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Contemplating a New Model for Air Force Aerospace Medical Technician Skills Sustainment Training

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CONTEMPLATING A NEW MODEL FOR AIR FORCE AEROSPACE MEDICAL TECHNIICAN SKILLS SUSTAINMENT TRAINING

THESIS

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Abstract

Two decades ago, Aerospace Medical Technicians received robust skills sustainment training through exposure to multi-faceted patient treatment environments. Available training environments included inpatient care, outpatient care, and emergency services. This diverse training environment made possible through large operating budgets and an extraordinary infrastructure could not last.

Today (after five separate base closure and realignment initiatives), medical funding and infrastructure is but a shadow of what it once was. Budget constraints and the rising cost of healthcare have necessitated a purposeful movement away from inpatient and emergency care, toward outpatient and preventative medicine.

Although changes in Air Force health care delivery may be necessary, the closure of inpatient units and emergency service departments around the Air Force has significantly impacted the Air Force's ability to train medical professionals and paraprofessionals for operations in a deployed setting, especially in the area of medical skills sustainment training. This research attempts to provide an alternate model for aerospace medical skills sustainment training that will assist students and trainers in overcoming the training limitations realized in a training environment plagued by budgetary constraints and the near complete loss of inpatient and emergency services.

Dedicated to my wife a source of comfort and strength and to my sons who constantly reaffirm that life is a joyous experience.

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CONTEMPLATING A NEW MODEL FOR AIR FORCE AEROSPACE MEDICAL TECHNICIAN SKILLS SUSTAINMENT TRAINING

I. Introduction

Background:

Aerospace Medical Technicians have diligently performed their role in ensuring the highest degree of combat readiness for the United States since the early days of the Army Air Corps. For nearly sixty years, they have provided quality health care for present and former members of the profession of arms and for their families. Today, these dedicated professionals continue to provide exceptional care both in the field and in the medical treatment facility. Through selfless devotion to duty, Aerospace Medical Technicians serve as highly skilled and valuable assets to combatant commanders and their tenant units.

While a number of capabilities and qualities have contributed to the success of Air Force Medics over the years, perhaps the greatest quality attributed to these altruistic professionals is their remarkable versatility. The typical Aerospace Medical Technician effortlessly transitions between work assignments: extensive training enables him or her to perform duties within the medical treatment facility (MTF) or in a pre-hospital environment.

While performing in the MTF, the medical technician is often called upon to assist in a number of various work centers. Thus, the technician must assimilate and store the knowledge required to perform countless duties and critical tasks associated with providing exceptional medical care in any number of outpatient clinics or inpatient units. For the aerospace medical technician, it is not sufficient to master the tasks of one's assigned work-center. The technician must develop a basic skill set that allows him or her to be utilized in numerous locations throughout the medical treatment facility.

Additionally, Aerospace Medical technicians must complete rigorous training to gain status as a Nationally Registered Emergency Medical Technician. Emergency Medical Technician training significantly enlarges the role of the aerospace medical technician. Upon completing the training, the technician often provides emergency care and transport for the sick and injured outside of the hospital environment. This training also assists the technician in developing the core competencies necessary to perform duties in a forward or deployed environment.

Throughout the history of aerospace medical technicians, the fundamental ingredient responsible for their demonstrated versatility and proficiency has been an extensive training program. In the past, technicians experienced the luxury of receiving ongoing training that provided exposure to a number of different work centers. Most Air Force bases maintained medical centers that boasted outpatient clinics, inpatient units, and emergency services. The multifaceted nature of the typical Air Force medical treatment facility proved very beneficial to medical technicians as it afforded them opportunity to gain valuable exposure to various work environments, thereby sharpening their medical skills for potential deployments during peacetime and war.

Unfortunately, the robust training experience of the past is somewhat diminished today. While the typical medical technician still receives exceptional initial training to prepare him or her for duty in a wide variety of work environments, more often than not, his or her first duty assignment will involve a base that no longer offers inpatient care or emergency services. As a result, the technician is generally assigned to an outpatient clinic where he or she is unable to practice tasks and principles that deal with inpatient and emergency treatment.

The inability to practice inpatient and emergency treatment skills may lead to dire circumstances. Important knowledge gained through effective technical training is not reinforced, and as a result, the technician's basic skill set begins to decline shortly after completing initial technical training. In more succinct terms, the medical technician soon forgets a great deal of the curriculum taught during Phase I and Phase II technical training because he or she has little opportunity to put the knowledge gained through training into practice. Without exposure to in-patient units and the emergency medicine setting, the technician loses a valuable opportunity to experience and master a number of core tasks and critical wartime skills.

As it stands today, the majority of modern Air Force Aerospace Medical Technicians perform their duties in a clinical environment. This phenomenon makes it extremely difficult for trainers to provide required wartime related instruction for subordinates. The injuries and illnesses treated in outpatient clinics during peacetime do not adequately prepare medics for the extensive injuries typical of most battlefield scenarios.

In years past (when DOD facilities typically offered inpatient and emergency services), even medics assigned to outpatient clinics could still obtain valuable hands on training by assisting in the emergency service department or the inpatient units during periods of increased volume or high patient census. Now, unless the technician is fortunate enough to be assigned to a major medical center, he or she will have virtually no opportunity to practice inpatient or emergency care skills. As the opportunity to practice these skills continues to decline, the level of tacit knowledge maintained by Aerospace Medical Technicians continues to decrease as well. Knowledge atrophy with respect to inpatient and emergency medical care is further exacerbated each year as more and more inpatient units and emergency service departments close their doors. Most of these facilities close as a result of base closure and realignment initiatives, but others close in order to comply with a cost driven shift away from inpatient and emergency medical care toward outpatient and preventative medicine.

As more and more medical treatment facilities are realigned to exclusively perform outpatient services, inpatient and emergency medical knowledge has slowly degraded. This results in a decreased skill set for Aerospace Medical Technicians. Further, because competency has been defined as a combination of knowledge and skill, the level of competency demonstrated by technicians whose experience is limited to outpatient clinics is also somewhat diminished.

The loss of divergent competency attributed to clinically trained technicians poses a real problem for deployed medical commanders. Too often, commanders discover that assigned medics have little or no inpatient or emergency medicine experience. This being the case, technicians are unable to perform many of the inpatient and emergency medicine duties associated with an assignment to a deployed location. Thus, arriving medics must receive extensive training at the deployment site.

Unfortunately, the aforementioned disparity between peacetime and wartime competencies for the typical Aerospace Medical Technician continues to grow as seasoned technicians (those who have inpatient and emergency medicine experience) depart the service after fulfilling their commitment. When these technicians depart, they take with them a wealth of tacit knowledge that may be very difficult to recapture. After those technicians with inpatient and emergency medicine experience depart, who will provide necessary inpatient and emergency war-time skills training in an era of outpatient medicine?

Senior Air Force Medical Planners have recognized that changes realized through multiple Base Realignment and Closure (BRAC) initiatives, through extensive outsourcing programs, and through several force shaping campaigns have imposed some real limitations on the remaining medical force. Perhaps, the most notable limitations imposed by these changes manifest themselves in the training arena. Training issues and the lack of experience demonstrated by outpatient personnel represent major management issues for senior medical personnel. In fact, senior medical planners regarded these issues as important enough to warrant discussion during the Corona Leadership Conference of 2005.

Unfortunately, senior medical planners were not the only parties taking note of current training issues in the Air Force medical community. The Air Force Inspection Agency also became somewhat alarmed when they discovered several training deficiencies during Health Services Inspections conducted during 2004 and 2005. The biggest deficiencies documented by inspectors involved the inability of supervisors to develop effective master training plans that provided adequate training for 100% of the tasks performed within the various work-centers (Hanks, 2005:18). But, other problems were noted as well.

Because Aerospace Medical Technicians perform a significant role in the delivery of quality medical care, training issues relating to knowledge and competency necessitate an immediate response on the part of senior medical planners. Of course, any logical response, should commence with a formal definition of the problem.

Deriving the Study Proposition and Purpose Statement:

The problems briefly described in the narrative above have not escaped the attention of senior medical planners. Current problems affecting the training of Aerospace Medical Technicians have been identified through official Air Force channels (the Air Force Inspection Agency, senior medical planners, and trainers/supervisors in the field). However, substantial disagreement persists in describing the nature and cause of these problems. While some Health Service Inspection (HSI) inspectors attribute problems to ineffective command and supervisory involvement, a number of unit training managers suggest that problems are the direct result of poor documentation on the part of supervisors.

As an aerospace medical technician who has experienced the problem firsthand, I feel neither of these explanations fully describe the problems observed. Having served as a trainer, task certifier, and supervisor in the Aerospace Technician Career Field for over 17 years, I view these problems as being far more complex. Current aerospace medical technician training issues are not resolvable through increased supervisory and command involvement, nor will they be eradicated through improved unit documentation. While these steps may prove useful in controlling some of the symptoms associated with the aforementioned problems, they will not resolve problem specific issues. Most certainly, current aerospace medical technician training problems will require a far more comprehensive plan for resolution.

In scientific terms, the problems experienced in training aerospace medical technicians are a direct application of the law of unintended consequences. This law holds that the "actions of people—and especially of governments—always have effects that are unanticipated or unintended" (Norton, 2006:1). Base closures, outsourcing, and force shaping have resulted in substantial savings for the United States Government and the United States Air Force. However, an unanticipated consequence of base closures, outsourcing, and downsizing is manifested through our inability to provide an adequate skills sustainment training environment for medical technicians. The training methods that proved so effective only a few decades ago, have somehow lost their effectiveness. Outsourcing, base closures, force-shaping initiatives, and a concerted movement toward outpatient medicine have effectively changed the traditional aerospace medical training environment forever.

Perhaps the greatest obstacle to effective future training involves the failure of senior medics to recognize the depth and breadth of these changes. An article describing some of the problems surrounding medical training appeared in the July-August, 2005 issue of the TIG Brief Magazine. In this article, CMSgt Jody Hanks, a veteran health services inspector assigned to the Air Force Inspection Agency's Medical Operations Directorate, asserted that an effective on-the-job training (OJT) program is still possible if supervisors take the time to develop effective master training plans (MTPs) and appropriately apply the Instructional System Development (ISD) model to training initiatives. He further supported his assertion by stating, "The On-the-Job Training Program is no mystery. After all, the Air Force has not significantly changed the way we've conducted and documented On-the-Job Training in 20 years (Hanks, 2005:19)."

Chief Hanks does not stand alone in his assertion. Many senior medical planners feel that we should not be experiencing any problems with aerospace medical technician training, because we have not changed the manner in which we conduct and document enlisted medical training for a number of years. Unfortunately, everything remotely related to medical training in the Air Force has changed. That is, of course, everything except how we conduct and document training. In other words, while it is true that we have not changed the medical training model for over 20 years, everything surrounding the training model, everything the model is built upon, has changed. The training environment has changed in as much as we have witnessed a transformation in primary focus from inpatient and emergency care to outpatient care. The nature and availability of relevant training resources has changed. The number of trainers with inpatient and emergency medicine experience that is readily applicable to battlefield medicine has changed. The level of tacit knowledge available at the various medical treatment facilities has changed. The funding levels for medical skills sustainment training have changed. Everything remotely related to the model has changed.

It is because of these changes that a new training model should be developed and implemented. The days of large training budgets and in place high fidelity medical readiness training are well behind us. Additional drivers for a new model include present and future budgetary constraints, as well as advances in technology.

The notion of a new training model for Aerospace Medical Technicians has transcended the question of "Do we need to build it?" By all indications, the answer is a resounding "Yes!" Fortunately, Air Force Medical Planners are a resourceful lot, and where they must, they will find a way to ensure optimal medical readiness. The only question that remains is when will we see the new training model implemented. It is our hope, that the necessary model will be developed quickly. Having provided this brief background, the thesis now turns to an introduction of the overarching proposition addressed by this research.

Study Proposition:

While IG inspectors and some senior medical planners suggest there should be no problem conducting training in the medical environment ("because nothing has changed in our training methods over the last 20 years"), this research explores the proposition that everything encompassing the medical training environment has changed. If this is, indeed, the case, then the methodology and model employed to conduct skills sustainment training should change in order to minimize the effects of limited resources realized in a training environment plagued by right sizing and base closures. Such a model must also prove robust against a paradigm shift away from inpatient and emergency care toward preventative medicine, outpatient services, and outsourcing. Thus the fundamental question addressed by this research effort becomes: What must change with respect to the current medical skills sustainment training model if we hope to maintain optimal levels of medical readiness for Aerospace Medical Technicians?

Purpose Statement:

The purpose of this research is multi-faceted. The first objective of the study involves establishing the need for an alternate training model for Aerospace Medical Technician skills sustainment training. The second objective involves the development and introduction of an alternate training model that could potentially be implemented for medical skills sustainment training within the aerospace medical technician career field.

The efficacy of the model will not be tested as part of this study; however, such testing could be the subject of future research. In order to successfully complete these objectives, a number of research questions are suggested. The research questions will frame the remainder of the research.

Research Questions:

Research Question 1:

What is the present model used to provide Air Force Aerospace Medical Technician skills sustainment training?

Research Question 2:

Have there been recent changes to the aerospace medical skills sustainment training environment that may contribute to the success or failure of the current model?

Research Question 3:

What indicators might suggest the current model has not successfully ensured medical readiness for Aerospace Medical Technicians?

Research Question 4:

What type of training model could enhance Aerospace Medical Technician skills while satisfying contemporary budgetary constraints?

Investigative Questions:

To facilitate a deeper exploration of the research questions listed above, the following supplemental investigative questions are suggested:

Investigative Question for Research Question 1:

What is the evidence suggesting a formal model for aerospace medical technician skills sustainment training?

Investigative Question for Research Question 2:

What changes have occurred with respect to land, labor, capital, and the nature of work?

Investigative Question for Research Question 3:

What insights can be gained from Air Force Lessons Learned with respect to Aerospace Medical Technician skills sustainment training?

Investigative Question for Research Question 4:

What are some of the problem areas the new model should address?

Methodology:

The overarching framework for this research effort will be an exploratory, embedded, single case study. A mixed methods research approach will be applied in an effort to discover and understand the nature and complexity of the problems described. The referenced approach will include historical analysis of the Aerospace Medical Technician career field, content analysis of reported lessons learned, and the presentation and interpretation of survey data provided by the Air Force Occupational and Measurement Squadron at Randolph Air Force Base, Texas.

Statistical techniques will include simple descriptive methods and multiple applications of analysis of variance. The analysis of variance technique will be used to demonstrate a statistically significant difference between home-station and deployed Aerospace Medical Technician training environments with respect to the percentage of technicians performing Career Field Education and Training Plan (CFETP) specific tasks. Finally, a proportion of agreement statistic will be calculated in an attempt to validate research assertions derived from content analysis of Air Force Operations News Medical Lessons Learned.

Benefits of Research:

This research will establish the necessity for and provide a potential alternate training model for Aerospace Medical Technicians skills sustainment training. It is the hope of the researcher that the suggested training model will enable meaningful and lasting knowledge transfer for Aerospace Medical Technicians, thereby increasing existing levels of medical readiness. Further benefits of the study may be derived if the model proves applicable to other medical and non-medical career fields throughout the Department of Defense (DOD).

Thesis Overview:

This thesis is composed of five chapters. Chapter 1 provided a brief introduction and stated the problem addressed by the study. A limited background concerning the problem was presented, and the basic methodology applied to the research was discussed. Chapter 2 will provide some background information through an extensive literature review. The literature review will explore the nature of the problem in more detail while lending proof support and clarification support to the chapters that follow. In Chapter 3, the methodology used for data collection and data interpretation will be discussed in detail. Chapter 4 involves a discussion of the data derived from the application of the chosen methodology and the results of data analysis. Finally, Chapter 5 provides discussion regarding potential applications of the research, as well as future research opportunities and limitations encountered.

II. Literature Review

Initial Aerospace Medical Technician Training:

As stated in the introduction, Air Force Aerospace Medical Technicians boast a distinguished and honorable history traceable to the early days of the Army Air Corps. Review of the available literature revealed that early Army Air Corps Medics (the pre-cursors to modern aerospace medical technicians) received their training through traditional Army ground forces training schools. Upon completing their coursework, selected ground force medics were assigned to elite Army Air Corps units (Parks, 1974:213).

Overall, the number of enlisted personnel receiving medical training was quite conservative during the early years. However, the number of trainees began to increase substantially following the introduction of the Surgeon General's Protective Mobilization Plan, which was published in December of 1939. This plan effectively commenced a pre-war expansion initiative that improved the quality of medical technician training for enlisted soldiers (Hester, 1939:7).

Prior to the Protective Mobilization Plan of 1939, Army medical and surgical enlisted technicians received all of their training on the job. After the Protective Mobilization Plan was introduced, Army Air Corps medics of the pre-war expansion era received formal classroom training at one of five established training centers. These centers included the Army Medical Center, Washington, D.C., William Beaumont Hospital, El Paso Texas, Fitzsimons General Hospital, Denver, Colorado, Letterman General Hospital, San Francisco, California, and the Army and Navy Hospital, Hot Springs, Arkansas (Parks, 1974:213).

Senior medical planners soon realized that training offered through the aforementioned medical training centers provided many necessary skills, but failed to prepare Army medics adequately for the realities of war and field service. Thus, the Army established special schools to provide more tangible and realistic training for medics. These courses offered through newly added facilities emphasized pre-hospital care and field medicine.

One such school chartered to train Army Air Force medical enlisted personnel was the Army Air Force Medical Service Training School established in 1942. Later designated the 25th Army Air Force Base Unit, Robins Field, Georgia, this school was home to most of the enlisted medical technicians trained for the Army Air Forces during World War II (Crowder, 1993:1).

From the inception of the Army Air Forces, senior Air Force leaders stressed the importance of adequate training for enlisted personnel and the medical specialty was no exception. Senior Army Air Force medical personnel believed the nature and frequency of flight related injuries necessitated flight specific field medical training. Based on this belief, Army Air Force medical planners began to lobby for enhanced training for their enlisted medics. Their efforts led to the development of a special field-medicine training course (later dubbed the Army Air Forces Medical Service Training Field Course) at Robins Field. The purpose of this course was to prepare medical and surgical technicians for duty with the field units of the Army Air Forces (Nanney, 1998:9).

It is interesting to note that Air Force medical planners recognized the need for additional field training separate from the rigid academic environment experienced at the

Army Air Forces Medical Service Training School. Senior medical personnel identified the importance of combat specific training from the earliest days of the Army Air Force.

Actual battlefield commanders provided input regarding the development of the field-training course. Shortly after the development of initial enlisted medical training programs, it became apparent to combatant commanders that technicians who trained exclusively in the hospital environment did not perform very well in the field. After commanders voiced this concern to academic planners, the planners began to recognize that enlisted medics must receive additional field or combat related medical training if they were to perform adequately at forward based locations. Thus, Army Air Force medics began to receive additional training in rendering emergency care through the field-training course. Relevant subjects of instruction included wound management, medication administration, anesthesia and immunization principles, control of hemorrhage and shock, care of musculoskeletal injuries, chemical exposure treatment, casualty management procedures, and war neurosis management (Crowder, 1993:2).

After taking the time to reflect upon the many accomplishments of the first Air Force enlisted medical curriculum designers, it is somewhat surprising to discover how little the design of initial enlisted medical instruction has changed over the years. Even before the Air Force became a separate service, the medical technicians of the Army Air Forces received initial training in much the same way that our technicians receive training today. Many of the major components of our current initial training model were implemented successfully. These components included formal classroom instruction, on-the-job training at one of several training hospitals, and combat focused medical readiness training (Mosley, 1944:1).

When considering the similarities between past and present initial training for medical technicians, it appears as though the initial training development model has withstood the test of time. Indeed, the technical training program developed at the USAF School of Health Care Sciences at Sheppard Air Force Base, Texas continues to produce highly qualified and highly knowledgeable technicians. Instruction received through actual formal attendance in the Aerospace Medical Apprentice Courses at Sheppard Air Force Base satisfies the first phase (Phase 1) of initial aerospace medical technician training.

In a second phase of training (Phase 2), knowledge gained through the Phase 1 program is reinforced through hands-on immersion training at one of the various Air Force training hospitals (typically major medical centers). Phase 2 facilities expose technicians to a number of medical disciplines. Students experience inpatient medicine, outpatient medicine, and emergency medicine first hand.

Unfortunately, the same cannot be said of medical skills sustainment training. Most technicians of today are not afforded the luxury of working in a medical treatment facility that offers inpatient medicine, outpatient medicine, and emergency services. This lack of exposure to various work environments is somewhat new. Technicians from the earliest inception of the Air Force, through the early 1990s were provided opportunities to work in inpatient and emergency service departments. This provided the opportunity for technicians to enhance their knowledge and skill everyday on the job in a form of skills immersion training very similar to the Phase 2 initial training experienced by aerospace medical apprentices.

Nearly every hospital offered a multi-faceted training environment because, unlike today, most military hospitals offered both emergency medicine and inpatient medical care. Thus, there were more opportunities for previous medics to practice combat related inpatient and emergency medical treatment skills. Those were the glory days; days when Air Force medics could fall back on their extensive training from the inpatient and emergency treatment arenas to help them provide quality care during wartime and peacetime operations.

Today, however, only a handful of military hospitals offer inpatient and emergency medicine services. The provision of these services is limited to major medical centers, and only a few medics are fortunate enough to be assigned to these larger facilities. Thus, the number of Air Force medics with inpatient and emergency medicine experience is rapidly declining.

In further explanation, because there are only a few major medical centers today, there is little chance the student will be assigned to a major medical center after completing Phase 2 of initial training. Thus, years or even decades may pass before a technician is afforded the opportunity to practice the inpatient or emergency medicine skills he or she learned during initial technical training.

When considering the immense infrastructural and philosophical changes in reference to the provision of medical care within our facilities, a seminal question arises that must be addressed by senior medical planners if the Air Force is to continue providing excellent services for its patients. The question the Air Force must address is of course: How can we prevent the erosion of knowledge and skill gained through initial training once technicians are assigned to an environment that offers almost no opportunity to put acquired knowledge and skill into practice? This question is not easily answered, and it may be years before we fully understand the effects of a changing military environment on aerospace medical technician training and the resultant level of medical readiness.

Big Changes for the Armed Forces:

Since the inception of the United States Air Force as a separate service, there have been wide fluctuations in both capital assets and personnel assigned to the Department of Defense. Bases have closed and reactivated. The services have mobilized prior to and demobilized following the various wars. There have also been increases and decreases in the number of personnel authorized. However, all of these changes pale in comparison to the “right sizing” initiatives that began during the late 1980s and continue through today. Perhaps the more recent reductions in force size prove more noticeable because they followed quickly behind the Cold War expansion that marked the greatest build-up of military power in the history of the United States (Brasher, 2000:5).

The Rise Before the Fall:

Under the Reagan administration, the United States military experienced extreme growth in terms of personnel and materiel. The Reagan buildup, which took place from 1981-1987, “represented the most extensive and rapid peacetime enlargement of the armed forces in American history” (Brasher, 2000:5). While personnel numbers continued to climb through 1987, fiscal resources available to the Department of Defense were beginning to decline with 1985 representing the apex of defense spending during the post-Vietnam era. The year 1985 also represented a change in governmental fiscal logic as Congress officially recognized the need to reduce federal spending through the passage of the Balanced Budget and Emergency Deficit Control Act (Gramm-Rudman-Hollings). This act effectively sought to control government expenditures through the end of the decade (Brasher, 2000:6).

Following the passage of the Balanced Budget and Emergency Deficit Control Act, Congress and the Department of Defense began to search for alternative methods to control spending. Unfortunately, both organizations came to the realization that reducing personnel levels throughout the Department of Defense would yield the quickest and most substantial savings for the defense budget (Betts, 1995:110). In light of this finding, the Army and the Air Force began a modest downsizing effort in 1987. The Marine Corps began a similar effort in 1988, while the Navy postponed personnel reductions until 1990 (Brasher, 2000:1).

Although the draw down was rather modest and internally focused at first, a number of world events combined with mounting fiscal constraints to expedite the process. On December 7, 1988, Soviet President Mikhail Gorbachev publicly announced his intention to cut 500,000 Soviets from the armed forces by 1991 (Brasher, 2000:15). On November 9, 1989, the Berlin Wall fell, and on Mar 31, 1991, the Warsaw Pact officially dissolved (Fisher, 1999:45). These events together with Gorbachev's new policies of perestroika (economic reform) and glasnost (political reform) seemed to ensure the Soviet threat had diminished to nothing more than an interesting topic for future history and political debates.

With the added security afforded by current events, the Department of Defense proposed a 25% unilateral cut in uniformed personnel in 1990. Although Desert Storm delayed the implementation of the proposed cuts, the subject of personnel cuts resurfaced as a primary feature of the Base Force Concept in 1991 (Powell, 1995:426, 431). Both Congress and the DOD appeared convinced that work force reductions would provide a safe and effective means for reducing the defense budget. As a result, extensive labor reductions occurred during the 1990s.

