Fall 2022

Combating the Challenge of Maintaining Active-Duty Military Medical Force Readiness

Thomas Jones
Gardner-Webb University, tjones33@gardner-webb.edu

Combating the Challenge of Maintaining Active-Duty Military Medical Force Readiness

by

Thomas Jones

A project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
in partial fulfillment of the requirements for the
Master of Science in Nursing Degree

Boiling Springs, North Carolina

2022

Submitted by:	Approved by:
Thomas Jones	Cindy Miller
Thomas Jones	Dr. Cindy Miller, PhD, RN
11/11/2022	11/11/2022
Date	Date

Abstract

The United States of America's military involvement in conflict is at one of its lowest points in over 2 decades. This presents a challenge for members of the military medical force to maintain the medical readiness skills they are expected to be proficient at in a moment's notice to care for casualties in the nation's next crisis or conflict. In addition to other pre-established methods, this project seeks to provide a unit-level training opportunity for Air Force active-duty medical members such as those in the United States Indo-Pacific region to practice certain medical readiness skills while continuing their steady-state daily operations. The ultimate goal of this project is for participating members to be practicing and verbalizing confidence in their ability to perform skills that would be expected of them throughout the Air Force en route patient care process. A quarterly training day that includes two scenarios will afford participants the opportunity to practice their Trauma Combat Casualty Care, triage, and aircraft loading and unloading skill in a high-threat simulated combat environment. Effectiveness of the training will be evaluated by a standardized evaluator skills checklist as well as a participant pre and post survey.

Keywords: active-duty, military, medical, readiness, simulation, skills, training

Table of Contents

List of Figures

List of Tables

CHAPTER I

Introduction

Problem Statement

The United States of America (US) military has enjoyed the luxury of superiority in conflict over the past 2 decades. The US has grown weary of military conflict, and recently the US military has shifted to more peacetime operations. As a result, there is the potential for a problem with the active-duty service military medical readiness for future conflicts that the nation could be involved in. Despite the level of care that US military medical members will be required to provide to casualties of future conflict, erosion of medical skills is occurring in Military Treatment Facilities (MTF) where the majority of active-duty military medical forces are employed during peacetime military operations. The deterioration of medical skills has been a historic issue throughout many conflicts involving the nation's military. A congressional Budget Office report in 1995 addressed this issue noting how MTFs in peacetime failed to prepare military service members for the care that would be required during wartime (Hutter et al., 2019). This phenomenon was coined by many as "the peacetime effect."

Significance

Military medical planners model potential future conflicts that could involve our nation. These models are used to look at how our military should shape their forces, resources, and training to be best postured for these potential engagements. Many of these plans show potential adversaries as nearly equal, or equal to the US in regards to their military capabilities in conflict. As a result, casualty levels are estimated to be at elevated levels that our nation has not seen in the past for our military forces. Potential

US military denied air, sea, and land space could mean that our military medical members are forced to care for these high-volume, multi-trauma casualties for extended periods of time with limited staffing and resources. Gleaning from past experiences and trainings will be of extreme importance early in conflict to provide the best patient care, ensuring the highest chance of survivability for the wounded warriors. Studies of previous military conflicts show that casualty mortality rates are elevated until the medical force is able to adapt. Operation Enduring Freedom in Afghanistan is a prime example of this pattern. Even though the number of casualties early in the conflict was relatively small, the mortality of those casualties in the first 4 of the 12 months was higher than the global average in Vietnam (Cannon, 2021).

Purpose

Numerous processes have been implemented across the Military Healthcare System (MHS) in attempts to combat the peacetime effects of steady-state military operations. Some of these include:

- Combining all military medical service branches under the umbrella of the Defense Health Agency (DHA);
- Increased medical involvement in military exercises;
- Mandating the Trauma Combat Casualty Care (TCCC) course as a standard for all military members of each service branch to be a requirement to maintain while in service;
- Creating programs such as the Center for Sustainment and Trauma and Readiness Skills (C-STARS) and the Sustained Medical and Readiness Trained (SMART) programs in which military members partner with major

civilian trauma centers to rotate active-duty service medical members through to get trauma experience; and

- Local MTFs working Memorandum of Understandings (MOU), or agreements, with local community hospitals to have their medical members work in the local trauma centers.

Competing factors such as additional duties, readiness requirements, limited resources, steady-state clients to care for, budget constraints, and manning shortages make it difficult for active-duty military medical members in the MDG to take advantage of many of these opportunities. Members in an MDG can easily find that they go their entire 3-year tour only achieving their minimum standards to keep their credentials and never once being exposed to patients/scenarios they would encounter during wartime/conflict.

The purpose of this project was to provide active-duty Air Force nurses and medical technicians in locations such as those serving in the US-Pacific regions with additional medical skills training to better prepare them for the volume and level of patient care they would need to administer to the casualties of future conflict. The anticipated lack of air, sea, and land dominance the military would have would lead to a decreased and sporadic logistics and evacuation process. This would lead to the military healthcare units with the capability of providing first aid, triage, and lifesaving measures, also known as role/echelon 1 healthcare capability, providing care to these wounded casualties for extended periods of time with limited resources. Leaner, faster, more agile forces are some of the expectations that Air Force (AF) leaders expect of the force so we can present as unpredictable to the enemy. To be better prepared to meet the environment that AF medical personnel would be required to work in as well as meet the expectations

of AF leaders, AF medical training is needed with a simulation that focuses on teamwork treatment of mass-casualty events, providing first-aid/TCCC battlefield care with limited resources, triage, and patient air evacuation preparation and loading. These work environments and expectations are not the norm for most AF medical members and will be a culture shift from their normal operations during steady-state as well as over the past 20 years of war. McGaghie et al. (2006) gleaned from their study on standardized learning outcomes in simulation-based medical education that the top three of ten aspects of the training leading to effective learning include feedback, repetitive practice, and that simulation is fused into the medical curriculum.

As previously listed, military healthcare workers have limited time to increase their skills due to a multitude of factors competing for their time. Some MDGs close their facility to patients and devote one work day per month solely to training. This project will aim to use four of those training days per year, one approximately every 3 months, for approximately 8 hours per day to conduct a simulation, debrief the scenarios, and provide time for the practice of techniques executed during the simulation. McGaghie et al. (2016) concluded from a review of simulation-based medical training that when conducted correctly, medical simulation training is a powerful educational intervention.

Theoretical/Conceptual Framework

Dr. Patricia Benner's 1984 nursing theory, From Novice to Expert, will be used as the theoretical framework to guide this project. The Health Research Funding Organization (2017) describes Benner's belief that the best nurses develop their skills over time. Education and experience assist in this development. This process of development became the foundation of her nursing theory. Some aspects of the Novice to

Expert theory were gathered using the Dreyfus Model of Skill Acquisition. Learning was believed by the Dreyfus brothers to be an experiential process that is supplemented by a situation-based process (Health Research Funding Organization, 2017). In other words, individuals can learn by means such as reading, listening, or watching, but they must be able to practice what they learn through kinesthetic learning, or becoming physically engaged, to gain relevant experience.

Each healthcare professional is at a different stage of understanding, comprehension, competency, and comfort level regarding their ability to provide patient care. Benner's theory divides these competencies into five stages: novice, advanced beginner, competent, proficient, and expert. Simulation facilitators may also be acting as evaluators and need to have a firm grasp of Dr. Benner's theory. Thomas and Kellgren (2017) explain the importance of Benner's theory for simulation facilitators. Each stage requires a different style of input that will be required by the simulation facilitators. The novice end of the spectrum will require more structure and direct guidance from the facilitator. Clear expectations and good descriptions of features and attributes of the situation must be offered by the simulator facilitator. As participants move toward the expert stage, facilitators will provide less guidance and develop in-depth scenarios that require critical thinking from participants (Thomas & Kellgren, 2017). As members proceed through the stages, the volume and acuity of the scenarios will intensify.

