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13. ABSTRACT *(Maximum 200 words)*
DeWitt Army Community Hospital (DACH) has in-house ambulances and personnel which provide patient transport and emergency medical services to a large portion of the National Capital Area (NCA). This study determines if it would be in the hospital's best interests to either (1) maintain the status quo; (2) transfer DeWitt's emergency medical service (EMS) mission to the Fort Belvoir Fire Department; or (3) contract (out-source) patient transport services to a commercial provider. The three alternatives were evaluated using the criteria of cost, needs of the facility, response time, and the effects of the Table of Distribution and Allowances (TDA).

The purpose of this study is to research various alternatives for the delivery of DeWitt services, and use this information to make an informed and educated recommendation to the commander.

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Running head: TRANSPORT AND EMS SERVICES AT DEWITT MEDDAC

A Study to Ascertain the Viability of Retaining Versus Out-Sourcing Patient Transport and Emergency Medical Services at DeWitt Army Community Hospital

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Abstract

In June of 1997 the Commander of the Walter Reed Health Care System (WRHCS) initiated a study to determine if it would be economically viable to (1) consolidate military ambulance transport assets in the National Capital Area (NCA) into a single-hub, centralized operation; (2) transfer each hospital's EMS mission to each post's fire department, or (3) contract with civilian agencies for transport services for Department of the Army units located in the NCA.

DeWitt Army Community Hospital (DACH) is a significant part of the WRHCS, and its in-house ambulances and personnel support patient transportation and emergency medical services (EMS) for a large geographic portion of the NCA. Various courses of action (COAs) for the provision of transport and EMS services were selected for consideration. The alternatives chosen include maintaining the status quo; transferring DeWitt's EMS mission, to include personnel and assets, to the Fort Belvoir Fire Department; and contracting (out-sourcing) DeWitt's patient transport mission (including transports from outlying clinics). The three alternatives were evaluated using the criteria of cost, needs of the facility, response time, and the effects on the Table of Distribution and Allowances (TDA) for each COA. The three COAs were compared using a decision-making matrix.

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A Study to Ascertain the Viability of Retaining Versus Out-Sourcing Patient Transport and Emergency Medical Services at DeWitt Army Community Hospital

Conditions Which Prompted the Study

The provision of health care to beneficiaries of the military community is in a state of transition as the Department of Defense moves to a managed healthcare system known as TRICARE. According to Department of Defense literature, the primary impetus for implementing a managed care program is "...to offer timely access to care, assure high quality care, control health care costs, and offer more choices for health care options to meet individual needs." (TRICARE, 1997).

In July 1997 the DACH commander commissioned a study to ascertain if it would be in the hospital's best interests to maintain the status quo; transfer DeWitt's EMS mission to the Fort Belvoir Fire Department; or contract (out-source) DeWitt's patient transport mission a commercial provider.

Presently, DACH operates 48 inpatient beds (seven intensive care beds, 21 medical/surgical beds, four step-down beds, and 16 mother/baby beds). DACH offers same day surgery, selected specialty care, primary care, and a Level II emergency room. The organizational structure is shown in Figure 1. DACH consists of four main treatment facilities: (1) The forty year

old main hospital located on Fort Belvoir (which also houses the DeWitt Family Health Center (FHC)), (2) the Fairfax FHC located in Fairfax, Virginia, (3) the Woodbridge FHC located in Woodbridge, Virginia, and (4) the Andrew Rader U. S. Army Health Clinic located on Fort Myer, Virginia.