The same logic that led to the draw-down of the 1990s lingers still today as evidenced by the DOD's announcement in January of 2005 of plans to cut an additional 16,600 Airmen by the end of fiscal 2005 (Grier, 2004:50). In April of 2005, the number of proposed cuts had risen to 18,000, and by May, it had swollen to just under 24,000 troops. It is important to note that the USAF is already approximately 40% smaller than it was during the Cold War. This being the case, the reductions planned for 2005 will produce a significant impact on force readiness in view of the increasing operations tempo confronting the USAF (Callander, 2004:50).

Changes in Infrastructure:

While work force reductions have significantly influenced the way the Air Force trains and operates, the loss of land and materiel associated with five rounds of base closures has also served as a significant force for change. The Base Closure and Realignment Commission process began in 1988 following the assertion by former Secretary of Defense Frank Carlucci that "the military could no longer support the excessive military infrastructure and needed the potential savings for personnel and equipment" (Schwalbe, 2003:1).

By 1988, Carlucci had witnessed a steady decline in Department of Defense appropriated funds for three straight years (Principi, 2005:311). Both Congressional and Department of Defense leaders felt that base closures were necessary in light of declining defense budgets. Many felt that maintaining the existing base structure was irresponsible when considering the declining number of military personnel and the decreasing availability of public funding (Crowe/Chanoff, 1993:328). Thus, it came as no surprise when the 1988 Base Closure and Realignment Commission's decision affected 145 military installations with 86 bases selected for closure and 7 installations selected for realignment. Congressional and Department of Defense planners projected these actions would save close to $700 million per year (U.S. House of Representatives, Feb 22, 1989:38-39).

A second Base Closure and Realignment Commission recommended the closure of 34 bases and the realignment of 48 others in 1991. This time Congressional and Department of Defense planners projected an estimated net savings of $2.3 billion from fiscal year 1992 to 1997. They also predicted a recurring savings of $1.5 billion annually for 1998 and subsequent years. The 1991 Commission's recommendations required an initial one-time investment $4.1 billion, and represented a reduction of approximately 5.4 percent of the domestic base structure. Upon receiving the Commission's report, the President accepted its recommendations. Later, the House of Representatives rejected a resolution of disapproval thereby ensuring the 1991 Base Realignment and Closure Commission recommendations would be enforced as law (Principi, 2005:313).

In 1993, a third Base Closure and Realignment Commission was formed. The 1993 Commission recommended the closure of 130 bases and targeted an additional 45 bases for realignment. These proposed cuts represented a 6.2% reduction in military infrastructure with an anticipated cost savings of $3.8 billion after five years and an additional $2.3 billion savings realized every year after that (U.S. House of

Representatives, 103rd Congress, *Defense Base Closure and Realignment Commission Report to the President*, (D.C.: Government Printing Office), p. 9.).

The 1995 Base Closure and Realignment Commission proposed the closure of 28 installations and the realignment of an additional 104 bases. Legislators anticipated an estimated cost savings of $1.6 billion per year as a result of the recommended reductions (U.S. House of Representatives, 104th Congress, *Defense Base Closure and Realignment Commission Report to the President*, (D.C.: Government Printing Office, 1995), pp. 15-16).

The 2005 Base Realignment and Closure Initiative was far more extensive than previous Base Realignment and Closure rounds with the number of recommendations in 2005 exceeding the number of recommendations in all four previous rounds combined. In 2005, the Department of Defense submitted 837 distinct closure or realignment recommendations. Of these recommendations, the Base Realignment and Closure Commission approved 22 major base closures and 33 major realignments. When taking minor closures and realignments into account, a total of 182 closures and realignments are scheduled for implementation during the years following the 2005 Base Realignment and Closure Commission (Principi, 2005: iii).

Base Closure and Realignment Impact on the Air Force:

Because the United States Air Force is a major component of the Department of Defense, it did not escape the impact wrought by five Base Closure and Realignment Commissions. In 1988, the Air Force felt the sting of the first Base Closure and Realignment proceedings as five major Air Force installations were targeted for closure. The bases effectively selected for closure were George Air Force Base, California;

Mather Air Force Base, California; Norton Air Force Base, California; Chanute Air Force Base, Illinois; and Pease Air Force Base, New Hampshire. Fortunately, the realignment process recommended by the 1988 Base Closure and Realignment Commission did not affect the Air Force (Edwards/Ribicoff, 1988: 74-79).

When the smoke had cleared from the 1991 Base Realignment and Closure proceedings, it became clear that the Air Force had suffered the greatest loss of all the military services. The commission recommended 13 major Air Force installations for closure. The unfortunate bases selected for closure this time around included: Bergstrom Air Force Base, Texas; Carswell Air Force Base, Texas; Castle Air Force Base, California; Eaker Air Force Base, Arkansas; England Air Force Base, Louisiana; Grissom Air Force Base, Indiana; Loring Air Force Base, Maine; Lowry Air Force Base, Colorado; Myrtle Beach Air Force Base, South Carolina; Richards-Gebaur Air Reserve Station, Montana; Rickenbacker Air Guard Base, Ohio; Williams Air Force Base, Arizona; and Wurtsmith Air Force Base, Michigan (Courter, 1991: 5-31—5-45).

The 1991 Commission also recommended military installations for realignment, and this time, the Air Force was not quite as fortunate. Six major Air Force installations were recommended for realignment: Beale Air Force Base, California; Goodfellow Air Force, Texas; MacDill Air Force Base, Florida; March Air Force Base, California; Mather Air Force Base, California; and Mountain Home Air Force Base, Idaho. The 1988 Base Realignment and Closure Commission had previously selected one of the Air Force bases selected for realignment by the 1991 Commission (Mather Air Force Base, California) for closure. Thus, Mather was permitted to remain open for a short while longer, but it was substantially realigned (Courter, 1991: 5-31—5-45).

The 1993 Base Realignment and Closure Commission recommended six major Air Force installations for closure. Gentile Air Force Station, Ohio; Homestead Air Force Base, Florida; K.I. Sawyer Air Force Base, Michigan; Newark Air Force Base, Ohio; O'Hare International Airport Air Reserve Station, Illinois; and Plattsburgh Air Force Base, New York all made the base closure list. Major Air Force facilities recommended for realignment included Griffiss Air Force Base, New York; Hill Air Force Base, Utah; and March Air Force Base, California (Courter, 1993: 1-71—1-83).

During the 1995 Base Closure and Realignment (BRAC) proceedings, six major Air Force installations were approved for closure. The bases recommended for closure by the 1995 BRAC included: Mc Clellan Air Force Base, California; Ontario International Airport Air Guard Station, California; Chicago O'Hare International Airport Air Reserve Station, Illinois; Roslyn Air Guard Station, New York; Bergstrom Air Reserve Base, Texas; and Reese Air Force Base, Texas all suffered the misfortune of making the base closure list. In addition to the aforementioned bases identified for closure, the 1995 Commission identified the following facilities for realignment: Onizuka Air Station, California; Eglin Air Force Base, Florida; Malmstrom Air Force Base, Montana; Grand Forks Air Force Base, North Dakota; Kelly Air Force Base, Texas; and Hill Air Force Base, Utah (Dixon, 1995: 1-83—1-113).

The 2005 Base Closure and Realignment Commission selected five major Air Force installations for closure and twelve major Air Force installations for realignment. The bases marked for closure include Kulis Air Guard Station, Alaska; Ozinuka Air Force Station, California; Brooks City Base, Texas; General Mitchell Air Reserve Station, Wisconsin; and Cannon Air Force Base, New Mexico. Installations targeted for realignment by the 2005 Commission included: Eielson AFB, Alaska; Elmendorf AFB, Alaska; Mountain Home

AFB, Idaho; Pope AFB, North Carolina; Grand Forks AFB, North Dakota; Lackland AFB, Texas; Sheppard AFB, Texas; McChord Air Force Base, Washington; Otis Air National Guard Base, Maine; W.K. Kellogg Airport Guard Station, Michigan; Niagara Falls International Airport Air Guard Station, New York; and Pittsburg International Airport Air Reserve Station, Pennsylvania (Principi, 2005: vi-vii).

Impact on Aerospace Medical Technician Training:

The loss of medical treatment facilities is perhaps the most discernable effect experienced by the Air Force Medical Service following a major base closure, or in some cases a major realignment. Many of the bases selected for closure operated fully staffed hospitals. These facilities typically offered inpatient, outpatient, emergency, and in some cases surgical services. When these hospitals closed in conjunction with base closures, the Air Force lost important training grounds for future medical technicians, nurses, and physicians. Unfortunately, the loss of capital assets only partially begins to describe the effects of base closures (De Lorenzo, 2005: 825).

Another notable impact to technician training was realized through the loss of experienced civilian personnel. Many hospitals throughout the Air Force have employed civilian nurses and medical technicians in order to maintain a minimum level of proficiency and experience. The civil servants employed by various medical treatment facilities enabled meaningful knowledge transfer from highly experienced and highly knowledgeable mentors to their less experienced military protégés. Because the civilian workers were usually more experienced than their young military counterparts, they made excellent trainers. Unfortunately, many of the civil servants employed in Air Force medical treatment facilities were forced to find work outside the Air Force following the implementation of Base Closure and Realignment initiatives.

A Paradigm Shift from Inpatient to Outpatient Medicine:

Members of the 1991 Base Closure and Realignment Commission insisted that the Department of Defense should confer with Congress to develop a plan outlining the provision of health care to beneficiaries impacted by base closures (Courter, 1993: 2-4). The 1991 Commission further mandated that the Department of Defense present a report to Congress referencing Department of Defense and Congressional findings concerning current health care policies within the Armed Services prior to the commencement of the 1993 Base Closure and Realignment Commission. Many felt that the Department of Defense failed to meet this requirement (Courter, 1993: 2-4).

Later, in 1993, the Department of Defense National Defense Authorization Act was published. Section 722 of this Act required the Department of Defense to report on alternative means to provide accessible health care in areas affected by base closures or realignments (Courter, 1993:2-4). With the passage of this Act, Congress validated the possibility that closing medical facilities may negatively impact the provision of quality medical care to beneficiaries within the Department of Defense. Beneficiaries were hopeful in the wake of this validation, with some even believing that previously lost facilities would be reinstated.

The hopes of beneficiaries were soon dashed, however, during a brief deposition by the Deputy Assistant Secretary of Defense for Health Affairs when he testified before the 1993 Base Closure and Realignment Commission. During his deposition, the Assistant Secretary testified that military hospitals were operating at only one-half of normal in-patient loads. He further proposed that the Armed Forces medical system possessed sufficient capacity to meet any readiness requirement as defined in Department of Defense Planning Guidance (Courter, 1993: 2-4)." Members of the 1993 Base Closure and Realignment Commission were somewhat taken aback by this revelation. They responded in turn by suggesting that if medical treatment facilities were really operating this far below capacity, the Department of Defense had both the "opportunity and responsibility to improve health care operations and cost effectiveness (Courter, 1993: 2-4)."

In an effort to demonstrate their commitment to improved operations and health care costs, the 1993 Commission provided guidance regarding future Department of Defense improvement initiatives. In doing so, Committee members suggested that future medical consolidation and cost reduction initiatives should focus on five major areas: (1) Examining the consolidation of resources and specified geographic areas or regions across military departments, (2) Closing medical treatment facilities operating at less than cost-effective levels when considering the patient load and the cost of medical care in the catchment area, (3) Moving assets across Military Departments and into other Service facilities as necessary to increase the capability and usage of existing facilities and operating beds, (4) Creating health care programs that operate on a competitive cost basis to support all beneficiaries, (5) Upgrading substandard facilities that are still required (Courter, 1993: 2-4). The Commission also recommended the Department of Defense should consider using civilian sector resources whenever doing so proved cost effective.

Because the 1993 Commission focused so much attention on future medical consolidation and restructuring, the Department of Defense created the Medical Joint Cross-Service Group to assist 1995 Commissioners in ensuring the medical related suggestions of the 1993 Base Closure and Realignment Commission would actually be implemented during the 1995 Base Closure and Realignment process. Further, the 1995

Commission hoped that the Medical Joint Cross-Service Group would present additional recommendations that "actively pursued military medical consolidation and restructuring" (Dixon, 1995: 3-2).

When the Joint Cross Service Group presented its list of suggested actions to the 1995 Base Closure and Realignment Commission, members of the Commission recognized the Group's suggestions offered "a good first step towards restructuring the military medical system (Dixon, 1995: 3-2)." However, most of the Group's suggestions were not presented as closure or realignment recommendations. In an effort to partially compensate for this oversight, officials from the Office of the Secretary of Defense assured the 1995 Commission they would pursue some of the 1995 Medical Joint Cross-Service Group's suggestions outside of Base Closure and Realignment channels (Dixon, 1995: 3-3). The Commission also received assurances from senior Department of Defense officials and independent service branch representatives that they would work together to earnestly pursue further consolidation and integration of military medical facilities. Service branch representatives worked hard to convince Commissioners they would implement future restructuring activities across service lines. The 1995 Defense Base Closure and Realignment Commission was encouraged by the level of intra-service cooperation demonstrated by the service branches, and reiterated that the service branches should continue to work together in this important effort (Dixon, 1995: 3-2).

While Commissioners from the 1995 Commission were pleased to see progress with respect to restructuring the provision of medical care, they were careful to point out that observed progress was minimal. Commissioners advocated much deeper reductions in direct care capacity across the Department of Defense, and for the first time

Commissioners suggested the bulk of these reductions should occur in the inpatient care arena (Dixon, 1995: 3-3). The Commission was convinced that reductions in inpatient care capacity would save money and improve the efficiency of the military medical system.

The Department of Defense began to recognize that increasing budget constraints would prevent the continued operation of its numerous military medical treatment facilities even before the 1995 Commission convened. One of the major concerns for Department of Defense planners involved the continued medical readiness for assigned personnel. Comments found in the preliminary draft of the Department of Defense Medical Readiness Strategic Plan emphasized Department of Defense frustrations regarding the lack of focus on medical readiness sustainment training. For example, the author's of the plan stated, "In retrospect, the focus during peacetime emphasized healthcare delivery…often at the expense of medical readiness (Anonymous, 1994: 37)."

About the same time the 1995 Base Closure and Realignment Commission presented its final report to the President (July, 1995), the Congressional Budget Office released a substantial report entitled, *Restructuring Military Health Care*. This report indicated that the Department of Defense Medical Budget was growing at an alarming rate. Specifically, the report indicated that the Department of Defense medical budget increased by over 65% during the period spanning 1979 and 1995 (Davidson, 1995: xii). Further, the report suggested the Department of Defense could not justify retaining the current military health delivery system unless two major conditions were met. The first of these conditions mandated "the provision of peacetime care must contribute to the Department of Defense's ability to perform its wartime mission (Davidson, 1995: 4)."

The second condition required that "the Department should be able to provide peace-time healthcare cost effectively" (Davidson, 1995: 4).

In order to demonstrate inherent inefficiencies with respect to the Department of Defense's attempt to use peacetime care to ensure wartime readiness, the Congressional Budget Office conducted a study of over 1,000,000 medical records. The study demonstrated a disconnect between peacetime medical operations and wartime medical operations. In conducting the study, the Congressional Budget Office compared specific medical conditions observed during peacetime operations at military medical treatment facilities to a list of typical medical conditions expected to occur during wartime. The list of expected wartime medical conditions used for the study was developed by the Naval Health Research Center. Not surprisingly, the study revealed some major differences between peacetime and wartime diagnoses (Davidson, 1995: 6-8).

For the purpose of the study, the wartime medical conditions were divided into two major categories: disease and non-battle injuries were placed in the first category, while wounded in action diagnoses were placed in the second group. There was a 75% correlation between the first category and conditions treated at military medical centers during peacetime (Davidson, 1995: 7). Sadly, there was only a 5% correlation between the second category and peacetime military medical care (Davidson, 1995: 8).

While the Congressional Budget Office study did reveal disparity between primary diagnoses rendered during peacetime and war, it failed to consider similarities in treatment measures for different diagnoses. For example, although a traumatic amputation and viral syndrome are worlds apart in terms of diagnoses, both conditions potentially require fluid replacement therapy, thereby presenting medical personnel with the opportunity to practice intravenous catheter insertion techniques and the preparation of intravenous infusion equipment.

The failure of the 1995 Congressional Budget Office study to recognize training opportunities inherent to multiple diagnoses was a tragic oversight. The study was not refuted, and it was often cited as partial justification for the closure or realignment of medical treatment facilities across the Department of Defense.

While the Congressional Budget Office study seemed to advocate the closure and realignment of military medical facilities, as well as increased dependence on civilian programs, the report seemed to contradict itself by voicing concerns regarding the impact proposed reductions would have on medical training throughout the Department of Defense. On one hand, the report suggested that peacetime medical operations throughout the Department of Defense were not sufficient to maintain adequate medical readiness. On the other hand the report stated, "Any reduction in the size of the military establishment would have a major impact on training and preparation for wartime" (Davidson, 1995: 2).

In an environment of increasing budget constraints, the 2005 Base Closure and Realignment Commission seemed more determined than ever to reduce existing military infrastructure. The Commission's commitment to cut costs wherever possible placed additional pressure on the 2005 Medical Joint Cross Service Group. Thus, the 2005 Medical Joint Cross Service Group worked diligently to identify areas for realignment or closure within the Department of Defense's medical community. The 2005 Group also embodied the modern concept of "jointness" by suggesting numerous mergers and realignments across service branch lines (Taylor, 2005).

While the 2005 Medical Joint Cross Service Group ("Group" hereafter) proved highly committed to reducing operating budgets and infrastructure throughout the Department of Defense's medical treatment facilities, the Group also voiced concern regarding the impact of closures and realignment on medical training. The Group hoped to avoid the closure of facilities that offered unique capabilities as evidenced by their statement: "Closure of any activity that provides a unique capability in support of a particular element of the medical/dental education and training mission, or that provides unique capabilities in support of that mission, will have an immediate impact on the ability of the Department of Defense to continue to meet the full spectrum of mission requirements (Taylor, 2005: 7). Further, the Group warned of the potential consequences related to closing or realigning any medical activities without prior planning, stating: "Closures of activities that are not unique in their missions or capabilities may reduce the Department of Defense's capacity to train personnel without careful prior planning and realignment (Taylor, 2005: 7)."

The recommendations of the 2005 Group were much more substantial than the recommendations of the 1995 Group. The recommendations of the 2005 Medical Joint Cross Service Group included: the closure of 9 inpatient functions, the conversion of multiple hospitals to outpatient clinics, and the consolidation of medical training platforms across the services. Even the Air Force's premier hospital, Wilford Hall Medical Center, was not spared from the Group's recommendations. The 2005 Group suggested the former 1500 inpatient bed facility should be converted into an ambulatory (outpatient) care center (Taylor, 2005: 31-32).

The recommendations of 2005 Medical Joint Cross Service Group will undoubtedly result in the closure of additional Emergency Service Departments and Inpatient Units across the United States Air Force. With the closure of these facilities, even fewer technicians will experience the opportunity to gain valuable knowledge only offered through hands-on experience in the inpatient and emergency service arenas. As recently as 9 May 2005, the 2005 Group sealed the fate of additional inpatient units and emergency service departments across the Air Force through closure and realignment initiatives. The recommendations of the Medical Joint-Cross Service Group were included in the 2005 Base Realignment and Closure Report presented to the Secretary of Defense.

When considered in sum, past and present closure and realignment initiatives effected by the various Base Closure and Realignment Commissions have significantly impacted all facets of Department of Defense medical skills sustainment training. Unfortunately, the effects of significantly reducing personnel exposure to inpatient and emergency medicine will be felt for some time to come. While all medical personnel will experience consequences resultant to closure and realignment initiatives, it is, perhaps, the enlisted force that will suffer the greatest loss. Because commissioned medical officers typically possess certifications and licensures recognized by civilian institutions, they are able to receive training through civilian training programs. This proves problematic for enlisted medical personnel, however, as they typically possess skill sets for which there is no civilian equivalent. For example, as an enlisted medic, I have been trained and certified in advanced suture techniques, medication administration, fluid replacement therapy, and hemodynamic monitoring, but liability issues related to licensure would prevent me from practicing these skills in many civilian institutions.

The 2005 Medical Joint Cross Service Group hopes to regain lost training opportunities for enlisted medics by establishing a single "Enlisted Medical Training Center of Excellence" for enlisted medical personnel at Fort Sam Houston, Texas. The center will provide basic and advanced medical training for all enlisted medical career fields in all service departments. The only exceptions will be enlisted courses offered at the USAF School of Aerospace Medicine. Aerospace Medicine technicians will attend courses offered through this school at Wright-Patterson Air Force Base, Ohio (Taylor, 2005: 26).

These large facilities will undoubtedly provide an exceptional initial training environment for enlisted personnel, however, at present, the Enlisted Medical Training Centers of Excellence are not targeted for the provision of skills sustainment training. Even if enlisted technicians could return to these centers for skills sustainment training, any attempt to ensure the continued medical readiness of the entire enlisted medical force through the "Centers of Excellence" would probably be cost prohibitive in terms of travel pay, per diem, and time lost at work.

In consideration of continued changes within the enlisted medical community, it is imperative that the Department of Defense and its associated medical communities seek out new training methods capable of improving current levels of medical readiness. Alternative training techniques must be developed and implemented if the Air Force medical service hopes to ensure the continued medical readiness of its aerospace medical technicians. This will prove rather difficult, however, as future efforts training initiatives must overcome limitations in the present training environment and restrictions resultant to increasing budgetary constraints.

Chapter Summary:

This chapter began with a brief history of Aerospace Medical Technician Training. Next, the chapter described personnel and infrastructural changes within the Air Force. Then, the chapter discussed the impact of the base closure and realignment process on the Air Force, the medical service, and aerospace medical technician training. Finally, the chapter explored the Air Force paradigm shift from inpatient and emergency medicine to outpatient and preventative medicine. The thesis now progresses to Chapter 3 to describe the methodology used to complete the research effort in detail.

III. Methodology

Chapter Overview:

This chapter provides an in-depth explanation of the research methods used to explore the present and future state of Aerospace Medical Technician sustainment training during an era of rapid change. More specifically, the chapter explains qualitative and quantitative data collection methods engaged by the study and provides a review of qualitative and quantitative data analysis techniques used to derive answers to the research questions proposed in Chapter 1.

Exploring Approaches to Research:

As noted during the literature review, many of the changes observed in the Aerospace Medical Technician training environment resulted from numerous base closure and realignment initiatives. Because the base closure and realignment issue and the state of Aerospace Medical Technician readiness are issues of significant scope, multiple research methods were engaged in an attempt to facilitate improved understanding of the problem under study. The individual research methods applied include: historical analysis, case study research, and statistical interpretation of survey data. This being the case, the thesis utilized both qualitative and quantitative research techniques, resulting in a mixed methods approach to research.

While multiple research methods were used, the objectives of this research seemed to suggest a revelatory, embedded single case approach for the overarching methodology. The case study methodology was selected in part because this thesis effort is based on research questions formulated to develop a deeper understanding of a particular phenomenon as suggested by Leedy and Ormrod (Leedy, et al, 2001: 100). The revelatory, single case design was selected because the researcher "has access to a situation previously inaccessible to scientific observation" as suggested by Yin (Yin, 2003: 42). The following paragraphs will provide additional insight regarding the research framework constructed for this research effort.

A Brief Review of Available Research Frameworks:

Typically, research is considered to be quantitative or qualitative in nature. However, more recently, a number of studies have combined qualitative and quantitative techniques to form a "mixed methods" approach (Creswell, 2003: 208). Because this research effort has opted to employ a mixed methods framework, a brief review of each research methodology is provided.

Quantitative Research:

Quantitative research is typically used to answer questions like: How much? How many? How often? The results of quantitative research are usually presented as numbers, percentages, or rates (Bouma, 2000: 19). Additionally, quantitative research is generally used when the researcher desires to explore the relationship observed between measured variables in an attempt to explain, predict, or control phenomena. However, quantitative research is also often used to prove or disprove a hypothesis (or hypotheses) generated through current or previous research (Leedy, et al, 2001: 100-103).

Qualitative Research:

Qualitative research is somewhat different in that it attempts to answer questions regarding the complexity of research worthy phenomena by leveraging the researcher's point of view as a tool to facilitate deeper comprehension concerning the phenomena under study (Schwab, 2005: 7). Qualitative research attempts to answer questions like: "What is it like to be a member of that group?" "What is going on in this situation?" "What is it like to experience that phenomenon?" Thus, qualitative research is typically expressed through images, feelings, and impressions (Bouma, 2000: 20). The qualitative research approach attempts to describe the "qualities of the events under study (Bouma, 2000: 20)."

Another distinguishing factor of qualitative research is observed in that qualitative research often generates new hypotheses or tentative answers to research problems. It is often said that qualitative research can be used to build new theory. However, qualitative researchers also use procedures derived from the humanities and social sciences to better understand and describe current or historical events (Leedy, et al, 2001) (Schwab, 2005: 7). Typically, qualitative research proves most beneficial when attempting to study complex problems within their natural setting (Leedy, et al, 2001).

The Mixed Methods Approach to Research:

The mixed methods approach to research provides a means for collecting and analyzing both quantitative and qualitative data in a single study or in a series of studies. This modern approach to research is typically based on the priority and sequence of information (Creswell, 2003: 208). While the mixed method approach combines both qualitative and quantitative data collection techniques, it also allows for quantitative and qualitative interpretation of results (Creswell, 2003: 208). According to Cresswell, 2003, a mixed method approach to research generally bases knowledge claims on pragmatic grounds.