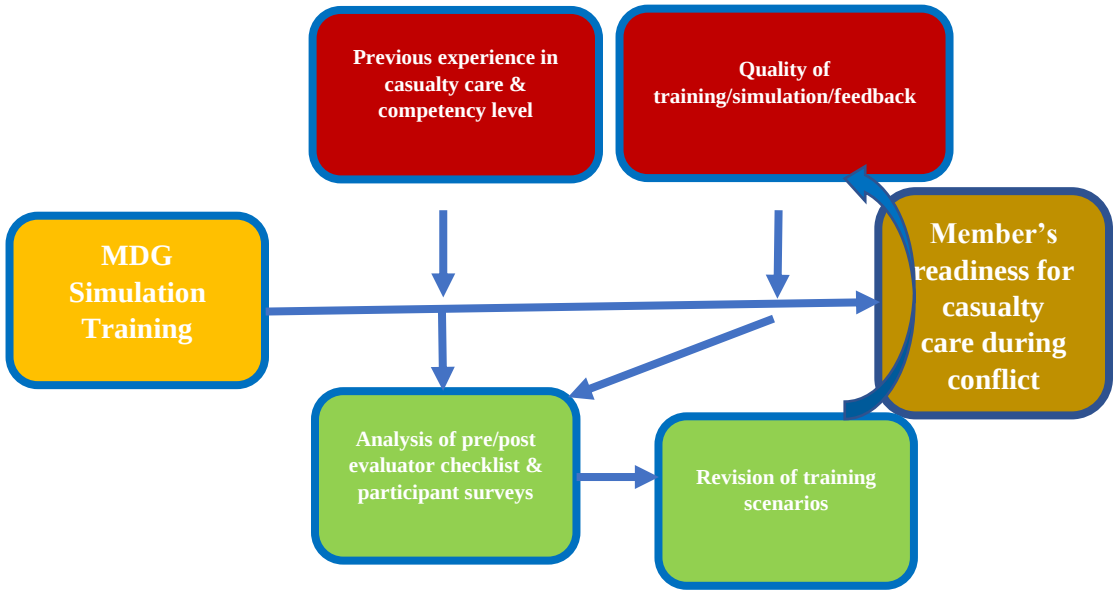
The feedback from those participating in the simulation as well as the facilitators and evaluators will be crucial to judge which stage of Dr. Benner's theory each member is in. Knowing this will shape subsequent trainings to allow the participants to gain the most out of the simulation training. Experiential learning successfully occurs in

environments where performance feedback is rich and chances for discussing and reflecting on experiential learning opportunities are deliberately planned out (Benner et al., 2009).

Figure 1 depicts the conceptual framework that will guide the project. The MDG training simulation has several factors that play into it ultimately affecting the military medical member's readiness for casualty care during conflict. These factors include previous experience in casualty care and member's competency level, and the quality of the training/simulation/feedback provided. These factors will be analyzed through facilitator and participant surveys, utilizing Benner's theoretical framework to identify the competency level of the participants. These findings will be used to tailor the training, simulations, and feedback to ultimately increase the quality of the process. This analysis and revision will be crucial and ongoing as there is typically a complete turnover within the MDG every 3 years.

Figure 1

Military Medical Group Conceptual Framework for Simulation Readiness Training



Definition of Terms

- Air Force Base (AFB) – The military organization of a nation for air warfare (Merriam-Webster. 2022).
- Center for Sustainment and Trauma and Readiness Skills (C-STARS) – A joint trauma program with the Air Force and Baltimore, Maryland; Cincinnati, Ohio; and St. Louis, Missouri Medical Centers, where Air Force medical personnel who provide ground support for deployed military operations will work closely with trauma service providers (Bedi, 2018).
- Defense Health Agency (DHA) – A joint, integrated Combat Support Agency that enables the Army, Navy, and Air Force medical services to provide a medically ready force and ready medical force to Combatant Commands in both peacetime and wartime (Health.mil, 2022).
- Medical Group (MDG) – A United States Air Force healthcare organization composed of different squadrons that offer different levels and specialties of medical care.
- Military Healthcare System (MHS) – One of America's largest and most complex health care institutions, and the world's preeminent military health care delivery operation (Health.mil, 2022).
- Memorandum of Understanding (MOU) – An agreement between two or more parties outlined in a formal document**.**
- Military Treatment Facility (MTF) – A military facility established for the purpose of furnishing medical and dental care to eligible individuals (Department of Defense [DOD] Instruction, 2017).

- Sustained Medical and Readiness Trained (SMART) – A military training program that expands training opportunities for skills requiring higher volume and complexity of hands-on care than normally seen in MTFs (AFMS Strategy, 2022).
- Trauma Combat Casualty Care (TCCC) – US military guidelines for trauma life support in prehospital combat medicine, designed to reduce preventable deaths while maintaining operation success (Joint Trauma System, 2019).

CHAPTER II

Literature Review

Introduction

The military medical force is charged with two primary missions, the first of which is maintaining readiness for diverse operations such as providing care in combat, response to natural disasters, humanitarian assistance, training, and diplomacy. The second mission is providing care to approximately 9.5 million military beneficiaries (Hutter et al., 2019). Finding the most efficient balance between the two of these missions with the available resources can be an arduous task for leaders in the military. Typically, in times of war or conflict, military medical members maintain their readiness skills while being deployed into combat to provide care for wounded warriors. With the recent drawdown of our military from conflict, these types of opportunities have decreased for military medical professionals. Researchers estimate that the US military could have prevented over 107,000 fatalities in combat throughout the onset of World War II, the Korean War, the Vietnam War, Operation Iraqi Freedom, and Operation Enduring Freedoms if the military medical force could have maintained their readiness skills during interwar periods (Tarpey, 2022). Military leaders from each service at all levels have taken numerous different approaches to maintain the active-duty medical force's readiness. For the Air Force, additional approaches can be taken at the individual medical group level to help military nurses and technicians maintain their readiness. The use of simulation-based training can provide additional opportunities for medical members to practice their skills through realistic scenarios in a high-demand, low-threat environment.

Historical Perspective

The beneficiary care mission has taken precedence for the majority of the active-duty military medical healthcare force for several reasons including the enduring need, the episodic nature of combat casualty care, and the bureaucratic demands related to the volume. In an effort to efficiently and effectively provide the care needed to the population, the Military Healthcare System (MHS) has decreased the amount of military treatment facilities, specifically hospitals, and outsourced many of their treatment options to civilian organizations. These efforts further complicate the difficulties in maintaining a proper readiness posture given that the decreased number of hospitals for the force to work in offer less opportunities for practicing the skills members would be required to be proficient in during combat operations. Even in the few military hospitals that remain, available cases that compare to the care that would be required for wounded warriors during combat is low. Fox et al. (2021) performed a search of the following Military Treatment Facilities (MTF) from 2014-2019; Brooke Army Medical Center (BAMC), Eglin Air Force Base (AFB), Nellis AFB, Travis AFB, and Wright-Patterson AFB. These locations were studied specifically for the fact that they had plastic surgeons stationed at their locations. Out of the identified 8,271 operating room procedures performed over the 5-year period studied, research determined that less than 7% of the cases were applicable to the care that the wounded warrior would need. These types of procedures included complex wound management, craniofacial reconstruction, limb salvage, hand reconstruction, and microsurgery.

Mooney (2021) provides details regarding an additional study of 147 MTFs from 2015-2019 that revealed a 25% decrease in the Knowledge, Skills, and Abilities (KSA)

metric further showing the decrease in military medical readiness skills. The KSA metric was developed by the Uniformed Services University (USU) in coordination with the American College of Surgeons as a tool to quantify the clinical readiness value of medical professional workload. Procedures performed in the 147 MTFs were then compiled and analyzed, with KSA points assigned to each procedure based on the type.

Given the complex dilemmas that the military's active-duty medical force faces, skill erosion can become quite common during steady-state, or peacetime operations. A comprehensive review of the literature available on medical skill fading conducted by Maddocks (2020) revealed that without practice, an individual's medical skills begin to fade and progressively become worse on average at around 6 months, but can occur in as little as 4 weeks post learning. Maddock's study was conducted using key phrases related to skill fade and yielded 747 records. Further research narrowed these records down to 10 applicable articles of focus. The methodology of these articles varied from surveys, focus groups, theory testing, literature reviews, to observations conducted to assess skill competency. Overall, all the results showed a skill decline over time without practice.

Way Forward

Air Force medical professionals, by the nature of their mission, would be required to provide en route care to casualties of military conflict. Given the anticipated logistical complications associated with future conflict, medical members would be required to provide limited care with limited resources to a large volume of wounded warriors in a high-threat, dangerous environment. Furthermore, the Air Force is tasked to prepare and provide ground transportation when air superiority is achieved in battle and mobility aircraft can land to provide Aeromedical Evacuation relief. Key skills that Air Force

medical members need to be competent with include: Trauma Combat Casualty Care (TCCC), triage, and the en route care processes and procedures. Simulated training to closely mimic the environment in which these active-duty medical members would be required to perform is another way to assist in maintaining skills readiness during times between military conflict.

