the medium (94 hours per month), large (48 hours per month), and teaching (66 hours per month) hospital categories. Sharing call equally in these facilities could possibly indicate that Navy CRNAs function as independent practitioners during call hours when anesthesiologists are not present in the facility. One small CONUS naval hospital responded, "MDAs [sic] and CRNAs share call equally." One medium CONUS hospital also responded, “MDs and CRNAs share equal number of first and second call, all taken from outside the facility. If possible MDA has CRNA backup and CRNA has MDA backup, but this is not always the case (i.e., a CRNA may be backup for another CRNA).” Regardless of which anesthesia provider pulled first call for the anesthesia department, a second call back-up anesthesia provider was available based on the responses from the Chief CRNAs.

Department or Service Navy CRNAs are Assigned in Naval Hospitals

A question was asked as to which department or service CRNAs were assigned. The Chief CRNA was asked to respond to whether the CRNAs were assigned to nursing, anesthesia, surgery, or other department or service in the hospitals organizational infrastructure. If the response was other, the respondent was asked to name the department or service CRNAs were assigned in their hospital (Appendix F, Table 4). The question was asked only to describe the organizational structure the CRNA falls under in each individual naval hospital.

The majority of responses report that CRNAs fall under the anesthesia department in small, CONUS, and OCONUS hospitals (Figure 4). The outlier of the responses was for medium and large hospitals. CRNAs are assigned to the surgery department in 50% of the six medium hospitals, and in 67% of the three large hospitals CRNAs fall under both the anesthesia and surgical departments. Another interesting finding was the other response rate. Twenty-nine percent of small hospitals, 19% of the CONUS hospitals, and 14% of the OCONUS hospitals reported that CRNAs fall under other departments besides anesthesia. The other departments listed by the respondents included the Director of Ambulatory Services and the Director of Clinical Services. It was interesting to find that CRNAs are assigned to departments or services other than the anesthesia department, especially in small hospitals located CONUS and OCONUS. As described earlier, the number of same-day surgical centers supporting outpatient surgical procedures were most numerous in the small, CONUS, and nonteaching naval hospitals (Appendix E, Figure 14). Outpatient surgical centers are usually considered same-day ambulatory care centers in many hospitals, which could possibly indicate why CRNAs are assigned to these departments.

Productivity Measurement

As discussed in Chapter 2, control in management pertains to the variable work measurement. Edwardson (1995) described work measurement as "a method to determine the work characteristics under stable conditions using a time device and performance rating adjustments" (p. 382). Measuring work or productivity in the delivery of anesthesia care will be described based on the responses from the Chief CRNAs. A question was asked about how productivity or work is measured in each anesthesia department where Navy CRNAs and anesthesiologists deliver anesthesia care. The Chief CRNAs was asked to describe how productivity or work is measured using the following criteria: cases, episodes (e.g., 3 hour intervals), time factors (e.g., minutes, hours, or days), a combination of the preceding variables or as other. A system of measuring productivity is important in determining the man hours and personnel needed to meet the demands of the department for proper allocation of resources. However, intent of this study was not to describe how the allocation of resources, man hours, and personnel is used in the

provision of anesthesia care delivery. As stated previously, this question was asked only to provide a description of how productivity is measured in each anesthesia department.

The responses to this question have been diagrammed in Figure 5. Productivity measurement in most of the naval hospitals appeared to be performed using cases and a combination of factors. Hours and minutes appeared to be the least time device variable utilized in measuring productivity. In large hospitals cases were used 100% of the time in productivity measurement.

Three OCONUS small hospitals provided personal responses of how they performed productivity measurement. One of these hospitals reported "Cases, for credentials. Minutes, for utilization." Another OCONUS hospital responded by reporting "Intra-department: case number by provider and total anesthesia time in minutes. Department: total number of man hours devoted to anesthesia, administration, duty/on call hours. By MEPER [sic] reporting system." One of the OCONUS small hospitals responded by saying that productivity was "Not tracked or recorded."

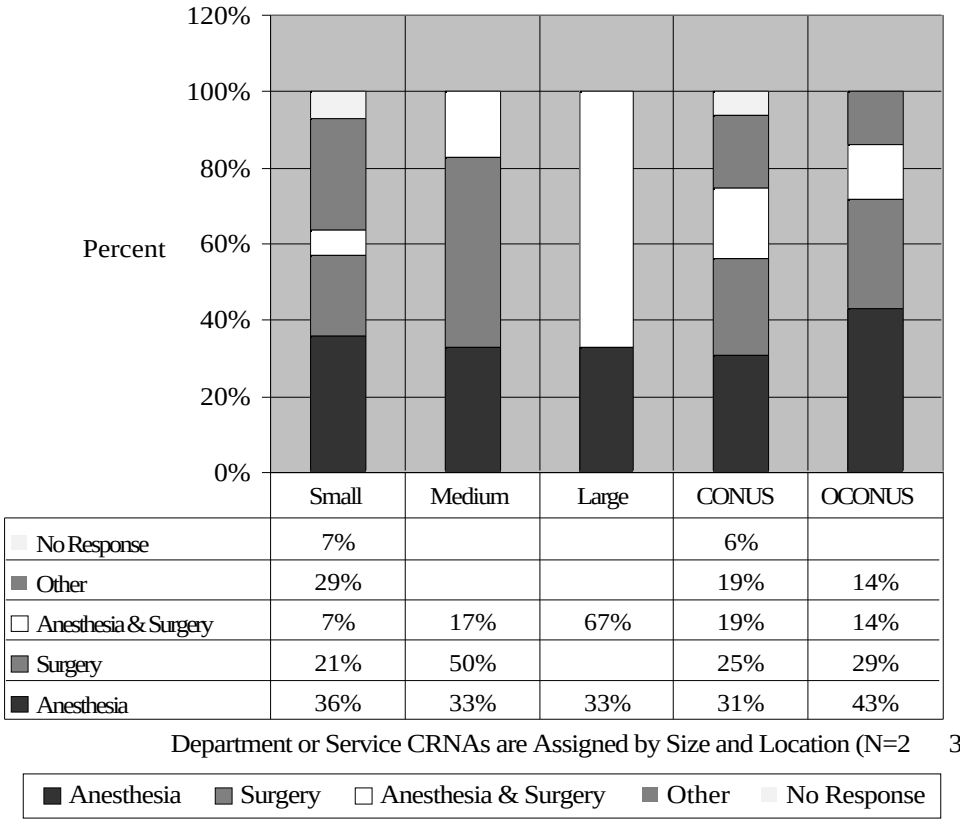


Figure 4.

Department or Service to Which CRNAs are Assigned, by Size and Location of Naval Hospital

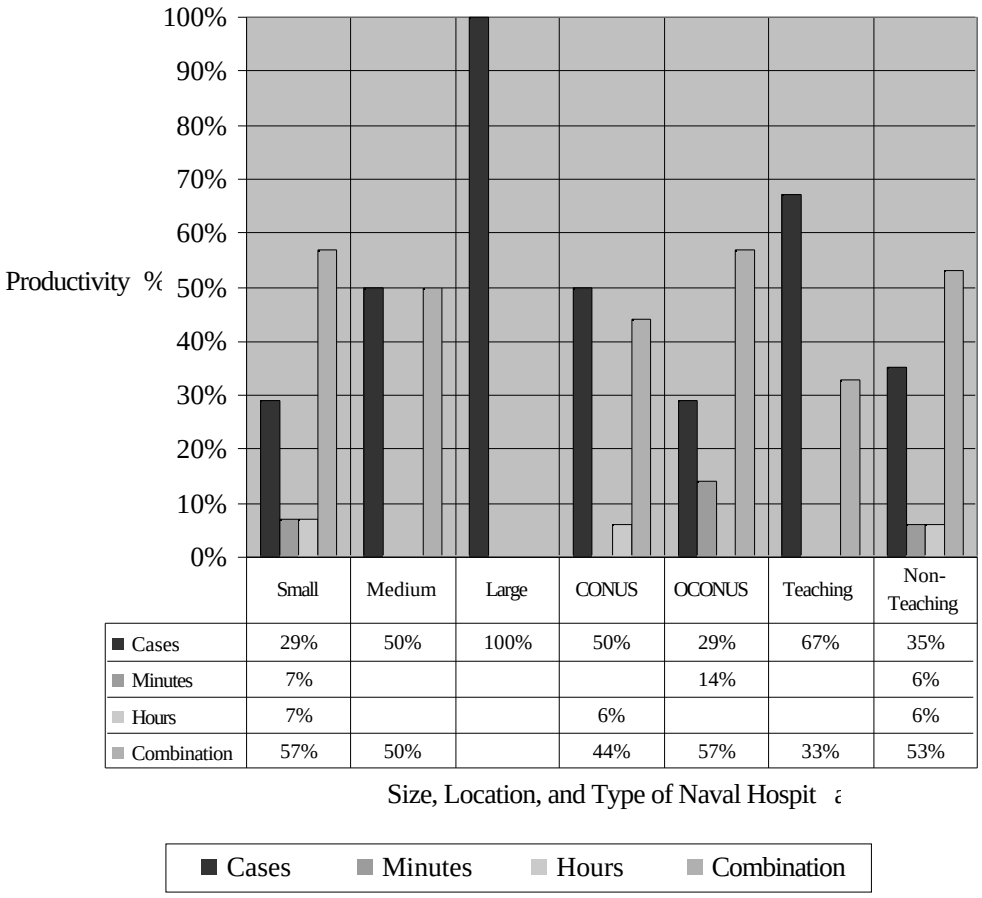


Figure 5.