In further explanation, Creswell suggests that the mixed methods approach to research tends to be consequence oriented, problem centered, and pluralistic (Creswell, 2003: 18). Additionally, because mixed methods research is viewed as a more pragmatic approach to research, this style of research may address needs and results in lieu of cause and effects (Berube, 2001: 867). Because the problem under investigation addresses the need for a new training model, the mixed methods approach appears to be the logical choice for the current research effort.

Choosing the Appropriate Research Framework:

In attempting to select an appropriate research methodology, Leedy and Ormrod's "rationale for selecting an appropriate research methodology" was applied as described in the table below. The Leedy and Ormrod rationale is based on five general questions (Table 1) developed to assist the researcher in determining whether a qualitative or quantitative research approach should be implemented (Leedy et. al, 2001). An in-depth explanation of these questions follows the table. See Table 1 for additional information.

Table 1: Rationale for Selecting the Appropriate Research Methodology:

Question:	*Quantitative:*	*Qualitative:*
What is the purpose of the research?	• To explain and predict • To confirm and validate • To test theory	• To describe and explain • To explore and interpret • To build theory
What is the nature of the research process?	• Focused • Known variables • Established guidelines • Static design • Context-free • Detached view	• Holistic • Unknown variables • Flexible guidelines • Emergent design • Context-bound • Personal view
What are the methods of data collection?	• Representative, large sample • Standardized instruments	• Informative, small sample • Observations, interviews
What is the form of reasoning used in analysis?	• Deductive analysis	• Inductive analysis
How are findings communicated?	• Numbers • Statistics, aggregated data • Formal voice, scientific style	• Words • Narratives, individual quotes • Personal voice, literary style

(adapted from Leedy and Ormrod, 2001)

Question 1: What is the purpose of the research?

To facilitate appropriate research methodology selection, the first question posed by Leedy and Ormrod references the purpose of the research. The question of purpose proves to be somewhat ambiguous as it is not generally as facile as one might hope. Thus, the question of purpose is more easily answered when it is divided into its minor sub-questions. These sub-questions include:

1. Is the research intended to explain and predict or to describe and explain?
2. Is the research intended to confirm and validate or to explore and interpret?
3. Does the research attempt to test theory or to build theory?

While, quantitative researchers attempt to explain observations or predict future events by testing existing or proposed theory, the qualitative researcher resolves to build theory through exploration and interpretation of available data. This research attempts to explore a complex problem in its natural setting through a somewhat ethnographically focused analysis of historical events that have substantially changed the Aerospace Medicine training environment and Aerospace Medical Technician skills sustainment training. Further, because this research attempts to propose an alternative model for training, the study can reasonably be interpreted as an attempt to build theory. Finally, the research questions proposed in Chapter 1 were exploratory questions posed in an effort to interpret events that impacted Aerospace Medical Technician training. Each of these observations suggests the current study lends itself to a qualitative approach.

Question 2: What is the nature of the research process?

Leedy and Ormrod's second question addresses the nature of the research process. This question also contains a number of sub-questions, such as:

1. Is the research focused or holistic?
2. Are the research variables known or unknown?
3. Are research guidelines established and rigid, or are they flexible?
4. Is the research design static or emergent?
5. Is the research process context free or context bound?
6. Does the research process employ a detached view or a personal view?

Because this research effort attempts to address events from beginning to end during a specific historical era, it must be considered holistic in nature. The research variables were not known prior to the research, and the research design was emergent in nature. Further, the research process is somewhat context bound as this research applies specifically to a single enlisted career field within the United States Air Force. Again, the answers to these questions overwhelmingly suggested a qualitative approach.

Further, it was pointed out by Leedy and Ormrod that the most important criteria in this group of sub-questions concerned the *detached* versus *personal view* perspective (Leedy and Ormrod, 2001). Because this research involves subjective interpretation of qualitative and quantitative data, the personal view was preeminent over a detached view, again suggesting a qualitative research design.

Question 3: What are the methods of data Collection?

The third question posed by Leedy and Ormrod concerns data collection methods. While quantitative studies typically examine large representative samples of the relevant population, qualitative studies generally examine informative, smaller samples. Further, quantitative studies usually involve formal standardized instruments, while qualitative studies tend to rely upon observations and interviews with the researcher sometimes referred to as the research instrument (Leedy and Ormrod, 2001).

Since the survey portion of this research was administered to the entire population of Air Force Aerospace Medical Technicians (Griffin-Hamilton, 2005), the sample size was rather large with over 5,000 technicians taking part in the survey. According to Leedy and Ormrod, such a large sample size seems to suggest a quantitative approach for this portion of the study.

Additional support suggesting the survey portion of the study is quantitative in nature is observed in the fact that a standardized instrument developed by the Air Force Occupational Measurement Squadron was administered to collect survey data (Griffin-Hamilton, 2005). It should be noted, however, that survey participants in this study represented an embedded unit of analysis. Thus, while the survey data collected and statistical tests performed are representative components of quantitative techniques, they will be presented as support for a single-case (Yin, 2001: 91).

Question 4: What is the form of reasoning used in analysis?

The fourth question considered focuses on the form of reasoning or logic used in conducting the research. Unlike Leedy and Ormrod's former questions, this question contained no sub-questions, and it provided only two alternatives to choose from, deductive analysis and inductive analysis. In order to facilitate an informed decision regarding which type of reasoning will be applied for this study, both forms of reasoning were addressed independently.

In formal deductive reasoning "a conclusion follows necessarily from a stated premise (Berube, 2001: 295)." This involves an inference made by "reasoning from the general to the specific (Berube, 2001: 295)." Deductive reasoning is usually observed in quantitative research. This makes sense because quantitative studies typically commence from general theories or hypotheses to specific conclusions based on logic supported by quantitative data analysis techniques.

Inductive reasoning involves drawing general inferences, conclusions, or principles from specific instances or facts (reasoning from specific to general). With inductive reasoning, the conclusions reached are probable, reasonable, plausible, and believable because the truth of the premises makes likely the truth of conclusion. Thus, a limitation of inductive reasoning is recognized in that while the conclusion is probable, it may also be fallible (Hardegree, 1999: 5).

Inductive reasoning is typically observed in qualitative studies. In performing a qualitative study, the researcher makes specific observations while collecting data. The researcher then uses these observations to formulate a general inference through inductive reasoning techniques (Berube, 2001: 565).

After reviewing the dichotomous forms of reasoning presented by Leedy and Ormrod, it becomes apparent that the reasoning framework for this study suggests a qualitative approach. In performing the study, specific facts and observations will be used to demonstrate the general need for a new Aerospace Medical Technician skills sustainment training model. Hence, the logic applied to the research is inductive in nature, because it progresses from specific premises to a general conclusion. Therefore, the reasoning employed for this research effort must be viewed as qualitative.

Question 5: How are findings communicated?

Leedy and Ormrod's final question explores how the researcher will communicate his or her research results. Because this research effort incorporates narratives and individual quotes as well as statistics and aggregated survey data, both qualitative and quantitative communication techniques are key features of the communication process engaged for the study (Leedy and Ormrod, 2001). Thus, elements of the study that deal with communicating results to the audience suggest a mixed methods approach.

The Overarching Framework:

Through answering the five questions that shape Leedy and Ormrod's rationale for choosing an appropriate research methodology, it becomes apparent that a mixed methods research approach is most suitable for this thesis effort. The decision to include both qualitative an quantitative methods of data collection and data analysis is well supported in the literature. Yin (2003: 93) and Leedy et al (2001) suggest that research studies are enhanced through the convergence of qualitative and quantitative research practices. However, because most of the research framing questions posed by Leedy and Ormrod led to qualitative responses, the overarching framework for the research is qualitative in nature. Thus, the final framework for the research is determined to be qualitative with quantitative support.

Yin (2003) discussed exemplary single-case studies that were strengthened by quantitative survey data and quantitative statistical tests (Yin, 2003: 91). Thus, the decision to employ a mixed methods approach in support of a qualitative research framework was reached in good conscience through the application of established means.

Summary of Leedy and Ormrod's Rationale for Research Methodology Selection:

1. Purpose of the research: Qualitative
2. Nature of the research project: Qualitative
3. Data Collection Methods: Qualitative and Quantitative
4. Form of Reasoning: Qualitative (Inductive Analysis)
5. Communication Methods for Results: Qualitative and Quantitative

Research Design:

After determining that an overarching qualitative framework was sufficient for the current study, additional elements of research design were considered. Elliot (2005), Cresswell (2003), Neuendorf (2002), Bouma (2000), and Glaser (1994) proposed a number of qualitative research designs. The major designs described by these researchers included: grounded theory, narrative research, phenomenological research, ethnographies, content analysis, and case study. Because each of these designs can stand alone as an individual research strategy, a brief review of each methodology is warranted.

Grounded Theory:

Grounded theory is a nascent but growing research design focused toward theory building (Glaser, 92; Dick, 2002). The grounded theory approach to research is quite unconventional because, unlike other research designs, it doesn't begin with constructs. The grounded theory research design begins with a situation (Glaser, 92). Further, grounded theory research is explicitly emergent in nature and does not involve hypothesis testing. It is uniquely suited for building theory, focusing on the creation of a theory that will actually account for the research situation as it exists. The chief objective of grounded theory as stated by Glaser is to “discover the theory implicit in the data” (Glaser, 1994: 2).

While the current research effort begins with a situation, and involves theory building, other critical components of the grounded theory approach were not used for this research. For example, Cresswell (2003) suggested the two primary characteristics of the grounded theory approach were “the constant comparison of data with emerging categories and theoretical sampling of different groups to maximize the similarities and the differences of information. (Cresswell, 2003: 14).” Because this research only involved a single sampling, of a single group, the grounded theory research design was not appropriate.

Narrative Research*:*

Hinchman and Hinchman (1997) defined narratives as “discourses with a clear sequential order that connects events in a meaningful way for a definite audience and thus offer insights about the world and/or people’s experience of it” (Hinchman and Hinchman, 1997: xvi). Elliot (2005) stressed three key features of narrative research: (1.) A temporal or chronological dimension is used to describe a series of events or experiences rather than an existing state of affairs. (2.) The meaning of events or experiences is communicated through evaluative statements and the temporal configuration of events. (3.) The narrative must demonstrate an important social dimension (Elliot, 2005: 15). Cresswell (2003) added that narrative researchers typically ask one or more individuals to provide stories about their lives or the series of events being studied (Cresswell, 2003: 15). Because this research attempts to explore an existing state of affairs and there is no application of storytelling, narrative research was not appropriate for the current study.

Phenomenological Research:

Phenomenological research involves a researcher's attempt to capture the "essence" of human experiences concerning a phenomenon through descriptions provided by research participants. Bouma (2000) added that phenomenological research "focuses on the ways in which social actors make situations meaningful (Bouma, 2000: 180). Generally, phenomenological research involves a small sample and requires prolonged and extensive observation. Observation is typically directed toward developing patterns and relationships of meaning (Creswell, 2003: 15). Because the current research does not involve prolonged observation and social actors will not be emphasized, the phenomenological research model was inappropriate for this study.

Ethnography:

Bouma (2000) described ethnography as a longitudinal study that attempts to describe the "way of life" of a group, culture, or subculture (Bouma, 2000: 180). Similar to phenomenological research, ethnographic research requires prolonged observation and it focuses on determining the meaning of social action and social organization. This form of research may also include the description of basic structures observed in the group or society being studied (Bouma, 2000: 180). While Aerospace Medical Technicians taken together as a group meet the criteria for consideration as a unique subculture, specific elements of data collection and data analysis were not longitudinal in nature. Therefore, the ethnographic research framework is not entirely appropriate for the current study.

Content Analysis:

In performing a content analysis, the researcher develops a measuring instrument or checklist and basically counts how frequently ideas, words, phrases, images, or scenes appear (Bouma, 2000: 80). Bouma (2000) simply defined content analysis as "a different way to examine records, documents or publications (Bouma, 2000: 80). Neuendorf (2002) provided a more robust definition, suggesting content analysis is "the systematic, objective, quantitative analysis of message characteristics" (Neuendorf, 2002: 1). Further, Neuendorf seemed adamant in her assertion that content analysis is inherently quantitative.

Mayring (2000) suggested qualitative content analysis must be regarded as a feasible and valid research methodology. He defines qualitative content analysis as "an approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytical rules and step-by-step models, without rash quantification (Mayring, 2000: 2). Patton (2002) also indicated that content analysis should be considered qualitative in nature when he asserted "the ideal-typical qualitative strategy is made up of three parts: (1) qualitative data, (2) a holistic-inductive design of naturalistic inquiry, and (3) content or case analysis" (Patton, 2002: 248).

While some controversy exists regarding whether content analysis should be considered qualitative or quantitative in nature, for the purpose of this study, content analysis is viewed as a qualitative technique, because it is applied to qualitative data. Thus, while the results of the analysis are quantitative in nature, the "Medical Lessons Learned" from which the results were derived are incontrovertibly qualitative in nature. In essence, while quantitative counts are tallied, these counts are representative of instances of qualitative data. For these reasons, the content analysis performed is considered qualitative in nature. Furthermore, content analysis does not serve as the primary research design. It merely serves to provide proof and clarification support for the qualitative, revelatory, embedded, single case design used for this thesis effort.

Case Study Research:

The case study is perhaps one of the most popular qualitative research designs, and it seems well-suited for the current research effort (Cresswell, 2003: 15). Case studies tend to focus on the "individual(s), program(s), or event(s) on which the investigation is focused" (Leedy and Ormrod, 2001: 149). Further, Yin suggests that case studies represent "empirical inquiries that investigate contemporary phenomena within their real life context, especially when the boundaries between the phenomenon and the context are not clearly evident (Yin, 2003: 13). Because this research attempts to investigate the current state of Aerospace Medical Technician skills sustainment training, the case study methodology seems entirely appropriate.

Rationale for Choosing Case Study Research:

In addition to Yin's comments above, Voss, Tsikriktsis, and Frohlich, (2002) described three additional strengths inherent to case study research. These strengths included:

(1) The phenomenon can be studied in its natural setting and meaningful, relevant theory generated from the understanding gained through observing actual practice.

(2) The case method allows the questions of why, what and how, to be answered with a relatively full understanding of the nature and complexity of the complete phenomenon.

(3) The case method lends itself to early, exploratory investigations where the variables are still unknown and the phenomenon not at all understood. (Voss, Tsikriktis, and Frohlich, 2002: 197)

The first strength offered by Voss, Tsikriktis, and Frohlick is desirable for the current study as it involves an attempt to understand the nature of Aerospace Medical Technician skills sustainment training as currently provided in the real world. The second strength is desirable because this thesis poses exploratory questions to facilitate a deeper understanding regarding past and present events that work together to shape Aerospace Medical Technician skills sustainment training. The third strength is also necessary as the variables affecting Aerospace Medical Technician training are still somewhat unknown and declining levels of medical readiness are not fully understood. This final point is also in agreement with Leedy's assertion that the case study research is "…especially suitable for learning more about a little known or poorly understood situation" (Leedy and Ormrod, 2001: 149).

Final Research Design:

In selecting a research design, the researcher establishes a plan that details what data to gather, how the data will be gathered, from whom data will be gathered, when the data will be collected, and how the data will be analyzed once it is obtained. A well established research design enables the researcher to more appropriately explore the research questions by providing guidelines the researcher should follow in his or her attempt to answer research questions (Leedy and Ormrod, 2001).

An Overarching Case Study:

Yin (2003) suggested that a single case study design is appropriate in a number of situations. A single case design may be appropriate when: the researcher desires to explain or explore a single instance of a unique phenomenon, the case under study is representative of commonplace events, a particular phenomenon was previously inaccessible to researchers, and when a longitudinal study seems logical (Yin, 2003: 40-42). On the other hand, a multiple case design should be implemented if the possibility exists for replication between cases, or if there is a potential to demonstrate contrast between cases (Yin, 2003: 53-54).

A single case design was chosen for this study because it meets the criteria established for a revelatory case. According to Yin (2003), a case is considered revelatory in nature when "an investigator has opportunity to analyze a phenomenon previously inaccessible to scientific investigation (Yin, 2003: 42). The phenomenon investigated in this study concerns Aerospace Medical Technician readiness during the turbulent era of base closures and realignments. The researcher's experience with multiple closures and realignments coupled with extreme longevity in Aerospace Medical Technician career field provide unique insights with respect to Aerospace Medial Technician skills sustainment training. The study is also the first of its kind as no other studies regarding Aerospace Medical technician sustainment training were available in the public available literature arena.

The embedded case study design was selected because the research effort will involve more than one unit of analysis. While the single case for this study is represented by a phenomenon as described above, attention will also be directed toward subunits within the phenomenon. For example, during the survey section of the study, individual Aerospace Medical Technicians were used as the unit of analysis. Further, during the content analysis section of the study individual lessons learned represented an additional unit of analysis (Yin, 2003: 42-43).

A structured review of the literature has revealed that an embedded, single case study design is well suited for this research project. Further, it has been determined that a double application of the sequential exploratory design as described by Cresswell (2003) will be completed (Cresswell, 2003: 213). Refer to the model provided below.

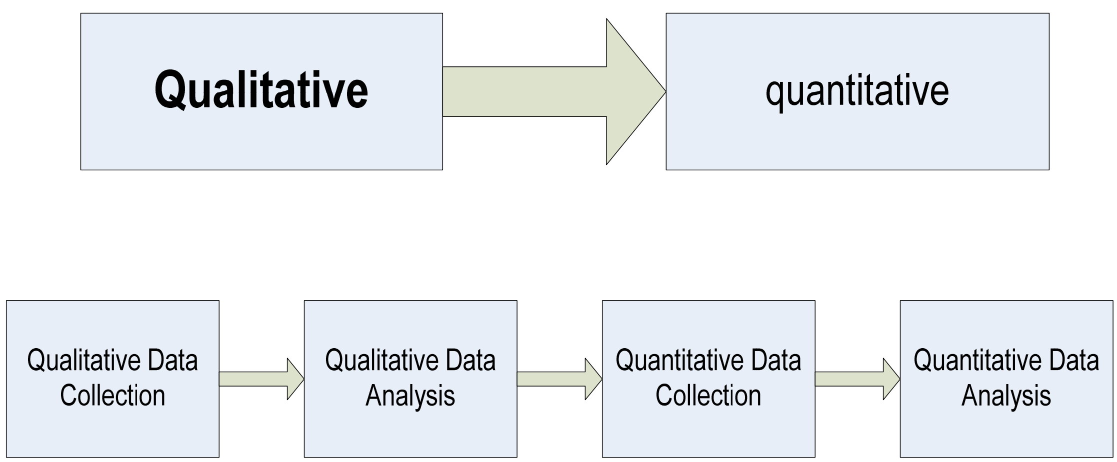


Figure 1: Sequential Exploratory Design

(Adapted from Cresswell, 2003)

In adhering to the double application of Yin's Sequential Exploratory design, the research will begin with a qualitative description of the current Aerospace Medical Technician skills sustainment training model. Next, quantitative historical data will be reviewed to demonstrate recent changes experienced in the Aerospace Medical

Technician training environment. Following this review, qualitative content analysis will be performed on Air Force Lessons Learned. Finally, secondary survey data will be analyzed in an attempt to demonstrate a statistically significant difference between the deployed training environment and the training environment provided at home station. As previously stated, these steps will result in a double sequential exploratory design. The double sequential exploratory design will form the foundation for the exploratory, embedded, single case study. Because the qualitative nature of the study is emphasized, qualitative evidence will take priority (it will be presented first) as described by Creswell (Creswell, 2003: 213).

The Nature of the Study:

As previously stated, it was determined that an exploratory study is warranted. According Yin (2003), "what" questions are appropriate for exploratory studies (Yin, 2003: 6). When appropriately applied, "what" questions assist the researcher in exploring the phenomenon under study with the hope of establishing hypotheses or propositions for further study. This research project is well suited for the exploratory model as it was initiated to draw attention to a general problem with the hope that future research will be devoted to further attempts toward problem resolution. A second driver for the study concerned the lack of a formalized training model for Aerospace Medical Technician skills sustainment training. The research was conducted with two general purposes: (1.) explore the drivers that necessitate a new aerospace medical technician skills sustainment training model, and (2.) exploring potential model development. In both respects, the study is exploratory in nature.

Case Study Components:

Because an embedded, single case design was selected as the overarching framework for this study, additional information concerning case study design is in order. According to Yin (2003) there are five major components of research design essential to performing a case study. These components include: the study's questions; its propositions; its unit(s) of analysis; the logic linking the data to the propositions; and criteria for interpreting the findings (Yin, 2003: 21). Each of these five components are discussed in more detail below.

The Study's Questions:

Chapter 1 introduced the research questions for this thesis effort. The research questions serve as a guide in performing research. The following research questions were presented in Chapter 1:

Research Questions:

Research Question 1:

What is the present model used to provide Air Force Aerospace Medical Technician skills sustainment training?

Research Question 2:

Have there been recent changes to the aerospace medical skills sustainment training environment that may contribute to the success or failure of the current model?

Research Question 3:

What indicators might suggest the current model has not successfully ensured medical readiness for Aerospace Medical Technicians?

Research Question 4:

Is a new Aerospace Medical Technician skills sustainment training model warranted?

To further explore the research questions, the following investigative questions were proposed:

Investigative Questions:

Investigative Question for Research Question 1:

What evidence suggests a formal model for aerospace medical technician skills sustainment training?

Investigative Question for Research Question 2:

What changes have occurred with respect to land, labor, capital, and the nature of work?

Investigative Question for Research Question 3:

What insights can be gained from Air Force Lessons Learned with respect to Aerospace Medical Technician skills sustainment training?

Investigative Question for Research Question 4:

What are some of the existing problem areas the new model should address?

Study Proposition:

The current research effort explores the proposition that numerous elements of the Aerospace Medical Technician training environment have changed. If this is, indeed, the case, then the methodology and model employed to conduct skills sustainment training for Aerospace Medical Technicians should also change. Such change is necessary in order to minimize the effects of limited resources realized in a training environment plagued by right sizing and base closures. Further, any future training model must prove robust against further base closure and realignment initiatives and increased outsourcing. Thus, the seminal proposition addressed by this research effort becomes: What must change with respect to current medical skills sustainment training if we hope to maintain a high degree of medical readiness for present and future Aerospace Medical Technicians?

Logic Linking Data to Proposition:

The fourth essential component of case study research advocated by Yin (2003) states that data must be linked to propositions (Yin, 2003: 26). For the purpose of this study, data will be linked to the single proposition through inductive logic. Links will be formed through historical analysis, content analysis, and quantitative survey techniques. Yin (2003) suggested that "pattern-matching" is one of the most powerful linking mechanisms used in case study research. When performing "pattern-matching," the researcher attempts ascertain if "several pieces of information…may be related to some theoretical proposition" (Yin, 2003:26). Further, Leedy and Ormrod have found that pattern matching assists the researcher in determining if underlying themes are characterizations of the broader case (Leedy and Ormrod, 2001).

While this study does not take full advantage of pattern-matching, content analysis (which in many respects is a specialized form of pattern-matching) is used. Content analysis proves extremely valuable in linking data to propositions. In this particular research effort, the researcher observed "Air Force Lessons Learned" for patterns suggestive of applicability with respect to aerospace medical technician skills sustainment training issues. This comparison, while performed under content analysis, probably satisfies the intent of pattern matching as described by Leedy and Ormrod (Leedy and Ormrod, 2001).

In summary, data will be linked to propositions qualitatively through inductive logic strategies that include historical analysis of archival records and qualitative content analysis of Air Force Lessons Learned. Additionally, the qualitative chain of evidence linking data to propositions will be strengthened through the addition of quantitative evidence derived from statistical analysis of Aerospace Medical Technician survey data provided by the Air Force Occupational Measurement Squadron (Griffin-Hamilton, 2005).

Criteria for Interpreting Findings:

Yin (2003) advocated effective criteria for interpreting the findings as his fifth essential component of case study research (Yin, 2003: 21). Patton (2002) proved insightful in his observation that traditional quantitative evaluation criteria for a study's findings focuses on the elements of rigor, validity, reliability, and generalizability (Patton, 2002: 13). Patton further suggests, however, that qualitative studies can not be held to the same evaluation criteria used for quantitative studies, because quantitative study evaluation criteria is highly instrument focused, and the researcher typically serves as the evaluation instrument for qualitative studies (Patton, 2002: 14).

In light of this observation, Patton suggests that nontraditional criteria for interpreting the study's findings should be employed for qualitative research. According to Patton, such nontraditional criteria should focus on elements of trustworthiness, diversity of perspectives, clarity of voice, and the credibility of the researcher (Patton, 2002: 13). While some academics may fail to accept the nontraditional criteria offered by Patton, a compromise might be reached through the use of evaluation standards that include: utility of the findings, feasibility of the findings, accuracy of the findings, and propriety of the findings (Patton, 2002: 13).