Simulation-based training is not a new concept in the training, medical, or miliary fields. The military medical force already uses this type of training as one source to maintain their readiness posture. Numerous researcher studies show the effects of simulation-based medical training. McGaghie et al. (2006) describe one such qualitative, systematic study in a review of 670 articles related to simulation-based training to learn the effects of using high-fidelity simulation-based training for education. Using certain exclusion and inclusion criteria, and the average weighted effect size (AWES) as a standardized metric to evaluate outcomes, the journal articles were narrowed down to 31. In the end, a strong correlation between the hours of simulation practice and the increase in degree of learning exists.

Captain Spooner and a group of his Navy Medical Corps colleagues (2019) detailed the results of a study completed on 57 participants to show the effects of simulation training, specifically focused on a comprehensive skills-based curriculum for military general medical officers. This two-year study evaluated the self-rated confidence of members who had attended the simulated training program through a computer-based survey at least 6-months after initiation of the training. It was concluded that the implementation of a comprehensive skills-based simulation training can be an effective way to improve the skills of medical providers.

Hustad et al. (2019) also studied the transfer of medical simulation training in clinical practice. In their qualitative descriptive design, eight focus group interviews, with three and six participants in each group, were conducted on 32 nursing students who volunteered to participate in the study. The program included thorough training to ensure those participating in the study understood the hi-fidelity simulators, the environment, course objectives, responsibilities, roles, logistics, and expectations. Two separate simulations were administered and debriefings completed with description, feelings, evaluation, analysis, conclusion, and action plan. This style of debrief follows the Gibb's reflective cycle. Follow-on surveys were conducted between two and four months after the scenarios were concluded. The results of these surveys were compiled and three themes emerged. These themes included simulation-based training promotes self-confidence, understanding from the simulation-based training improves clinical skills and judgement in clinical practice, and the importance of communication and team collaboration is emphasized by simulation-based training. Although a relatively small sample size, 32 participants total, were studied, these themes accurately reflect what the military medical force will be faced with as they engage in providing care during future conflicts as described by military planners. The more the military medical force can be exposed to and comfortable with the themes described in this study, the better they ideally would be able to perform.

Many of the studies showing the benefits of using medical simulation-based training to maintain skill competencies and readiness also report a lack of standardization in the trainings they have studied. The International Nursing Association for Clinical Simulation and Learning (INACSL) Standards Committee and the INACSL Board of

Directors (BOD) convened to integrate the advancement of the use of simulation-based experience with academia, clinical practice, and research (Watts et al., 2021). In a 2021 update of these standards, the committee conducted a rigorous literature review over hundreds of hours with multiple stakeholders to revise and provide updated standards for the use of simulation-based training. In addition to methods such as manikin-based, standardized patient, online, and skill performance, virtual learning was a new method of simulation that the standards would apply to given the changes that the COVID-19 pandemic had forced to the training environment. The 2021 revised standards include professional development, pre-briefing, simulation design, facilitation, the debriefing process, operations, outcomes and objectives, professional integrity, sim-enhanced IPE, evaluation of learning and performance, and simulation glossary. These published standards serve as a guide and were created in hopes of laying a foundation as well as providing talking points of discussion for organizational areas of practice (Watts et al., 2021).

In spite of the numerous benefits of using simulated training as a method to maintain medical readiness, some studies reveal drawbacks to simulated training as compared to actual experience. Dr. Krishnan et al. (2017) list many disadvantages of using simulated training methods in their literature review. Although no information is provided as to how many articles were included in the study, the reference list contains 23 sources that date from 1984-2012. Some of these outdated sources could have different outcomes in more recent times given the advances in technology. However, the majority of the following simulated training cons would still be applicable no matter the date. These simulated training drawbacks include incomplete mimicking of human

systems, defective learning, attitude of the learners, cost factor, time factor, infrastructure, technical difficulties, programming difficulties, and learner specific teaching not possible.

The people of America expect the nation's military to perform well in order to defend their country and its interests. Those willing to fulfill the call and serve in the military expect to receive top-notch medical care when they are injured executing the orders of those appointed over them. The US military medical force has a crucial role in providing this rightfully deserved care to the nation's wounded warriors. As the nation draws down its military's participation in conflict, studies show that the military medical force faces a challenge in maintaining an adequate readiness posture. As military leaders attempt to find solutions to this challenge, many efforts have been focused on the use of medical simulated training to maintain readiness. Studies show that capitalizing on simulated training can be advantageous in increasing and maintaining the skills of medical members.

CHAPTER III

Needs Assessment

Population and Setting

The Defense Health Agency (DHA) is a joint, integrated agency that enables each service branch of the military to provide medical services in both peacetime and wartime. A pillar of the DHA campaign plan includes a Ready Medical Force in which the DHA reinforces its commitment to providing the setting for the military medical force to build their skills for deployment and sustain service medical currency and competency requirements (Health.mil, 2022). Additionally, in attempts to align AF medical personnel with the National Defense Strategy (NDS), the Air Force Medical Services (AFMS) prioritize medical force training as one of their four methods to meeting their goal of generating high performing Airmen and Guardians (AFMS, 2022).

From the top levels of the DHA all the way throughout the AFMS, readiness is a foundational priority of the military medical force. Operating in peacetime is no excuse for a decrease in readiness posture. After decades of conflict, the nation is rightfully weary of conflict. Active-duty medical military members often find maintaining their medical readiness challenging while operating in times of little to no conflict. Active-duty AF medics serving in the US Indo-Pacific region fall under the Pacific Air Force (PACAF) Command and are granted no exception to these challenges, and often face even more of this challenge given the limited US healthcare resources available in some of these remote areas.

Sponsors and Stakeholders

The MTF Director of Education and Training (E&T) will need to be a sponsor for this project. As the head of E&T within the base MTF, the E&T director is charged with maintaining oversight of the MTF member's clinical currencies. This individual leads the medical training programs that are offered throughout the MTF and base.

Internal stakeholders to this project primarily include the active-duty medical employees in the MDG. Their comfort and readiness levels should improve as the trainings are conducted. Additional internal stakeholders include leaders within the MDG. As the overall readiness skill levels increase within the organization, the MDG clinical medical readiness reports will increase as well, showing an increase in deployment ready status for the group. The internal stakeholders in the MDG that this project training is tailored to a composition of 14 Registered Nurses and 33 Medical Technicians. The number of participants, facilitators, and evaluators in this training project would not degrade access to care or performance of the current mission.

Most bases within the Air Force have active-duty medical nurses and technicians that work outside of the MDG fulfilling mandatory medical non-clinical roles that do not fall under the MDG command. These external stakeholders would also be affected by the results of this project as they too would increase their medical skills readiness and overall comfort level. These medical non-clinical roles that fall outside of the MDG generally do not have monthly training days where daily operations stop for training purposes. As a result, the rest of the organization that these members belong to as well as their leadership will be affected by this project in that they will have to absorb the additional work that their member would have otherwise completed if they were not at the training.

Desired and Expected Outcomes

The medical skills training that this project encompasses has been designed to address the potential problem that active-duty military medical personnel face during military peace time operations. This project should bring about the following desired and expected outcomes for the participating active-duty medical members:

- A self-reported increase in comfort-level when performing duties during TCCC, triage, and en route patient care coordination scenarios while in a high-threat simulated environment;
- An increase in team and individual performance during TCCC, triage, and en route care patient coordination scenarios while in a high-threat simulated environment.

These outcomes will be evaluated in two ways. The first of these will be through a pre and post-survey provided to all participants before the training and then again after the training is completed. Additionally, subject matter experts will be present during the training scenarios to provide an overall evaluation of the team's performance throughout the scenarios. To keep the methods of evaluation uniform, each evaluator will utilize a standardized evaluation tool. The results from both methods will be compiled and used to gage the effectiveness of training scenarios in meeting the outcomes. Furthermore, these results will shape any changes needed for future training scenarios to maximize the training time and better meet the desired and expected outcomes.

SWOT Analysis

The SWOT analysis in Figure 2 shows that the MDG has a pre-established day each month in which medical services are closed and training occurs the entire day. There

is a mix of military medical members with an extensive history of experience working in AF MTFs in both peacetimes as well as times of conflict. This should help to provide additional assistance to those members that are less experienced. Overall, the training outcomes can be met with the assistance of volunteers who act as causalities and should not require the use of high-fidelity simulators. As discussed earlier, the DHA and AF have many opportunities available for active-duty medical members to maintain their medical skills in peacetime, so this is not the sole training opportunity members will have to maintain their skills. Many AF bases have aircraft and supporting crews that can be used in the training scenario to increase realism. Medical military members that work outside of the MDG can also provide subject matter expertise (SME) as well as participate in the training. Given the push from the DHA and AF leaders to maintain medical readiness, the need for trainings like this should be supported from top leadership down. AF headquarters often reward teams for their innovative ideas/processes by funding them with special grants that cover all or a portion of their project initiatives.