Work Measurement of Anesthesia Care Delivery, by Size, Location, and Type of Naval Hospital

Supervision or Medical Direction of Navy CRNAs

The term supervision or medical direction has become a topic of debate in the civilian sector of anesthesia care delivery for monetary reimbursement purposes of anesthesia providers. According to the AANA, about 80% of CRNAs work as partners in the delivery of anesthesia care with anesthesiologists. While the other 20% of CRNAs provide anesthesia in collaboration with surgeons and other licensed practitioners (AANA, 1998b). As stated in Chapter 2, the AANA (1996b) does not support the belief that CRNAs must practice with anesthesiologists in an anesthesia care team approach. In this section, many variables are described in relationship to the practice of Navy CRNAs and anesthesiologists in the terms of supervision, consultation, and work methods of the supervision ratio of anesthesiologists to CRNAs in Naval Hospitals.

Several questions were proposed to the Chief CRNAs regarding supervision, consultation between providers, and the supervision ratio of CRNAs by anesthesiologists. Also, a question was asked based on the TEFRA criteria described in Chapter 2 of the supervisory performance elements in the delivery of anesthesia by CRNAs. The ASA Patient Classification System of Physical Status was used to construct a question about the supervision of Navy CRNAs by anesthesiologists. These questions prompted a host of personal responses from the Chief CRNAs, which will be discussed in Chapter 5 of the Conclusions section.

The responses by the Chief CRNAs to the question about anesthesiologist(s) supervision or medical direction of CRNAs on a routine basis will be discussed in this section. Figure 6 illustrates the responses from the Chief CRNAs. Overall, the majority of small, medium, large, CONUS, and OCONUS naval hospitals response to the question of whether the anesthesiologist supervises CRNAs on a routine basis was "no". Fewer than 20% of 23 small, six medium, 16 CONUS, seven OCONUS, six teaching, and 17 non-teaching naval hospitals reported that anesthesiologists supervise CRNAs on a routine basis. Thirty-three percent of the three large hospitals responded as "yes". More than 67% of all the 23 hospitals by size, location, and type response was "no" to the supervision of CRNAs by anesthesiologists.

One medium CONUS hospital responded, “They (anesthesiologists) are available as the “floorwalker” for consult/assistance. They often accompany Pediatric or ASA III inductions, but do not normally come in during inductions or cases unless they are concerned or interested (sick patients, airway cases) or giving a break. The department has its own requirement that the MDs co-sign the Pre-op (Watch pre-ops are done later). The word supervise is not supervision in our manual.” A large hospital responded by saying, “The policy of supervision at this facility means that a physician anesthesia provider is presented the pt. or pt.'s [sic] scheduled to receive anesthesia on that day by the nurse anesthetist. The maximum allowed ratio of providers (MDA [sic] to CRNA) can be no more than 1:2. The physician then elects to intervene as they so desire. The range of closeness of supervision is highly variable from team to team (MDA and CRNA).” One small OCONUS hospital responded, "This is a topic of great debate right now. As it stands CRNAs are independent and consult an MDA when they feel it is necessary. However, the MDAs here are trying to change the instruction and that would mean more supervision in the future." Overall, the personal responses fostered several common themes. The most common theme was that CRNAs were required to consult the

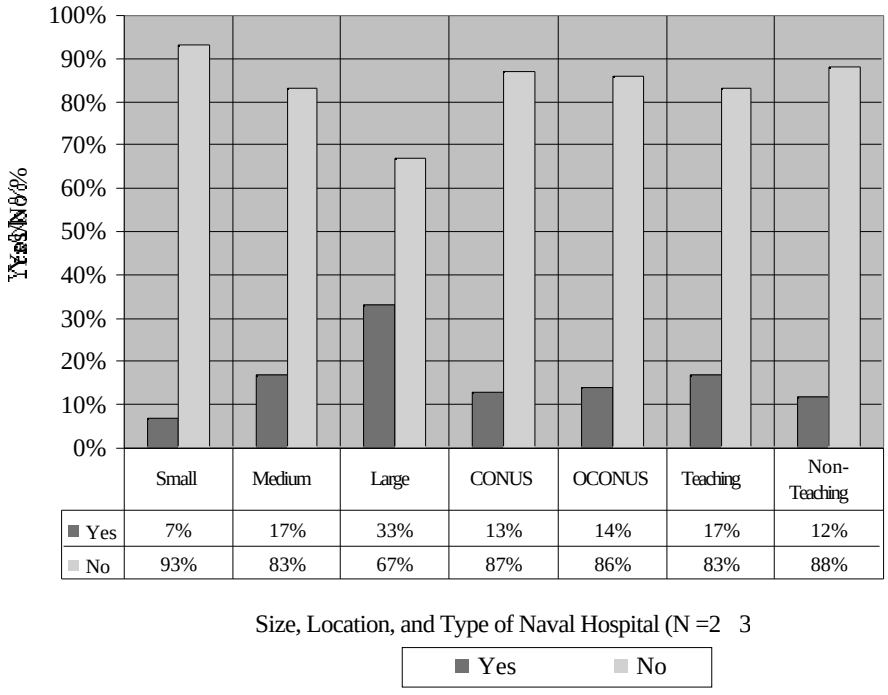


Figure 6.

Anesthesiologists Supervision of CRNAs, by Size, Location, and Type of Naval Hospital

attending anesthesiologist for medically complicated cases, or cases with the ASA classification of III or higher. The personal responses will be discussed later in Chapter 5.

Navy Anesthesia Providers Practice Patterns, Provider Mix, and Supervision Ratio

As mentioned in Chapter 2, several work method approaches by anesthesia providers exist or have been attempted, such as independent CRNAs or anesthesiologists, anesthesia care teams, and 1:2 ratio, 1:3 ratio, 1:4 ratio, etc (anesthesiologists:CRNAs) provider mix (Fassett & Calmes, 1995). The ASA has advocated medical direction of all nonphysician anesthetists, generally at a 1:2 anesthesiologist:CRNA ratio in the development of Medicare reimbursement regulations for CRNAs and anesthesiologists as cited by Gunn (1996). The AANA lobbied to establish a ratio of 4:1 CRNAs:anesthesiologist as a maximum number of concurrent cases for which an anesthesiologist could obtain reimbursement for the medical direction of CRNAs. However, Navy anesthesiologists do not compete for direct reimbursement of medically directing CRNAs during concurrent cases as in the civilian community of anesthesia practice. A Fassett and Calmes (1995) study found in urban community hospitals only one fourth of the anesthetics administered among CRNAs and anesthesiologists required either medical direction or a second pair of educated hands. Fassett and Calmes reported once these findings could be operationalized, the cost of providing anesthesia services could be reduced within that facility.

In this section, the data collected from the responses by the Chief CRNAs will attempt to describe Navy anesthesiologists:CRNAs supervision ratio, the percentage of time Navy CRNAs are supervised by anesthesiologists

during ASA I through ASA V cases, whether a Navy CRNA is required to consult an anesthesiologist after normal working hours during call when administering anesthesia independently, and which Navy anesthesia provider accomplishes each task for surgical cases based on the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA).

A question was asked about the supervision ratio of Navy anesthesiologists to CRNAs during concurrent cases of anesthesia care delivery. Figure 7 illustrates the responses. The response categories were arranged in chronological order from one, two, three, four, five, greater than five, and as not applicable. The responses were based on a previous question of whether anesthesiologists supervise CRNAs on a routine basis. The overwhelming response of 67% to 83% of the facilities indicated this was not applicable. This finding appears to indicate Navy CRNAs are not supervised by anesthesiologists during concurrent cases of anesthesia care delivery in these facilities. Respondents in 33% of the three large hospitals reported a 1:2 anesthesiologists:CRNAs ratio was applicable. A 1:2 anesthesiologists:CRNAs supervision ratio was reported in 17% of teaching hospitals. In 17% of the six medium hospitals a 1:4 anesthesiologists:CRNAs supervision ratio was reported. The supervisory ratio of 1:2 anesthesiologists:CRNAs in large hospitals and 1:4 anesthesiologist:CRNA supervisory ratio in teaching hospitals may be due to more anesthesiologists assigned to these facilities than CRNAs (Appendix F, Table 3). In most hospitals an anesthesiologist and a CRNA are usually assigned collaboratively to cover an operating room.

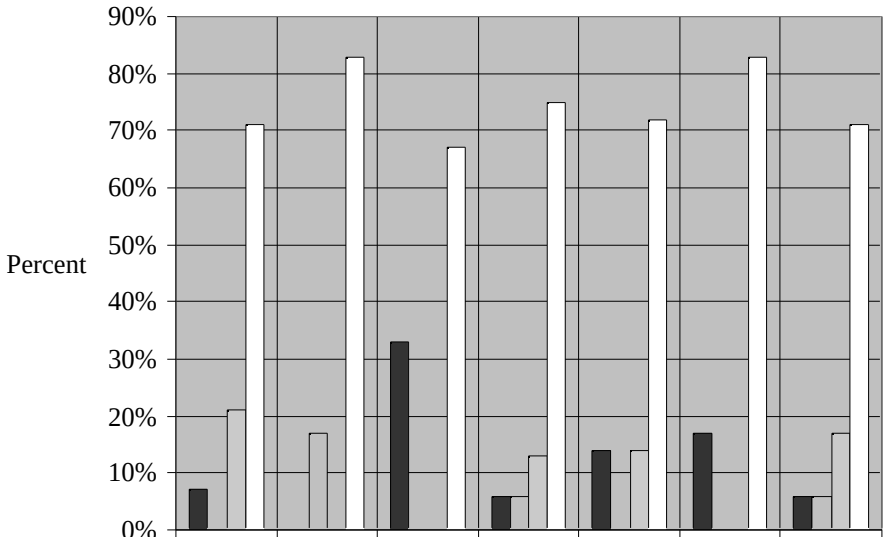
Overall, the majority of facilities had a not applicable response. The supervisory ratio of anesthesia providers may presume that Navy CRNAs are independent practitioners working in collaboration with anesthesiologists to provide anesthesia without direct supervision.