Although, Patton offers a very compelling argument, a number of researchers may not agree with his bold assertions. Thus, the current research effort will engage traditional research evaluation criteria to interpret findings.

The Role of Data Collection in Quality Research:

According to Yin (2003) the quality of a study can be increased substantially when the researcher adheres to three general principles of data collection (Yin, 2003: 83) First, Yin suggests that data collection should include multiple sources of evidence that converge upon the same findings. (Yin, 2003: 83). Yin identified six sources of evidence available to the researcher. These sources include: documentation, archival records, interviews, direct observations, participant observations, and physical artifacts. Second, Yin suggests the creation of a case study database to store all the data used throughout the research project. A final recommendation posed by Yin involved the use of a chain-of-evidence similar to that used by law enforcement personnel. By creating such an evidence chain, the researcher essentially mitigates potential threats to validity. Because Yin's recommendations are thought to significantly contribute to effective data collection, current study applications of each recommendation are discussed below.

Multiple Sources of Evidence:

As stated previously, Yin viewed the ability to provide multiple sources of evidence as a major strength for case study data collection (Yin, 2003: 83). Because case studies (especially single case studies) are more vulnerable to validity and reliability threats, the need for multiple sources of evidence is more apparent for case studies as compared to other research methodologies. Thus, the researcher must take steps to minimize validity threats whenever possible.

Differing Points of View:

While Yin (2003) identified the six sources of evidence discussed previously, Creswell (2003) proposed only four sources. There was considerable overlap between the sources listed by Yin and those suggested by Creswell, with Creswell advocating observations, interviews, documents, and audiovisual materials. This study also engaged quantitative data collection and analysis through the evaluation of secondary survey data as an additional source of evidence. As stated by Yin, quantitative findings serve to strengthen qualitative results in this case (Yin, 2003).

Data Collection Procedures:

Data collection for this project involved three distinct phases. First, the researcher reviewed a number of archival documents. Sources reviewed included Aerospace Medical Technician specific documents, Congressional hearings, Government Accounting Office reports, Base Closure and Realignment Commission reports, Congressional Budget Office reports, and archival data provided by statisticians at the Air Force Surgeon General's Office.

During the second phase of data collection, the researcher assimilated the necessary information to perform a qualitative content analysis on recent "Medical Lessons Learned" in an effort to explore *Research Question 2*. In order to accomplish this task, the primary researcher submitted a formal request for information to the site managers of the Air Force Operations News Medical Lessons Learned website at (https://afopsnews.afmoa.af.mil/lessonslearned/). In submitting this request, the researcher asked for all Lessons Learned addressing enlisted medical skills sustainment training. In turn, the site managers reviewed massive amounts of data in search of potentially relevant lessons learned and forwarded these cases to the researcher via e-mail.

The third phase of data collection involved secondary survey data provided by the Air Force Occupational Measurement Squadron(AFOMS), Randolph Air Force Base, Texas. The researcher found this data relevant to the exploration of *Research Question 4*. In attempting to answer this question, the researcher hopes to demonstrate disparity between the deployed work environment and home station in terms of task frequency and task difficulty.

Design Quality

Previous researchers have suggested two fundamental elements of design quality: research quality and evidence quality. While research quality pertains to the scientific process, evidence quality pertains more to a judgment regarding the strength and confidence one has in the research findings emanating from the scientific process (Mosteller and Boruch, 2002; Shavelson and Towne, 2002). West, King, and Carey (2002) suggested three characteristics of evidence dictate its strength and utility (West, King, and Carey, 2002):

- The quality of the evidence
- The quantity of evidence
- The consistency of the evidence

When assessing the quality of a particular study, qualitative researchers are more interested in standards like purposefulness and explicitness of assumptions and biases. Other important standards for qualitative researchers include rigor, completeness, and coherence. Finally, qualitative researchers are also interested in the persuasiveness, usefulness, and consensus demonstrated by a study (Leedy and Ormrod, 2001: 164-165).

Yin's Logical Tests for Quality:

Yin (2003) suggested that four logical tests could be applied to determine the quality of case-study research. Behavioral scientists apply these same tests to determine the quality of empirical social research (Yin, 2003: 33-34). Because case studies are a form of social research, Yin proposes the same logic tests used for empirical research effectively apply to case-study research. Table 2 below describes the four logic tests and their associated tactics as presented by Yin. The table also lists the phases of research in which each tactic should occur to ensure effective case-study research (Yin, 2003: 34).

Table 2: Case Study Tactics for Four Design Tests (Adapted from Yin, 2003)

Tests	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	• Use multiple sources of evidence	data collection
	• Establish chain of evidence	data collection
	• Have key informants review draft case study report	
Internal validity	• Do pattern-matching	data analysis
	• Do explanation-building	data analysis
	• Address rival explanations	data analysis
	• Use logic models	data analysis
External validity	• Use theory in single-case studies	research design
	• Use replication logic in multiple-case studies	research design
Reliability	• Use case study protocol	data collection
	• Develop case study database	data collection

Construct validity:

Construct validity addresses the degree to which inferences can legitimately be made from the operationalizations of the study to the theoretical constructs on which those operationalizations were based. Researchers achieve construct validity by developing and administering the correct operational measures for the concepts under study. This typically involves three distinct steps: (1) accurately defining variables, (2) appropriately relating variables to objectives, and (3) effectively demonstrating that measures are indicative of the variables they measure.

According to Yin (2003), construct validity is "especially problematic in case study research," because qualitative investigators frequently fail to sufficiently develop operational measures (Yin, 2003: 35). To avoid this trap, Yin advises the researcher to take two critical steps:

1. Select the specific types of changes that are to be studied (and relate them to the original objectives of the study).
2. Demonstrate that the selected measures of these changes do indeed reflect the specific types of change that have been selected (Yin, 2003)

Further, as presented in Table 2, Yin (2003) identified three tactics used by case researchers to ensure construct validity: (1) use multiple sources of evidence, (2) establish a chain of evidence, and (3) have key informants review the draft case-study report (Yin, 2003: 34). In an attempt to ensure construct validity, the researcher employed each of these techniques (with slight modification to the third tactic as necessitated by the research design).

Construct Validity Tactics:

Multiple Sources of Evidence:

Yin's first suggestion for ensuring construct validity necessitates multiple sources of evidence. Sources for this study included archival evidence, content analysis, and secondary survey data analysis. These three evidence sources were woven together throughout the study like three strands of the same rope, significantly contributing to construct validity. Steps taken to ensure each individual data source contributed to construct validity are provided below.

Archival Evidence:

Facility closure and realignment data used for the historical analysis portion of this project was provided by the Medical Plans and Programs Directorate of the Air Force Surgeon General's Office (Berthe and Kenndedy, 2005). This office frequently briefs top level medical management, and the data they generate is subject to an extreme level of scrutiny. Further, the Surgeon General's Office serves as the highest level approval authority or validating agency within the Air Force. Thus, the archival data used for historical analysis was subject to intense and rigorous data validation before it was deemed appropriate for the current study (Berthe and Kennedy, 2005).

Content Analysis:

The content analysis portion of the research required substantial efforts to ensure a high degree of validity. Strict adherence to Neuendorf's Content Analysis model was ensured. Neuendorf's model is basically a construct guide for content analysis presented in the form of a flow chart (Neuendorf, 2002). The flowchart identified nine processes researchers can follow to assist them in ensuring valid constructs. A slightly modified version of the flowchart is presented below in Figure 2 (Neuendorf, 2002: 50-51).

Content Analysis Flowchart

1. Theory or rationale: What content will be examined and why? Are there certain theories or perspectives that indicate that the particular message content is important to study? If you're using an integrative model, linking the content analysis with the text to show the relationship with the source is an important characteristic. What are your research questions or hypothesis to be tested?

2. Conceptualization: What variables or antecedents will be used in the study, and how will you define them? It is recommended that the researcher examines some examples of the content to be examined to be reasonably certain that all the variables to be measured can be coded for.

3. Operationalizations or Measures: Measures should match conceptualizations, otherwise known as internal validity. Are the variables measured well (i.e., at a high level of measurement, with categories that are mutually exclusive)? An a priori coding scheme describing all measures must be created. Both face validity and content validity can also be assessed at this point.

4. Coding Schemes: Researchers need to create a codebook (variable measures fully explained) and a coding form.

5. Sampling: How will you randomly sample a subset of the content? The Sample application could be accomplished by designating a: time period, journal article, number of pages, issue, or channel.

6. Training and Pilot Reliability: During a training session in which coders work together, find out whether they can agree on the coding of variables. Then, in an independent coding test, note the reliability on each variable. At each stage, revise the codebook or coding form as needed.

7. Coding: Use at least two coders, to establish reliability. Coding should be done independently, with at least 80% for the reliability test.

8. Final reliability: Calculate the reliability figure (percent agreement) for each variable.

9. Tabulation and reporting: Figures and statistics may be reported one variable at a time (univariate), or variables may be cross-tabulated in different ways (bivariate and multivariate techniques). Over-time trends are also a common reporting method. In the long run, relationships between content analysis variables may establish criterion and construct validity.

Figure 2: Content Analysis Flow Chart
(adapted from Neuendorf, 2002, pp. 50-51)

Determining Final Reliability for Content Analysis:

While steps were taken to ensure adherence to Neuendorf's suggestions for ensuring reliability (multiple coders, coder training, codebook, and coding form), perhaps the most important content analysis function described by Neuendorf is to determine a final reliability assessment. According to Neuendorf, one method frequently used to determine final reliability involves a measure of intercoder reliability using "raw percent agreement" (Neuendorf, 2002: 148). While Neuendorf suggests "the final reliability assessment should be performed on a separate randomly selected sub-sample during full data collection to fairly represent the coders' performance throughout the study," this proved impractical for the current research effort. Due to the simplistic nature of the final analysis (lessons learned were coded as either "positive or negative" and only 59 lessons learned were coded), each coder independently coded every lesson learned from the final analysis. Thus, every lesson learned was used to determine inter-coder reliability.

The formula $\mathbf{PA_o = A/n}$ "where $\mathbf{PA_o}$ stands for 'proportion of agreement, observed,' **A** represents the number of agreements between two coders, and **n** reflects the total number agreements possible through analysis (number of units coded) (Neuendorf, 2002:149). The proportion of agreement statistic returns a value between 0.00 and 1.00 with 0.00 indicating a total lack of agreement between coders and 1.0 representing 100% agreement between coders (Neuendorf, 2002). Because four coders were involved in the coding process, six separate bi-coder $\mathbf{PA_o}$s will be determined. These six $\mathbf{PA_o}$**s** represent the possible comparisons between independent coding efforts without repetition. In addition to these $\mathbf{PA_o}$**s,** a separate statistic will be calculated to demonstrate the overall proportion of agreement for the final analysis. The grand PA_o will be determined by dividing the total number of agreements and dividing it by 59 (the number of units used for final analysis).

Validity of Secondary Survey Data:

The Aerospace Medical Technician survey data used for statistical analysis was provided by the Air Force Occupational Measurements Squadron (AFOMS). This squadron is one of the premier statistician consortiums of the Air Force. Data was certified valid by the Air Force Occupational Measurement Squadron before the primary researcher even received it. Interestingly, the quantitative data demonstrated construct validity and internal validity because tasks surveyed were taken directly from the Career Field Education and Training Plan (CFETP). Additionally, the data demonstrated a high degree of external validity because study findings will apply to other medical sub-communities within the Armed Forces (Air Force Nurses, Navy Corpsmen, Army Medics, etc). Having completed the review of validity factors concerning Yin's first suggestion for the assurance of construct validity, the thesis now addresses Yin's second suggestion.

Chain of Evidence:

Yin's second suggestion for ensuring construct validity concerned a chain-of-evidence for the data collected. In completing this study, all data collected was placed on a single thumb drive, and later transferred to a single compact disc (CD). Once the study is complete, a copy of the disk will be sent to the study sponsor, and anyone else who wishes to view the data or study results. By ensuring the disk is available, the researcher is providing a means for interested parties to review the data in raw form (Yin, 2003). The researcher maintained the chain-of-evidence as prescribed by Yin (2003) by storing relevant evidence in the database while conducting the study. Further, the researcher ensured the integrity of the data by prohibiting access to anyone other than the coders and the primary researcher. After the study is completed, anyone who requests access to the research information will be acquiesced. Refer now to Yin's third suggestion: have key informants review the draft case-study report.

Review of Draft Case-study Report by Key Informants:

Because interviews were not a part of the case study process in this particular research effort, there were no key informants to review the case study report. This resulted in a slight modification to Yin's third tactic for establishing construct validity. Subject matter experts were substituted for key informants in this case. This ensured a type of "reality check" regarding the research findings. The subject matter experts were all senior ranking Aerospace Medicine Technicians. Further, each subject matter expert had at least 17 years experience in the field.

Internal Validity:

Leedy and Ormrod (2003) asserted that internal validity is a measure of how well the study's design (and the data it yields) equips the researcher to form conclusions pertaining to cause and effect or other relationships within the data (Leedy and Ormrod, 2001: 103-104). Creswell (1994) defined internal validity as "the accuracy of the information and whether it matches reality" (Creswell, 1994: 158). While both of these definitions have merit, Yin (2003) suggested internal validity is only applicable to causal or explanatory case studies (Yin, 2003: 36). Because this study is exploratory in nature, internal validity was not considered a vital threat. However, the researcher still followed established guidelines in an attempt to ensure the highest possible level of internal validity.

Internal Validity Tactics:

In an effort to ensure internal validity for study, many of Yin's proposed tactics were implemented. First, the researcher used archival evidence to facilitate explanation building with respect to base closure and realignment initiatives. Next, the coding team used a "specialized" form of pattern-matching while performing the content analysis portion of the research. Finally, the researcher followed established criteria during the planning stage of the research to ensure the research design followed specific logic models as suggested by Yin (Yin, 2003: 34). Together, these tactics will substantially contribute to the study's internal validity.

External Validity:

Leedy and Ormrod defined the external validity of a study as "the extent to which its results apply to situations beyond the study itself (Leedy and Ormrod, 2001: 105). Yin (2003) added that external validity is achieved in qualitative research when the researcher uses analytical generalization to infer a specific set of results on some broader group or theory. The researcher must take precautions not to "automatically" infer or generalize. Any generalization or inference derived from a single case study can only be considered theoretical until it is tested through replication logic (Yin, 2003: 37).

Reliability:

Bouma (2000) suggested that a study is considered reliable if "researchers using the same measuring device would get the same results when measuring the same event (Bouma, 2000: 86). Leedy and Ormrod added that the question of reliability is a question of consistency. As such, reliability is achieved when a study's author takes steps to ensure future researchers can use the same processes and procedures in the same way to achieve the same results. Yin (2003) further suggests that a study may still be reliable, even if the results of the study are different, as long as the procedures and processes were applied in a manner consistent to the previous study (Yin, 2003: 37-38)). Sufficient documentation serves as a primary means of ensuring reliability. By appropriately documenting each step of the research and the protocols used, the researcher lays the foundation for consistency in future research efforts. The case study database, the case study protocol, the case study appendices, and even this chapter on case study research methodology serve as sources of documentation that future researchers can use to replicate or audit this study. These steps are in compliance with Yin's suggested case study tactics proposed to ensure reliability: (1) Use case study protocol, and (2) Develop a case study database (Yin, 2003: 34).

Summary of Methodology:

This chapter described the research methods used to explore the skills sustainment training environment for the Aerospace Medical Technician. The rationale for choosing an overarching qualitative framework with a mixed methods approach was presented, as was the rationale for choosing the single embedded case study research design. Finally, data collection methods and the elements of design quality were discussed. Next, the research turns to Chapter 4 where the full disclosure of data analysis is provided.

IV. Discussion of Data

Chapter Overview:

The purpose of this chapter is to present the data collected through the applied research methods in an attempt to provide answers for the research questions posed in Chapter 1. Thus, this chapter begins with a qualitative representation of the current skills sustainment training model. After discussing the current model, a brief quantitative review of the historical data will demonstrate recent changes in the aerospace medical technician skills sustainment training environment. Next, the results of content analysis performed on USAF Lessons Learned will illustrate mounting concern from the field with respect to aerospace medical technician skills sustainment training. Finally, quantitative survey data will be used to demonstrate statistically significant differences between deployed skills sustainment training environments and the skills sustainment training environments currently offered to aerospace medical technicians at their home station. The presentation of data throughout this chapter will be linked to research questions to enhance comprehension of associations and relationships.

Addressing the Research and Investigative Questions:

Research Question 1:

What is the present model used to provide Air Force Aerospace Medical Technician skills sustainment training?

The Current Aerospace Medical Technician Skills Sustainment Training Model:

Any attempt to demonstrate the current model for skills sustainment training proves difficult, because such a model has not been formalized. However, the Aerospace Medical Technician Career Field Education and Training Plan (CFETP) defines sustainment training as “recurring training required to maintain the skills of a qualified individual to perform the duties required by the 4N0X1 AFSC (Harms and Cahill, 2002: 7).” In February of 2004, Change 1 of the CFETP was published. This document added that sustainment training includes “formal training courses, such as Advanced Cardiac Life Support, inservice training, and exercises” (Harms, 2004: 1). The CFETP also lists the Readiness Skills Verification Program as a component of aerospace medical technician skills sustainment training (Harms, 2002: 8). Further, because Qualification Training (QT) occurs both during and after upgrade training, and because it focuses on maintaining the skills and qualifications of assigned personnel, qualification training must also be considered a component of skills sustainment training. Thus, a rough model for current skills sustainment training practices can be formulated using these five principle components: (1.) formal training, (2.) inservice training, (3.) Readiness Skills Verification Program, (4.) exercises, (5.) qualification training. For further clarification, refer to Figure 3 below.

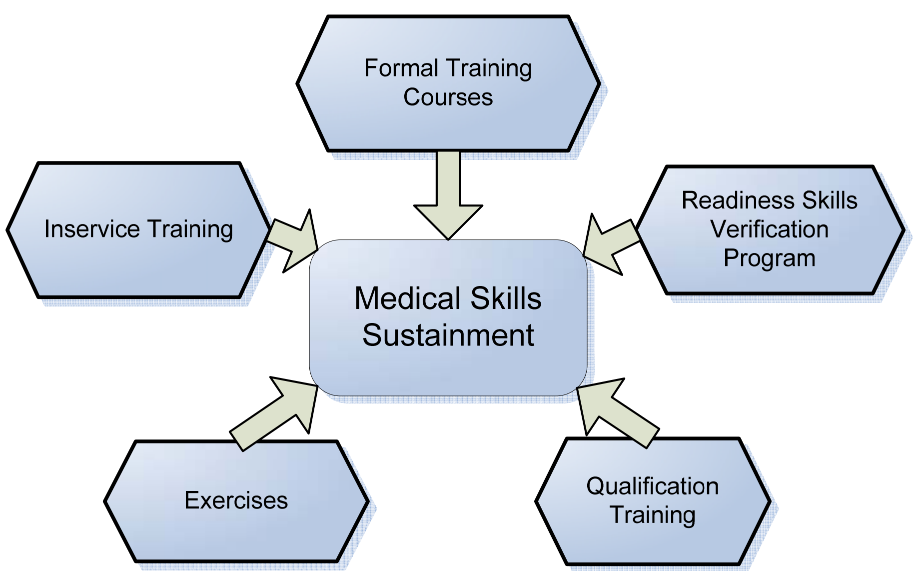


Figure 3: Current Medical Skills Sustainment Training Model

Current Model Components Description:

The first component of sustainment training, formal training, includes actual "in-class" attendance in formal courses as offered by Air Education and Training Command or other entities. For a few fortunate aerospace medical technicians, this may entail attending courses offered at the Center for Sustainment of Trauma and Readiness Skills (C-STARS) at Cincinnati, Ohio; Baltimore, Maryland; or St. Louis, Missouri. For others, it may involve attendance at the Air Force Critical Care Course presented by critical care physicians and nurses at Wilford Hall Medical Center. Additionally, formal training might include non-Air Force sponsored curricula such as Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS) courses.

The second component of sustainment training, inservice training, is typically offered by subject matter experts at the medical treatment facility, and is usually focused on a single task or process. Because aerospace medical technicians are required to maintain Nationally Registered Emergency Medical Technician (NREMT) certification, they attend inservice training to obtain continuing education credits mandated by re-certification requirements.

The third component of sustainment training, the Readiness Skills Verification Program (RSVP), is described as "Air Force Specialty Code (AFSC) specific sustainment training designed to ensure all members with a fully qualified AFSC maintain the required skill proficiency to perform their duties in a deployed setting" (Harms, 2002: 8). The RSVP uses a series of readiness skills verification checklists to verify each members current qualification for specific skills and tasks. These checklists are linked to the pre-existing QTPs utilized for qualification training (Harms, 2003: 1).

The fourth component of sustainment training, scenario based exercises, involves simulations of actual events where technicians are provided the opportunity to put their skill sets into practice. Exercises present technicians with true-to –life scenarios. The realistic nature of exercises also assists leaders in identifying training deficiencies that may be addressed through future inservice training.

Finally, the fifth component of sustainment training, qualification training, is a form of "hands-on" performance training developed by subject matter experts and used to qualify airman in specific positions or on specific pieces of equipment. Special qualification training packages (QTPs) are developed to assist supervisors and trainers in the administration of this training. As stated previously, because qualification training occurs both during and after upgrade training, it must be considered a component of skills sustainment training (Harms, 2002: 7).

***Investigative Question 1*:**

What evidence suggests a formal model for aerospace medical technician skills sustainment training?

Current research revealed that while a formal model for aerospace medical technician skills sustainment training has not been introduced, the principal components of such a model have been identified, defined, and implemented. Thus, these components can be used to formulate a rough model of current skills sustainment practices as presented above in Figure 3.

Research Question 2:

Have there been recent changes to the aerospace medical skills sustainment training environment that may contribute to the success or failure of the current model?

While this question was largely answered during the literature review, a more detailed look at the historical data provided by the USAF Surgeon General's Office, revealed exactly how extreme the aforementioned environmental changes have been (Berthe and Kennedy, 2005). Data revealed that approximately 82 hospitals in the Air Force inventory provided inpatient care and/or emergency services prior to the first base closure and realignment initiative in 1988. Today, a mere 19 inpatient hospitals remain. At first glance, it would appear as though this finding suggests a current impatient treatment capacity roughly equivalent to 25% of the 1988 capacity. Figure 4 (below) reveals the depth of reductions in USAF inpatient hospitals over the previous 19 years.

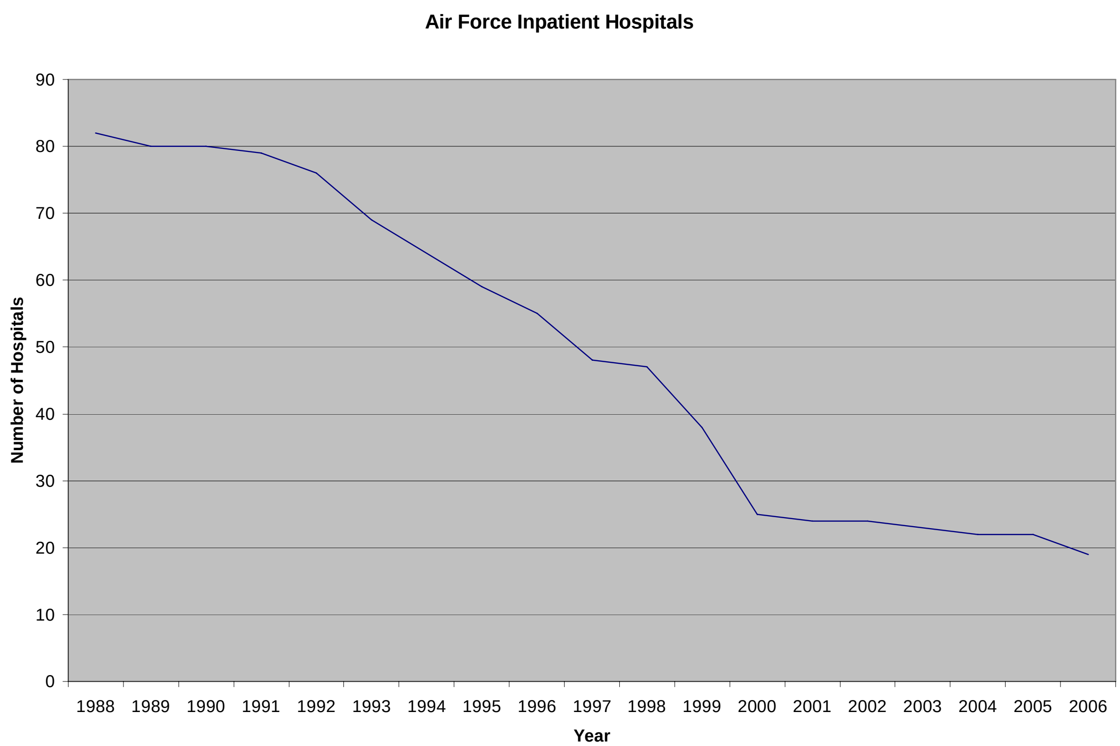
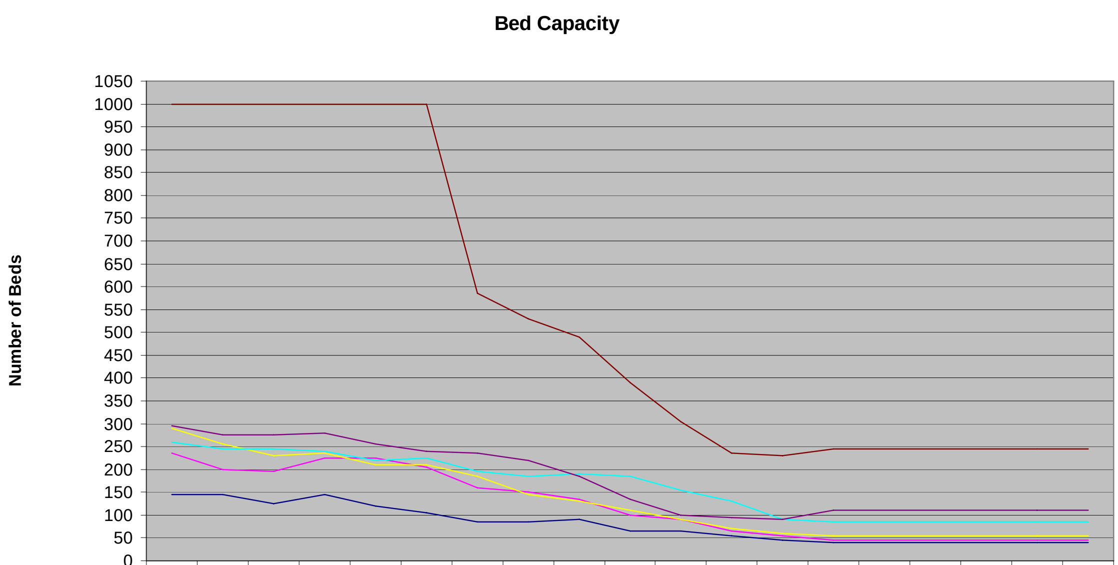


Figure 4: Number of Air Force Hospitals Offering Inpatient Services

After further review of the data, however, it becomes apparent that this statistic only tells part of the story. While the loss of inpatient hospitals was immense, the loss of inpatient beds provides a more accurate indication of training opportunities lost to aerospace medical technicians. This is because while some of the larger Air Force medical treatment facilities remained open, their inpatient treatment capabilities were significantly reduced. Figure 5 (below) reveals the decrease in inpatient bed capacity over the past 19 years for the six largest Air Force medical treatment facilities. These facilities are located at Lackland AFB, Keesler AFB, Travis AFB, Andrews AFB, Wright-Patterson AFB, and Eglin AFB. When inpatient capacity losses suffered through base closures and reductions in inpatient bed capability for remaining facilities are examined together, one can not help but consider the overall loss in inpatient capability and associated losses in training capabilities as somewhat alarming.