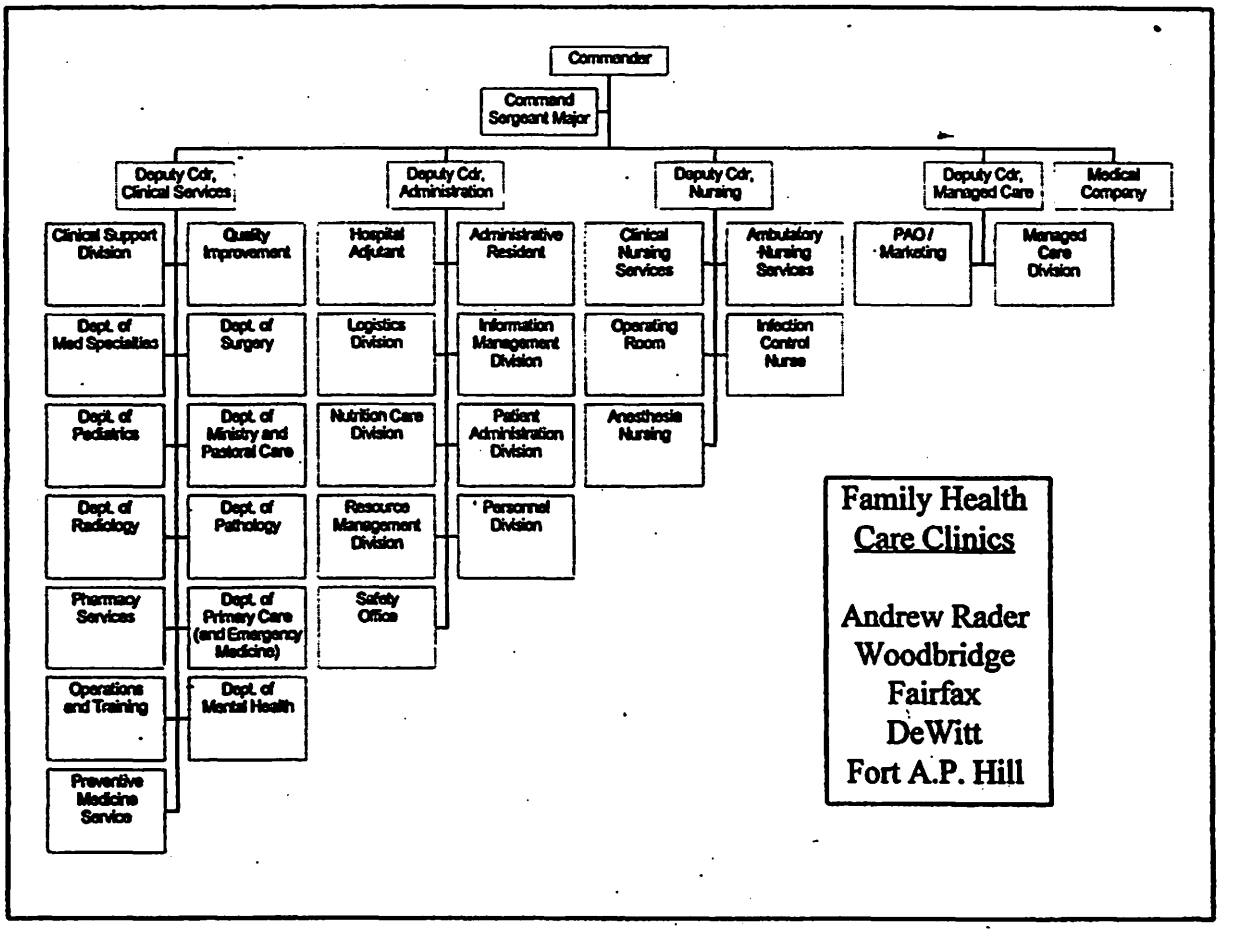

Figure 1. Current DeWitt Organizational Structure, 1998
Source: Colonel Jones, DeWitt Commander

Figure 2 is a graphical representation of DACH's catchment area, and descriptions of the current and projected beneficiaries in DeWitt's catchment area are shown in Figures 3 through 6.