AF aircraft are limited and in high-demand. Coordinating aircraft availability could be a potential problem. Like aircraft, staffing at bases is typically thin and members are encouraged to do more with less. Finding the time for MDG members and outside base supporting agencies to complete this in addition to competing priorities could be a challenge. Real-world operations will take precedence over this training and one organization pulling out of the training could degrade the realization of the overall scenario and potentially result in the training not taking place. While the overall cost of this training should be low due to the use of other base personnel and resources, the cost of purchasing needed materials could be a strain on the limited E&T budget. Ideally, this

training scenario would take place, be debriefed in detail, and then executed a second time, therefore any delays could make this training difficult to achieve in the allotted 8-hour training day.

Figure 2

PACAF Active-Duty Medical Skills Training SWOT Analysis

Resources

Several key resources are required for the execution of the medical skills training scenarios. These resources are listed in Table 1. Due to the level of interoperability and synchronization with other organizations, the overall cost of this project will remain relatively low. In an Air Force that expects members to do more with less, the low cost of this project should be a selling point when gaining leadership approval. On the flip side, strong relations would need to be built with outside organizations assisting with this project since the number of personnel and total man-hours required for this training is

high. The cost of supplies listed in Table 1 was assuming that there were no supplies or medications in the MDG that could be used. Typically, E&T departments keep out of date medication containers and medical supplies that would otherwise need to be discarded due to their expiration dates. The use of these expired medications and supplies from the MDG would drastically decrease the overall cost of the required supplies listed below. Additionally, labels could be created by the E&T staff and affixed to any expired medication to indicate it was the needed medication for the training. This option could take away from the realism of what the actual medication would look like in its package or container but would save money from the overall project cost.

Table 1

Required Resources

Resources	Cost in Dollars	Total Man-Hours
Personnel		
Team leader	$0	9
Facilitators x2	$0	18
Volunteers x8	$0	56
Evaluators x2	$0	16
Aircraft personnel (Pilot and/or Load Master and/or Maintenance) x2	$0	8
Vehicles		
Static aircraft (opportune aircraft)	$0	0
Ambus	$0	0

Resources	Cost in Dollars	Total Man-Hours
Supplies		
Casualty Simulation Kit Average of three casualty simulation kits from 3 companies (Bound Tree, DiaMedical USA, Nasco Simulaids)	$1,409.00	
Individual First Aid Kits (IFAK) x10 Average of three IFAKs from 3 companies (MyMedic, EVERLIT, Lightning X Gunshot	$1,250.00	
Training Medications (Demo/Training Doses)		
Morphine Sulfate x10	$15.90	
Fentanyl Lozenge x10	$57.95	
Ketamine x10	$62.95	
Acetaminophen x10	$14.95	
Meloxicam x1 box (100 count)	$19.99	
Ertapenem Sodium x1 box (30 count)	$57.95	
Moxifloxacin x1 box (30 count)	$57.95	
Ondansetron x1 box (48 count)	$14.95	
Cyklokaprn (TXA) x10	$20.90	
Hypertonic Saline x10	$39.50	
Diazepam x10	$62.95	
Midazolam HCl x1 box (100 count labels)	$14.95	
Total	$3,099.89	107

Team Members

To effectively conduct this project, certain team members will be required. The team leader should be designated to oversee the planning and execution. Leading the medical skills training programs in an MTF is typically the job of the E&T director, therefore, it would be ideal to have the MTF E&T director direct this program as the team leader. The E&T Non-Commissioned Officer in Charge (NCOIC) typically plays a large role in scheduling, coordinating, planning, and managing specific trainings, so it would be crucial to have the NCOIC as a member of the team for this training project as well. The NCOIC usually has a close working relationship with the medical logistics department and would be able to work through the process of ordering the required supplies. Additional members within the E&T department, if any, could act as facilitators or evaluators during the actual scenario as well as assist in planning and preparing the events leading up to the training.

Additional facilitators and evaluators would need to include a mixture of individuals who had a history of en route care and/or specific Aeromedical Evacuation (AE), TCCC, emergency critical care, and previous deployment experience. Ensuring facilitators and evaluators have a balance of some or all of these backgrounds will create a more robust learning experience for all participating in the training.

Cost-Benefit Analysis

The earlier review of literature was proof of the challenge the military faces in maintaining their medical force's readiness skills posture. This is not a new concept and attempts are being made to address this potential problem at the Air Force, military, and DHA levels with numerous different programs and processes. The proposed project is an

attempt to provide additional readiness skills training opportunities for active-duty military medical members in the areas such as those in PACAF. This project focuses on training TCCC, triage, and en-route patient care. There are different training courses and programs that allow military medical members to maintain their skills in these areas. Large-scale military exercises also can incorporate these topics during their medical scenarios. These training courses, programs, and exercises are often times infrequent, require traveling to attend, and are extremely costly. The proposed project allows a day-long, inexpensive, local training that encompasses all three aspects of care in a scenario and is executed in a simulated combat environment. Participants are able to accomplish a portion of their mandatory annual skills verification in an atmosphere that replicates consolidated point of injury care throughout casualty air evacuation.

The relatively small cost of this project, $3,100, should be absorbed in an MTF budget. If the budget could not cover this, the previously discussed use of expired supplies and medications within the MTF, as well as borrowing supplies from other training programs could substantially reduce if not eliminate the cost altogether. The benefits of this training project far outweigh the risk assumed in regard to the overall monetary cost.

With the push for AF military members to do more with less, many members are stretched thin performing the many duties assigned to them. The bigger cost of this project would not be monetary but would be the time and number of individuals that would be needed to ensure successful training. MDG leadership and personnel should be accepting of a low amount of change in their current operations since most AF MTFs are afforded one day per month to devote training. The medical members that work in non-

clinical positions outside of the MDG as well as the supporting personnel and casualty volunteers will have to make the biggest sacrifice leaving their daily duties to assist in the training. Based on the number of individuals that can assist in helping within the E&T department of the MDG, there will likely be a need to utilize 8-10 personnel outside of the MDG to assist in conducting this training. If this many individuals outside the MDG could not support this training opportunity, the MDG could use additional members from their sections and ensure that they were able to participate in subsequent trainings as actual participants. There would still be value added to the volunteers within the MDG as they would get to watch first-hand in the training and provide valuable feedback with their unique medical background adding more validity to their input. Since these active-duty military healthcare workers will be providing the only initial care that the rest of the AF receive if they became causalities during a conflict, the risk and sacrifice of their time up front would be well worth the assurance that they would be provided with the best possible care in their time of medical need.

CHAPTER IV

Project Design

Goals and Objectives

The goal of this project was to provide a unit-level training program for active-duty AF military members working in the medical force that allows them to practice and feel more confident in performing readiness skills that would be required of them throughout the AF en route patient care process. The following objectives will be executed to achieve this goal:

- In a team setting, participants will be able to explain and demonstrate how to perform the TCCC steps using the MARCH PAWS mnemonic on a group of casualties while in a simulated contested, combat environment;
- Working with their team, participants will be able to explain and demonstrate triage of a group of casualties and determine which casualties will be air evacuated when limited space is available in a simulated high-threat, time-sensitive environment;
- Working with their team as well as supporting agencies, participants will correctly explain and demonstrate loading of non-ambulatory casualties on mobility aircraft of opportunity in a simulated high-threat, time-sensitive environment.

Plan and Material Development

As previously shown, there is substantial literature describing studies that show that simulation is an effective way of medical training for individuals to maintain or grow their skillset. When the nation is not involved in conflict, simulated training that emulates a combat environment could be as close as they get to these real-life situations. This

project will use simulated training scenarios and focus them at the AF base level to achieve the intended goal.

Active-duty military members typically change duty assignments every three to four years. Often times their new assignment will be at a different base. As a result, there is a constant turnover throughout the base of active-duty personnel. In an attempt to capture as many of the members of this rotating force as possible, this project will occur every 4 months during the MDG training day and should become a standard practice that occurs on an ongoing basis. The plan to execute this project is broken into three main phases: the planning, the execution, and the project evaluation/revision phase.