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Eglin	145	145	125	145	120	105	85	85	90	65	65	55	45	40	40	40	40	40	40
WPAFB	235	200	195	225	225	205	160	150	135	100	90	65	55	45	45	45	45	45	45
Andrews	290	255	230	235	210	210	185	145	130	110	90	70	60	55	55	55	55	55	55
Travis	260	245	245	240	220	225	195	185	190	185	155	130	90	85	85	85	85	85	85
Keesler	295	275	275	280	255	240	235	220	185	135	100	95	90	110	110	110	110	110	110
Lackland	1000	1000	1000	1000	1000	1000	585	530	490	390	305	235	230	245	245	245	245	245	245

Figure 5: Inpatient Bed Levels for the Six Largest Air Force MTFs

After revealing the two major sources of inpatient capacity reductions (closure of facilities and loss of beds within remaining facilities), all that remains is to discuss the overall reduction in inpatient capability for the Air Force. Figure 6 (below) shows the actual overall decrease in inpatient capability during the base closure and realignment (BRAC) era (1988 to present).

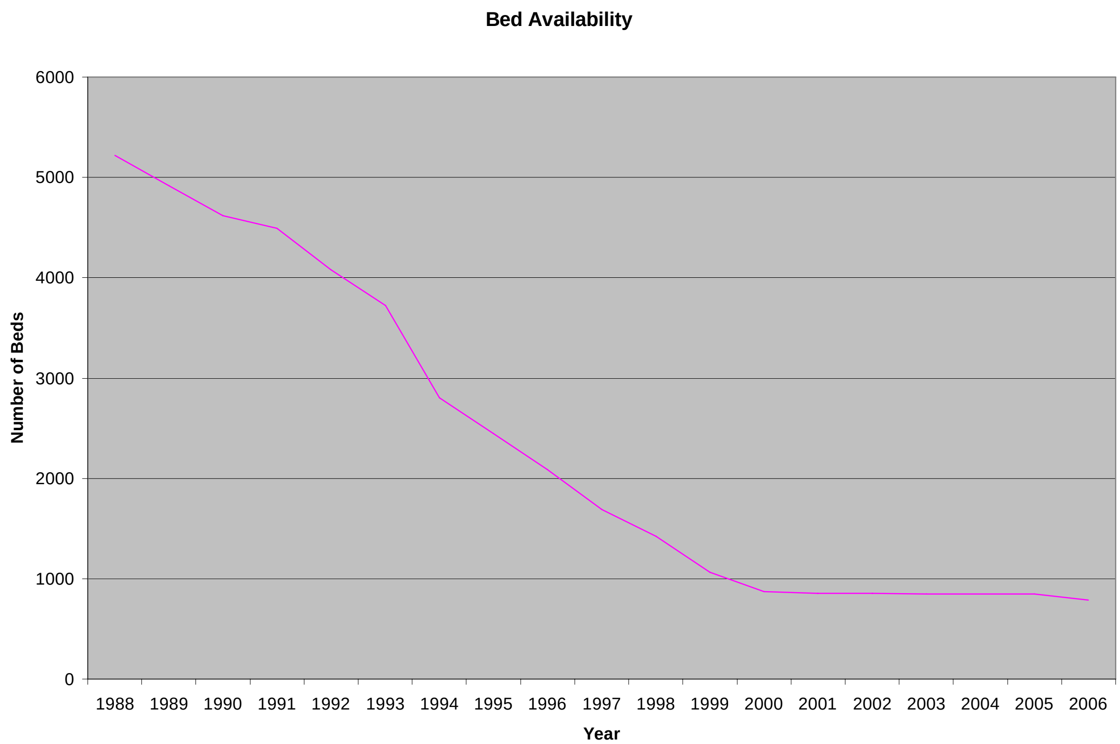


Figure 6: Overall Air Force Inpatient Bed Availability

Prior to the first BRAC round in 1988, the USAF boasted some 5219 inpatient beds. Today, the total number of inpatient beds is a mere 785. This equates to an 85% reduction in inpatient bed capacity, and further suggests that present inpatient care capabilities are actually only about 15% of what they were prior to Base Closure and Realignment initiatives. Because the loss of inpatient beds necessitates a decrease in the number of inpatients at Air Force medical treatment facilities, training opportunities for aerospace medical technicians have been significantly reduced as well.

While the loss of inpatient capability has been significant, other factors also contributed to changes in the aerospace medical technician training environment. As mentioned during the literary review, many Air Force medical treatment facilities offered emergency services prior to BRAC. Today, only 6-10 emergency service departments remain (Lewis, 2006). Typically, when medical treatment facilities lose their inpatient capability, they lose their emergency service departments as well. Without emergency service departments, medical treatment facilities are forced to refer emergency patients to other facilities, and quite frequently, the referral facilities are civilian entities. The loss of emergency patients to civilian treatment facilities represents another huge loss in terms of training opportunities for aerospace medical technicians.

Investigative Question 2:

What changes have occurred with respect to land, labor, capital, and the nature of work?

The review of historical data revealed the aerospace medical technician career field has experienced extensive reductions in terms of land, labor, and capital. These changes involved the loss of entire medical treatment facilities (MTFs), the loss of available inpatient beds, the closure of emergency service departments, and increased budgetary constraints. The review of historical data also revealed changes in the nature of work. These changes were resultant to a paradigm shift away from inpatient and emergency medicine toward outpatient and preventative medicine.

Research Question 3:

What indicators might suggest the current model has not successfully ensured medical readiness for Aerospace Medical Technicians?

A brief review of available literature revealed that educators frequently use training accessibility (Klatt, 1999; Ravet and Layte, 1998; Brennan and Johnson, 2004) and training effectiveness (Shapiro, 1995; Kirkpatrick, 1998; Bringslimark, 2004) as indicators of training quality. Because these determinants apply to aerospace medical technician training, they were considered possible problem indicators with respect to the current aerospace medical technician training model. Each of these indicators will be examined separately below.

Training Effectiveness and Training Accessibility:

It was determined that a focused review of the Air Force Operations News Medical Lessons Learned website would provide information concerning accessibility to training and training effectiveness with respect to current aerospace medical technician skills sustainment training practices. Thus, data was obtained from website and a form of mini content analysis was performed on the resultant data.

In order to perform the aforementioned analysis, the primary researcher submitted a request to knowledge managers at the primary Air Force Medical Lessons Learned website (https://afopsnews.afmoa.af.mil/lessonslearned/). In submitting this request, the researcher asked for all lessons learned from the past year (February 2005-February 2006) that potentially addressed enlisted medical technician training. The knowledge managers at the website responded, in turn, with 162 lessons learned conveniently arranged on a spreadsheet to facilitate analysis. A copy of this spreadsheet is presented as Appendix A of the study.

After the lessons learned were received from knowledge managers at the website (https://afopsnews.afmoa.af.mil), the primary researcher assembled a team of four coders at Wright Patterson Air Force Base. This team was comprised of the primary researcher and three additional senior ranking aerospace medical technicians. Aerospace medical technicians were chosen for the coding team because the study concentrated fully on the aerospace medical technician career field (4N0X1). The experience levels of these technicians suggested they were subject matter experts with respect to aerospace medical technician skills sustainment training and were well suited for the relevant content analysis.

Next, all four team members reviewed the Excel document to identify trends that might suggest potential variables for the content analysis. After collaborating for some time, the coding team determined that three variables should be included in the analysis: (1.) the applicability of the lesson learned, (2.) the environment of the lesson learned, and (3.) the nature of the lesson learned. The "applicability" variable referred to whether or not the lesson learned truly applied to aerospace medical technicians. The "environment" variable concerned the environment from which the lesson learned was submitted (real world vs. exercise). Finally, the "nature" variable addressed whether the lesson learned represented a positive or negative finding.

Rationale for Variable Selection:

The applicability variable was selected, because only Lessons Learned that pertained to the aerospace medical technician career field were desired for further analysis. The environment variable was selected because many of the Lessons Learned were from simulated situations (exercises) and may have skewed the real world data. The nature variable was chosen, because the coding team felt lessons learned that were negative in nature would be highly suggestive of problems attributable to the current training model. Variable definitions and rationale for selection were placed in the content analysis "coding book" as suggested by Neuendorf (2002). See Appendix B.

To ensure all lessons learned considered in the final analysis were from the real world environment and applied to aerospace medical technicians, a preliminary analysis using only the first two variables was conducted to identify lessons learned submitted in response to exercises and lessons learned that did not address aerospace medical technicians. Lessons learned submitted following exercises and those that did not apply to aerospace medical technicians were removed from consideration in the final analysis.

During the preliminary analysis, an acceptance standard of 75% agreement between coders was established as the criteria for including a lesson learned for final analysis. The preliminary analysis resulted in 59 lessons learned identified for final analysis. These 59 lessons learned were arranged on a separate Excel spreadsheet to facilitate the final analysis. A copy of the spreadsheet containing the 59 lessons learned evaluated during final analysis is included as Appendix C.

Final analysis involved only determining if the lessons learned reflected positive or negative findings. For this portion of the analysis, the coders independently completed coding forms, and returned them to the primary researcher. The primary researcher completed a coding form as well. Please see Appendix D for a copy of the coding form used for final analysis.

Training Effectiveness:

Surprisingly, each of the lessons learned (100%) from the final analysis indicated a negative finding. Determinations of the "proportion of agreement, observed" using the formula $\mathbf{PA_o = A/n}$ as described in Chapter 3, resulted in a value of 100% for all inter-coder comparisons. This resulted in an overall proportion of agreement value of 100% as well. In other words, each of the coders felt all applicable, real world lessons learned posted to the Air Force Operations News Medical Lessons Learned website indicated a training deficiency or the need for additional training. The high proportion of agreement achieved is suggestive of definitive problems with respect to training effectiveness. In further explanation, it appears the level of training effectiveness achieved through the current aerospace medical technician skills sustainment model is less than optimal.

Training Accessibility:

While the effectiveness of training is a concern, another factor affecting skills sustainment involves the aerospace technician's accessibility to training. This factor also proved problematic according to the lessons learned website with 13 of the final lessons learned citing instances where technicians did not receive necessary training at all. In further explanation, 22% of the final lessons learned indicated that training was either not accessible, or at least not accessed. This is somewhat understandable as indicated during the literary review, because the opportunity to train technicians with respect to inpatient and emergency patient care is limited by the current outpatient focused patient care environment. These limitations were brought about as a result of base closures, inpatient unit closures, and emergency services department closures.

C-STARS:

In an attempt to overcome this limitation, senior medical planners developed three Centers for Sustainment of Trauma and Readiness Skills (C-STARS). The C-STARS training centers are strategically located at Baltimore, Maryland; Cincinnati, Ohio; and St. Louis, Missouri. The result of joint ventures between the Air Force and civilian trauma centers, the C-STARS sites provide skills sustainment training in trauma management and critical care by immersing medical personnel in real world trauma situations ((https://kx.afms.mil/).

Training received through C-Stars is exceptional. Aerospace medical technicians typically attend courses offered at Baltimore or St. Louis. They typically do not attend courses offered through Cincinnati because these courses are specifically targeted toward Critical Care Air Transport Teams. These teams include physicians, critical care nurses, cardiopulmonary technicians, but not aerospace medical technicians.

C-STARS Baltimore:

The technician's course at Baltimore is three weeks long, and includes the following activities:

-- Five day Pre-Hospital Trauma Life Support (PHTLS) course with outdoor exercises
-- High Performance Human Simulator Sessions
-- Human Cadaver Lab
-- Baltimore City Ambulance Ride-Alongs
-- Trauma Resuscitations in the STC Trauma Resuscitation Unit (TRU), ICU, ER, and burn unit (https://kx.afms.mil/)

C-STARS St. Louis:

Technicians who attend C-STARS at St. Louis receive a two week course of instruction that includes:

-- Trauma refresher lecture series
-- EMT refresher training (if required)
-- EMEDS equipment refresher

-- Clinical skills review
-- Human patient simulator sessions
-- St. Louis Fire Department ambulance ride-along
-- Air ambulance (ARCH) ride-along (optional, when available)
-- Clinical duties in ER, ICU and operating room (https://kx.afms.mil/)

While training received through C-STARs is exceptional, not all aerospace technicians are fortunate enough to attend the training. In fact, less than 230 active duty aerospace medical technicians have attended the course since its inception in 2002 (Taylor: 2006). According to the Aerospace Medical Technician Career Field Manager, there are over 5,500 active duty aerospace medical technicians (Lewis, 2006). Thus, only 4% of the active duty aerospace medical technician population received training through C-STARS. Last year (2005), only 88 active duty aerospace medical technicians were fortunate enough to attend C-STARS (Taylor: 2006). If the Air Force continues to train an average of 88 technicians per year and manning remains constant for the career field, it will take approximately 60 years to train the active duty population, not to mention national guard members and reservists. Further, because sustainment training is recurrent in nature, technicians should probably receive C-STARS training annually or at least biannually, placing even further limitations current accessibility. Thus, while C-STARS training effectively increases technician trauma and readiness skills, it is not readily accessible to all aerospace medical technicians because of training capacity limitations.

Investigative Question 3:

What insights can be gained from Air Force Lessons Learned with respect to Aerospace Medical Technician skills sustainment training?

Review of the applicable lessons learned revealed that training effectiveness and training accessibility are two important indicators suggestive of problems affiliated with the current aerospace medical technician skills sustainment training model. Each of these indicators were consistently cited as problems in recent medical lessons learned, and hence, should not be ignored be Air Force aerospace medical technician skills sustainment training curriculum designers.

Research Question 4:

Is a new Aerospace Medical Technician skills sustainment training model warranted?

Based on this research, the answer to this question is a resounding “yes.” Simply stated, aerospace medical technicians are not receiving adequate training for skills sustainment as evidenced through content analysis of recent lessons learned. The Air Force patient care environment has changed significantly. Thus, current and future training initiatives must be instituted to compensate for these changes.

Investigative Question 4:

What are some of the existing problem areas the new model should address?

Once developed, the new training model should initially address training effectiveness and training accessibility concerns as discussed previously. Additionally, the new model should address the problem of “versatility.” For the purpose of model development, versatility refers to the model’s ability to adapt to various patient treatment environments. Medical leaders must ensure that sustainment training provided through the new model is versatile enough to prove effective in both deployed and home-station patient care environments.

While great effort has been expended in establishing the importance of preparing technicians for deployment, the home station mission is equally important. Thus, we must not forsake outpatient-focused home-station training for the sake of trauma-focused deployment specific training. Any model developed to ensure skills sustainment must effectively train technicians on the primary components of both deployed and home-station patient treatment environments. This can only occur if medical planners are willing to recognize there is a difference and institute the policy and procedures necessary to create a new "real-world" training model that proves applicable to both training environments. Further, once these policies and procedures are implemented, medica leaders must monitor the training environment for further changes in an effort to maintain model versatility.

Supportive Evidence Suggesting the New Model Should be Versatile:

Quantitative data analysis techniques were used to demonstrate a statistically significant difference between deployed and home-station medical treatment environments. This involved both descriptive statistics and analysis of variance (ANOVA) using ordinary least squares (OLS). These techniques were performed on data provided by the Air Force Occupational Measurement Squadron (AFOMS).

In September of 2004, AFOMS administered a job inventory survey to aerospace medical technicians (Griffin-Hamilton: 2005). In completing this survey, technicians indicated if they performed tasks listed in the Career Field Education and Training Plan (CFETP). AFOMS analysts then determined the percentage of technicians performing each task. Technicians were grouped according to skill level and duty status (deployed vs. home-station). Individuals in the deployed group were actually deployed at the time of the survey, or had recently been deployed (within the last 12 months). This survey provided an excellent opportunity to compare the aerospace medical technician deployed and home-station work environments.

Prior to performing the ANOVAs, data was transferred from the training extract provided by the AFOMS to an Excel spreadsheet. Several of the tasks surveyed by AFOMS were specific to sub specialties within the aerospace medical technician career field (neurology technicians, allergy immunization technicians, independent duty medical technicians, etc.). These sections were not included in the analysis, because aerospace medical technicians not assigned to these subspecialties do not perform sub-specialty specific tasks. Furthermore, aerospace medical technicians who work in these specialized areas receive additional training not received by the “average” aerospace medical technician.

Additionally, certain sections of the survey focused on patient records, supply, and other administrative duties. These sections were also excluded from analysis because they do not require skills sustainment training and are not immediately concerned with patient care. Further, any task that did not exceed 5% for any of the populations was not considered representative for the entire population, and was therefore dropped from the analysis. Thus, while the original survey inventoried 846 tasks, only 371 of those tasks were considered applicable to the “average” aerospace medical technician. These tasks were included in the descriptive statistics and ANOVAs performed below.

Because the current research effort focuses on sustainment training, a decision was reached to include only “5” and “7” skill level technicians in the analysis. This decision was based on Air Force Instruction 41-106 *Medical Readiness Planning and Training*, which states, “enlisted personnel enter into sustainment training when awarded their 5 skill level" (Taylor, 2004: 25). While "3" level technicians are extremely important to mission accomplishment, they have recently attended initial training, and have not yet been certified on many Career Field Education and Training Plan tasks. Technicians from the "9" level population were not surveyed by AFOMS, and thus, could not be considered in the analysis. While this may be considered a limitation, it is probably most appropriate because most 9 level technicians predominantly perform managerial duties.

ANOVA Procedure:

Once the tasks and populations of interest were identified, and the data was entered into Excel, descriptive statistics were accomplished for each population. The descriptive statistics enabled a high-level comparison between the deployed and home-station work environments for both the "5" and "7" skill level populations of aerospace medical technicians. For each population the number of tasks evaluated was 371.

Following the descriptive statistics, single factor one-way ANOVAs were performed using ordinary least squares (OLS). In order to prevent multicolinearity issues between populations, separate ANOVAs were performed on the "5" level and "7" level populations.

"5" Skill Level Comparison:

With respect to "5" level populations, the deployed (Dep) active duty (AD) population demonstrated a mean percentage of 23.62. This statistic revealed that an average of 23.62% of all deployed active duty "5" skill level technicians perform the tasks determined to be representative of the average aerospace medical technician as derived from the Career Field Education and Training Plan (CFETP). For the "5" level home-station (HS) population the mean percentage of technicians performing indicated tasks was 20.20. This finding suggests a difference with respect to technicians performing CFETP prescribed tasks between the deployed and home-station work environments. However, further analysis is required to determine if the identified difference is statistically significant. Please refer to Table 3 (below) for additional information.

Table 3: "5" Skill Level Descriptive Statistics

DEP AD 5		*HS AD 5*	
Mean	23.61725067	Mean	20.20215633
Standard Error	0.869220863	Standard Error	0.792759902
Median	21	Median	17
Mode	6	Mode	4
Standard Deviation	16.74237621	Standard Deviation	15.26963408
Sample Variance	280.3071611	Sample Variance	233.1617251
Kurtosis	0.187806368	Kurtosis	0.366751642
Skewness	0.885033916	Skewness	0.949777789
Range	80	Range	74
Minimum	2	Minimum	1
Maximum	82	Maximum	75
Sum	8762	Sum	7495
Count	371	Count	371
Confidence (95%)	1.709232535	Confidence (95%)	1.558879997

After completing the "5" skill level descriptive statistics, a single factor, one way ANOVA was performed using OLS to test the assumption that deployed and home-station aerospace medical technician "5" skill level work environments will differ with respect to percentage of technicians performing tasks. For the purpose of ANOVA, this assumption was determined to be the research or alternate hypothesis. The null hypothesis held that deployed and home-station "5" skill level work environments will not differ with respect to percentage of technicians performing tasks.

> H_o: *Deployed (DEP) and Home-station (HS) "5" skill level work environments will not differ with respect to the percentage of technicians performing tasks.*

H_a: Deployed and Home-station "5" skill level work environments will differ with respect to the percentage of technicians performing tasks.

Refer to Table 4 (below) for the ANOVA demonstrating the results of the hypothesis testing and additional information.

Table 4: "5" Skill Level ANOVA

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
DEP AD 5	371	8762	23.61725	280.3072
HS AD 5	371	7495	20.20216	233.1617

ANOVA

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2163.462264	1	2163.462	8.426849	0.003807	3.854056
Within Groups	189983.4879	740	256.7344			
Total	192146.9501	741				

"5" Level ANOVA Results:

At the 95% confidence level, a P-value less than 0.05 is statistically significant. Because the P-value obtained for this particular ANOVA is well below this threshold, we reject the null hypothesis in favor of the alternate hypothesis. The difference between deployed and home-station work environments with respect to tasks performed is statistically significant for the "5" level population. A greater percentage of deployed "5" skill level technicians perform indicated tasks when compared to "5" skill level technicians at home-station.

"7" Skill Level Comparison:

With respect to the "7" level populations, the deployed population demonstrated a mean percentage of 25.39. This statistic revealed that an average of 25.39% of all deployed "7" skill level technicians perform the tasks determined to be representative of the average aerospace medical technician as derived from the Career Field Education and Training Plan (CFETP). For the "7" skill level home-station population the mean percentage of technicians performing indicated tasks was 18.12. This finding suggests a difference with respect to technicians performing CFETP prescribed tasks between the deployed and home-station work environments. However, further analysis is required to determine if the identified difference is statistically significant. Please refer to Table 5 for additional information.

Table 5: "7" Level Descriptive Statistics

DEP AD 7		*HS AD 7*	
Mean	25.38544474	Mean	18.1186
Standard Error	0.996525915	Standard Error	0.673061
Median	19	Median	14
Mode	6	Mode	4
Standard Deviation	19.19444468	Standard Deviation	12.96406
Sample Variance	368.4267065	Sample Variance	168.067
Kurtosis	-0.179567211	Kurtosis	-0.1001
Skewness	0.843656784	Skewness	0.850414
Range	80	Range	61
Minimum	1	Minimum	2
Maximum	81	Maximum	63
Sum	9418	Sum	6722
Count	371	Count	371
Confidence Level(95.0%)	1.959564696	Confidence Level(95.0%)	1.323504

After completing the "7" skill level descriptive statistics, a single factor, one way ANOVA was performed using OLS to test the assumption that deployed and home-station aerospace medical technician "7" skill level work environments will differ with respect to percentage of technicians performing tasks. For the purpose of ANOVA, the assumption tested was determined to be the research or alternate hypothesis. The null hypothesis held that deployed and home-station “7” skill level work environments will not differ with respect to percentage of technicians performing tasks.