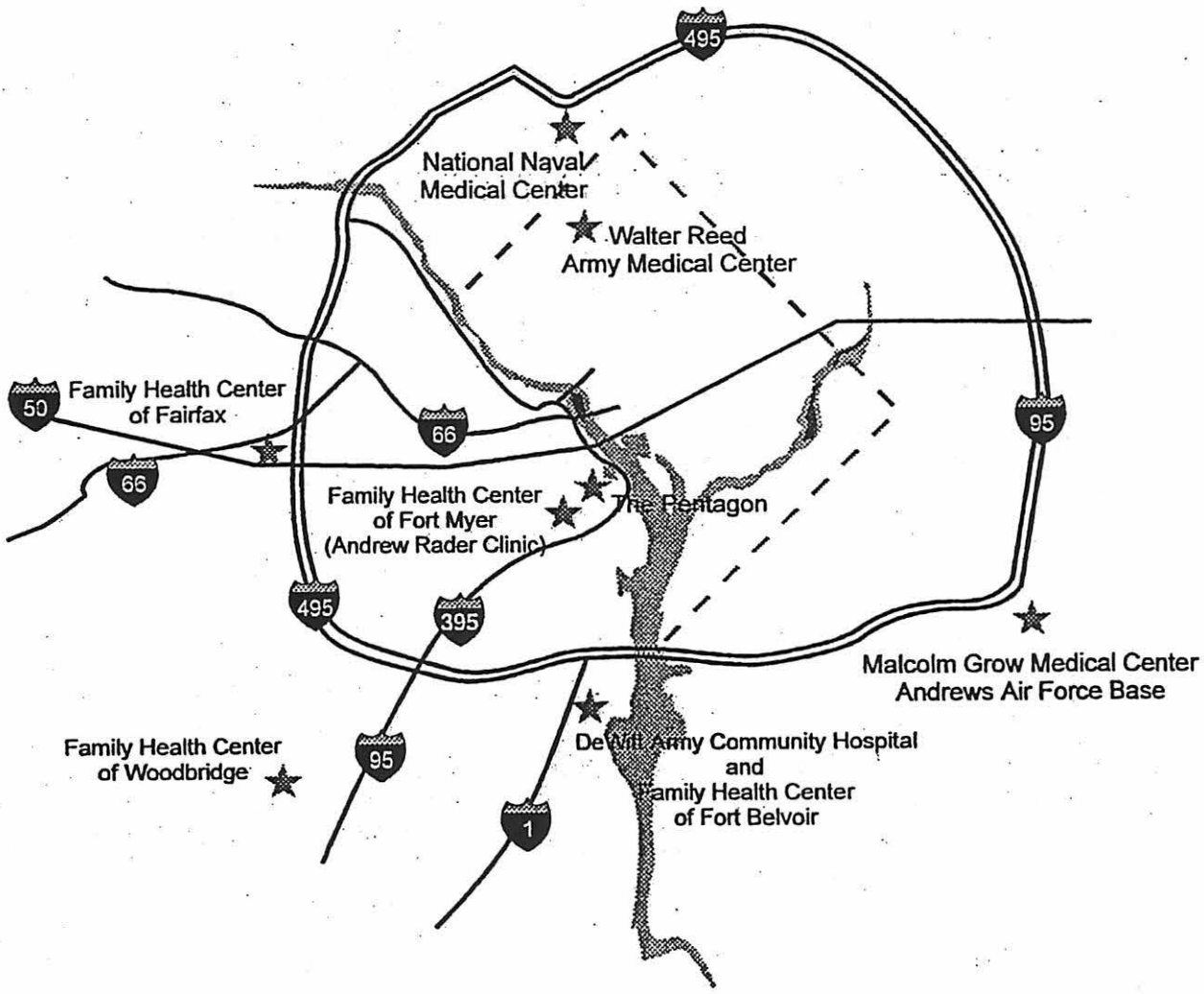

Figure 2. Map of Area Encompassing the DeWitt Health Care System, 1998. Source: Susan Allen, Marketing Director, DHCS

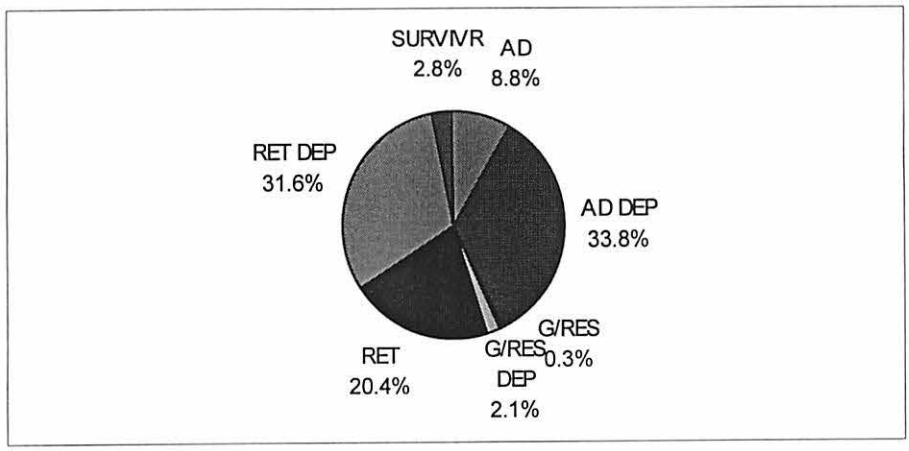

Figure 3. DeWitt Catchment Area
by Beneficiary Category, FY97 Actual
Source: DMIS, FY97