During the planning phase, budgeting for the project occurs and required supplies are ordered. The E&T department meets to make the required reservations to include training areas, training resources, and volunteers to assist in executing training. As the planning phase continues, the E&T department ensures all reservations are secured as well as emails out pre-surveys to participants. At the end of the planning phase, approximately one day out to the morning of the execution phase, required supplies are gathered and the training area is set up. Pre-surveys are collected and compiled electronically from response emails.

The execution phase will occur on the actual day of training. This phase will include running both scenarios with a detailed debrief occurring after each scenario. Evaluator skills checklists will be physically collected from evaluators by the E&T department staff at the end of this phase.

During the evaluation and revision phase, the education staff will periodically meet to meet specific objectives. These objectives include, inventory, and restock for the

next training opportunity; compile and analyze surveys and evaluations; and make appropriate changes to the training program based on analyzed results.

Project Phases

There are specific details and timeframes for each of the three phases of the project.

Phase I: Planning Steps

A. Present/input project resources needed during budget meeting (prior to new fiscal year).

B. E&T department meets (x6 weeks out from training)

- Determine training date/s
- Reserve static aircraft
- Reserve Ambus for patient transport
- Solicit volunteer casualties
- Identify/solicit evaluators and facilitators as needed
- Reserve outside training area on the base
- Communicate training date to MDG/base medical members
- Verify supplies on hand/order remaining supplies
- Reserve simulated firearms, combat helmets, flak jackets
- E&T department meets (x2 weeks out from training)
- Send pre-survey to participants
- Verify static aircraft reserved
- Verify Ambus reserved
- Verify casualty volunteers/communicate expectations
- Verify outside training area on base
- Verify all training supplies available
- Verify simulated firearms, combat helmets. flak jackets reserved
- Communicate expectations with facilitators/evaluators

- Resend participant reporting instructions (rules of engagement, location)
- E&T department meets (x1 day out from training)
- Collect pre-survey from participants
- Gather all training supplies, place in Ambus
- Verify all reservations
- Verify aircraft parking spot
- E&T department/facilitators/evaluators meet (morning of training)
- Review plan of execution
- Set up simulation
- Moulage casualty volunteers
- Resend participant reporting instructions (rules of engagement, location)

Phase II: Execution

A. Run simulation round one
    - Debrief round one
    - Run simulation round two
    - Debrief round two
    - Collect evaluator skills checklists

Phase III: Evaluation/Revision

A. E&T department meets (x1 day after training)
    - Inventory supplies
    - Replace/restock supplies
    - Return simulated firearms/combat helmets/flak jackets
    - Email post-survey to participants
B. E&T department (x2 weeks after training)
    - Compiles/analyzes evaluator skills checklists and participants' pre/post surveys
C. E&T department (x4 weeks after training)
    - Discusses results of evaluator skills checklist/surveys
    - Makes adjustments to better meet training needs

Project facilitators will be able to use the sequence of events (SOE) listed in Table 2 to guide the simulated training on the day of execution. For standardization purposes, each evaluator will need to be provided with an evaluation tool such as the ones listed in Appendices A-C that they utilize to evaluate teams during both rounds of training simulation. Training participants should each be provided with a pre and post survey such as the survey listed in Appendix D at 2 weeks pre training, and 1-day post training. Completion of these surveys is voluntary but highly encouraged in order to evaluate the effectiveness of the training as well as adjust future training for optimization. Volunteers should each be provided with a card such as that in Appendix E in order to provide guidance as to the injury they should simulate as a casualty during the training. Facilitators and evaluators should use this card to determine how to apply moulage to the volunteer casualties for increased realism.

Table 2

Sequence of Events

Time	Event
0700-0800	- Drive Ambus to the base training site - Offload training supplies - Read simulation pre-brief to all facilitators/evaluators/volunteer casualties - Pass out casualty cards to volunteer casualties - Moulage casualties appropriately
0730-0830	- Drive Ambus to pre-determined team participant meeting location - Read simulation pre-brief to all team participants - Distribute simulated firearms, IFAKs, combat helmets, flak jackets

Time	Event
	- Allow team participants to set up gear, team huddle
0830-0845	- Ambus with team begins driving in route to work area (simulated patient staging facility) - On the way, Ambus encounters Security Force (SF) member who reports IED blast on road with casualties - Ambus with team in route to simulated en route patient staging facility tent
0845-1030	- Team disembarks Ambus and follows SF member to IED blast where they find 8 casualties - Team visualizes IED blast site and casualties - Team takes fire - Team suppresses/eliminates fire - Team begins TCCC and gets patients back to Ambus - Team loads casualties on Ambus - Team provides casualty care on Ambus while driving to flight line - Team arrives to flight line and coordinates with AE/flight crew - Team learns there is only room for 6/8 patients - Team works to triage who will be air evacuated - Team follows direction of AE/flight crew to load patients with limited time (enemy inbound and aircraft must depart ASAP) - ENDEX after last patient loaded
1030-1045	Break
1045-1145	- Debrief simulation o Participants/facilitators/evaluators/volunteers allowed to provide feedback

Time	Event
1145-1245	- Lunch
1245-1330	- Pass out casualty cards to volunteer casualties - Moulage casualties appropriately - Read simulation pre-brief to all team participants - Distribute simulated firearms, IFAKs, combat helmets, flak jackets - Allow team participants to set up gear, team huddle
1330-1345	Ambus with team begins driving in route to work area (simulated patient staging facility) On the way, Ambus encounters Security Force (SF) member who reports IED blast on road with casualties Ambus with team in route to simulated en route patient staging facility tent
1345-1530	- Team disembarks Ambus and follows SF member to IED blast where they find 8 casualties - Team visualizes IED blast site and casualties - Team takes fire - Team suppresses/eliminates fire - Team begins TCCC and gets patients back to Ambus - Team loads casualties on Ambus - Team provides casualty care on Ambus while driving to flight line - Team arrives to flight line and coordinates with AE/flight crew - Team learns there is only room for 6/8 patients - Team works to triage who will be air evacuated - Team follows direction of AE/flight crew to load patients with limited time (enemy inbound and aircraft must depart ASAP)

Time	Event
	- ENDEX after last patient loaded - Casualty volunteers released for the day
1530-1545	Break
1545-1630	- Debrief simulation o Participants/facilitators/evaluators allowed to provide feedback

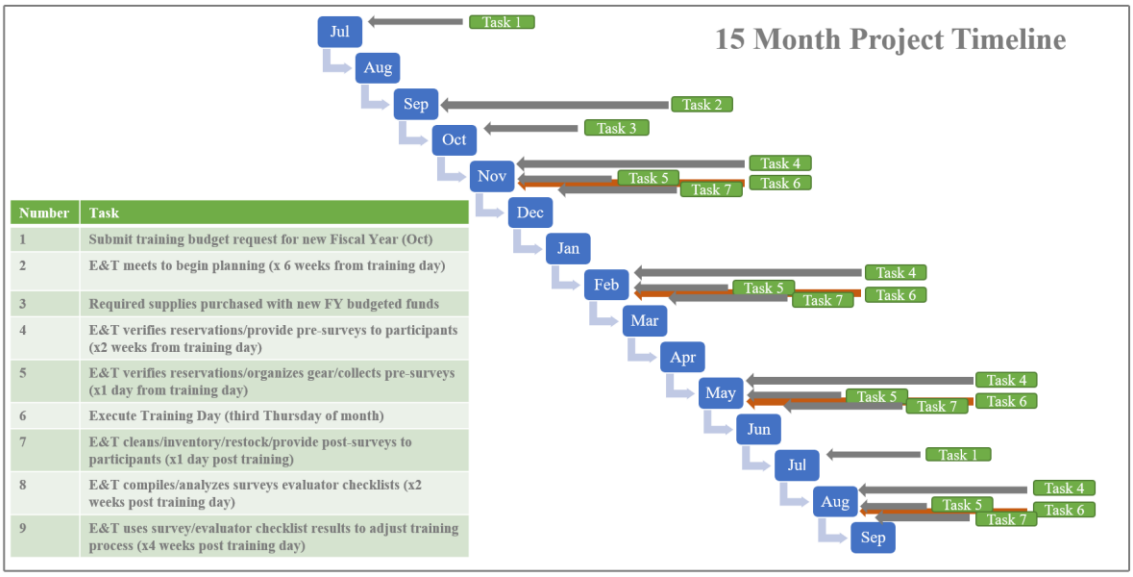
Timeline

As previously discussed, active-duty military members often rotate assignments every 3-4 years. This new assignment will frequently result in the member having to move bases. This combined with the need for military medical members to maintain a constant readiness posture will mean this project should be implemented on a consistent basis. The first year of implementation should be viewed for planning purposes within a 15-month timeframe and then on an annual basis for subsequent years thereafter.