> *H_o: Deployed and home-station “7” skill level work environments will not differ with respect to percentage of technicians performing tasks.*

> *H_a: Deployed and home-station “7” skill level work environments will differ with respect to the percentage of technicians performing tasks.*

Refer to the ANOVA results listed in Table 6 (below) for additional information.

Table 6: “7” Skill Level ANOVA

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Dep AD 7	371	9418	25.38544	368.4267
HS AD 7	371	6722	18.1186	168.067

ANOVA

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	9795.708895	1	9795.709	36.51752	2.4E-09	3.854056
Within Groups	198502.6631	740	268.2468			
Total	208298.372	741				

“7” Level ANOVA Results:

Recall that a P-value less than 0.05 is statistically significant at the 95% confidence level. The P-value obtained for this particular ANOVA was exceptionally low at 0.0000000024. This value is well below the 0.05 threshold causing us to reject the null in favor of the alternate hypothesis. The difference between deployed and home-station work environments with respect to tasks performed is statistically significant for “7” level aerospace medical technicians. A greater percentage of deployed “7” skill level technicians perform indicated tasks when compared to “7” skill level technicians at home-station.

Summary of Quantitative Analysis:

Through analysis of variance, this research demonstrates a statistically significant difference between deployed and home-station work environments for both the "5" level and "7" level aerospace medical technician populations. Medical leaders must take steps to ensure both environments are addressed by any proposed skills sustainment training model.

Chapter Summary:

This chapter began with a qualitative representation of the current skills sustainment training model. After discussing the current model, a brief quantitative review of the historical data demonstrated two decades of turbulent change in the aerospace medical technician skills sustainment training environment. Next, the results of content analysis performed on USAF Lessons Learned identified indicators that suggest problems concerning the present aerospace medical technician skills sustainment training model. Finally, quantitative survey data was used to demonstrate statistically significant differences between deployed skills sustainment training environments and the skills sustainment training environments offered to aerospace medical technicians at their home station. The research now proceeds to Chapter 5 to discuss future research considerations based on Chapter 4's findings and present a proposed aerospace medical technician skills sustainment training model as a potential solution for training problems experienced in today's highly mobile Air Force.

V. Results

Chapter Overview:

This chapter begins with a discussion regarding whether or not thesis findings supported the single study proposition. Next, the chapter provides recommendations for consideration in developing a new model for aerospace medical technician skills sustainment training. Then, the chapter introduces a potential model for future aerospace medical technician skills sustainment training. Following the introduction of a potential model, the chapter turns to a discussion of proposed model limitations. Next, the chapter lists opportunities for future research. Finally, a chapter summary is provided.

Study Proposition:

This research effort explored the proposition that numerous elements of the Aerospace Medical Technician training environment have changed. The study proposition was supported by literature review findings and the historical analysis of archival data. Because the study substantiated monumental change within the aerospace medical technician skills sustainment training environment, the methodology and model employed to conduct skills sustainment training for Aerospace Medical Technicians should adapt to compensate for changes observed and documented. Such adaptation proves necessary to minimize the effects of limited resources realized in a training environment plagued by right sizing and base closures.

Recommendations for New Model Consideration:

Defense experts referred to the 2005 Base Closure and Realignment Commission (BRAC) as “the mother all of all BRACs” (Turner, 2005). The changes recommended by this commission were more extensive than the changes rendered by all previous BRACs combined. While previous BRACs (1988, 1991, 1993, and 1995) combined to eliminate approximately 20% of the Department of Defense (DOD) infrastructure, the 2005 BRAC resulted in eliminating approximately 25% of the remaining DOD infrastructure (Turner, 2005). For the medical community, this loss equates to further reductions in the number of emergency service departments, and the conversion of even more inpatient units to outpatient care (Taylor, 2005).

Because these changes will be more radical than previous changes experienced by the aerospace medical technician career field, it is imperative that any potential training model proves robust against environmental changes within the skills sustainment training environment. To achieve the required level of robustness, the model must ensure that future training is both accessible and effective as discussed previously in this thesis. Ensuring training is both accessible and effective proves extremely problematic, especially when considering the aforementioned budgetary constraints. The Air Force is not alone when confronting this problem, however, as civilian organizations face similar challenges (Majdalany and Guiney, 1999).

Unlike the Air Force Aerospace Medical Technician Skills Sustainment Training Program, however, many civilian organizations have found success addressing these concerns through distance education (Harrington-Leuker, 1999). Curriculum designers list three crucial elements necessary for a successful distance education program: (1.) sound instructional design, (2.) appropriate applications of technology, and (3.) adequate support for teachers, students and collaborative partners (Steiner, 1999).

The Air Force is highly experienced with distance education programs. The Extension Course Institute has used Career Development Courses (CDCs) (a form of distance learning) to provide upgrade training to enlisted members for years. It is also true that Air Force distance education is based upon a sound instructional design. Air Force enlisted upgrade training is based on the Instructional Systems Design (ISD) model (Hanks, 2005). This model is widely accepted in both civilian and military educational programs (Carey and Carey, 2001). See Figure 7 below.

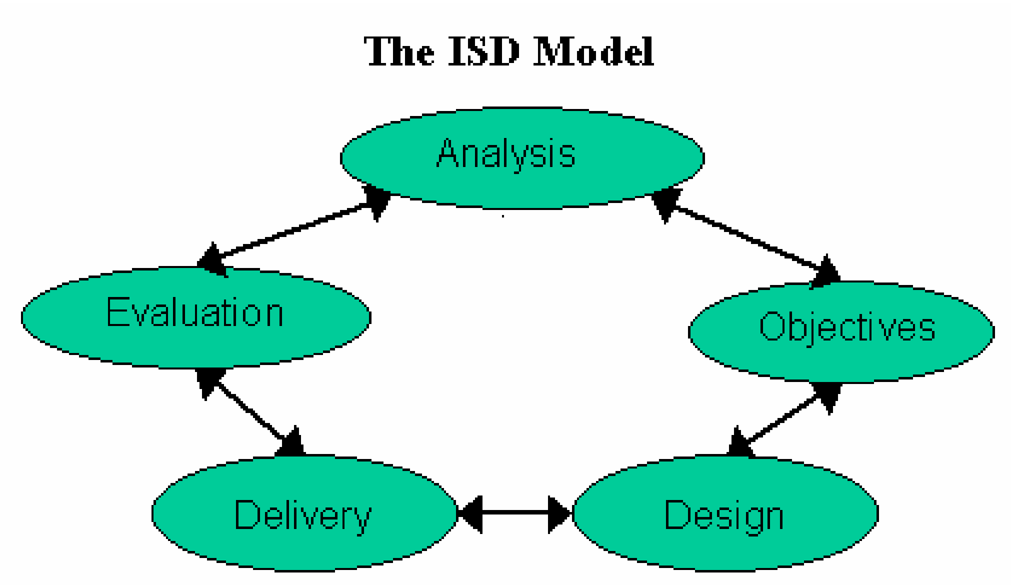


Figure 7: The ISD Model for Instructional Design

While Air Force distance education satisfies the first crucial element of effective distance education, deficiencies become apparent with respect to the remaining elements: the application of available technology and adequate support for teachers (trainers), students (trainees), and collaborative partners (subject matter experts). There is little to suggest Air Force distance education fully utilizes available technology at this time. Most distance education courses are not available on-line, and they do not offer student to instructor, student to student, and student to subject matter expert interactions similar to those made possible through modern information technology. In general, the distributed learning courses provided to aerospace medical technicians are received in paper-based format. Sometimes compact discs accompany the paper-based courses, but the discs simply replicate the information provided through the paper-based course. It is somewhat surprising that technology does not play a more substantial role in the delivery of skills sustainment training, especially when one considers the enhanced technology focus of the Air Force. For example, senior Air Force leaders advocate the importance of net-centric warfare, but foundational elements of enlisted distance education are not net-centric.

The deficiency in the final critical element: support for teachers (trainers), students (trainees), and other collaborative partners (subject matter experts) is witnessed through the inability of Air Force educators to provide an environment where trainees can practice critical tasks from the Career Field Education and Training Plan (CFETP), as discussed previously in the thesis. Without access to inpatient and emergency service environments, technicians will not retain valuable knowledge gained through exceptional initial training programs.

Addressing Identified Deficiencies:

One application that may assist educators in applying available information technology to enhance aerospace medical technician skills sustainment training is the use of asynchronous learning networks (ALNs). ALNs could potentially assist trainees and trainers with the accessibility issues mentioned previously, because they make training accessible to virtually any authorized individual with internet access.

Asynchronous Learning Networks Defined:

An asynchronous learning network (ALN) is defined as "a network developed for people for the purpose of facilitating the accession of knowledge. It combines self-study principles with focused asynchronous interactivity with others. ALNs allow users to employ computer and communications technologies to tap into remote learning resources, including instructors and other students. Asynchronous Learning Networks are people networks established for anytime, anywhere learning" (Campbell: 1998).

More specifically, an asynchronous learning network is a nontraditional education and training medium that employs communications technologies to combine self-study and asynchronous interactivity between students and instructors, between students and other students, and between students and other collaborators, such as subject matter experts. Because the network is asynchronous, students are not required to be on-line at the same time as instructors or other students. They may access course information at their own convenience. Students are also encouraged to post comments concerning the material to virtual classroom discussion groups and access the comments posted by fellow students and other collaborators. The World Wide Web serves as a chief component of asynchronous learning network technology. It is used more frequently than any other ALN learning tool (Mayadas: 1997).

The Promise of Asynchronous Learning Networks:

ALNs are effective because they leverage Web based technology to overcome separation in time and space between students and instructors. They also significantly reduce the cost of providing training in terms of travel and printing costs. In such an environment the student remains joined with fellow students and the instructor(s) through common interests and electronic communication. Computer technology and the world wide web afford the opportunity to employ learning strategies like individualized tutorials and group projects when members are at a distance. They also let students contribute ideas for ongoing simulations and models at their own convenience. Through asynchronous learning networks, courses offered all around the world provide students and instructors opportunity to collaborate using Web-based technology such as Web-pages, virtual bulletin boards, list-servs and additional conferencing systems. ALNs also take advantage of Web-based technology to create an electronic medium for students to complete and submit assignments (Campbell: 1998).

True ALNs also utilize synchronous technology for short periods of time. For example, an instructor who provides a course of instruction through an ALN may require a proctored examination at a specified time and place. He or she may also require an in-person kickoff meeting to introduce students to each other and the course. It is also not uncommon to see occasional synchronous chat or lab sessions required for ALN students within close-proximity of each other. In fact, some researchers advocate the creation of powerful learner-centered networks through harnessing the potential of synchronous and asynchronous instructional delivery methods. The resultant "Networked Learning Environment" significantly improves the effectiveness of distributed (distance) education (Chute, Sayers, and Gardner, 1997). An illustration of the learner-centered model for networked learning systems is provided below in Figure 8. This model takes full advantage of asynchronous and synchronous technology and fully qualifies as an asynchronous learning network.

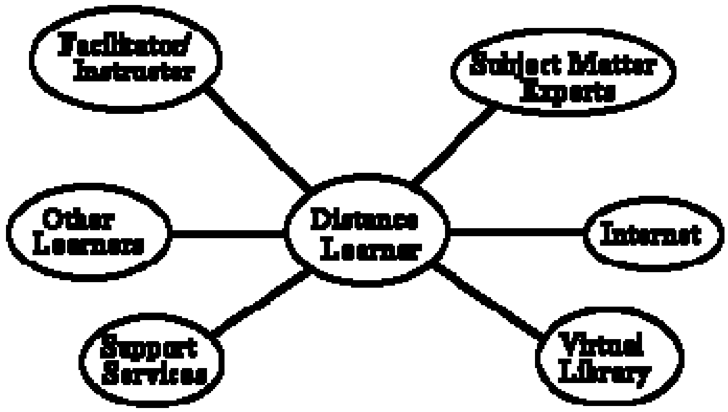


Figure 8: The Networked Learning Environment

*From: Chute, et. al., 1997, p. 75

By now, you have probably assimilated a good working definition for ALNs (sometimes referred to as networked learning environments). It is also essential that you develop an understanding of what is and what is not considered an ALN. Thus, we now turn our attention toward identifying the primary components that actually make up such a network. According to Jack Wilson, PhD (the current President of the University of Massachusetts, and former CEO of UMassOnline) a good asynchronous network will consist of or use the following components (Wilson, 1997):

- Delivery on standards-based multimedia personal computers equipped for live video/audio interactions and connected to a robust Internet Protocol (IP) multicasting network
- A mix of synchronous and asynchronous activity
- Use of Internet and/or CD-ROM-based multimedia materials
- Live audio and/or video interactions among the students and with faculty
- Use of professional quality software tools for computer aided design (CAD), symbolic math, spreadsheets, word processing, etc.
- Small group discussions
- Question-and-answer tools to verify content retention
- Collaborative software for application sharing and application synching over the network
- Access to rich resources on the network

- Floor control to allow classroom coordination for both instructor-led and student-centered learning
- Course administration to track student progress and to identify students during synchronous interactions

Using the definitions and critical components described above to guide our understanding of ALNs, we find workshops that leverage Web-based technology to facilitate frequent episodes of online conferencing and communication with others fulfill the requirements of an asynchronous learning network. Surprisingly, even a text-based course that requires students to use Web based technology such as listservs or e-mail to discuss course content and assignments qualifies as an asynchronous learning network. More frequently, however, ALNs combine both computer-based training and Web-based technologies to provide a more robust learning experience for students.

Our working definition of ALNs may be further strengthened by providing a few examples of learning environments that do not qualify as ALNs (or networked learning environments). Dr. J. Olin Campbell of the Sloan Consortium provided a few examples in his paper entitled *Asynchronous Learning Networks: Evaluating Anytime/Anywhere Learning.* According to Campbell, a distance education course based on synchronous audio or video presentations does not qualify as an asynchronous learning network. Traditional in-service training and conferences do not qualify as ALNs either, because they require the constant presence of students and instructors. Simple computer based instruction, video taped instruction, and mail based correspondence courses definitely do not qualify as ALNs because they lack the rapid and substantial interactivity with other students and instructors inherent to asynchronous learning (Campbell, 1998).

ALNs are becoming a standard conduit for the impartation of knowledge in both education and business. Slowly and surely this distributed learning technology has transformed computer based instruction from what was once thought to be a second rate knowledge transfer medium into a highly respected and widely accepted educational construct. Though once rejected by academia, the level of acceptance toward ALNs demonstrated by major universities today serves as a testament to the ubiquitous nature of this growing technology. Asynchronous learning may soon affect every stage of education within the United States. The number of learning institutions using ALN technology to improve existing course offerings (and even provide additional course offerings) continues to grow each year (http://www.scis.nova.edu/~taburich/async.html).

When considering the level of success demonstrated civilian institutions after implementing ALNs, it is not hard to imagine ALNs performing a critical role in improving accessibility to training as mentioned previously in this paper. ALNs represent an existing technology that could prove quite useful in improving aerospace medical technician skills sustainment training. For further information concerning asynchronous learning networks visit the asynchronous learning network website on the World Wide Web (www.aln.org).

Support Issues:

Asynchronous Learning Networks could also prove helpful in dealing with demonstrated deficiencies in terms of support for trainees, trainers, and subject matter experts. However, additional technology is also required. As stated previously in the thesis, the greatest lack of support concerns the apparent inability of Air Force leaders to provide adequate training environments with respect to inpatient and emergency medical skills sustainment. With sparse inpatient units and emergency service departments, many trainees are not exposed to trauma patients or patients suffering from injuries or conditions consistent with combat related injury or illness. Again, information technology might provide our only hope for addressing this concern. Trainees and trainers may overcome their lack of adequate exposure to patient treatment scenarios through utilizing high fidelity patient simulators.

Patient Simulators: A New Standard in Skills Sustainment Training:

A model's ability to realistically simulate operational or "real world" events is described as "model fidelity" (Hays and Singer, 1989). Researchers suggest three levels of model or simulator fidelity: low fidelity, mid or moderate fidelity, and high fidelity (De Lorenzo, 2005; Yaeger and others 2002). These same three terms are also used to describe levels of simulation training: low fidelity training, mid fidelity training, and high fidelity training. Low fidelity training "permits trainees to practice skills in isolation" (Yaeger and others, 2002). This typically involves working with simple mannequins. Moderate fidelity training offers more realism, but "lacks the cues necessary for total immersion in the situation" (Yaeger and others, 2002). High-fidelity training incorporates extensive use of multimedia resources providing real-time physiological responses on the part of the simulated patient. These responses include all the necessary information for medical personnel to formulate decisions (such as diagnostic decisions) and implement patient treatment regimes. In high fidelity training scenarios, the simulator is highly interactive demonstrating positive or ill effects based on treatment decisions implemented by medical personnel (De Lorenzo, 2005).

An Indicator for Simulator Fidelity:

While abundant indicators of model fidelity have proven somewhat elusive, researchers have suggested a model's ability to integrate the three domains of learning (cognitive, affective, and psychomotor) as described by Bloom and others (1956); Krathwohl and others (1964); and Simpson (1972) serves as one indicator of model fidelity (Friedrich, 2002). Thus, in order for a simulator to be considered a "high-fidelity" simulator, it must effectively integrate the domains of learning as described above. High fidelity patient simulators accomplish this by fully implementing existing information technology to create a more robust learning environment for trainees (Yaeger and others, 2004; De Lorenzo, 2005).

Because traditional patient simulations typically involved the use of training mannequins, animal or cadaver models, and the moulage of simulated casualties, they proved somewhat ineffective in achieving desired levels of realism. (De Lorenzo, 2005). Low and mid fidelity simulators proved especially problematic in the affective domain because students found it difficult to value unrealistic training scenarios.

In contrast, high-fidelity patient simulators offer treatment scenarios so realistic they provide signs and symptoms necessary to practice "history taking, physical examinations, invasive procedures, fluid therapy, pharmaceutical therapy, and surgical interventions" (De Lorenzo, 2005). Even more remarkable, high fidelity patient simulators are being used more frequently at all levels of medical skills sustainment training. While high fidelity patient simulators have typically been reserved for professional staff at larger Universities and training hospitals, recent training applications utilizing high fidelity patient simulators have been offered to pre-hospital personnel (First Responders and EMTs) at Central Michigan University (http://www.med-smart.org/).

While high fidelity patient simulators provide promise for improving support to trainers and trainees, they have also demonstrated the ability to improve training effectiveness (Gordon and Armstrong, 2002). In a study conducted at Harvard Medical School, researchers demonstrated that even a single exposure to high fidelity patient simulators improved training effectiveness for an experimental group of medical residents as compared to a control group that was not exposed to high fidelity simulation (Gordon and Armstrong, 2002). A separate study measured the trainee's physiological response to stress through heart rate variability during resuscitations using high fidelity patient simulators and during actual live resuscitation efforts. The study effectively demonstrated the extraordinary level of realism high fidelity patient simulators provide by demonstrating no statistically significant difference in trainee heart rate variability when comparing simulated and actual patient resuscitation efforts (Yaeger and others, 2004) and (Murphy and others, 2004).

The One-Two Punch:

Because asynchronous learning networks have proven exceptionally useful in improving accessibility to training and high fidelity patient simulators have proven successful in improving training effectiveness, it seems reasonable to imagine an effort to integrate asynchronous learning networks and high fidelity patient simulators into all components of aerospace medical technician training could greatly enhance present levels of accessibility and efficiency. Further, if these efforts prove successful, new levels of aerospace medical technician readiness may be attained. Thus, a new model for aerospace medical technician skills sustainment training should attempt such an integration effort. A potential model that demonstrates such an integration is provided below in Figure 9. In this model, ALNs and high-fidelity patient simulators are used to enhance training within each component of medical skills sustainment training.

A New Model for Aerospace Medical Technician Skills Sustainment Training:

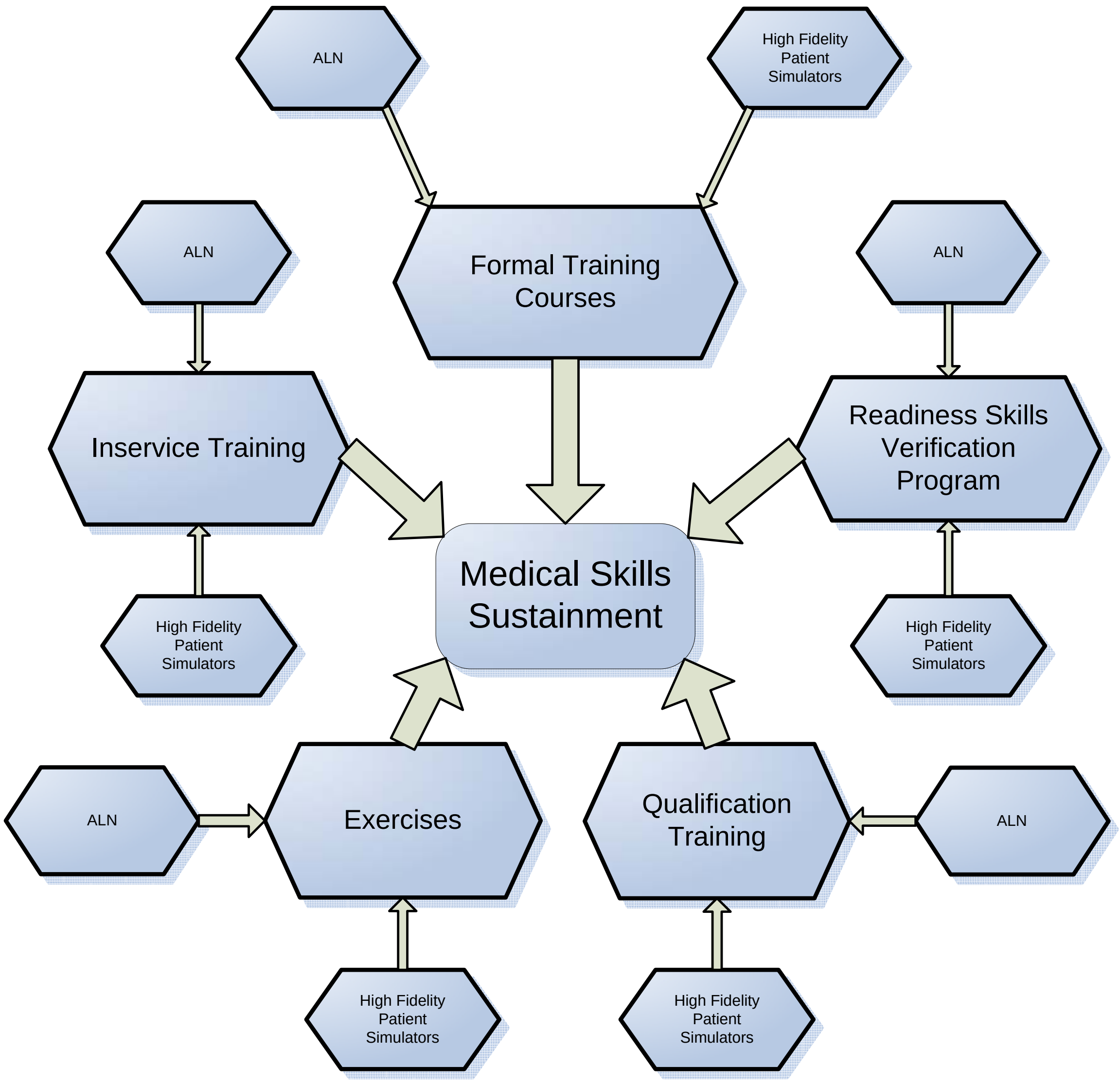


Figure 9: A New Model for Aerospace Medical Technician Skills Sustainment Training

Model Validity Concerns:

As stated from the earliest conception of this project, no effort is made to validate the new model, as this would require an entirely separate study. The main objective of this study was to demonstrate the need for change, and to provide an example of what such a change might entail. It is worthy to note, however, that the University of

Michigan, Michigan State University, and Central Michigan University have each achieved such an integration through technology provided by Medical Simulation Modeling Advanced Research and Training (MedSMART) (http://www.med-smart.org/).

Hints of Validity From a Relevant Case:

MedSMART provides improved accessibility, effectiveness, and affordability with respect to medical skills sustainment training through the integration of distributed learning technology and high fidelity human patient simulators (HPS). This not for profit organization effectively provides training for field management of combat trauma, disaster, and nuclear, biological, and chemical (NBC) field casualty care. Even more fascinating, advanced distributed learning principles (made possible through ALN technology) and distributed interactive simulation techniques (made possible through high-fidelity patient simulators) make up the chief components of their program.

The distributed interactive simulation offered through MedSMART involves the use of simple mannequins with sensors networked to centrally located high fidelity simulators. This cutting edge technology enables MedSMART to provide medical skills sustainment training to personnel deployed anywhere in the world. In further explanation, MedSMART overcomes barriers to distance based simulation training through the integration of sophisticated, remote controlled human patient simulators with "an interactive 3-D video-teleconferencing/telepointing Internet-based network whose geographical range is unlimited" ((http://www.med-smart.org/).

Because this technology can be provided anywhere a network can be established, it has the potential to effectively address problems associated with the disparity demonstrated between deployed and home-station training environments. Differences in training ability when comparing deployed to home-station aerospace medical technician training environments could be successfully mitigated through similar applications of available technology (http://www.med-smart.org/).