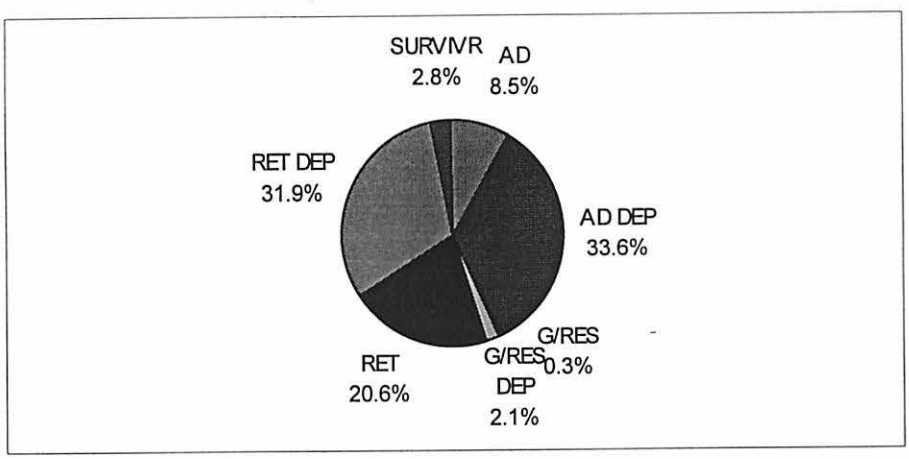

Figure 4. DeWitt Catchment Area by
Beneficiary Category FY 98, Projected
Source: DMIS, FY97

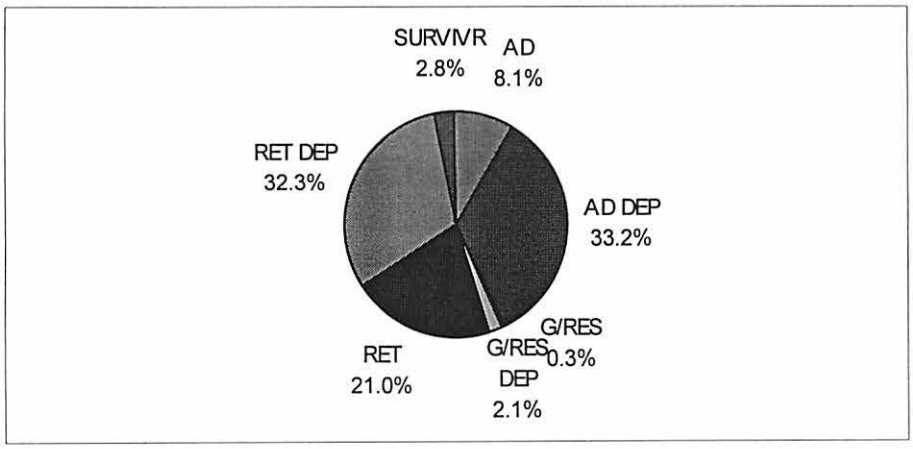

Figure 5. DeWitt Catchment Area by Beneficiary Category FY99, Projected
Source: DMIS, FY97