The first year requires the 15-months of planning for the purpose of budgeting. The extra 3 months will give time for the total costs, listed in Table 1, to be proposed and submitted to the MDG leadership budget council. Subsequent years will still require the same budgeting, but it will fall within the fiscal year (FY) prior to the training year that is being planned. Figure 3 depicts the 15-month timeline that should be followed.

Figure 3

15-Month Projected Timeline



Number	Task
1	Submit training budget request for new Fiscal Year (Oct)
2	E&T meets to begin planning (x 6 weeks from training day)
3	Required supplies purchased with new FY budgeted funds
4	E&T verifies reservations/provide pre-surveys to participants (x2 weeks from training day)
5	E&T verifies reservations/organizes gear/collects pre-surveys (x1 day from training day)
6	Execute Training Day (third Thursday of month)
7	E&T cleans/inventory/restock/provide post-surveys to participants (x1 day post training)
8	E&T compiles/analyzes surveys evaluator checklists (x2 weeks post training day)
9	E&T uses survey/evaluator checklist results to adjust training process (x4 weeks post training day)

Initial planning for the project should begin approximately 6-weeks before the first training day and be chaired by and include mostly members from the E&T department. Topics of discussion during this meeting should include determining training dates; reserving the static aircraft, Ambus, training area, and gear; soliciting for casualty volunteers; identifying evaluators and facilitators; and verifying training supplies needed.

The USAF new FY begins in October. At this point, budget supplies should be ordered to allow time for them to arrive prior to the first training day. Approximately 2 weeks from the first training day, the E&T department should conduct another meeting to verify that reservations have been secured, and send out the pre-training Clinical Skills Confidence Rating Scale surveys, Appendix D, to all participants. The day before the first training, the E&T department will need to ensure that there are no changes to the reservations and gather supplies and gear for the training.

The day of training execution, E&T members will have a full day of events that focus on setup, trainings, debriefs and feedbacks, and finally cleanup. Details of the training day's sequence of events are described in Table 2. Several important tasks will still be necessary after the training day. The day after training, the E&T department will need to clean, inventory, restock, and provide post-training Clinical Skills Confidence Rating Scale surveys to all participants. At 2 weeks post training, surveys will need to be collected and analyzed so that the E&T department can meet a month after that training to discuss what adjustments are needed to modify the next training based on the results of the evaluator's checklist and surveys. Planning will then resume with the E&T department meeting again 6-weeks pre training to repeat the tasks for the next training day.

Budget

The overall direct cost associated with this project is relatively low as compared to the indirect cost, or man-hours, that will be required for the training to be executed. Table 3 details the direct and indirect training cost associated with this training project from an initial startup cost and then on an annual basis thereafter. Many of the resources used for the training are borrowed or reserved from other base organizations in an attempt to keep the overall cost of the training low. The direct costs associated with the project were gathered with the assumption that the E&T department had no supplies they could pull from such as moulage supplies used in other training classes, or expired medications and supplies from the MDG. The availability of these items could result in a decrease in the overall cost associated with the project and would need to be assessed prior to budgeting for the project. Further assumptions were made that budgeting for subsequent

years would need to include an annual refresh of all training supplies, medications, and moulage materials.

As previously discussed, the man-hours required, or indirect cost for proper training execution could be more challenging of a cost to obtain than the direct cost. A large portion of these hours comes from the casualty volunteers. Except for aircraft personnel, the remaining positions requiring hours could come from the MDG if needed. Additionally, casualty volunteers could come from the MDG as well if there were no volunteers from other organizations. While not as robust of a training, or completely meeting the initial intent of the project, if MDG personnel were to support every position except for the aircraft personnel, there would not be as large of a demand for the indirect cost of man-hours.

Table 3

Project Budget

Resource	Initial Year Direct Cost	Initial Year Indirect Cost (Man-hours)	Subsequent Annual Direct Cost	Subsequent Annual Indirect Cost (Man-hours)
Personnel				
- Team leader	0	36 (9/training)	0	36 (9/training)
- Facilitators x2	0	72 (18/training)	0	72 (18/training)
- Volunteers x8	0	224 (56/training)	0	224 (56/training)
- Evaluators x2	0	64 (16/training)	0	64 (16/training)
- Aircraft personnel (Pilot and/or Load Master and/or Maintenance) x2	0	32 (8/training)	0	32 (8/training)

Resource	Initial Year Direct Cost	Initial Year Indirect Cost (Man-hours)	Subsequent Annual Direct Cost	Subsequent Annual Indirect Cost (Man-hours)
Vehicles				
- Static aircraft (opportune aircraft)	0	0	0	0
- Ambus	0	0	0	0
Supplies				
- Casualty Simulation Kit o Average of three casualty simulation kits from 3 companies (Bound Tree, DiaMedical USA, Nasco Simulaids)	$1,409.00	0	$1,409.00	0
- Individual First Aid Kits (IFAK) x10 o Average of three IFAKs from 3 companies (MyMedic, EVERLIT, Lightning X Gunshot	$1,250.00	0	$1,250.00	0
- Simulated Firearms	0	0	0	0
- Flak Jackets	0	0	0	0
- Combat Helmets	0	0	0	0
- Litters	0	0	0	0
Training Medications (Demo/Training Doses)				
- Morphine Sulfate x10	$15.90	0	$15.90	0
- Fentanyl Lozenge x10	$57.95	0	$57.95	0
- Ketamine x10	$62.95	0	$62.95	0

Resource	Initial Year Direct Cost	Initial Year Indirect Cost (Man-hours)	Subsequent Annual Direct Cost	Subsequent Annual Indirect Cost (Man-hours)
- Acetaminophen x10	$14.95	0	$14.95	0
- Meloxicam x1 box (100 count)	$19.99	0	$19.99	0
- Ertapenem Sodium x1 box (30 count)	$57.95	0	$57.95	0
- Moxifloxacin x1 box (30 count)	$57.95	0	$57.95	0
- Ondansetron x1 box (48 count)	$14.95	0	$14.95	0
- Cyklokaprn (TXA) x10	$20.90	0	$20.90	0
- Hypertonic Saline x10	$39.50	0	$39.50	0
- Diazepam x10	$62.95	0	$62.95	0
- Midazolam HCl x1 box (100 count labels)	$14.95	0	$14.95	0
Total	**$3,099.89**	**107**	**$3,099.89**	**107**

Evaluation Plan

The effectiveness of this training project in meeting the desired outcomes will be evaluated by two methods. The first of these will be by analyzing the confidence survey that is provided to each participant. The same survey, shown in Appendix D, will be provided both pre and post training. Specific notes written by participants on the survey will be taken into account, but the primary means of analyzing effectiveness from these pre and post surveys will be to reevaluate areas of the training. Areas that at least 25% of participants scored an area the same or less on the post-survey as compared to the pre survey will be reevaluated. Reevaluation of these areas should include an assessment of

how the scenario and feedback currently address this area and how it could be adjusted to more effectively simulate the areas for a better learning experience.

In conjunction with utilizing surveys to evaluate the effectiveness of the training, evaluator skills checklists will be compiled and analyzed post-training. Evaluator's notes will be taken into account, but the primary means of analyzing these checklists will be to reevaluate areas of training that had a 50% or higher average grading of not accomplished on round one of training. During the second round of training, a 25% or higher average grading of not accomplished will prompt a reevaluation of that specific area of training. Like the survey reevaluations, areas in question from the evaluation checklist analysis should have the simulation scenario and feedback style assessed and adjustments made to optimize the next training experience.

CHAPTER V

Dissemination

Dissemination Activity

The ability of the US military medical force could be threatened during times in which the nation is not involved in military conflict or crisis. This challenge is further complicated for many active-duty medical members who are assigned to areas outside of the hospital setting. This project will give AF medical units an opportunity to train on some of these skills that they will need to be proficient in during times of conflict or crisis.

This project was presented to the Chief Nurse of an MDG within the US PACAF area of responsibility (AOR) who also serves as the E&T director. The project was presented during a face-to-face meeting using a Power Point presentation. The presentation began by stressing the importance of maintaining military readiness, giving the historical perspective of the peacetime effect in previous military conflicts, and thoroughly explaining how the project would help to combat this challenge, including the budget, planning required, and plan for the actual execution of the training.