Air Force Applications:

The Air Force already owns and operates several high fidelity HPSs. Additional HPSs are available to Air Force personnel through C-STARS as previously discussed. Imagine the improvements that could be realized if Air Force educators find a way to network these high fidelity patient simulators with inexpensive sensor mannequins at the different Air Force MTFs, thereby integrating the expertise of remotely located subject matter experts with localized training sites. This style of networking is definitely possible through ALNs and advanced distributed learning technology. It seems plausible that a networked learning environment as envisioned by this research project would improve present aerospace medical technician skills sustainment training capabilities dramatically.

Overall Validity of Findings:

Because validity tactics for the individual components were described in detail in Chapter 3, this section will focus on addressing the overall validity of the study. Recall form Chapter 3 that Yin provided a list of case study tactics capable of improving the four forms of validity identified in Chapter 3: construct validity, internal validity, external validity, and reliability. A brief review of the case study tactics employed to ensure critical elements of the aforementioned forms of validity are presented below. The review begins with strategies employed to ensure construct validity.

Construct Validity:

Yin asserted that construct validity is improved through utilizing multiple sources of evidence, developing a "chain-of-evidence," and by having key informants review the draft case-study report (Yin, 2003).

Multiple Sources of Evidence:

Yin's first suggestion for ensuring construct validity necessitates multiple sources of evidence. Sources for this study included archival evidence, content analysis, and secondary survey data analysis. These three evidence sources were woven together throughout the study like three strands of the same rope, significantly contributing to construct validity.

Chain-of-Evidence:

Yin's second suggestion for ensuring construct validity concerned a chain-of-evidence for the data collected. In completing this study, all data collected was placed on a single thumb drive, and later transferred to a single compact disc (CD). Once the study is complete, a copy of the disk will be sent to the study sponsor, and anyone else who wishes to view the data or study results. By ensuring the disk is available, the researcher is providing a means for interested parties to review the data in raw form (Yin, 2003). The researcher maintained the chain-of-evidence as prescribed by Yin (2003) by storing relevant evidence in the database while conducting the study. Further, the researcher ensured the integrity of the data by prohibiting access to anyone other than the coders and the primary researcher. After the study is completed, anyone who requests access to the research information will be acquiesced.

Review of Draft Case Study by Key Informants:

Yin's third tactic for establishing construct validity was slightly modified. Yin proposed that key informants should review the draft case study report. For this study, however, subject matter experts were substituted for key informants. This ensured a type of "reality check" regarding the research findings. The subject matter experts were all senior ranking Aerospace Medicine Technicians. Further, each subject matter expert had at least 17 years experience in the field.

Internal Validity:

In an effort to ensure internal validity for study, many of Yin's proposed tactics were implemented. First, the researcher used archival evidence to facilitate explanation building with respect to base closure and realignment initiatives. Next, the coding team used a "specialized" form of pattern-matching while performing the content analysis portion of the research. Finally, the researcher followed established criteria during the planning stage of the research to ensure the research design followed specific logic models as suggested by Yin (Yin, 2003: 34). Together, these tactics substantially contributed to the study's internal validity.

External Validity:

Leedy and Ormrod defined the external validity as "the extent to which its results apply to situations beyond the study itself (Leedy et. al, 2001: 105). Yin (2003) added that external validity is achieved in qualitative research when the researcher uses analytical generalization to infer a specific set of results on some broader group or theory. The researcher must take precautions not to "automatically" infer or generalize. Any generalization or inference derived from a single case study can only be considered theoretical until it is tested through replication logic (Yin, 2003: 37).

While it seems logical that the results of this study would apply to medical technicians in the sister services (Army, Navy, Marines, Coast Guard), Yin's warning not to automatically infer suggests that external validity must be listed as a potential limitation of the study. This makes sense because this thesis effort represented an embedded single case design. As a single case study, findings must be considered theoretical until validated through replication as suggested by Yin (2003:37)

Reliability:

Bouma (2000) suggested that a study is considered reliable if "researchers using the same measuring device would get the same results when measuring the same event (Bouma, 2000: 86). Leedy and Ormrod added the question of reliability is a question of consistency. As such, reliability is achieved when a study's author takes steps to ensure future researchers can use the same processes and procedures in the same way to achieve the same results. Yin (2003) further suggests that a study may still be reliable, even if the results of the study are different, as long as the procedures and processes were applied in a manner consistent to the previous study (Yin, 2003: 37-38)).

Sufficient documentation serves as a primary means of ensuring reliability. By appropriately documenting each step of the research and the protocols used, the researcher lays the foundation for consistency in future research efforts. The case study database, the case study protocol, the case study appendices, and the chapter on case study research methodology serve as sources of documentation that future researchers can use to replicate or audit this study. These steps are in compliance with Yin's suggested case study tactics proposed to ensure reliability: (1) Use case study protocol, and (2) Develop a case study database (Yin, 2003: 34).

Benefits of Research:

This research validated the need for a new aerospace medical technician skills sustainment training model and provided a potential model for future implementation. It is the hope of the researcher that the suggested training model will enable meaningful and lasting knowledge transfer for Aerospace Medical Technicians, thereby increasing existing levels of medical readiness. Additional benefits realized through this research include:

- A broad-brush view of problem areas regarding required training as mandated in the CFETP.
- Confirmation of decreasing resources experienced by Air Force Aerospace Medical Technician trainees and trainers.
- Exploration of decreasing experience levels exhibited by Air Force Aerospace Medical Technician trainers.
- Application of findings to other medical related AFSCs.
- The development of a potential alternate training model that further exploits the advantages of existing resources such as IT.
- A starting point for future research concerning the efficacy of such a model.
- Insight into the nature of Air Force Aerospace Medical Technician training issues/problems as reported by AF trainees and trainers.
- Possible applications to other medical and non-medical career fields throughout the Department of Defense (DOD).

Limitations:

There were many limitations associated with this research effort. First, while the changes listed in this study are valid, a possible confounding variable exists in the recent merger between the 4N (formerly medical service specialists) and the 4F (formerly aerospace medicine technician) career fields. While the merger probably significantly impacts training, the scope of the merger issue is significant enough to warrant a separate study.

Second, the content analysis portion of this study was based on lessons learned from a single website. It is quite possible that these lessons learned are not entirely representative of the potential lessons learned that exist. The primary researcher encountered extreme difficulty in attempting to locate lessons learned that pertained specifically to aerospace medical technicians. It was somewhat disappointing that no positive natured "real-world" lessons learned were posted to the study's website.

Third, the software suite used by AFOMS offered no export or import feature, and was not made available to the primary researcher. This proved problematic, as the primary researcher was not able to perform desired sorting of data for further analysis. For example, the ability to sort responses according to nature of work (outpatient vs. inpatient, etc.) would have been very helpful. The inability to perform these actions detracted somewhat from the original intent of the study.

Fourth, because the study was exploratory in nature, the findings are considered theoretical until proven through replication logic. Still, the findings of individual component analyses help to mitigate this limitation. For example, while the study is exploratory in nature, findings resultant to historical analysis and quantitative analysis (ANOVA) must be considered objective in nature.

Finally, no attempt was made to test the validity of the model. Because this study was already multi-faceted in nature, such a test would have proven overwhelming to the current study. A separate study to evaluate model validity should be conducted, however, before actually implementing the proposed model. This concludes the list of limitations. The thesis now turns to future research opportunities.

Future Research:

This research effort revealed numerous opportunities for future research. First, a follow-on study to establish model fidelity might be in order. Second, a study that compares the confidence and competence of aerospace technicians assigned to critical care areas to those assigned to outpatient clinics with respect to the top 100 skills performed in deployed work environments would be very interesting. Finally, a study utilizing the technology acceptance model might be useful in determining resistance to change with respect to the implementation of ALNs and high-fidelity human patient simulators.

Conclusion:

Since their earliest days with the Army Air Corps, Air Force enlisted medical technicians experienced a robust skills sustainment training environment through exposure to multi-faceted patient scenarios. Available training environments included inpatient care, outpatient care, and emergency services. The diversity of training scenarios experienced was possible because operating budgets were large and the Department of Defense medical infrastructure was enormous.

Today (after five separate base closure and realignment initiatives), medical funding and infrastructure is but a shadow of what it once was. Budget constraints, and the rising cost of healthcare have necessitated a purposeful movement away from inpatient and emergency care, toward outpatient and preventative medicine.

Although changes in the Air Force health care delivery system may be necessary, the closure of inpatient units and emergency service departments around the Air Force has significantly impacted the Air Force's ability to train medical professionals and paraprofessionals for operations in a deployed setting, especially in the area of medical skills sustainment training. This research effectively validated the need for an alternate model for medical skills sustainment training. Further, an alternate model for aerospace medical technician skills sustainment training was introduce with the hope that model integration will assist students and trainers in overcoming training limitations realized in a training environment plagued by personnel reductions, budgetary constraints, and the near complete loss of inpatient and emergency services.

Appendix A: Air Force Operations News Medical Lessons Learned

	Synopsis of Issue	Source Document	Remarks	Date Completed
1	Experienced Crew Management Cell (CMC) staff can enhance and have a direct impact on the mission.	459th AES, Andrews AFB, MD 25 Feb 03-4 May 03; 775 EAES, 13 Aug 03	Limited experience at all levels is a fact of life. We can recommend experience as a key requirement to the personnel system.	2/23/2005
2	CCATT assets were inappropriate and in some cases ineffectively utilized to accomplish the mission.	491st {later 791st} EAES, Ramstein AB, Germany, 7 April to 31 July 2003	Doctrine on employment of CCAT requires revision, CCAT training program requires revision.	2/23/2005
3	The 459th Life Support personnel are to be commended for issuing CCATT necessary gear without written guidance and offering a last minute "crash course" on its use.	491st EAES, 27 Feb 03-19 Jul 03	Seems to be a current theme with CCAT on issues of training & equipment.	2/23/2005
4	Many validating Flight Surgeons had little if any understanding of what types of patients CCATT teams were capable of moving and what patients did not require CATT expertise resulting in poor, inefficient utilization of the asset.	491st EAES, 27 Feb 03 - 19 Jul 03	It seems the doctrine on how to employ the CCAT is either not clear or the field is not well versed. Or I suspect a combination of both. I recommend a re-look at the doctrine and concept of operations for the employment of the CCAT.	2/23/2005
5	If TRAC2ES is the main enterprise for patient regulations, it is imperative that medical units, regardless of branch of service, are proficiently trained.	86 MDG/ASF, Ramstein, GE, no date	How are we training our personnel? Fire hose method?	2/23/2005
6	Ensure unit personnel have necessary expertise.	320 EAES, Seeb, Oman, 2 Mar to 20 May 2003	Limited experience at all levels is a fact of life. We can recommend experience as a key requirement to the personnel system.	2/23/2005
7	Development of a standardized C2 Lesson Plan created by a single AMC Directorate which includes CONOPS, UTC training requirements, and Theater Chain of Command is required.	775 EAES, 13 Aug 03 AE presentation (Leesburg), BG Hemminger	How are we training our personnel? Fire hose method?	2/24/2005
8	The opinion held by some superiors that we will not need training in rotary-wing or other special operations environments is not valid.	EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03	No comments	2/24/2005
9	Hands on experience for our members during the Motown Medics training program was extremely beneficial.	186 MDS, 7/13/2003	No comments	2/24/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
10	Current training does not prepare crews for combat conditions. Development of an AE Survival Training for AECM and CCATT personnel is needed. Training needs to reflect the environment with sustainment training gearing towards trauma.	AE Lesson Learned Power Point presentation, Sep 03; --AMC/DOOE 491ST EAES, Mar-Aug 2003	Valid requirement for combat survival training.	2/24/2005
11	Training is required for AE personnel in the area of interoperability between AE airframes, rotary wing and fixed wing aircraft.	775 EAES, 13 Aug 03 EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03;	I was under the impression that AE crews where trained on diverse platforms. If not then this issue must be addressed in light of our operational tempo.	2/24/2005
12	Flight line driving is base specific and must be accomplished once unit members arrive at their destination base. EMEDS, CCAT and AE personnel must be familiar with flight line operations at various locations.	Scott AFB, Illinois 7/30/2003	Flight line driving requirements are one of the basic core requirements. Lack of training in this case became a safety risk.	2/24/2005
13	Insufficient training on non-medical assets and equipment resulted in AECM and CCATT personnel were unfamiliar with the use of WRM Equipment.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	2/25/2005
14	Lack of preparedness on part of a lot of the officers and enlisted alike, i.e. not physically fit, no knowledge or experience with wearing MOPP gear, improper response to alarm conditions, etc	386 EMDG, Ali Al Salem, Suedbeck, 12 Dec 02 to 28 April 03	This is a powerful comment on our readiness status	2/25/2005
15	Line commanders fail to understand food safety/contracting issues. Background: Commanders sacrifice safety for morale and “good will”. Impact: Mission compromised by food-borne outbreak/poor contracting with no QA provisions.	BEE Lesson Learned Power Point, 5-17 Dec 03 Site Y 22 Jan 2003 to 12 May 2003	Sick troops due to food poisoning will not improve morale.	2/25/2005
16	OIF Blood Support-Supplies, in particular Collins boxes, boxes at times were in short supply.	AF Blood Program Office, Lt Col McBride, Jan 03 - present	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	2/25/2005
17	Implement vehicle licenses into UTC training requirements.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	Flight line driving requirements are one of the basic core requirements.	2/25/2005
18	Ramstein provides an excellent site for training, enables deployed personnel to understand function at our mission when deployed.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	No comments	2/25/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
19	Staying current in ACLS, ATLS, PALS certification is essential in a deployed environment.	Maj John Cotton, no location, no unit, Sep 03; Al Dhafra, 9/19/2003 Capt Teresa Goodman, Sep 03,	No comments	2/25/2005
20	Medical Groups need to deploy their best (not their worst) members. Lack of adequately trained and motivated personnel are being deployed without opportunity to complete training necessary for mission accomplishment.	Capt Teresa Goodman, Sep 03, no unit, no location-- 386 EMDG, Ali Al Salem, Suedbeck.	Lack of training is a recurrent theme.	2/25/2005
21	I thought that medicine would be my biggest challenge. Instead it was administrative, planning, manning documents and chain of command issues.	Capt Teresa Goodman, Sep 03, no unit, no location-- 386 EMDG, Ali Al Salem, Suedbeck.	Chain of Command Issues.	2/25/2005
22	There was insufficient preparation for the repatriation portion of personnel recovery duties prior to deployment and no clear and concise view of Combatant chain-of-command.	BEE Lesson Learned Power Point, 5-17 Dec 03 Site Y 22 Jan 2003 to 12 May 2003	The issue of Chain of Command Confusion repeats itself.	2/25/2005
23	No established method to produce operational psychologists who have the necessary training, certifications, and experience to meet AFSOC requirements. Providers are not prepared to deal with operational stress reactions.	Mental Health Consultant, Col Talcott, no date--Deployed Medical Care presentation, Col Cristianson, no date	Would this require a special course to prepare a psychologist for SOF support & deployment.	2/25/2005
24	More training in the use of side arms was necessary. The management of weapons was inconsistent. Additionally, other important security and survival measures were lacking such as searching personnel for weapons and using maps for coordinates.	EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03	All facets of training seem to require top down review.	2/25/2005
25	The deploying dentist needs to be fully aware of what the EMEDS Allowance Standard contains and capable of setting up all equipment by themselves.	379th Air Expeditionary Wing (AEW), Al Udeid Air Base (AUAB)	Good point, the question is who is responsible for becoming aware and trained on the TOE? EMEDS or the Dentist?	2/28/2005
26	The staff at CRTC Alpena has done an outstanding job of making the training realistic and meaningful.	EMEDS Training 2003 – Alpena CRTC, Michigan, 7/13/2003	Good review.	2/28/2005
27	Lack of EMEDS MIN XRAY, ACR 2000, and ULTRASOUND training for X-ray technician.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK-ACC	2/28/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
28	I think it is essential for ALL medical people who are deploying to go to EMEDS training, it was the best thing I could have done.	321st Expeditionary Medical Operations Squadron, Masirah Island Air Base, Oman, 30 May 2002—04 Sept 2002	Good follow up recommendations.	2/28/2005
29	Lack of MFST and EMEDS training for deploying providers	Al Udeid AB, Qatar, 9/15/2003	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	2/28/2005
30	Major deficiency noted in training to use the TRAC2ES, SIMLM, TCAM and other applications for AFMS personnel deploying to the AOR.	HQ ACC AAR Review, Aug 03 IM/IT presentation, Col Janice Lee, no date	Medical System personnel do not deploy with EMEDS?	3/1/2005
31	Add special equipment training (forklift, water buffalo towing, etc.) for enlisted and selected officers.	EMEDS Conference, 23-24 May 02 & MacDill AFB, FL, Jun 03	Added training would assist EMEDS package in becoming more self-sufficient.	3/1/2005
32	Inadequate training of EMEDS CC/staff to interact with other disaster assets.	EMEDS Conference, 23-24 May 02 & MacDill AFB, FL, Jun 03	Teaching Federal Response Plan to command staff is a step in the right direction. Embedding planning staff with that expertise?	3/1/2005
33	EMEDS, CCAT and AE personnel unfamiliar with flight line operations.	Deployed Medical Care presentation, Col Cristianson, no date	Flight line driving requirements are one of the basic core requirements.	3/1/2005
34	Personnel were not trained on Global Expeditionary Medical System (GEMS) software prior to deployment resulting in a high requirement for technical assistance placed on limited computer support staff.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03 & 458 EMS, Constanta, Romania, TSgt Posten, no date.	Added training would assist EMEDS package in becoming more self-sufficient.	3/1/2005
35	Medical planners fill requirements via capability (“spaces”…not “faces”). UTCs not trained or exercised to standards. Expertise and capability varied greatly.	BEE Lesson Learned Power Point, 5-17 Dec 03	Was this an isolated incident or a constant problem with personnel sourcing this UTC?	3/2/2005
36	GME programs suffered due to mobility.	No name of unit or person mentioned.	No comments.	3/2/2005
37	The CONOPS for the FFGKV team is not consistent with how the team was utilized compromising team integrity and training.	BEE Lesson Learned Power Point, 5-17 Dec 03-379th EMEDS Souda Bay, Greece. 3 Mar - 12 Apr 03	Was this an isolated incident or a constant problem with personnel sourcing this UTC?	3/2/2005
38	The implementation of new information technology systems during significant combat operations put undue stress on Component staffs.	No name of unit or person mentioned.	No comments.	3/2/2005
39	No communication/coordination between BIO, CEX, BAT for WMD	363 EMDG/SGPC, Prince Sultan Air Base,	Good review. Coordination on WMD is essential	3/2/2005

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40	AFR/ANG received greater access to Comm assets. MAJCOM purchase a complete set of communications equipment for training.	AE Lesson Learned Power Point presentation, Sep 03, AMC/DOOE	This should be moved to Equipment.	3/2/2005
41	Current local readiness training is inadequate for real world, bare base deployment situations Extended Reach Concept.	BEE Lesson Learned Power Point, 5-17 Dec 03-379th EMEDS Souda Bay, Greece. 3 Mar - 12 Apr 03	Was this an isolated incident or a constant problem with personnel sourcing this UTC?	3/2/2005
42	Training: Field ATLS protocol was strictly adhered to, and life threatening injuries were identified in prompt fashion.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/5/2005
43	Training: Litter command, control, and movement were performed safely. Patients were placed on the litter using appropriate spinal precautions.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/6/2005
44	Training: Airway compromised patients were identified quickly and appropriate actions were taken.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/6/2005
45	Training: In addition, airway patients were organized in the triage site next to one another, and reassessed frequently. Prompt intubations were performed when airway function deteriorated.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/6/2005
46	Training: There was an excessive amount of burn victim patients with airway compromise.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/6/2005
47	Training: In addition to prompt airway management, fluid resuscitation was begun early and appropriately, which is essential to decreasing the morbidity and mortality of burn victims.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/6/2005
48	Training-CRITIQUE: Not enough litters.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/7/2005
49	Training-CRITIQUE: No use of medical supplies during mass casualty inspections creates an artificial environment.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/7/2005
50	Training-CRITIQUE: There was lack of manpower at the incident site.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/7/2005
51	Training: Field fracture management was quickly performed using appropriate splinting technique, which allowed safer patient transport and further damage.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/7/2005

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52	Training-CRITIQUE: Significant delay in medical response; Approximately 58 minutes after the incident, the first medical response team arrived.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/7/2005
53	Training-CRITIQUE: Insufficient training on proper ambulance loading. Patient's loaded into ambulances incorrectly.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/8/2005
54	Training-CRITIQUE: They were loaded in an order that didn't make the highest priority the first off	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/8/2005
55	Training-CRITIQUE: Pt's were being loaded over Pt's already in the ambulance.	506 EMEDS, Major Zierold, USAF, MC 2 July 2005	No comments.	7/8/2005
56	Training: Annual home station field exercises should include deployable equipment training/use, including Global Expeditionary Medical Service database.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
57	Training: Upon arrival, no 4N0X1s with ambulance driver's qualifications were also certified to drive on the flight line. This necessitated EOSS personnel taking time to train them locally.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
58	Training: EMEDS training every two years is not sufficient for people to maintain proficiency on deployment specific medical equipment and databases. These are rarely used by personnel at home station.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
59	Medical Education and Training: Participated in medical education and training of EMEDS personnel, Dust-off medics, and Army medical staff.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
60	Training: All potential ambulance drivers should be qualified/trained in flight line driving prior to deployment.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
61	Training: Once deployed, personnel must adapt to and learn/relearn to use the new equipment. The equipment is also maintained by a contract company.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
62	Training: Recommend IDMT's rotate through Drug Testing Office at DM. Currently the 1st Sgt gets the training	Inca Gold After Action Report, CURAÇAO, NETHERLANDS, 10 Jan 2005	No Comment.	8/26/2005

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63	Facilities & Materiel: A digital X-ray unit was received at the very end of the rotation (last 2 weeks) and was not utilized due to existing personnel's unfamiliarity with the system.	AAR, 386th EMG, Desai, LtCol, Ali Al Salem AB, Kuwait, March 2004	Reoccurring issues of deployed personnel not trained on deployed equipment.	9/2/2005
64	Joint: There was NO training or processing at Fort Benning. This was a complete waste of time and only served to pull our deploying airmen away from their families early.	AAR-1st PMTAF, LtCol Duque, Camp Udairi, Kuwait, June 2004	Army requirement should be checked at Air Staff level to see if it's valid for medical support personnel.	9/2/2005
65	Training: There was no training on how the Army accomplishes documentation of occupational and environmental exposures to personnel on deployment as required by the Joint Chiefs of Staff and Presidential Directive 5.	AAR-1st PMTAF, LtCol Duque, Camp Udairi, Kuwait, June 2004	Lack of training in sister service procedures are crucial for a smooth operation.	9/2/2005
66	Training: This course concentrated on Army doctrine and introduction to some of the Army preventive medicine regulations. There was very little review of the contents of the applicable regulations.	AAR-1st PMTAF, LtCol Duque, Camp Udairi, Kuwait, June 2004	No comments.	9/2/2005
67	Training: The 1st PMTAF attended a one week training course at the Army Center for Health Promotion and Preventive Medicine (CHPPM).	AAR-1st PMTAF, LtCol Duque, Camp Udairi, Kuwait, June 2004	No comments.	9/2/2005
68	Accomplishments: This was successfully tested during two base wide Mass Casualty exercises. Nursing also utilized as liaison between local hospitals and 386 AEW/EMDG CC.	AAR, 386th EMG, Desai, LtCol, Ali Al Salem AB, Kuwait, March 2004	No comments.	9/2/2005
69	Training: A positive success was conducting hands on training with CE Readiness and Fire Department counterparts to keep informed on other functional's equipment capabilities, limitations, and expertise.	E-Mail DTG 1 September 2005, 6:30 AM, SMSgt Wiederholt, USAF	No comments.	9/9/2005
70	Training: Helicopter experience – CASF members need recent familiarization with the on-load and offload procedures for UH-60s and Chinook UH-47s. Army Med Evacs use this airlift.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005

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71	Training: Personnel assigned to Bioenvironmental Engineering need to be certified to run the HAP-SITE, a crucial piece of monitoring equipment.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
72	Training: As flying missions continue to grow and diversify, an assigned flight surgeon to EMEDS would greatly enhance patient care for all personnel on flying status.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
73	Training: The severity and intensity of patient exposures necessitate a staffing enhancement consideration. Also, nutritional medicine has been a huge benefit to the CASF mission.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
74	Training: Mission staffing adjustments – Flight Surgeons and Nurses and Medical Techs would be better able to perform in Balad if they have recent/current trauma, critical care, or emergency medicine experience.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
75	Training: Licenses and certifications/licenses need to be current through the period of deployment for a member to volunteer. Also, members need to report with their credentials or 6-part folders.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
76	Training: Also, some staff members EMT certifications expired while deployed, resulting in reassignment to ancillary duties.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
77	Training: Early mission assignments are based on the expectation staff members will report qualified to perform the mission. Suggests rolling fleet to ensure each reserve, guard, or active base has access to train with various vehicles.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
78	Training: For the CASF, many members arrived without Ambus or even Bus on their licenses. Other vehicles of opportunity were assigned, including HUMVEES, 2 ½ Ton, Stakebeds and 1 Ton Pickups.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005