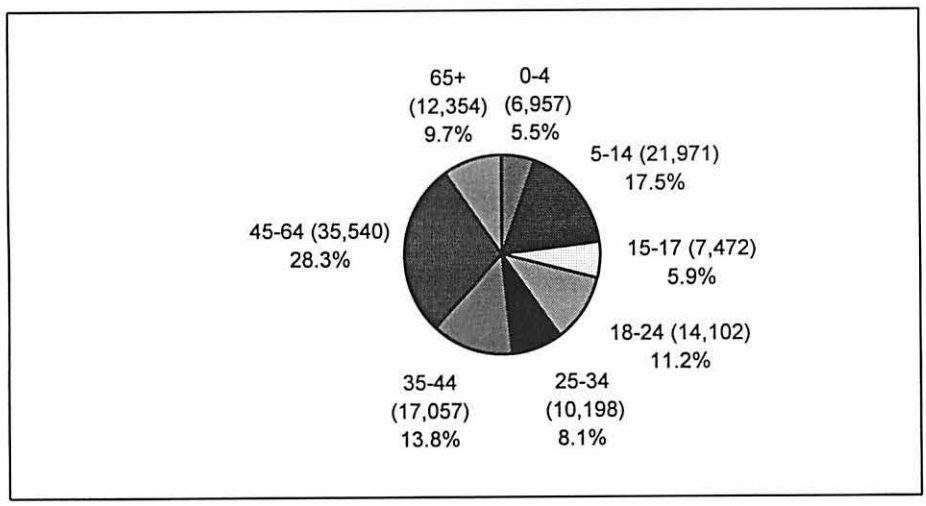

Figure 6. DeWitt Catchment Area by Age, FY97 Actual. Source: RAPS, FY97

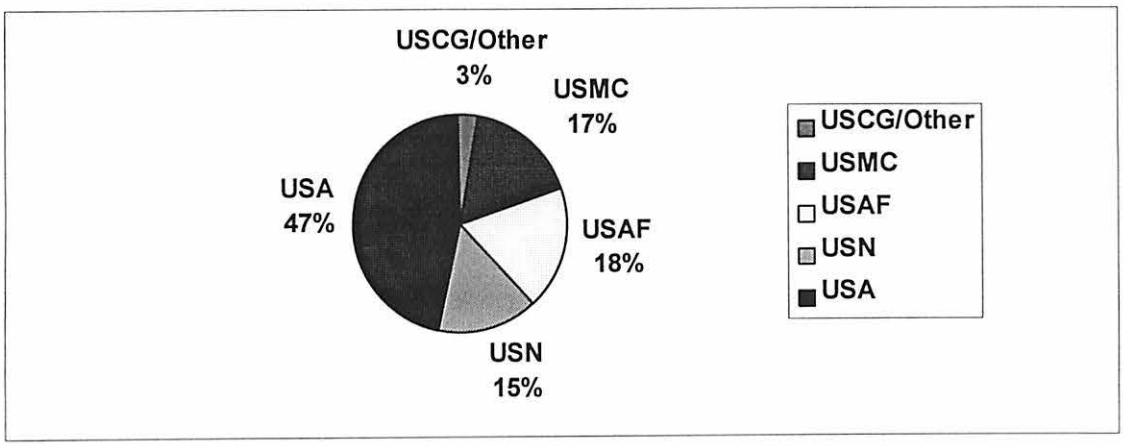

Figure 7. DeWitt Beneficiary Sponsor's Branch of Service, FY97 Actual. Source: DMIS, FY97

Statement of the Problem

Various methods for the provision of patient transport and emergency medical services will be investigated. The stated research problem is: Determine from various courses of action the most appropriate method of providing patient transport and emergency medical services for patients of DeWitt Army Community Hospital, and beneficiaries residing in the Fort Belvoir catchment area.

Literature Review

Since the concept of out-sourcing transport or EMS services is a fairly recent one (essentially since the end of the Cold War, or about 1991), professional writings addressing this

topic are not widely available. However, information was gathered from a few journals written for personnel working in the emergency treatment arena, and verbal communications occurred with personnel possessing expert knowledge of emergency transport and EMS personnel utilization issues. To develop various and appropriate courses of action, in-depth research was conducted on the emergency medical systems within DeWitt Army Community Hospital, Walter Reed Army Medical Center (WRAMC), the U.S. Army Medical Department (AMEDD), the U.S. Army, and the Department of Defense (DoD). Additional information was gathered reference EMS certification and training requirements, EMS equipment requirements, historical information and precedents, staffing models for ambulance transport and EMS sections, average transport and response times, and cost factors. Before any option was considered, it had to meet the appropriate regulatory requirements for certifications, training, equipment, staffing, response time and EMS standards of care.

Also ascertained were the DoD or AMEDD requirements for patient transport or EMS services in a fixed facility, U.S. Army medical activity. According to Medical Command (MEDCOM) Regulation 40-5, Medical Services Ambulatory Patient Care, "Each inpatient facility will maintain emergency medical services (EMS) designated by the medical activity (MEDDAC) commander at the

appropriate Joint Accreditation of Health Care Organizations (JCAHO) level. The designated level will be consistent with the personnel, equipment, and physical plant resources of the facility. If there is a need to raise or lower the existing level of EMS provided, such a change will be compatible with the health service region's goal of providing total health care." (MEDCOM, 1997).

According to the EMS Systems Program Guidelines, "...each EMS system must provide for the establishment of appropriate arrangements with other EMS systems or similar entities serving neighboring areas for the provision of emergency services on a reciprocal basis where access to such services would be more appropriate and effective in terms of the services available, time, and distance" (DHEW, 1979). MEDCOM Reg 40-5 also states that "...each MTF ambulance section must have two fully equipped and fully staffed ambulances available 24 hours per day, seven days per week. If a facility, as determined by the MTF Commander, is unable to provide the second (backup) ambulance crew, there will be health service region coordination to ensure continuity of service" (MEDCOM, 1997). This is vital to know when studying the various courses of action. DACH has an established concurrent jurisdiction agreement with the Fairfax County EMS system. Under

this arrangement, adequate backup would be provided should DeWitt's coverage assets become unavailable.