The presentation was well received and the Chief Nurse agreed with the challenge nurses and technicians face during peacetime operations to maintain their medical skills. The MDG has conducted smaller-scale versions of this project in the past but the Chief Nurse asked if she could have access to some of the data gathered and created in order to look at the possibility of trialing this within the MDG. Feedback included adjusting the Evaluator Checklist to Evaluator Skills Checklist. The size of the MDG that this project was designed for was not originally explained prior to receiving feedback on the

importance of relaying this in the paper to show how the composition of participants, facilitators, and evaluators was determined. For budgeting, there was a suggestion to refresh all supplies on an annual basis instead of the IFAK kits only having a 30% refresh rate as originally planned. This suggestion was incorporated since the same supplies would be used 2-4 times per year in field conditions. Suggestions for executing the training included adding a minimum of twice a year with a goal of 4 times per year as well as cutting the training short to just one round of simulation per training period to allow for other training requirements MDG members have to accomplish during the designated training day. Given the importance of skills readiness, these suggestions were not incorporated into the project initially but could be adjusted as needed after the project is trialed.

Limitations

Assumptions were made during this project that the E&T department in the MDG would be able to coordinate with the appropriate base agencies to reserve an aircraft for the portion of the training that involves the loading of casualties for air evacuation. The inability to know if an aircraft would be available for the training is a limitation and could not be addressed since there is no way to accurately determine on a 15-month timeline when an aircraft would be available at any given base due to the multiple competing priorities and requirements that require their use.

Implications for Nursing

Maintaining their medical skillset is a necessity for all healthcare professionals in order to provide the care that patients deserve. This is especially true for the military medical force as previously discussed. Opportunities such as the training proposed in this

project give medical members a chance to develop and maintain their skills when they typically operate in an environment that would not otherwise allow them to maintain those skills. This project offers training for certain skills that Air Force medical members would be expected to perform in conflict or crisis. The overall concept of this project is universal to every medical professional. This type of unit-level training could be tailored to meet the needs of any military service or civilian medical healthcare professional.

Recommendations

As the training from this project is executed and refined with the AF active-duty medical members, opportunities to involve medical members from other services should be trialed. The DHA continues to integrate military medical forces, and military leaders from all services and levels stress the importance of working collectively with our sister services as a crucial part of the military's involvement in future crises or conflicts. Knowing the next conflict will need to be fought as a joint team, it is recommended that as this project progresses, sister services be invited to integrate and participate in the training to maximize opportunities to build medical skills in an interoperable environment.

Conclusion

The US places a high-level of trust in the military medical force to provide care to the warriors that are injured while defending the interests of the nation. Military medical professionals are expected to be ready to provide this care at a moment's notice and potentially do so in high-threat, austere environments with limited resources for extended periods of time. Peacetime or steady-state operating environments are not an excuse for a dip in skills readiness for the military's medical force. The training offered in this project

is just one of the many options out there to be taken advantage of when addressing the medical skillset readiness posture of the military medical force.

References

AFMS Strategy. *The official home page of the AFMS.* (2022). Retrieved September 25, 2022, https://www.airforcemedicine.af.mil/

Bedi, S. (2018, June 27). *Readiness, trauma at heart of C-stars Baltimore partnership*. Air Force Medical Service. Retrieved November 7, 2022, https://www.airforcemedicine.af.mil/News/Display/Article/1561789/readiness-trauma-at-heart-of-c-stars-baltimore-partnership/#:~:text=The%20U.S.%20Air%20Force%E2%80%99s%20C-STARS%20Baltimore%20program%20partners,setting.%20%28Courtesy%20photo%29%20Photo%20Details%20%2F%20Download%20Hi-Res

Benner, P. E., Tanner, C. A., & Chesla, C. A. (2009). *Expertise in nursing practice: Caring, clinical judgment and ethics* (2nd ed.). Springer.

Cannon, J. W. (2021, January 1). Combating the peacetime effect in military medicine. *JAMA Surgery*. Retrieved June 10, 2022, https://jamanetwork.com/journals/jamasurgery/fullarticle/2770274

Department of Defense (DOD) Instruction. (2017, April 11). *DOD health record life cycle management (whs.mil No. 6040.45)*. Retrieved November 8, 2022, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/604045p.pdf?ver=2019-03-22-095342-773

Fox, J. P., Markov, N. P., & Latham, K. P. (2021). Combating the “peacetime effect” in military plastic surgery: Implications for mission readiness. *Military Medicine*, *186*(7-8), 183–186. https://doi.org/10.1093/milmed/usab162

Health.mil. (2022, July 15). *Defense health agency campaign plan*. Military Health System. Retrieved September 22, 2022, https://www.health.mil/About-MHS/OASDHA/Defense-Health-Agency/DHA-Campaign-Plan

Health Research Funding (HRF) Organization. (2017, January 31). *Patricia Benner novice to expert nursing theory explained*. Retrieved July 10, 2022, https://healthresearchfunding.org/patricia-benner-novice-to-expert-nursing-theory-explained/

Hustad, J., Johannesen, B., Fossum, M., & Hovland, O. J. (2019). Nursing students' transfer of learning outcomes from simulation-based training to clinical practice: A Focus-group study. *BMC Nursing*, *18*(1). https://doi.org/10.1186/s12912-019-0376-5

Hutter, P. J., Roski, J., Woodson, J., Middleton, A., Kneeland, R., Worthy, A., Zitelman, D., Trinh, T., Cruz, S. D., & Cooper, E. (2019). Readiness of medical providers in the Military health system: Overview of operational and policy considerations. *Health Affairs*, *38*(8), 1274–1280. https://doi.org/10.1377/hlthaff.2019.00336

Joint Trauma System. *Joint trauma system: The department of defense center of excellence for trauma.* (2019, March 7). Retrieved November 7, 2022, https://jts.health.mil/index.cfm/committees/cotccc

Krishnan, D. G., Keloth, A. V., & Ubedulla, S. (2017). Pros and cons of simulation in medical education: A review. *International Journal of Medical and Health Research*, *3*(6), 84–87. https://doi.org/file:///C:/Users/ssdd8/Downloads/Prosandconsofsimulationinmedicaleducation-International...%20(2).pdf

Maddocks, W. (2020). Skill fade in military medical training: A literature review of supraglottic airway use in the prehospital environment. *JMVH*, *28*(3), 35–42.

McGaghie, W. C., Issenberg, S. B., Petrusa, E. R., & Scalese, R. J. (2006). Effect of practice on standardised learning outcomes in simulation-based medical education. *Medical Education*, *40*(8), 792–797. https://doi.org/10.1111/j.1365-2929.2006.02528.x

McGaghie, W. C., Issenberg, S. B., Petrusa, E. R., & Scalese, R. J. (2016). Revisiting 'A critical review of simulation-based Medical Education Research: 2003-2009.' *Medical Education*, *50*(10), 986–991. https://doi.org/10.1111/medu.12795

Merriam-Webster. (n.d.). Air force. In *Merriam-Webster.com dictionary*. Retrieved November 7, 2022, https://www.merriam-webster.com/dictionary/air%20force

Mooney, B. (2021, November 15). *Military surgeon readiness continues to decline as patient caseloads drop*. U.S. Medicine. Retrieved August 31, 2022, https://www.usmedicine.com/current-issue-top/military-surgeon-readiness-continues-to-decline-as-patient-caseloads-drop/

Spooner, M. T., Alex, J. E., Greer, J. A., Delorey, D. R., Kiser, R. A., Petersen, C., Polk, T., & Gunzelman, K. (2019). Simulation training for operational medicine providers (stomp): Impact of a comprehensive skills-based curriculum for military general medical officers. *Military Medicine*, *184*(5-6), e141–e146. https://doi.org/10.1093/milmed/usy346

Tarpey, M. J. (2022). Reorganizing around combat casualty care can army medicine negate the peacetime effect? - *Military Review*, *102*(2), 67–80. https://doi.org/https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/MA-22/Tarpey/Tarpey.pdf#:~:text=The%20effort%20and%20resources%20involved%20in%20planning%2C%20orga-,prevent%20thousands%20of%20deaths%20in%20the%20next%20conflict

Thomas, C. M., & Kellgren, M. (2017). Benner's novice to expert model: An application for simulation facilitators. *Nursing Science Quarterly*, *30*(3), 227–234. https://doi.org/10.1177/0894318417708410