A question was asked about whether Navy CRNAs had to consult or discuss each surgical case with an anesthesiologist during call hours when administering anesthesia in naval hospitals. Figure 8 illustrates the responses. The response from all respondents to this question was overwhelmingly "no". Navy CRNAs are deployed as independent practitioners onboard ships and with Fleet Surgical Support Teams. Navy CRNAs are trained to be autonomous practitioners and usually do not have another anesthesia provider with whom to consult during the administration of anesthesia. Navy CRNAs and anesthesiologists work collaboratively in providing anesthesia to ensure that high quality anesthesia care is delivered.

Because Navy CRNAs and anesthesiologists work collaboratively in the provision of anesthesia care in Naval Hospitals, a question was asked about the percentage of time anesthesiologists supervise or medically direct CRNAs during anesthesia delivery based on the ASA Patient Classification of Physical Status. As discussed earlier,

the ASA Classification System was developed to determine a patient's risk of perioperative mortality and morbidity based on their physical status (Morgan & Mikhail, 1996). Table 8 (Appendix F) outlines the preoperative physical status classification of patients according to the ASA. Table 9 (Appendix F) illustrates the responses based on a 100% scale of time that anesthesiologists supervise, or medically direct, CRNAs based on the ASA classification system.

The supervision of CRNAs by anesthesiologists during the delivery of anesthesia care to ASA I through ASA III patients in two large hospitals and three teaching hospitals



	Small	Medium	Large	CONUS	OCONUS	Teaching	Non-Teaching
2	7%		33%	6%	14%	17%	6%
4		17%		6%			6%
No Anesthesiologists	21%			13%	14%		17%
N/A	71%	83%	67%	75%	72%	83%	71%

Figure 7.

Supervision Ratio of Anesthesiologists:CRNAs, by Size, Location, and Type of Naval Hospital

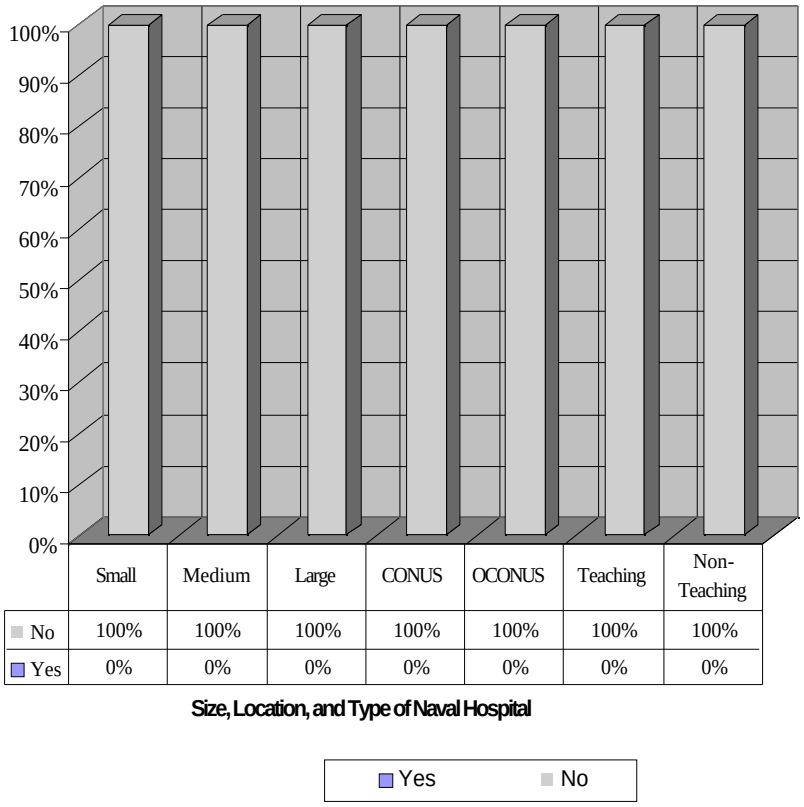


Figure 8.

CRNAs Required to Consult or Discuss Each After Duty Hours Surgical Case With An Anesthesiologist

had the overall highest mean percentage in comparison to the mean percentage of other categories. In the ASA IV and V patient categories, the mean percentages of supervision of CRNAs by anesthesiologists was more than 50% of the time. It must be noted that the response rate to this question was low. Only seven of 14 small hospitals, four of six medium hospitals, and two of the three large hospitals responded to this question. It is the belief of the author that the response rate would have been higher if the question had been constructed using a Likert scale. Future recommendations for study could include the use of a Likert scale to obtain qualitative responses instead of quantitative responses based on a time percentage. However, the response rate to the question may imply that CRNAs are supervised more diligently when providing anesthesia to patients in the ASA IV and ASA V classification. One small, OCONUS hospital responded, "Hospital policy states in by-laws that CRNA's must consult with MDA [sic] for ASA III, IV, and V patients."

Practice Patterns and Role Delineation's of Navy CRNAs and Anesthesiologists in the Delivery of Anesthesia Care

As discussed in the literature review in Chapter 2, the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) established criteria for anesthesiologists (as cited in AANA, 1996b) to meet in order to be paid by Medicare for supervising or medically directing a CRNA. TEFRA (1982) criteria established that the medical direction of ACTs were as follows:

1. Performs a preanesthesia examination and evaluation,
2. Prescribes the anesthesia plan,
3. Personally participates in the most demanding procedures of the anesthesia plan including induction and emergence,
4. Ensures that any procedures in the anesthesia plan that he or she does not perform are performed by qualified anesthetists,
5. Monitors the course of anesthesia administration at intervals,
6. Remains physically present and available for immediate diagnosis and treatment of emergencies, and
7. Provides indicated post-anesthesia care.

Even though no economic incentive exists for military anesthesia providers based on the TEFRA criteria (AANA, 1996b) cited for reimbursement, a question was asked to explain which anesthesia provider accomplishes the above anesthesia-related tasks for each surgical case (Appendix A). The Chief CRNAs was asked to provide a response to each of the above listed categories based on a 100% scale of whether the CRNA, anesthesiologist, or both anesthesia providers accomplishes the anesthesia-related tasks for each surgical case.

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) performs the preanesthesia examination and evaluation for surgical cases? The performance of the preanesthesia examination and evaluation in all categories by size, location, and type of naval hospital appeared to have a higher mean percentage of CRNAs accomplishing the task in comparison to anesthesiologists (Appendix F, Table 10). Anesthesia providers accomplished this anesthesia-related task in fewer than 10% of the surgical cases based on the respondents in the "both" category. However, as noted earlier, more CRNAs are assigned to small hospitals compared to anesthesiologists, which may explain the mean percentage difference of which provider performs the preanesthesia examination and evaluation in these facilities. Also, as stated earlier, three respondents from small hospitals had no anesthesiologists assigned to their facility. However in large hospitals CRNAs appear to perform this task more often than anesthesiologists. As illustrated in Table 3 (Appendix F) the number of anesthesiologists assigned to large hospitals as compared to CRNAs had a mean ratio of 2:1 anesthesiologists:CRNAs. In teaching hospitals CRNAs appear to perform this task more often than anesthesiologists, even though the provider mix is greater for anesthesiologists to CRNAs in these facilities (Appendix F, Table 3). Overall, it appears the CRNAs accomplished the task of performing the preanesthesia examination and evaluation in the anesthesia departments for small, medium, and large hospitals based on the responses from the Chief CRNAs.

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) prescribes the anesthesia care plan for each surgical case? In all facilities, with the exception of small hospitals, it appears the CRNA prescribes the anesthesia care plan most of the time for each surgical case (Appendix F, Table 11). In small hospitals the mean percent is almost equal for both anesthesia providers in prescribing the anesthesia care plan. In the "both" category, the anesthesia providers accomplished this anesthesia-related task in fewer than 10% of the surgical cases. Based on the responses, it appears CRNAs independently prescribe the anesthesia care plan for the surgical case. One Chief CRNA from a medium CONUS hospital responded, “Each provider is totally independent. None of us have any other provider in the room unless requested, this includes Pre- and Post-op evaluation.” Another Chief CRNA from

a small CONUS hospital responded, “We equally decide cases, pre-ops, duty, etc. If you do the case, you decide on the care plan.”

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) participates in the induction and the emergence of anesthesia for each surgical case? Again, in all facilities, with the exception of the "both" categories in large and teaching hospitals, it appeared the CRNA performs the induction and emergence of anesthesia for each surgical case (Appendix F, Table 12). In the "both" categories, the respondents reported that both providers perform the induction and emergence of anesthesia in 40% of the surgical cases in large and teaching hospitals. One Chief CRNA from a medium CONUS hospital responded, "We work together, but autonomously." Based on the respondents, it appears the Navy CRNA is an independent practitioner in the induction and emergence of anesthesia in the surgical case for which they are assigned.