Although a minimum of one ambulance is generally required for every 40,000 people, a single paramedic unit with adequate transport support and state-of-the-art priority dispatch may be adequate for up to 200,000 people (Kuehl, 1994). According to Rusty Pearson, senior emergency medical technician at DACH, "DeWitt's two fully staffed advanced life support ambulances are able to handle the majority of EMS and fire calls for the 125,000 personnel residing in DeWitt's catchment area. Fairfax County is always able to respond when there is a need for additional support" (R. Pearson, personal communication, October 23, 1997).

Privatization of services continues to be a growing trend, and in many communities this includes EMS (Swan, 1988). Private EMS contractors have learned over the years that EMS operations can be very financially lucrative if done in a cost-conscious way and in an area which provides a steady flow of clients (Kuehl, 1994). With the federal government steadily increasing the number of operations it contracts out, it is no surprise that state and local municipalities across the nation are increasingly contracting for ambulance services.

One other option emerged during the literature review process. MEDCOM Regulation 40-5 states "If other federal agencies

(e.g., fire department, security police) provide the ambulance support, The Director of Health Services will ensure the use of appropriate vehicles, the presence of currently certified emergency medical technician (EMT) personnel on emergency dispatches, and the maintenance of quality patient care services. Additional MEDDAC responsibilities include approving EMS protocols, delineating personnel qualifications, and monitoring training programs" (MEDCOM, 1997). According to the officer in charge (OIC) of the DACH Emergency Room (ER), "Even if we (DeWitt) transfer the hospital's EMS mission to the Fort Belvoir Fire Department, the ER OIC will still exercise proficiency monitoring of the personnel working the EMS mission. By doing this, the MEDDAC operates within the guidelines outlined in the MEDCOM regulation reference 'maintaining EMS services'" (T. A. Diallo, personal conversation, 1997). Approximately one half of the EMS systems in the United States are fire department-based operations (Kuehl, 1994). Since DeWitt's ambulances and EMS crews already respond to all Fort Belvoir fire calls, collocation of DeWitt EMS services with the fire department is worth investigating.

For information regarding patient transport contract costs, various civilian companies specializing in ambulance services and able to serve DeWitt's catchment area were

contacted. These companies were (1) AL-LIN Ambulance Service, (2) Advance Care Ambulance, (3) Maryland Ambulance Service, Inc., (4) American Ambulance and Oxygen Service, and (5) Laurel Rescue Squad, Inc. The average estimated cost from each company was used when analyzing the option of contracting out patient transport services.

Virginia EMS System

As mandated by MEDCOM Regulation 40-5, a MTF ambulance service must comply not only with DoD standards and directives, but also with applicable state and local standards and directives. Formal organization of the Virginia EMS system was promulgated under Title 32.1, Chapter 5, Article 5 of the Code of Virginia (1950), as amended, and in conformity with the General Administrative Process Act, Title 9, Chapter 1-1:1 of the Code, and most recently approved on July 1, 1996 by the Office of Emergency Medical Services, Virginia State Board of Health (Dept. of Health, 1996). The law specifically requires that the Board regulate such services by establishing minimum standards for agencies and for EMS vehicles and equipment. These regulations are administered by the following:

a. State Board of Health - The Board of Health has the responsibility to promulgate, amend, and repeal, as appropriate, regulations for the provision of medical services;

b. State Health Commissioner - The Commissioner, as Executive Officer of the Board, administers the regulations;

c. EMS Advisory Board - Responsible for reviewing and evaluating State EMS policies and procedures. The Board meets quarterly and provides technical advice and recommendations to the State Board of Health. Other duties and responsibilities include continuous monitoring and improvement of transportation for emergency, critically injured, and critically ill patients, establishing guidelines for reciprocal support and mutual aid agreements, and review and approval of EMS operating and capital budgets.