Watts, P. I., Rossler, K., Bowler, F., Miller, C., Charnetski, M., Decker, S., Molloy, M. A., Persico, L., McMahon, E., McDermott, D., & Hallmark, B. (2021). Onward and upward: Introducing the healthcare simulation standards of Best PRACTICETM. *Clinical Simulation in Nursing*, *58*, 1–4. https://doi.org/10.1016/j.ecns.2021.08.006

Appendix A

TCCC Response

Task	Completed	
	1st	2nd
1. Identified team leader	Y / N	Y / N
2. Phase I – Care Under Fire, Point of Injury		
- Continue tactical mission (gain fire superiority)	Y / N	Y / N
- Ask casualty these 3 questions	Y / N	Y / N
A. Can you return fire?	Y / N	Y / N
B. Can you provide self-care?	Y / N	Y / N
C. Can you move to cover?	Y / N	Y / N
- Treat Only Massive Hemorrhaging during CUF (tourniquet)	Y / N	Y / N
3. Phase II – Tactical Field Care; Casualty Collection Point		
- Disarm casualty	Y / N	Y / N
- Begin the steps of MARCH PAWS mnemonic	Y / N	Y / N
A. Massive Hemorrhaging a. Apply tourniquets, write the time applied b. Pack wounds with combat gauze c. Apply Dressing and Bandages	Y / N	Y / N
B. Airway a. Observe Mouth and Nose for Obstructions b. If no apparent Head or Spinal Injury perform head tilt chin lift to open airway further c. If still difficulty breathing, lubricate NPA and insert in their left nostril	Y / N	Y / N
C. Circulation a. Check casualty's pulse on their wrist, neck, and ankle i. Ensure there is no pulse on a limb below a tourniquet	Y / N	Y / N

Task	Completed	
D. Head Injury / Hypothermia a. Perform Responsiveness Assessment, Sternum Rub b. Stabilize the neck if apparent spinal cord injury c. If no head injury: i. Ensure casualty has coverage on their head, but not face	Y / N	Y / N
E. Pain Management a. Administer appropriate analgesia or sedation to manage pain i. Mobic/Tylenol ii. Fentanyl OTFC iii. Ketamine or fentanyl IV/IM	Y / N	Y / N
F. Antibiotics a. Administer battlefield antibiotic for prevention of infection i. PO or IV/IO/IM for all open combat wounds	Y / N	Y / N
G. Wound Management a. Assess and dress additional wounds and check prior interventions (clean and dress)	Y / N	Y / N
H. Splinting a. Splint all fractures or provide support to limb dressings (SAM, KTD, spine, rigid eye shield)	Y / N	Y / N
4. Phase III – Tactical Evacuation Care		
A. Move Casualty to CCP	Y / N	Y / N
B. Establish CASEVAC/MEDEVAC Point and Call 9 Line	Y / N	Y / N
C. While waiting, re-assess using MARCH PAWS mnemonic	Y / N	Y / N

Notes:

_____

_____

_____

_____

_____

Evaluator:

_____

Appendix B

En Route Care

Task	Completed	
	1st Round	2nd Round
1. Correctly places and packages casualty on litter for transportation - Litter correctly assembled - Correct number/placement of straps to secure casualty - Arms outside upper litter strap if conscious, tucked inside upper litter strap if unconscious - Encourages/provides casualty hearing/eye protection (for Engines Running Onload (ERO))	Y / N	Y / N
2. Demonstrates correct litter commands	Y / N	Y / N
3. Demonstrates correct litter carrying techniques (2, 3, 4-person carry)	Y / N	Y / N
4. Demonstrates correct vehicle litter loading/offloading procedures (Ambus)	Y / N	Y / N
5. Reassesses casualties using MARCH PAWS mnemonic while traveling in vehicle	Y / N	Y / N
6. Demonstrates correct aircraft litter loading procedures during ERO - Appropriate PPE for participants - Takes direction (verbal/hand signals) from AE crew/Load Master - Stays out of aircraft engine/propwash danger zones - Carries casualties up feet first (unless directed differently by AE crew) - Identifies if they need help lifting litter and casualty/racking litter into stanchion	Y / N	Y / N

Notes:

_____

_____

_____

_____

_____

Evaluator:

_____

Appendix C

Triage

Task	Completed	
	1st	2nd
1. Team demonstrates/explains triage process for casualties - Which casualties get on aircraft (limited space available) - Which casualties stay behind (return to duty, expectant) - Which order to load patients - Categorize patient correctly (red, yellow, green, black)		
A. Casualty 1	Y / N	Y / N
B. Casualty 2	Y / N	Y / N
C. Casualty 3	Y / N	Y / N
D. Casualty 4	Y / N	Y / N
E. Casualty 5	Y / N	Y / N
F. Casualty 6	Y / N	Y / N
G. Casualty 7	Y / N	Y / N
H. Casualty 8	Y / N	Y / N

Notes:

_____

_____

_____

_____

_____

Evaluator:

_____

Appendix D

Clinical Skills Confidence Rating Scale

Please circle the number that best describes how confident you are about your ability to perform each of the following aspects of care for a casualty on the battlefield and in the Air Force en route patient care system.

	Not at all confident	**Somewhat confident**	**Moderately confident**	**Very confident**
1. I can seek support from my team	1	2	3	4
2. I can take direction from my team leader	1	2	3	4
3. I can act as the team leader if/as needed	1	2	3	4
4. I know what questions to ask casualties during Phase I of TCCC (Care Under Fire)	1	2	3	4
5. I can provide care using MARCH PAWS mnemonic during Phase II of TCCC (Tactical Field Care; Casualty Collection Point)	1	2	3	4
6. I can provide care to casualties during Phase III of TCCC (Tactical Evacuation Care)	1	2	3	4
7. I can package a casualty for CASEVAC/MEDEVAC/AEROVAC	1	2	3	4
8. I can call litter commands	1	2	3	4
9. I can carry a casualty on a litter (2, 3, 4-person carry)	1	2	3	4
10. I can load/offload a litter-bound casualty on a vehicle of opportunity (Ambus)	1	2	3	4
11. I can load an aircraft with a litter-bound casualty (during Engines Running Operations)	1	2	3	4
12. I can triage casualties and determine who returns to duty (RTD), gets evacuated/stays behind if limited space available	1	2	3	4

Appendix E

Casualty Cards

Casualty	Casualty Presentation	Moulage
1	Acute Psychosis - Loud intrusive behavior. Demanding, yelling incoherently at times for team to "find his weapon or give him their weapon." - Pain – Denies - Pulse – 110 - Respirations – 20	Mild superficial abrasions to left side of face/cheek
2	Orthopedic (fractured left leg) - Open fracture of the tibia bone - Screaming out in pain, cannot tolerate seeing sight of injury - Pain - 10/10 - Pulse - 105 - Respirations - 24	Bloody left pant leg torn open exposing broken tibia bone
3	Abdominal wound (evisceration of large intestines) - Right lower quadrant laceration with exposed intestines - Pain - 9/10 - Pulse - 95 - Respirations - 20	Right lower quadrant laceration with exposed intestines
4	Pulmonary (sucking right chest wound) tension pneumothorax - Deep gasps for a breath - Unequal chest rise and fall - Cyanotic - Pain – 9/10 - Pulse – 118 - Respiration – 24	Blue fingers and lips Bloody wound to right side of chest

5	Head injury (catatonic state) - Unresponsive - Left pupil larger than right and non-reactive to light - Pain – Unresponsive - Pulse – 50 - Respirations – 8 to 10	Large penetrating wound to left side of head oozing blood
6	Middle ear trauma - Disoriented, unsteady on feet, yelling while communicating due to hearing loss - Hearing loss - Tinnitus - Vertigo - Bleeding from ear canal - Pain - 4/10 - Respirations - 20 - Pulse - 97	Minor scratches to face Blood coming from ears
7	Burns (partial thickness burns to face, chest, and arms) - Trying to help others despite being in pain. - Blanched and blistered skin - Pain - 7/10 - Pulse - 110 - Respirations - 20	Blanched skin, clear and bloody blisters on face chest and arms Ripped shirt exposing blisters with material sticking to some burned sites
8	Eye Injury (debris in eyes) - Complaining of eye pain, disoriented related to visual difficulties - Difficulty seeing - Itchy burning eyes - Pain - 5/10 - Pulse - 88 - Respirations - 18	Minor scratches on face Red eyes with dirt/ debris around eyes and face