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) monitors the patient during the maintenance of anesthesia for each surgical case? In the responding facilities Navy CRNAs appeared to be the anesthesia provider most responsible for monitoring the patient during the maintenance of anesthesia for each surgical case (Appendix F, Table 13). The mean percentage in small hospitals was almost equal in the 70th percentile range for both CRNAs and anesthesiologists in the monitoring of the patient during maintenance of anesthesia for each surgical case. Fewer than 10% of surgical cases did both anesthesia providers monitor the patient during the maintenance phase of anesthesia for all facilities surveyed. The mean percentage for monitoring the patient during anesthesia maintenance is worth noting for both the Navy CRNA and anesthesiologist in all facilities. One Chief CRNA from a large teaching hospital responded, "If I do the case, I do it all. If the MDA [sic] does the case, he does it all." Based on the responses to this question it appears whichever anesthesia provider is performing the anesthesia-related task for the surgical case, each practitioner performs the monitoring of the patient during the maintenance of anesthesia autonomously.

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) is physically present and available in the diagnosis and treatment of emergencies during anesthesia care delivery for each surgical case? Based on the responses, with the exception of the large hospital category, the mean percentage for all facilities was higher for CRNAs (Appendix F, Table 14). The responses from two of the three large hospitals had a higher percentage of 52% for anesthesiologists compared to 48% for CRNAs being physically present and available in the diagnosis and treatment of emergencies in each surgical case. As stated earlier, the anesthesia provider ratio of anesthesiologists in

large hospitals is much higher as compared to CRNAs (see Appendix F, Table 3). The category for both anesthesia providers in small, large, CONUS, and OCONUS hospitals had a response of 50%. It appears in these facilities the CRNAs and anesthesiologists work collaboratively, both providers being physically present and available to diagnosis and treat emergencies during the delivery of anesthesia for surgical cases.

Which Navy anesthesia provider (i.e., CRNA, anesthesiologist or both) participates in or provides postanesthesia care for each surgical case or both? Again, based on the response, the mean percentage for CRNAs was higher for all facilities in the provision of postanesthesia care for each surgical case (Appendix F, Table 15). For both anesthesia providers the accomplishment of this anesthesia-related task was fewer than 10% for all facilities.

In summary, it appears Navy CRNAs are independent practitioners in the provision of anesthesia care in accomplishing the anesthesia-related tasks for each surgical case based on the responses from the Chief CRNAs. A Chief CRNA from a medium CONUS hospital responded:

> "Pre-ops done by on-call person, or whoever pt. first encounters. Equal number (of pre-ops) are done by both MD's and CRNA's. Whomever does the pre-op discusses anesthetic options with pt. and arrives at conclusion. May be modified later at the providers discretion. Each provider does own case, solo, unless circumstances dictate need for assistance. Again, each provider, either MDA [sic] or CRNA, does their own case. Whoever is available will respond (in the diagnosis and treatment of emergencies). Provider, or 'on-call' person supervises recoveries."

Another Chief CRNA from a small CONUS hospital responded, "We equally decide cases, pre-ops, duty, etc. If you do the case, you decide on the care plan". Overall, based on the respondents it seems both anesthesia providers are practicing independently in the delivery of anesthesia.

This description of Navy anesthesia provider practices may be of future value in determining practice patterns and provider responsibilities. As stated earlier, understanding the role assignments between Navy anesthesia providers may serve as a catalyst in the development of strategies to produce positive effects on role perceptions and assumptions of Navy CRNAs.

Navy CRNAs Service as Members on Hospital Wide Committees

A Navy CRNA's responsibility is not solely in the delivery of anesthesia to patients, but as a professional consultant to other professional health care providers. The Chief CRNAs was asked if CRNAs in their department

serve on hospital-wide committees. The response was yes, CRNAs serve as members on hospital-wide committees in 100% of facilities surveyed (Appendix E, Figure 15). Also, the Chief CRNA of each naval hospital was asked to provide a listing of the various types of committees on which CRNAs serve. A listing of the committees by hospital size is illustrated in Tables 16, 17, and 18 (Appendix F).

Armed Forces Health Professions Scholarship Program (AFHPSP) and Full-Time Out-Service (FTOS) Civilian-Trained CRNA Graduates Requirement for Additional Anesthesia Training

As mentioned in the literature review in Chapter 2, Navy CRNAs possess an exceptional body of knowledge that enables the performance of their peacetime and mobilization roles, which differentiates them from their civilian colleagues. The US Navy relies upon CRNA providers in solo practice s in contrast to some civilian hospitals' ACT approach. Navy CRNAs fill operational assignments, because civilian CRNAs cannot be deployed (OASD [HA], 1994). A portion of this descriptive study was devoted to ascertaining the amount additional anesthesia training required by AFHPSP and FTOS graduates from civilian-trained programs. This subject was included because of the potential impact the additional anesthesia training may have in preparing the civilian-trained AFHPSP or FTOS CRNA graduates for operational billets. Also, the anesthesia training may require the anesthesia department to allocate additional man hours. The additional training time may require anesthesia personnel to act in a supervisory role while educating the AFHPSP and FTOS graduates to possess the body of knowledge needed to perform as Navy CRNAs. However, one limitation for this study was in comparing the length of time of additional anesthesia training may be required for

a new CRNA graduate from military-trained anesthesia programs. The Chief CRNA from one small OCONUS hospital responded, “Have never worked with AFHPSP nurses.” Also, the Chief CRNA from a large CONUS hospital responded, "I don't think that the Navy has ever had anyone from AFHPSP (none here). We have had some from FTOST [sic] and FTOS."

In the questionnaire, the Chief CRNAs was asked to provide a yes, no, or not applicable response. If the response was yes, the respondent was asked to provide the months of additional training required for these CRNA graduates in various anesthesia procedures or services. The anesthesia procedures or services cited were: regional blocks, spinal blocks, epidural blocks, obstetric anesthesia, pediatric anesthesia, invasive line placement (e.g., central lines, pulmonary artery catheters, arterial lines, etc.), and anesthesia call or duty (Appendix A).

Thirty-six percent of small hospitals, 66% of medium hospitals, and 67% of large hospitals responded that additional training for civilian-trained AFHPSP or FTOS new graduates was required (Figure 9). Also, 66% of the teaching hospitals noted the need for additional training. In four of the five small hospitals, one to three additional months of training was required for regional blocks and anesthesia call. From other small hospitals, coaxial blocks (i.e., spinals and epidurals) were reported to require an additional one to six months of training. Figure 16 (Appendix E) provides an illustration of the additional anesthesia requirements for these new graduates. Medium hospitals reported that an additional one to six months of training was required for training in regional blocks, coaxial blocks, and obstetrics (Appendix E, Figure 17). Respondents reported that pediatric anesthesia required an additional one to three months in three of the four medium hospitals. Respondents reported that invasive line placement and anesthesia call required an additional one to three months in two of the four medium facilities, and 10 to 12 months of additional training was required in one medium hospital. Respondents from two of the three large hospitals reported an additional one to three months of training was required in regional blocks, coaxial blocks, and anesthesia call (Appendix E, Figure 18).

The need for additional anesthesia training for AFHPSP or FTOS graduates may be due to limited use of these procedures or services in civilian anesthesia practice. One medium CONUS responded, “Only informal training, no formal training (assistance and support). This is also for outservice trained CRNAs (on active duty). Epidural blocks require 4 to 6 months of additional training due to few being done.” Another medium CONUS responded, “Have noted a deficiency in regional preparation.” Based on the responses, it appears the anesthesia programs for civilian-trained AFHPSP or FTOS nurse anesthesia students have the need to ensure their curriculum provides more diversity in regional blocks, coaxial blocks, pediatric anesthesia, and obstetric anesthesia.

What Size and Type of Naval Hospital Should a New CRNA Graduate Be Assigned and Why?

Because the above training only focused on new graduates from AFHPSP or FTOS, a question was asked as to what size and type of naval hospital should new CRNA graduates be assigned. The majority of respondents reported new CRNA graduates first assignment should be to a medium hospital upon graduation from an accredited program of nurse anesthesia (Appendix E, Figure 19). As to the type of naval hospital, the majority of the respondents reported a nonteaching hospital would be best suited for new CRNA graduates (Appendix E, Figure 20). The respondents then added personal

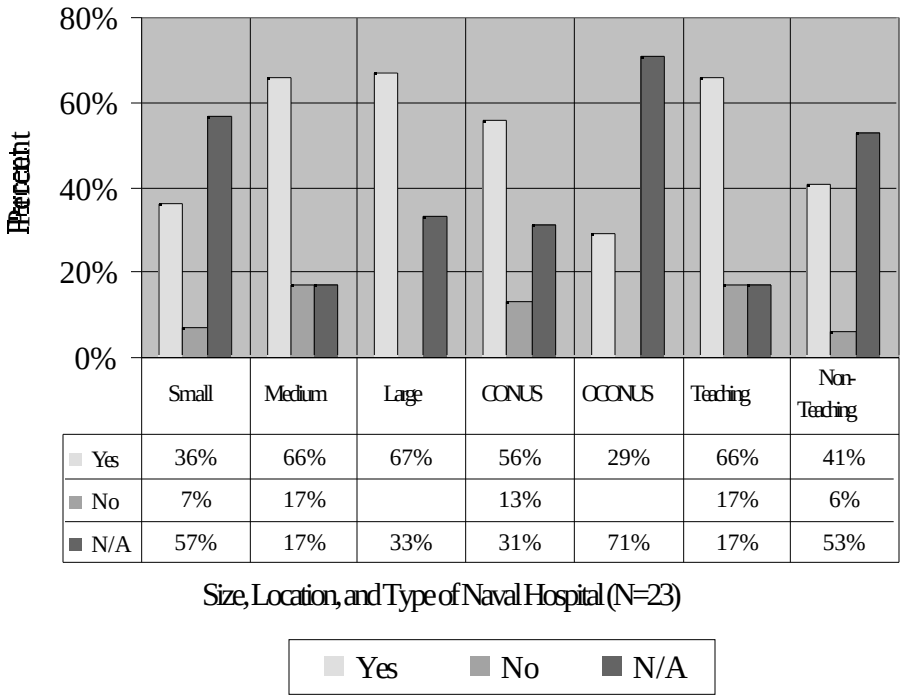


Figure 9.