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79	Training: Only two of the four temporary 4B071's (Bioenvironmental Engineering) were trained to run the HAP-SITE equipment - equipment crucial to the 4B Wartime Concept of Operations.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
80	Training: Personnel Reporting without Certifications and Driver Training – Approximately 40% of the reporting staff were without driver's license certifications in mission assigned vehicles.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
81	Training: This was a fairly useful course though much time was spent on water, air or soil sampling kits which the Bioenvironmental Engineering technicians already had some proficiency with.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
82	Training & Joint: More time should have been spent on Army procedures, organization, protocol and points of contact.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
83	Training & Joint: The instructors were very knowledgeable, but where our expectations were what we could currently expect to find in this particular theater working with the Army	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
84	Training & Joint: and how to prepare, as well as what was expected of us, the course was more generic and non-specific.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
85	Training: The 2nd PMTAF-C team taught a monthly Field Sanitation Team course to Army and Navy personnel and provided as often as requested, Medical Threat briefings to personnel deploying to Iraq.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
86	Training: The 2nd PMTAF-C team was not responsible for tracking immunizations, conducting Post Deployment Health Surveillance reports or DNBI reporting.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
87	CATM training scheduled for day prior to deployment causing undue stress.	AAR, Captain Eaton, Camp Buehring, Kuwait, Aug – Dec 04	No comments.	9/16/2005
88	We were required to carry weapons in Kuwait, it was very beneficial to complete weapons training just prior to deployment.	AAR, Captain Eaton, Camp Buehring, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005

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89	Training: We were required to attend a CHPPM Preventive Medicine course to be familiarized with Army procedures for their Preventive Medicine teams.	AAR, Major Shibukawa-Kent, Camp Arijfan, Kuwait, 10 Aug 04 – 21 Dec 04	No comments.	9/16/2005
90	Training: Lack of instrument/procedure operating instructions - compiled 27 instruments and procedure OIs; prepped lab for sustainment operations.	AAR-407th EMDG, Colonel Williams, Silver Rotation, 7 March-7 June 2004	Reoccurring theme.	9/30/2005
91	Training: Lack of priority system for lab results contributed to poor utilization of lab personnel - devised lab result priority system (STAT, ASAP, Routine) and designated time for routine lab draws to better utilize limited lab personnel.	AAR-407th EMDG, Colonel Williams, Silver Rotation, 7 March-7 June 2004	No comments.	9/30/2005
92	Training: Developed policy letter outlining requirements for processing and shipping specimens.	AAR-407th EMDG, Colonel Williams, Silver Rotation, 7 March-7 June 2004	No comments.	9/30/2005
93	More hands-on training for wartime skills. In-service training is not enough. Staff with training from the inner city hospitals had the best experience and skills.	Maj Bischel, Chief Nurse +25, FFEP4 Qatar, January 03 - May 03	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005
94	Lack of adequately trained and motivated personnel, Lack of basic medical materials and supplies	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem: Leolyn.Bischel@spangdahlem.af.mil	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005
95	Training programs must be staffed above their critical RRC required manning, in order to support mobility while avoiding violation of RRC rules.	Sharon G. Harris, MD Col, USAF, MC Endocrinology Flight Commander,	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005
96	Taking a program down below critical RRC staffing numbers by deployments should only be done if there is no other alternative.	Sharon G. Harris, MD Col, USAF, MC Endocrinology Flight Commander,	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005
97	Training-continued from above: instead of making the injured troops travel. This would mirror the Army PT role to various FOBs in theater.	Major Reinhardt, Chief, Physical Medicine & Occupational Therapist, Balad AB Iraq- 25 April 2005	Requires follow up.	10/21/2005
98	Training: This keeps boots on the ground in the AOR, and eases the aeromedical evacuation system burden.	Major Reinhardt, Chief, Physical Medicine & Occupational Therapist, Balad AB, 25 April 2005	Requires follow up.	10/21/2005

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99	Training: If injured Marines, Soldiers, Airmen and Sailors are referred to PT/OT acutely, there is a higher likelihood they may be able to return to full duty with minimal downtime.	Major Reinhardt, Chief, Physical Medicine & Occupational Therapist, Balad AB Iraq- 25 April 2005	Requires follow up.	10/21/2005
100	Training: If sufficient PT/OT providers available in the AOR, then they could take helicopter flights to various FOBs to provide care	Major Reinhardt, Chief, Physical Medicine & Occupational Therapist, Balad AB Iraq- 25 April 2005	Requires follow up.	10/21/2005
101	Training: Need to educate providers throughout the AOR of rehabilitative services available.	Major Reinhardt, Chief, Physical Medicine & Occupational Therapist, Balad AB Iraq- 25 April 2005	Requires follow up.	10/21/2005
102	All personnel on the EMEDs package be trained in its use (this does usually happen in most bases that have an EMEDs mission)	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
103	Deployed personnel without training	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
104	Nurse midwife deployed as chief nurse but had no prior EMEDs training.	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
105	She was unfamiliar with the contents of the EMEDs and where she would be obtaining equipment and supplies that were not included in the package.	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
106	This will gradually build a civilian core and offer stability to the programs.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
107	VA ventures or even employing active duty medical in civilian facilities may need consideration in order to develop, enhance, and maintain top-notch clinical skills.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
108	Turnover is extremely high, especially in internal medicine.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
109	This will gradually build a civilian core and offer stability to the programs.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006

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110	(the RRC requires 5 years of experience for program directors), it will become increasingly difficult to keep the PD and key teaching positions filled with qualified military officers.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
111	The ops tempo has been high since 911, and shows no sign of decreasing.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
112	Ensure all nurses in the reserves are working at least part-time in the medical arena, especially when filling primary slots on UTCs	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
113	It has been reported on different instances and settings that there were issues with the clinical ability of some reserve nurses.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
114	Future training program gaps need to be identified proactively and civilian fills sought as soon as it is apparent that there is no qualified military officer.	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
115	Decreased skill level of military staff may be an increasing problem.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
116	Clinic arena does not allow for the technician to solidify their new learned profession.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
117	Additionally, issues were reported where medical technicians, especially those whose only work experience has been in clinics, had difficultly with basic nursing skills i.e. Continued below	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
118	With ever increasing RRC requirements for training programs and the need for experienced people in key positions-continued below	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
119	New technicians directly out of technical school working in the clinic environment or only work in the in-patient setting for a brief period of time before moving to the clinic.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
120	Even some of the AF “hospitals” now only see very low acuity patients.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
121	Skills learned in school are never developed.	Penelope F. Gorsuch, Maj, USAF, NC.	Posted to IC database. Follow on analysis.	1/16/2006

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122	May also begin to see a decrease in skill levels in active duty nurses/even physicians.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
123	Issue: The knowledge levels of both nurses and medical technicians have been addressed as concerns.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
124	Air Force Medical facilities have scaled down in-patient to more outpatient services.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
125	Intravenous flow drip rates, starting intravenous lines, common illness signs and symptoms etc. Supporting Information: Reserve nurses, must hold an active nursing license	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
126	Ensure nurses maintain enough civilian working hours as a nurse to be on a UTC.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
127	Cleanliness - Toilets were located too far. Nurses and Techs emptied bedside commodes frequently until soldiers could walk the distance to the latrine located outside the hospital.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
128	Logistics – The FFGKV equipment package did not arrive in theater until +40 days after the team arrived at the bare base.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
129	D5 1/2NS and D5 1/4NS IV fluids were not available on the supply list so staff had to mix it themselves, depleting other stocks and exposing patients to possible hazards such as medication errors and infection.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
130	Nurses and Technicians performed as housekeepers, adhering to a schedule of sweeping, mopping and dusting.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
131	Nurses had to obtain them from their original bases. Nursing Care - Nursing care plans, Operating Instructions, and other important forms were scarce.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
132	Medical Supplies and Materials - Logistic packages were inadequate. Packages coming from other bases often had old, incomplete equipment.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006

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133	Staff had to beg, borrow, and steal to get adequate material to do their jobs.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
134	Wool blankets are sent, causing a fire hazard to inpatient units with oxygen.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
135	Adequate facilities – Need separate tents for enlisted and officer staff.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
136	Critically the nursing RSVs to ensure they include all important basic and specialized skills required for wartime settings.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
137	Provide more focused, well-developed training annually rather than the current cycles of Q 15-30 months based on the AEF cycles One of the most important lessons is this: everyone worked hard every day for so many hours.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
138	Many nurses needed to talk to the psychologist about the experiences they heard about.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
139	Equipment – The equipment package for the FFGKV team was inadequate for the bare base environment with limited external sources or supplies/equipment.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
140	Many things could have been missed because nurses were only used to healthy patients coming in for a specific complaint needing nothing but that one system taken care of.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
141	Team Integrity and Training – The CONOPS for the FFGKV team is not consistent with how the team was utilized.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006

	Synopsis of Issue	Source Document	Remarks	Date Completed
142	The training for the FFGKV is inadequate.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
143	Joint Operations Concerns – The medical screening process for other services Reserve components and the Air National Guard did not meet the same standards as the Air Force.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
144	Ensure logistical packages are appropriate and adequate for current times	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
145	In-service training is not enough. Staff with training from the inner city hospitals had the best experience and skills.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
146	The FFGKV was not properly trained on joint service policies and standards.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
147	Assign new medical technicians to inpatient units directly out of school for solidification of education from tech school.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
148	Also, look at duty assignments and alternation between clinic facilities and in-patient facilities to maintain skill levels.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
149	Ensure deployable facilities are provided educational material for in-field OJT.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
150	Explore other avenues of maintaining skill levels, i.e. expand CSTARS to more individuals, VA ventures, civilian ventures with local communities.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
151	Lack of adequately trained and motivated personnel.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
152	Medical Groups should deploy their best (not their worst) members. One nurse sent because her unit wanted to get rid of her.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006

	Synopsis of Issue	Source Document	Remarks	Date Completed
153	More hands-on training for wartime skills.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
154	Compassion - soldiers needed to talk about things. Many were sent to the psychologist after nurses spent time talking to them.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
155	Basic nursing care needs to be emphasized.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
156	Total bed baths needed to be given to soldiers who had been out in the elements for 4 - 8 weeks wearing the same uniform and never taking a bath.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
157	That couldn't be over looked and nurses needed to make sure they saw every inch of the soldiers' body.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
158	More training on chemical and biological agents, detection, and treatment.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
159	Nurse was supposedly an Intensive Care Unit nurse, but did not have the necessary skills.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
160	Nurse routinely committed errors (6 medication errors and 10 breeches in standards of practice in one shift) in addition to numerous near misses.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
161	She was transferred from ICU into a general Med-Surgery unit under another nurse's supervision. She seemed well meaning but very dangerous.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
162	Lack of basic medical materials and supplies.	Maj Leolyn Bischel, Maternal-Child Flight Commander, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006

Appendix C: Content Analysis Coding Book

Content Analysis Variables:

- **Applicability:** Does the lesson learned actually apply to aerospace medical technicians?

- **Environment:** Was the lesson learned submitted from a real-world or scenario exercise environment?

- **Nature of Finding:** Did the lesson learned reflect a positive or negative finding?

Rationale for Variable Selection:

- **Applicability:** The "applicability" variable was selected, because only lessons learned pertaining to the aerospace medical technician career field were desired for further analysis.

- **Environment:** The "environment" variable was selected after noting that many of the lessons learned referenced simulated situations (exercises) and may have skewed the real world data.

- **Nature of Finding:** The "nature of finding" variable was chosen, because the coding team felt lessons learned that were negative in nature would be highly suggestive of problems attributable to the current training model.

Appendix C: Real World Aerospace Medical Technician Lessons Learned

	Synopsis of Issue	Source Document	Remarks	Date Completed
1	Ensure unit personnel have necessary expertise.	320 EAES, Seeb, Oman, 2 Mar to 20 May 2003	Limited experience at all levels is a fact of life	2/23/2005
2	The opinion held by some superiors that we will not need training in rotary-wing or other special operations environments is not valid.	EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03	No comments	2/24/2005
3	Current training does not prepare crews for combat conditions. Development of an AE Survival Training for AECM and CCATT personnel is needed. Training needs to reflect the environment with sustainment training gearing towards trauma.	AE Lesson Learned Power Point presentation, Sep 03; --AMC/DOOE 491ST EAES, Mar-Aug 2003	Valid requirement for combat survival training.	2/24/2005
4	Training is required for AE personnel in the area of interoperability between AE airframes, rotary wing and fixed wing aircraft.	775 EAES, 13 Aug 03 EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03;	I was under the impression that AE crews where trained on diverse platforms.	2/24/2005
5	Flight line driving is base specific and must be accomplished once unit members arrive at their destination base. EMEDS, CCAT and AE personnel must be familiar with flight line operations at various locations.	Scott AFB, Illinois 7/30/2003	Flight line driving requirements are one of the basic core requirements.	2/24/2005
6	Insufficient training on non-medical assets and equipment resulted in AECM and CCATT personnel were unfamiliar with the use of WRM Equipment.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	2/25/2005
7	Lack of preparedness on part of a lot of the officers and enlisted alike, i.e. not physically fit, no knowledge or experience with wearing MOPP gear, improper response to alarm conditions, etc	386 EMDG, Ali Al Salem, Suedbeck, 12 Dec 02 to 28 April 03	This is a powerful comment on our readiness status	2/25/2005
8	Implement vehicle licenses into UTC training requirements.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03	Flight line driving requirements are one of the basic core requirements.	2/25/2005
9	Staying current in ACLS, ATLS, PALS certification is essential in a deployed environment.	Maj John Cotton, no location, no unit, Sep 03; Al Dhafra, 9/19/2003 Capt Teresa Goodman, Sep 03,	No comments	2/25/2005
10	Medical Groups need to deploy their best (not their worst) members. Lack of adequately trained and motivated personnel are being deployed without opportunity to complete training necessary for mission accomplishment.	Capt Teresa Goodman, Sep 03, no unit, no location-- 386 EMDG, Ali Al Salem, Suedbeck.	Lack of training is a recurrent theme.	2/25/2005
11	More training in the use of side arms was necessary. The management of weapons was inconsistent. Additionally, other important security and survival measures were lacking such as searching personnel for weapons and using maps for coordinates.	EMF TEAM 2/OIF/JDOTF-N/FOB 102, Dec 02-May 03	All facets of training seem to require top down review.	2/25/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
12	I think it is essential for ALL medical people who are deploying to go to EMEDS training, it was the best thing I could have done.	321st Expeditionary Medical Operations Squadron, Masirah Island Air Base, Oman, 30 May 2002—04 Sept 2002	Good follow up recommendations.	2/28/2005
13	Major deficiency noted in training to use the TRAC2ES, SIMLM, TCAM and other applications for AFMS personnel deploying to the AOR.	HQ ACC AAR Review, Aug 03 IM/IT presentation, Col Janice Lee, no date	Medical System personnel do not deploy with EMEDS?	3/1/2005
14	Add special equipment training (forklift, water buffalo towing, etc.) for enlisted and selected officers.	EMEDS Conference, 23-24 May 02 & MacDill AFB, FL, Jun 03	Added training would assist EMEDS package in becoming more self-sufficient.	3/1/2005
15	Inadequate training of EMEDS CC/staff to interact with other disaster assets.	EMEDS Conference, 23-24 May 02 & MacDill AFB, FL, Jun 03	Teaching the Federal Response Plan to command staff is a step in the right direction.	3/1/2005
16	EMEDS, CCAT and AE personnel unfamiliar with flight line operations.	Deployed Medical Care presentation, Col Cristianson, no date	Flight line driving requirements are one of the basic core requirements.	3/1/2005
17	Personnel were not trained on Global Expeditionary Medical System (GEMS) software prior to deployment resulting in a high requirement for technical assistance placed on limited computer support staff.	444th EMS, King Faisal Air Base, Jordan, 16 Jan 03 & 458 EMS, Constanta, Romania, TSgt Posten, no date.	Added training would assist EMEDS package in becoming more self-sufficient.	3/1/2005
18	Medical planners fill requirements via capability (“spaces”…not “faces”). UTCs not trained or exercised to standards. Expertise and capability varied greatly.	BEE Lesson Learned Power Point, 5-17 Dec 03	Was this an isolated incident or a constant problem with personnel sourcing this UTC?	3/2/2005
19	Current local readiness training is inadequate for real world, bare base deployment situations Extended Reach Concept.	BEE Lesson Learned Power Point, 5-17 Dec 03-379th EMEDS Souda Bay, Greece. 3 Mar - 12 Apr 03	Was this an isolated incident or a constant problem with personnel sourcing this UTC?	3/2/2005
20	Training: Upon arrival, no 4N0X1s with ambulance driver’s qualifications were also certified to drive on the flight line. This necessitated EOSS personnel taking time to train them locally.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
21	Training: EMEDS training every two years is not sufficient for people to maintain proficiency on deployment specific medical equipment and databases. These are rarely used by personnel at home station.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
22	Medical Education and Training: Participated in medical education and training of EMEDS personnel, Dust-off medics, and Army medical staff.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
23	Training: All potential ambulance drivers should be qualified/trained in flight line driving prior to deployment.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
24	Training: Once deployed, personnel must adapt to and learn/relearn to use the new equipment. The equipment is also maintained by a contract company.	506 EMEDS AAR, Kirkuk, Iraq, 14 September 04-15 January 2005, Colonel Toussaint.	No comment.	8/12/2005
25	Helicopter experience – CASF members need recent familiarization with the on-load and offload procedures for UH-60s and Chinook UH-47s. Army Med Evacs use this airlift.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
26	Training: The severity and intensity of patient exposures necessitate a staffing enhancement consideration. Also, nutritional medicine has been a huge benefit to the CASF mission.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
27	Training: Mission staffing adjustments – Flight Surgeons and Nurses and Medical Techs would be better able to perform in Balad if they have recent/current trauma, critical care, or emergency medicine experience.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
28	Training: Licenses and certifications/licenses need to be current through the period of deployment for a member to volunteer. Also, members need to report with their credentials or 6-part folders.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
29	Training: Also, some staff members EMT certifications expired while deployed, resulting in reassignment to ancillary duties.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
30	Training: Early mission assignments are based on the expectation staff members will report qualified to perform the mission. Suggests rolling fleet to ensure each reserve, guard, or active base has access to train with various vehicles.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
31	Training: For the CASF, many members arrived without Ambus or even Bus on their licenses. Other vehicles of opportunity were assigned, including HUMVEES, 2 ½ Ton, Stakebeds and 1 Ton Pickups.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
32	Training: Personnel Reporting without Certifications and Driver Training – Approximately 40% of the reporting staff were without driver's license certifications in mission assigned vehicles.	AAR 332nd EMDG, Colonel Church, 5 March-4 June 2004.	No comments.	9/9/2005
33	More hands-on training for wartime skills. In-service training is not enough. Staff with training from the inner city hospitals had the best experience and skills.	Maj Bischel, Chief Nurse +25, FFEP4 Qatar, January 03 - May 03	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005

	Synopsis of Issue	Source Document	Remarks	Date Completed
34	Lack of adequately trained and motivated personnel, Lack of basic medical materials and supplies	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany	Line Item Closed via E-mail DTG 10/19/05 14:37 PM: MEFPAK	10/19/2005
35	All personnel on the EMEDs package be trained in its use (this does usually happen in most bases that have an EMEDs mission)	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
36	Deployed personnel without training	DR-35 Major Wanda McFatter, 21 September 2005	Posted to IC database. Follow on analysis.	1/2/2006
37	VA ventures or even employing active duty medical in civilian facilities may need consideration in order to develop, enhance, and maintain top-notch clinical skills.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
38	Decreased skill level of military staff may be an increasing problem.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
39	Clinic arena does not allow for the technician to solidify their new learned profession.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
40	Additionally, issues were reported where medical technicians, especially those whose only work experience has been in clinics, had difficultly with basic nursing skills i.e. Continued below	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
41	With ever increasing RRC requirements for training programs and the need for experienced people in key positions- continued below	Colonel Harris, Consultant to the Air Force Surgeon for Endocrinology, 9/28/2005	Posted to IC database. Follow on analysis.	1/16/2006
42	New technicians directly out of technical school working in the clinic environment or only work in the in-patient setting for a brief period of time before moving to the clinic.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
43	Even some of the AF “hospitals” now only see very low acuity patients.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
44	Skills learned in school are never developed.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
45	Issue: The knowledge levels of both nurses and medical technicians have been addressed as concerns.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
46	Air Force Medical facilities have scaled down in-patient to more outpatient services.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006
47	Intravenous flow drip rates, starting intravenous lines, common illness signs and symptoms etc. Supporting Information: Reserve nurses, must hold an active nursing license	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/16/2006

	Synopsis of Issue	Source Document	Remarks	Date Completed
48	The training for the FFGKV is inadequate.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
49	In-service training is not enough. Staff with training from the inner city hospitals had the best experience and skills.	Maj Leolyn Bischel, Maternal-Child Flight, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
50	The FFGKV was not properly trained on joint service policies and standards.	Major William Satterfield, 60 MDOS/SGOH, 21 September 2005, UAE.	Posted to IC database. Follow on analysis.	1/23/2006
51	Assign new medical technicians to inpatient units directly out of school for solidification of education from tech school.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
52	Also, look at duty assignments and alternation between clinic facilities and in-patient facilities to maintain skill levels.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
53	Ensure deployable facilities are provided educational material for in-field OJT.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
54	Explore other avenues of maintaining skill levels, i.e. expand CSTARS to more individuals, VA ventures, civilian ventures with local communities.	Penelope F. Gorsuch, Maj, USAF, NC, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
55	Lack of adequately trained and motivated personnel.	Maj Leolyn Bischel, Maternal-Child Flight October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
56	Medical Groups need to deploy their best (not their worst) members. We had one nurse sent because her unit wanted to get rid of her.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
57	More hands-on training for wartime skills.	Maj Leolyn Bischel, Maternal-Child Flight October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
58	Basic nursing care needs to be emphasized.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006
59	More training on chemical and biological agents, detection, and treatment.	Maj Leolyn Bischel, Maternal-Child Flight Commander, Spangdahlem, Germany, 3 October 2005.	Posted to IC database. Follow on analysis.	1/23/2006

Appendix D: Final Content Analysis Coding Form

Directions: Place a positive sign (“+”) or negative sign (“-“) in the box to the right of the indicated lesson learned to denote the positive or negative nature of finding reported in the indicated lesson learned.

Lesson Learned	Nature of Finding: (positive or negative)	Lesson Learned	Nature of Finding: (positive or negative)
1.		31.	
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Vita

Master Sergeant (MSgt) Robert M. Corrigan graduated from Harrison High School, Harrison, Michigan. Following Graduation, he enlisted in the United States Air Force where he was awarded “Honor Graduate” from Basic Military Training School and the Medical Service Apprentice Course.

In April of 1986, MSgt Corrigan was assigned to the 379th Strategic Hospital, Wurtsmith Air Force Base Michigan where he was assigned to the Obstetrical Unit, Medical Surgical Unit, and Family Practice Clinic. He received his Associate in Applied Science degree from the Community College of the Air Force in August of 1992.

In January of 1993, MSgt Corrigan was assigned to the USAF Regional Hospital, Sheppard Air Force Base, Texas where he worked as a Shift-Leader in the Emergency Services Department. Later, he attended the Critical Care Course at Wilford Hall Medical Center, and subsequently was assigned to the Special Care Unit at Sheppard. While stationed at Sheppard, MSgt Corrigan received his Bachelor of Science degree from Midwestern State University.

In June of 2001, MSgt Corrigan was assigned to the 325th Medical Group at Tyndall Air Force Base, Florida. He served as NCOIC of the Family Practice Clinic, and later as the NCOIC of Ambulance Services Element. In October of 2002, MSgt Corrigan was assigned to the College for Enlisted Military Education at Tyndall NCO Academy.

In August of 2004, MSgt Corrigan began pursuing his Master of Science degree in Information Resource Management at the Air Force Institute of Technology. Upon completing his degree, he will be assigned to the 88th Medical Operations Squadron, Wright-Patterson Air Force Base, Ohio.

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14. ABSTRACT
Two decades ago, Aerospace Medical Technicians received robust skills sustainment training through exposure to multi-faceted patient treatment environments. Available training environments included inpatient care, outpatient care, and emergency services. This diverse training environment made possible through large operating budgets and an extraordinary infrastructure could not last. Today (after five separate base closure and realignment initiatives), medical funding and infrastructure is but a shadow of what it once was. Budget constraints and the rising cost of healthcare have necessitated a purposeful movement away from inpatient and emergency care, toward outpatient and preventative medicine. Although changes in Air Force health care delivery may be necessary, the closure of inpatient units and emergency service departments around the Air Force has significantly impacted the Air Force's ability to train medical professionals and paraprofessionals for operations in a deployed setting, especially in the area of medical skills sustainment training. This research attempts to provide an alternate model for aerospace medical skills sustainment training that will assist students and trainers in overcoming the training limitations realized in a training environment plagued by budgetary constraints and the near complete loss of inpatient and emergency services.

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