Training and Certification

Prior to 1966 there were few national, state, or local regulations or guidelines for ambulance personnel; essentially, anyone with a driver's license could respond to emergencies. The Highway Safety Act of 1966 provided funds to develop a training course curriculum for the new position of Emergency Medical Technician-Ambulance (EMT-A)(Kuehl, 1994). The 70-hour curriculum was originally published by the American Association of Orthopedic Surgeons in 1969, and has been updated several times since. The training for EMS personnel is regulated at the state level but is based on national recommendations from the Department of Transportation (DOT). The Virginia EMS training programs lead to the following certifications: First Responder,

Emergency Medical Technician-Basic (EMT-B), Emergency Medical Technician-Ambulance (EMT-A); Emergency Medical Technician-Instructor (EMT-I), Emergency Medical Technician-Shock Trauma (EMT-ST), Emergency Medical Technician-Cardiac (EMT-C), and Emergency Medical Technician-Paramedic (EMT-P). However, only three levels of prehospital providers are utilized on Fort Belvoir: First Responder (Firefighters and Military Police), and EMT-B and EMT-P (DeWitt Hospital).

The National Registry of Emergency Medical Technicians (NREMT), an independent non-government agency, certifies EMT providers by requiring the providers to pass a DOT-approved training program. The NREMT together with state regulatory agencies provide the framework for which the standards of care are maintained. DoD instruction 6000-10 directs that the individual services will ensure all ambulance personnel are trained at the EMT-A level (Jagoda and Pietrzak, 1992), and that EMTs are NREMT certified.

In modern EMS systems the term "first responder" refers to nonmedical public safety personnel, usually firefighters or police. First responders deliver basic first aid and cardiopulmonary resuscitation (CPR) until more highly trained EMTs or paramedics arrive. EMT-Bs possess and perform all of the

first responder skills and much more, and increasingly EMT-Bs have almost as much training and skills as paramedics.

Paramedics (EMT-Ps) provide the most comprehensive prehospital care. Depending on law and local need, these providers administer an array of medications and initiate a large number of procedures. Paramedics are trained in the recognition and management of medical emergencies, trauma assessment, patient stabilization, patient transport, advanced airway management, advanced life support protocols (including defibrillation), and medication administration (Jagoda and Pietrzak, 1992).

To operate as a Class A-level ATLS ambulance unit, the law requires that the ambulance have at least one EMT-P provider, and a driver at least 18 years old who has completed the Virginia Evacuation of Casualties (EVOC) Course within the previous five years. Class B vehicle teams consist of at least one EMT-B provider and a driver at least 18 years old who has completed the Virginia Evacuation of Casualties (EVOC) Course within the previous five years. The AMEDD's guidance for ambulance staffing levels is more flexible than Virginia's standards and MEDCOM Reg 40-5 reads "... two health care personnel will accompany each ambulance when dispatched on a emergency, the second may serve as driver. Personnel can be a combination of appropriately qualified

physician, certified nurse anesthetist, nurse midwife, EMS nurse, critical care nurse, EMT, or other health care personnel."

Response Time

One of the issues which surfaced was a notion that response times would (1) increase as the number of personnel assigned to the section decreased, and (2) decrease if the civilian EMTs were positioned at the Post Fire Department. This matter required research and investigation to determine if response time was a significant life threatening factor. Despite more than two decades of growth of increasingly sophisticated EMS systems, there is still little knowledge regarding the impact of most prehospital care on patient outcomes. There is currently no widely accepted model for the chronological time sequence of EMS response time and care (Spaite et al., 1993). Most of the information sources addressed response times, determining medically optimal response times, and the effect of response times on medical outcomes of cardiac incidents. The American Hospital Association's Textbook of Advanced Cardiac Life Support (Cummins, 1994) reads that "...cardiac arrest survival includes four components: (1) early access to the EMS system, (2) early CPR either by bystanders or first responders, (3) early defibrillation, and (4) early ATLS measures. Each link in the chain must be strong to assure maximal survival rates for those

who experience out-of-hospital cardiac arrest. For example, if CPR and ATLS occur within four and eight minutes, respectively, the average survival rate is 43 percent. The survival rate drops to zero percent if the CPR and ATLS do not occur within 12 minutes and 16 minutes, respectively."

Based on this, a quick response time can significantly affect the survival rate of cardiac arrest victims. However, to put things into perspective, cardiac arrest victims account for less than two percent of all EMS responses (Spaite et al., 1993). The "rule of thumb" in most literature was that, for 90 percent of the cases, basic life support should be delivered within five minutes, and ATLS within nine minutes (Ornato, 1995). DeWitt's average response time per call in FY97 was 3.5 minutes.

Purpose of the Study

The purpose of this study is to research various alternatives for the delivery of patient transport and EMS services, and use this information to make an informed and educated recommendation to the DACH commander.