Additional Anesthesia Training Required for AFHPSP or FTOS Civilian-Trained CRNA Graduates

opinions in reference to this question. The Chief CRNAs' own personal experience as Navy CRNAs provides a sound basis to ensure a new CRNA graduate is granted the autonomy and anesthesia care delivery experience needed to function as a Navy CRNA. One medium CONUS hospital responded:

> "I think new graduate should be assigned to a facility that provides moderate case volume (including OB), and allows for enough independence to build confidence in skills and judgement. Large facilities tend to have training programs, and lots of MD staff, so the new graduate does not get to experience the full weight of responsibility that one feels when they are truly 'alone'. Small facilities do not have the case volume needed to build skills."

A small CONUS nonteaching hospital responded, "A medium size facility provides an opportunity for a variety of cases, enough staff for back up. Non-teaching facility allows the new graduate an opportunity to be 'staff', not student, also no competition for cases with students." While one large CONUS teaching hospital provided the following response, "A medium nonteaching facility provides the opportunity for independent growth and professional development without the competition from trainees or physicians." However, not all the respondents think a new graduate should be assigned to a medium hospital only, some respondents commented that a variety of facilities would provide the proficiency, confidence, and skills needed to develop as a independent Navy CRNA. Such as the response from one small OCONUS non-teaching hospital:

> "Small, medium, large, non-teaching. The size doesn't matter. There are pros and cons to all sizes. However, they should not be assigned to teaching facilities, I don't care HOW GOOD a student they were. They won't get the opportunity to do a year or two of decent cases on their own. They are <u>not</u> ready to teach."

The personal responses were included as an illustration of the thoughts of experienced Navy CRNAs based on the size and type of Naval Hospital a new CRNA graduate should be assigned.

Mobilization Assignments Involving the Anesthesia Department

Navy CRNAs are trained to deploy for the delivery of anesthesia in any theater of operations. A question was asked about the mobility tasking of the anesthesia department in naval hospitals. Four of the 14 small hospitals, four of the six medium hospitals, and all three large hospitals reported their anesthesia department was assigned to mobility billets (Appendix E, Figure 21). Of the hospitals located CONUS, nine of the 16 hospitals anesthesia departments have mobility assignments. Also, two of the five OCONUS hospitals anesthesia personnel has a mobility assignment. Five of the six teaching hospitals and six of the 17 nonteaching hospitals had mobility billets for anesthesia personnel. According to one large CONUS teaching hospital, a response to the mobility tasking of their department was, "According to OPTEMP [sic]. Support 3 CVA's [sic], 2 amphibious, fleet hospital, and 2

FSSG's [sic]". Another large CONUS teaching hospital response to the mobility tasking for anesthesia personnel involved, “West PACs [sic], fill in Okinawa, Japan, and Lincoln (USS Lincoln, Carrier) detachments”. Navy CRNAs are trained to perform in operational billets as required to fulfill the mission of the Navy Medical Department. This unique role of Navy CRNAs differentiates their scope of practice and role expectations from their civilian counterparts.

Obstetrical Anesthesia Services in Naval Hospitals

Obstetrical (OB) anesthesia is one of the many patient care services offered by naval hospitals. Navy CRNAs and anesthesiologists provide anesthesia care services to obstetrical patients. These services usually involve labor pain management through the administration and management of labor epidurals and intrathecal narcotics. Anesthesia personnel also provide services for both emergent and elective Cesarean sections. Navy CRNAs and anesthesiologist are assigned to cover the OB Department daily. Obstetrical services are offered in 18 of the 23 responding hospitals. Three small and two medium CONUS naval hospitals do not offer obstetrical services at their facilities (Appendix E, Figure 22). There were no explanations from the Chief CRNAs as to how OB services were provided at these CONUS facilities for beneficiaries.

Pain Management Services in Naval Hospitals

Pain management has become a lucrative service offered by the anesthesia department in many civilian hospitals. Pain management clinics offer the control of long-term (chronic pain) and short-term pain (acute pain) to patients on an inpatient and outpatient basis. How many anesthesia departments within the small, medium, and large naval hospitals operate a pain management clinic? If the hospital has a pain management clinic, what type of pain management services is being offered? Do Navy CRNAs provide pain management services in these clinics? These questions were asked of the Chief CRNAs in the anesthesia departments of all Naval Hospitals.

Several of the responding hospitals offered pain management services, but many of the services were limited. Naval hospitals providing pain management services included nine of the 14 small hospitals, five of the six medium hospitals, and all three large hospitals (Appendix E, Figure 23). Twelve of these hospitals were located CONUS, and five were located OCONUS. Five of the six teaching hospitals, and 12 of the 17 nonteaching hospitals provided pain management services.

Acute postoperative pain and chronic pain management were the two types of pain management services assessed in these hospitals. Acute postoperative pain management is offered to those patients on a short-term basis

following surgical procedures or trauma. Chronic or long-term pain management is a service provided to patients with severe and often debilitating pain from injury or disease. Nine of the 14 small hospitals, four of the six medium hospitals, and all three large hospitals provided acute postoperative pain management services (Appendix E, Figure 24). Ten of these hospitals are located CONUS, and six are located OCONUS. Chronic pain management services, such as epidural steroid administration and regional blocks, were offered in eight of the 14 small hospitals, five of the six medium hospitals, and all three large hospitals (Appendix E, Figure 25). One small OCONUS hospital responded, "We see some pain patients rarely, but do post-op PCE [sic] orders." A medium CONUS hospital had the following comment about acute and chronic pain management services offered in their facility, “One anesthesiologist who graduated from a pain fellowship provides chronic pain management. Acute pain managed by CRNA or MDA [sic]”. Of the 23 responding hospitals, four had no response to the question regarding acute and chronic pain management services.

Do Navy CRNAs work in the pain management clinic of these hospitals? Navy CRNAs work in the pain management clinic in seven of the 14 small hospitals and only in one of the medium hospitals (Appendix E, Figure 26). Four of the seven small hospitals where Navy CRNAs work in the pain management clinic are located overseas. CRNAs in the three large hospitals were not assigned to work in the pain clinic. It appears Navy CRNAs provide pain management services where the CRNAs staffing ratio is greater than anesthesiologists staffing. Again, four of the 23 hospitals did not respond.

CHAPTER V - SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

A description of the management characteristics and practice patterns of anesthesia care delivery between Navy CRNAs and anesthesiologists was not found in the literature. Navy CRNAs and anesthesiologists share a collaborative role in the delivery of anesthesia care in the Navy Medical Department. Describing the management characteristics and practice patterns may provide assistance in documenting educational needs, staffing requirements, role expectations, practice patterns, provider responsibilities, and the value of each anesthesia provider to the Navy Medical Department. A description of these characteristics may be useful in relating how motivation, quality of worklife, and job responsibility effect role expectations and assignment of Navy CRNAs and anesthesiologists in the provision of anesthesia care. Data from this study may be useful in describing which factors influence the delivery of anesthesia care in Naval Hospitals. Those factors include the size and geographical location of the hospital, number and type of anesthesia providers assigned to those hospitals, and whether the hospital is teaching or nonteaching. The data may also be useful in determining future operational and medical readiness needs, staffing assignments, educational or readiness programs, practice patterns, provider responsibilities, and workload management characteristics of Navy CRNAs. Data obtained from this study may provide a basis to future studies about the best mix of anesthesia providers that may be most practical, beneficial, and valuable in the delivery of anesthesia care. As stated earlier, no study has been published that demonstrates that anesthesia care delivered by anesthesiologists is superior to that delivered by CRNAs. The only studies in publication attempt to correlate patient outcomes to anesthesia providers (i.e., CRNAs and anesthesiologists) suggest that the quality of care is not significantly different.

The purpose of this research was to provide data describing specific management characteristics of anesthesia care delivery in small, medium, large, teaching and non-teaching hospitals located CONUS and CONUS in the U. S. Navy. Data was obtained from 23 of the 29 naval hospitals (79%) responding to a 45-item questionnaire distributed to all Chief CRNAs at US Naval Hospitals providing anesthesia services. The questionnaire was divided into four sections: demographics, management, personnel, and practice patterns. Although this study focused on the management characteristics of anesthesia care delivery, some data from the personnel and practice pattern sections was included to provide background information.

The hospitals responding to the survey included 14 small facilities (61%), six medium facilities (26%), and three large facilities (13%) where anesthesia services are provided. The size, location, and type of hospital was based on the responses from the demographics section of the survey. Six of the 23 (26%) responding hospitals were teaching hospitals, and 17 of the 23 (74%) were nonteaching hospitals based on whether the anesthesia department had an established anesthesia clinical curriculum for SRNAs and anesthesiology residents. Sixteen of the 23 (70%) hospitals were located CONUS and seven of the 23 (30%) hospitals were located OCONUS. Additionally, several questions on the survey allowed the Chief CRNAs to provide personal responses, which were included in the analysis. A higher response rate may have provided a better statistical representation of the data described in Chapter 4.

The number of operating rooms increased in size in proportion to the size of the facility. The large hospitals had an average of 18 operating rooms, whereas small hospitals had an average of three operating rooms and medium hospitals, seven operating rooms. As expected, the number of surgical cases performed on a monthly and yearly basis was much higher in the large hospitals as compared to the small and medium hospitals. Large hospitals performed a range of 1,800 to 14,580 surgical cases per year in comparison to the range of surgical cases for medium hospitals at 1,040 to 6,000. Small hospitals had a range of 36 to 1,800 surgical cases per year. This finding may reflect the number of personnel and resources available at large hospitals.

The ratio of anesthesia providers assigned to these hospitals was an interesting finding in comparison to the number of operating rooms and surgical cases performed in these facilities. A larger proportion of anesthesiologists were assigned to the large hospitals, whereas a larger proportion of CRNAs were assigned to the medium and small naval hospitals. This finding may indicate that Navy CRNAs are more independent and autonomous in the small and medium hospitals in comparison to the large hospitals. Navy CRNAs were assigned to more OCONUS billets

than anesthesiologists to provide anesthesia services in these locations. Two of the OCONUS hospitals only had CRNAs assigned to their facility, which allowed the CRNAs to provide anesthesia independently without the direct supervision of anesthesiologists. More anesthesiologists were assigned to large, CONUS, and teaching hospitals at a much larger ratio than CRNAs. The mean ratio of anesthesiologists to CRNAs in CONUS facilities was about 6:4. The mean ratio of anesthesiologists to CRNAs in teaching facilities was approximately 13:1, and in large hospitals 20:3. It appears that anesthesiologists are assigned to the large, CONUS, and teaching hospitals where there are more operating rooms and more surgical cases performed on a monthly and yearly basis.

Only one large hospital reported teaching anesthesia to anesthesiology residents. However, the question may have been misinterpreted by the respondents. The question asked, "Do you teach anesthesia to physician anesthetists in your facility?" The question should have been structured to ask if their facility had an established curriculum for physician anesthetists, although the respondents in all three large hospitals reported they teach anesthesia to SRNAs. All teaching hospitals reported training SRNAs as future Navy CRNAs. The number of CRNAs assigned to a teaching based hospital as compared to nonteaching hospitals was equal. Navy CRNAs provide the experience and knowledge for the clinical education foundation required for the anesthesia training of SRNAs in these facilities.

As mentioned earlier, the Navy relies upon solo CRNAs in contrast to some civilian hospitals' anesthesia care team approach. Navy CRNAs must possess a special body of knowledge to enable their performance during peacetime and wartime mobilization roles. The training provided to SRNAs by Navy CRNAs allows new graduate CRNAs to possess the anesthesia care knowledge base needed to fulfill the medical readiness needs of the Navy Medical Department. Navy Medicine is undergoing a "reengineering plan" (Snyder, 1998, p. 9) through the Surgeon General of the Navy proposed plan of the “Total Healthcare Support Readiness Requirement” (Snyder, 1998, p. 7). Since the end of the Cold War, much time and debate has been centered on enabling the "resizing" by the Navy Medical Department. Resizing to meet the medical readiness requirement by providing the "right people, with the right training, with the right equipment, in the right place at the right time" (Snyder, 1998, p. 9). To prepare the Navy Medical Department for the continued support all Navy and Marine Corps operational missions will require medical readiness training to be entrusted to the care of those capable of maintaining health and fitness.

New CRNA graduates must be prepared to meet the medical readiness needs of the Navy Medical Department as proposed by the reengineering plan of the Surgeon General of the Navy. Based on the responses

from the Chief CRNAs, for new CRNA graduates to obtain the right training, an assignment to a medium nonteaching hospital would fulfill the experience required for a Navy CRNA to practice independently. Many of the Chief CRNAs responded that a large teaching facility has too much supervision, and the need to develop independent work habits through a variety of cases would provide a well-rounded anesthetist. One Chief CRNA felt an assignment to a small hospital upon graduation would not give the new CRNA graduate the case volume needed to build skills, while large hospitals tend to have training programs, and lots of MD staff. Another medium CONUS nonteaching hospital felt that new CRNAs need to do their own cases to gain experience as an independent practitioner before precepting those in training. The experience of one Chief CRNA at a small CONUS nonteaching hospital led to the view point that a medium size facility provides an opportunity for a variety of cases, enough staff for backup. Nonteaching facilities allows the new graduate an opportunity to be staff, not student, also no competition for cases with students. A Chief CRNA from a small OCONUS nonteaching hospital provided the following response, "A new CRNA needs time to adjust to making decisions on their own and to develop a sense of professional autonomy. A small hospital may not provide enough diversity in types of surgical cases." The overwhelming responses by the Chief CRNAs appears to confirm their commitment to ensuring future Navy CRNAs are prepared to meet the medical readiness needs of the Navy Medical Department. Their concern in developing the most diverse and experienced Navy CRNAs will allow the delivery of anesthesia care in a state-of-the-art health care system (Snyder, 1998).

The AFHPSP and FTOS programs are two avenues available in which new graduate CRNAs are trained from civilian-trained nurse anesthesia programs. Based on the respondents of the naval hospitals where these graduates were assigned, additional anesthesia training in regional blocks, coaxial blocks, obstetrics, pediatrics, invasive line placement, and anesthesia call was required. The responses from the hospitals Chief CRNAs indicated that these graduates required an additional one to six months of training in these anesthesia procedures or services. One medium hospital indicated as much as 10 to 12 months of additional training was required for invasive line placement and anesthesia call. The potential impact of additional anesthesia training of new graduates from civilian-trained nurse anesthesia programs requires the anesthesia department to allocate additional man hours for training. The additional training requirement may also require other CRNAs to act in a supervisory role to ensure the role expectations of independent practice of anesthesia care delivery for the new CRNA graduate is satisfied. It was beyond the scope of this descriptive study to determine the number of man hours needed to provide the additional

anesthesia training for these graduates. Many civilian-based anesthesia programs use civilian hospitals to provide the clinical training for these graduates as opposed to the military-based programs which uses military MTFs in their curriculum. Describing the additional training requirements for AFHPSP or FTOS new graduates may provide a reference in the future to identify training barriers in these programs. Identifying these training deficits would ensure the new CRNA graduate is properly trained to meet the medical readiness needs of the Navy Medical Department. A future recommendation of this study is to determine if additional anesthesia training was required for new CRNA graduates from the military-based nurse anesthesia programs.

Navy CRNAs are trained to deploy in operational billets to deliver anesthesia care in any theater of operation. The anesthesia departments of four of the 14 small hospitals, four of the six medium hospitals, and all three of the large hospitals had mobilization billets for the CRNAs. This specialized role of Navy CRNAs enables the Navy Medical Department to meet the medical readiness needs of anesthesia care delivery. Navy CRNAs scope of practice and role expectations in the delivery of anesthesia care in any operational theater differentiates their practice from civilian CRNAs. For Navy CRNAs to be prepared to support all Navy and Marine Corps operational missions, it is imperative for CRNAs to be an independent provider of anesthesia. Navy CRNAs are often deployed with aircraft carriers, hospital ships, Fleet Surgical Support Teams, or in remote locations as the sole anesthesia provider. According to the Navy Medical Department's Readiness Reengineering Plan and the Joint Chiefs of Staff doctrinal definition of readiness, i.e., "the right people, with the right training, with the right equipment, in the right place at the right time" (Snyder, 1998, p. 9) requires that Navy CRNAs maintain a high state of medical readiness.

Additional demographic data obtained from this descriptive study included whether a hospital operated a same-day surgical center. The need to reduce health care costs has caused the creation and growth of same-day surgical centers to provide surgery on an outpatient basis. These centers admit and discharge patients from the hospital on the same day of their surgery. Navy MTFs have followed suit in many of their hospitals by providing a same-day surgery center. Five of the 14 small hospitals, one medium hospital, and all three large hospitals operate a surgical center; one medium hospital did not respond. Seven of the hospitals were located CONUS, and two were located OCONUS. Of the six teaching hospitals responding, four indicated that their facility operates a surgical center. The respondents were asked to describe whether their same-day surgical center was a surgical center (i.e., operates separately from the traditional operating rooms), same-day surgical center (i.e., using the hospital's operating rooms), surgical center and same-day surgical center, or other. The most utilized surgical center was

same-day surgical centers. The evolving trend in providing anesthesia care delivery on an outpatient basis may impact the management of anesthesia services and practice patterns of anesthesia providers. Traditional operating room suites are used to provide surgical procedures to outpatients through same-day surgery in some hospitals. Providing same-day surgical services to allow faster turnover times in the operating room has been described in the literature. How the evolving trend of same-day surgical centers will impact the practice of Navy nurse anesthesia is beyond the scope of this study. The growth of surgical centers in naval hospitals may require implementing additional training for anesthesia providers as well as restructuring of manpower resources to assure the anesthesia care can be most effective in these settings. The provision of this training in nurse anesthesia and anesthesiology residency programs will allow increased efficiency of faster turnover times in the operating rooms and enable more proficient use of anesthesia practice patterns. The information presented may be of future use in determining the staffing requirements, practice patterns, management characteristics, and provider mix of an individual Naval Hospital. A future recommendation is to repeat this study in five years to describe the number of Naval MTFs operating a same-day surgical center. Another recommendation is to describe the staffing mix and practice patterns of the anesthesia providers in these surgical centers.

Recently, the terms supervision and medical direction have received a great deal of attention in the civilian sector of anesthesia practice between the two groups of anesthesia providers. The Health Care Financing Administration (HCFA) has proposed a change to the rule that nurse anesthetists must be supervised by an operating physician practitioner or an anesthesiologist. The proposed change would allow nurse anesthetists to independently provide anesthesia services to Medicare and Medicaid patients if state laws permit. The AANA has been lobbying as a proponent to this proposed rule change by HCFA to expand the CRNAs scope of practice at the state level. The ASA has been lobbying against the proposed change to the rule of CRNAs providing anesthesia without the direct supervision of the operating physician practitioner or an anesthesiologist. The ASAs December 1997 issue of the President's Update by Dr. William D. Owens commented on this issue of the proposed rule change:

> ASA members should recognize the socioeconomic impact of HCFA's proposal.....it takes a little imagination to see that a move away from required supervision of nurse anesthetists potentially erodes the number of cases in which medical direction will apply, because nurse anesthetists will seek to practice independently, whenever and wherever permitted. (Owens, 1997,pp. 3-4).

Currently, there are 29 states that do not require physician supervision of CRNAs in their states' nursing statutes and regulations according to the AANA (AANA, 1998a). No significant differences in the anesthesia outcomes between CRNAs and anesthesiologists has been demonstrated according to several published studies. A proposed change in the supervision of military nurse anesthetists by anesthesiologists during the Fiscal Year 1988-89 Department of Defense Authorization Act was heard by the US House of Representatives Committee on Armed Services. During the hearing on House of Representatives (H.R.) 1748 (AANA, 1998c), the committee reported that it was not aware of any data from the quality of care standpoint that nurse anesthetists needed a higher level of supervision. In pages 208 to 209 of the report, the committee cited the current practice in civilian and military medical care systems is that a CRNA must be supervised by a physician. The proposed change in the H.R. 1748 would require military nurse anesthetists to be supervised by anesthesiologists. However, the committee ruled against the proposed change in stating:

> The committee is skeptical that such a policy change makes sense from a patient care, quality of care or medical readiness standpoint. In terms of patient care, the requirement that an anesthesiologists supervise every anesthetists would mean that many anesthesiologists would be force to provide less patient care (H.R. 1748, 1989, pp. 208-209).

The committee did not adopt the change policy due to the lack of data and non-compelling reasons that military nurse anesthetists should be supervised by anesthesiologists. Based on the responses from the Chief CRNAs, in fewer than 20 percent of small, medium, CONUS, OCONUS, teaching, and nonteaching naval hospitals did anesthesiologists supervise Navy CRNAs in the delivery of anesthesia care. Overall, Navy CRNAs are reportedly not supervised on a routine basis by anesthesiologists. Only in one large teaching hospital did the Chief CRNA report that supervision by anesthesiologists occurred on a routine basis. The 2:1 anesthesiologists to CRNAs ratio at this facility may describe that both the anesthesiologist and CRNA were assigned to cover the operating room during delivery of anesthesia. The collaborative effort of providing total anesthesia care may be abandoned by the anesthesiologist, who is acting in the supervisory role as perceived by the CRNA. The question regarding supervision of CRNAs by anesthesiologists generated many personal responses. Many common themes was found in these responses. One was that CRNAs are independent practitioners. Another was that CRNAs were assigned to anesthesia call alone and were not required to consult an anesthesiologist after hours during the administration of anesthesia. Collaborative consultation was another common theme found in the personal responses, where the

CRNA was required to consult the anesthesiologist on more complicated cases that carried a higher morbidity based on the ASA classification system discussed in Chapter 4. According to the respondents, supervision only occurred in some facilities if the patient presented for anesthesia in the ASA Classification category III or above. Often supervision in some of these facilities appeared to be perceived by the CRNA based on the fact the anesthesiologist had to sign the anesthesia record on ASA Classifications III or above. Other facilities had policy guidelines indicating the degree of supervision required for certain types of surgical procedures (e.g., trauma, pediatrics, and neurological cases). One large hospital reported that CRNAs are only required to consult the anesthesiologist for trauma, neonates, neurological, and ASA III or higher. Since the term supervision or medical direction could possibly have so many different interpretations by various CRNAs, questions were designed to describe the amount of supervision during a surgical case. The questions were developed based on the ASA Classification of Physical Status (ASA I though V) and the TEFRA criteria cited in Chapters Two and Four.

The supervision of Navy CRNAs occurred most often during the administration of anesthesia to ASA I through ASA III patients in large and teaching hospitals. The most supervision of Navy CRNAs in all naval hospitals occurred during the administration of anesthesia to ASA IV and V patients. According to Morgan and Mikhail (1996) the ASA classification system generally correlates with the perioperative mortality rates even though the system was not intended to represent this correlation. These patients usually require more invasive monitoring techniques and diligence on the part of the anesthesia provider. As stated earlier, several of the personal responses reported that the facility had set policies on the requirement of supervision of CRNAs during the delivery of anesthesia care to ASA III or higher patients. However, in many of the small and medium, non-teaching hospitals located both CONUS and OCONUS, the amount of direct supervision of CRNAs by anesthesiologist was much less due to the provider mix of anesthesiologists to CRNAs at these facilities. Often each anesthesia provider at these facilities were assigned to individually staff an operating room. Each anesthesia provider was responsible for the anesthesia care independently. A future recommendation for study would be to redesign this question based on qualitative responses (e.g., always, sometimes, seldom, never, etc.).

The amount of supervision or medical direction during the administration of anesthesia based on the TEFRA criteria described many differences in the practice patterns of both anesthesia providers. The preanesthesia examination and evaluation was reportedly performed most often by CRNAs in all of the facilities surveyed. Based on the respondents' answers, CRNAs prescribed the anesthesia care plan in all facilities except small hospitals. In

small hospitals the anesthesia care plan was reportedly prescribed equally by both providers. The provider mix in small hospitals was 1:2 anesthesiologists:CRNAs mean ratio may describe the autonomy of the CRNA is prescribing the anesthesia care plan. The induction and emergence of anesthesia was reportedly performed by CRNAs in most facilities. However, in the large and teaching hospitals the task was reportedly performed by both providers almost 40% of the time. As stated earlier, the assignment of an anesthesiologist and a CRNA to a surgical case or room in large and teaching hospitals, may allow both providers to work collaboratively during the induction and emergence of anesthesia. CRNAs were responsible for monitoring the patient during the maintenance of anesthesia almost exclusively based on the respondents. It appears whichever anesthesia provider is monitoring the patient during the maintenance of anesthesia that the task is performed autonomously by each provider. It appears that both anesthesia providers work in collaboration in being present for the diagnosis and treatment of emergencies during anesthesia care delivery for a surgical case. Also, CRNAs participate and provide the postanesthesia care for each surgical case such as writing the postoperative anesthesia orders in the Post-Anesthesia Care Unit. In summary, based on the respondents, it appears CRNAs are independent practitioners in the provision of anesthesia care based on the questions outlined from the TEFRA criteria. Describing these characteristics of anesthesia care delivery leads to the conclusion that the CRNAs have more freedom of practice and less supervision in the delivery of anesthesia in naval hospitals.

As stated previously, the assignment of anesthesia providers to the daily work schedule is the area of control given to the manager of the anesthesia department. Elective surgical cases are typically scheduled in advance by the operating physician practitioner for an operating room to perform the case. The control of assigning CRNAs to the daily surgical cases varied considerably in all facilities except the large hospitals. In large hospitals CRNAs were assigned daily to surgical cases by an anesthesiologist. The decision-making process to assign personnel to surgical cases may be based upon the staffing level, provider mix, patient classification, or the experience of the anesthesia provider. Control of the daily work schedule in teaching hospitals was mostly controlled by the anesthesiologists. The rational for this area of control was not evaluated in this study. It appears that the provider mix and staffing ratio may be the reason for the Chief CRNAs not having control of the daily work schedule for staff CRNAs in these hospitals. A recommendation for future study would be to repeat the study to assess and describe the amount of control and contribution each anesthesia provider has in the daily work schedule for CRNAs.

The Chief CRNAs have more control in assigning staff CRNAs to the monthly work schedule in most facilities. Only one large hospital reported the anesthesiologists controlled the monthly work schedule for CRNAs. In the remaining hospitals both anesthesia providers worked collaboratively in devising the monthly work schedule.

Based on the respondents, it appears that in the hospitals with a higher ratio of anesthesiologists to CRNAs, less control was given to the Chief CRNAs in assigning CRNAs to the daily and monthly schedule. In other facilities where the provider mix of anesthesiologists to CRNAs did not vary considerably, the control of the daily and monthly schedule was equally controlled by both anesthesia providers.

The staffing assignment for anesthesia call is within in the control of the monthly work schedule. The staffing assignment for anesthesia call of CRNAs and anesthesiologists allowed call to be performed outside the hospital in most facilities. In facilities where first call was pulled outside the hospital, the anesthesia providers must live within 30 minutes of the hospital. Some facilities required even less time for the anesthesia provider to be in house and ready to perform the anesthesia for a surgical case. The responses explaining how first call was performed in these facilities varied considerably. Large hospitals and teaching hospitals required both the CRNA and anesthesiologist to pull call in the hospital. In facilities that had assigned SRNAs and anesthesiology residents to call, along with the various other services provided by the anesthesia department (e.g., obstetrical anesthesia, pain services, etc.), required CRNAs and anesthesiologists to pull first call in the hospital. In summary, anesthesia call was mostly first call outside the hospital in all categories except large and teaching hospitals for both anesthesia providers.

On average, the number of hours required to pull first call by each anesthesia provider varied. In small hospitals the CRNAs pulled call almost 40 hours per month on average more than the anesthesiologists. The difference in the number of call hours by CRNAs from the anesthesiologists may be attributed to more CRNAs being assigned to these facilities. Three small hospitals did report that no anesthesiologist were assigned to their facility. It was interesting to note the amount of hours per month of anesthesia call was equal among the CRNAs and anesthesiologists in the medium and large hospitals. This finding may indicate that each anesthesia provider stands call autonomously and practices anesthesia independently after hours without the assistance of another anesthesia provider. As stated earlier, each anesthesia provider has a back-up provider should the call stander need assistance after hours.

Navy CRNAs are reportedly not required to consult with the anesthesiologists before administering anesthesia during after duty hours. CRNAs reportedly practice anesthesia independently, often without telephone consultation or discussion of the case with another provider during after duty hours. Based on the responses, there is always another CRNA or anesthesiologist assigned to second call in the likelihood assistance is required to perform additional cases or procedures. The responses from the Chief CRNAs indicated additional anesthesia staff was available as second call backup if the first call stander was unable to handle the additional workload during after duty hours. Only one small hospital reported that consultation with an anesthesiologist was required if the ASA Classification of Physical Status was "ASA III or above." Otherwise, all other respondents reported that no consultation with an anesthesiologist was required during the administration of anesthesia after duty hours.

Navy CRNAs participate in collateral duties outside the scope of the anesthesia department by serving as members on hospital-wide committees. The Chief CRNAs provided a list of the various committees CRNAs served on as professional consultants to other health care providers. Those committees listed by the Chief CRNAs have been outlined in Tables 16, 17, and 18 (Appendix F). These findings describe that the collateral duties CRNAs perform are in addition to the delivery of anesthesia care. CRNAs are involved in many other duties outside the anesthesia department including mobility tasking as described earlier. Navy CRNAs are a diverse group of practitioners whose scope of practice and expertise in anesthesia benefits other health care providers and the beneficiary population they serve.

Eighteen of the facilities surveyed indicated their hospital provides obstetrical services. CRNAs are an integral part of providing anesthesia services to obstetrical patients on consultation by the obstetrical department. CRNAs provide anesthesia to this population during and after duty hours. The anesthesia services provided by CRNAs include the administration of labor epidurals and intrathecal narcotics to obstetrical patients. The practice pattern section of the survey asked the Chief CRNA to estimate the number of deliveries, Caesarian sections, intrathecal narcotics, and labor epidurals the anesthesia department performed during the month of September 1997. Many facilities provided a numerical response to each of these anesthesia procedures provided to obstetrical patients. However, this part of the survey was not analyzed. The portion of this section analyzed was used only to describe if the facility provided obstetrical services. SRNAs are required to learn and perform obstetrical anesthesia as part of their training. The training in obstetrical anesthesia management is an integral part to fulfill their role as a Navy CRNA. Nurse anesthesia programs must ensure SRNAs have training in obstetrical anesthesia incorporated in

their curriculum. The Council on Certification of Nurse Anesthetists (CCNA) has a requirement for SRNAs to perform a stated number of obstetrical cases before participating in the certification examination. The training will allow new CRNA graduates to become independent practitioners in the administration of obstetrical anesthesia.

As stated earlier, pain management has become a lucrative service offered by the anesthesia department in many civilian hospitals. Pain management clinics offer the control of long-term (chronic pain) and short-term pain (acute pain) to patients on an inpatient and outpatient basis. Many anesthesia departments in the naval hospitals surveyed are providing pain management services to patients. Acute and chronic pain management services are two types of pain management provided in many of the naval hospitals surveyed. CRNAs are providing these services in small and medium hospitals. CRNAs were most involved in the management of acute postoperative pain management, such as patient-controlled epidural and intravenous pain management, redosing of epidurals, and consultation with other health professional on the management of acute pain. One small hospital reported that CRNAs perform "acute post-op pain management, but the Doc's do the epidural steroids." The management of chronic pain is usually performed on an outpatient basis. Pain management clinics are consulted by other health care professionals for the anesthesia department to manage chronic or retractable pain when no other therapeutic interventions provide the pain relief needed for the patient.

Seventeen of the 23 hospitals surveyed reported their facility has a pain management clinic. However, only eight of these hospitals reported that CRNAs provide pain management services in these clinics. Seven of the 14 small hospitals and only one medium hospital reported CRNAs perform this service in their facility. CRNAs do not reportedly provide pain services in any of the three large hospitals responding. The provider mix of CRNAs and anesthesiologists in the small hospitals may explain why CRNAs perform this service at these facilities. As described earlier, a higher ratio of CRNAs are assigned to small hospitals. Pain management is a growing trend in the delivery of anesthesia in naval hospitals. CRNAs must have the knowledge and skills in the management of acute and chronic pain. For CRNAs to be a well-rounded anesthetist, training in the management of pain must be incorporated into nurse anesthesia programs and naval hospitals. Pain management is one area of anesthesia were CRNAs can apply their knowledge and skills to serve patients. One future recommendation for study would be to repeat a survey to determine if Navy CRNAs are independently providing pain management services in an established pain management clinic in naval hospitals.

Conclusions

This research provides descriptive data specific to the management characteristics of anesthesia care delivery in small, medium, large, teaching, and nonteaching hospitals in the U. S. Navy located CONUS and OCONUS. Data from this study may be beneficial in describing and examining the management characteristics and practice patterns among Navy CRNAs and anesthesiologists. The data also may useful in describing the role expectations, scope of practice, workload characteristics, medical readiness, and educational needs of Navy CRNAs. The information from this descriptive study regarding anesthesia provider responsibilities, practice patterns, and management characteristics may be beneficial in determining how manpower needs may be met in the Navy Medical Department.

Motivational Aspects of the Study Related to the Theoretical Framework

Factors of motivation regarding a worker's job satisfaction and job dissatisfaction was outlined in Herzberg's motivation-hygiene theory in Chapter 1. Herzberg's (1966) analysis concluded that employees have a need for the presence of extrinsic factors, such as basic physiological needs not to experience job dissatisfaction in the work environment. Supervision, company policy and administration, working conditions, job security, satisfactory pay, and interpersonal relations were the extrinsic factors that must be present not to experience job dissatisfaction. However, the presence of these factors leads to an employee showing up for work, but lacking the motivation to perform the job and feel satisfied. The external factors of supervision, interpersonal relations, and working conditions were applied as the framework of this descriptive study. Based on Herzberg's analysis, the presence of supervision would have a negative impact on the motivation of the employee to perform their job resulting in dissatisfaction. The terms supervision (i.e., medical direction), interpersonal relations (i.e., collaboration and consultation), and working conditions (i.e., scheduling, call hours, call assignment) were discussed and described at length in this study in respect to the delivery of anesthesia care among anesthesia providers in the Navy. Applying this theoretical framework to this study provides an avenue to broaden the understanding of which extrinsic factors may cause job dissatisfaction among Navy anesthesia providers in the delivery of anesthesia care. Supervising the administration of anesthesia by CRNAs may cause the individual to lack the motivation to perform their job satisfactory based on Herzberg's motivation theory. Understanding the complexity of what motivates an individual to perform the job without dissatisfaction is among the many factors in the management process. Providing the understanding to identify the negative motivators of one's job may give the individual an incentive to

perform their job more efficiently and effectively. As previously stated, understanding the motivation process is essential for Navy anesthesia providers to develop a comprehension of other factors such as, leadership, practice patterns, and incentive systems as they relate to job performance and satisfaction (Sullivan & Decker, 1992).

The application of McGregor's (1966) theory Y is an assumption that Navy nurse anesthetists must be self-directed in achieving the mission goals of the Navy Medical Department and the DoD, motivated at all levels of the profession in delivering safe and quality anesthesia care to patients, and self-controlled if they are properly motivated by the management and leadership of the organization. The assumptions of McGregor's theory Y permits leaders, or managers, in an organization to respond to the needs of the people as they work to achieve the organization's goal. Navy nurse anesthetists are expected to perform as leaders to demonstrate teamwork, problem-solving, communication, and collaboration. The development of leadership skills is essential for the continued growth of the Navy nurse anesthesia profession.

Recommendations

The information provided by this research can be applied in assessing and describing the many aspects of Navy anesthesia management characteristics and practice patterns. In order for the data to be reliable and beneficial, it must be current. Providing an annual assessment of these variables will allow for the collection of current data and information to determine the medical readiness needs, mobility tasking, and manpower requirements of Navy CRNAs.

The length of the survey may have been one limiting factor in preventing the return of the survey by six hospitals. Future recommendations for the study of management characteristics of anesthesia care delivery would be to tailor the survey in assessing and describing only information specific to this area of the study. Decreasing the number of questions on the survey may increase the return of data required to provide a detailed description of the area under study. The possibility exists to develop an annual questionnaire to reassess this area of anesthesia practice. An annual questionnaire would keep the data current for managers to determine practice patterns and educational needs among Navy CRNAs and anesthesiologists. The data could be provided to the Anesthesia Consultant to the United States Navy Surgeon General. A standardized survey could be used to provide current information about the changing practice of anesthesia. Additionally, the information could serve leaders in Navy anesthesia tasked with the responsibility of managing medical readiness needs of anesthesia providers. A standardized survey may keep leaders and managers in Navy anesthesia abreast of any variations or differences that

may exist among civilian and military anesthesia practice. Information from the survey may allow leaders in Navy anesthesia departments to identify variations of anesthesia management characteristics and practices patterns between the various naval hospitals providing anesthesia services.

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APPENDICES

Appendix A

Anesthesia Care Delivery Questionnaire

Appendix B

Anesthesia Care Delivery Questionnaire Cover Sheet

Appendix C

Circle of Care Diagram

Appendix D

Factors Affecting Labor Productivity Diagram

Appendix E

Figures 10 through 26

Appendix F

Tables 2 through 18

Appendix G

Institutional Review Board Approval Forms