Methods and Procedures

The Decision-Making Process

According to Ivancevich and Matteson (1996), "The decision-making process typically involves the following: (1) establishing specific goals and objectives; (2) problem

identification and definition; (3) development of alternative solutions; (4) evaluation of alternative solutions; (5) solution selection; (6) implementation; and (7) follow-up. The scope of this project will be through step five. The specific goal is to ascertain one course of action that produces the best delivery of transport and EMS services for DACH in particular, and the WRHCS in general.

Ambulance Workload Data Analysis

The COAs were developed during the literature review and through conversations with various personnel within DACH and the WRHCS. Analyzed were the DACH ambulance section's FY97 workload data, and this data was comparatively used when analyzing civilian cost and workload estimates. The workload data was obtained from files maintained by the ambulance section supervisor.

The workload data allowed for anticipation of future transport and EMS demand. The literature review and workload data served as the basis for formulation of appropriate COAs. Also, due to the lack of published information regarding similar studies, a modified Delphi technique and advice and opinions of subject matter experts (SMEs) were used.

Description of Courses of Action

Three COAs were developed: (1) Retaining and maintaining the current in-house transport and EMS systems (i.e., maintain the status quo); (2) contract to a civilian provider (out-source) all DACH transport and EMS services; and (3) retain in-house the transport services and transfer EMS services to the Fort Belvoir Fire Department. Assumptions considered were that each COA (1) would be staffed by individuals meeting Virginia and DoD regulatory requirements regarding licensure and certification; (2) would have vehicles and equipment in compliance with Virginia and DoD regulatory requirements; and (3) would be supported with continuing backup coverage from Fairfax County EMS.

Applied to each COA were the criteria of cost, needs of the facility, response time, and the effects on the DACH TDA.

The Decision-Making Matrix

The proposed COAs were compared to each other to determine the most appropriate COA to recommend to the DACH commander. The method used for evaluating the COAs is a decision-making matrix comparing weighted scores. The operational definitions for the criteria are:

Cost - Total per run cost to perform transport services and EMS services. In-house costs include vehicle costs, salaries, conference fees, and equipment and supplies. Contract cost is the proposed amount by a contractor, either on a monthly "hours of

coverage" basis or on a fee for service per run basis. This variable will be measured and reported in actual dollars or total cost per run for each COA. The average per run cost is determined by dividing the total annual cost by the total annual numbers and types of transport and EMS services performed. The lower the cost variable, the higher the score given to the COA.

Needs of the Facility - The DACH commander reviews each COA and rank orders each COA based on what he perceives to be in the best interest of the facility. The most preferred COA receives the highest weighted score; the second most preferred COA receives the second highest weighted score; and the third COA receives the lowest weighted score.

Response Time - For EMS: the interval of time between the time a "911" call is received and the time an ambulance arrives on the scene. The shorter the response time variable, the higher the score given to the COA.

Effects on TDA - the total number of TDA authorizations required to accomplish the EMS or transport function. The weighted score will be directly related to the number of DACH TDA authorizations required to accomplish each COA. The lower the number of authorizations, the higher the score given to the COA.

The following weights were assigned to each criteria:

Response Time 1.7

Fac. Needs	1.6
Cost	1.5
TDA Effects	1.0

Discussion

COA 1 - Maintain the Status Quo.

Currently the 0298 TDA staffs the Ambulance Section with 19 personnel (12 military and seven civilian), and this COA assumes no change from the current method of providing EMS and patient transport services. The approximate cost of this COA is $535,881 with an average cost per run of $335 for EMS missions and $291 for patient transports. The status quo cost for patient transports compares favorably to the projected average contract cost of approximately $441 for all other civilian companies from which information was provided. No civilian cost estimate was lower than the in house cost.

Retaining all personnel in house preserves all of the DeWitt Commander's command and control of assigned personnel. Additionally, TDA slots are preserved, and the personnel remain gainfully employed in the ER when not on an EMS or patient transport mission. The average response time per run is expected to remain at 3.5 minutes.

COA 2 - Transfer the EMS mission to the Fort Belvoir Fire Department. The following is a synopsis of the main points of a in-person discussion between the author and Mr. William G.

Shelton, Jr., the Chief of the Fort Belvoir Fire Department (W. G. Shelton, personal communication, November 7, 1997):

> It would be a very smart move to transfer the duty location of DeWitt's seven federal civilian EMTs to the Fort Belvoir Fire Department. In this time of fiscal constraints, we can no longer afford to have three separate fire and rescue entities, those being the EMTs at DeWitt, the fire assets here at the fire station, and a separate hazardous materials (HAZMAT) processing mission. All three of these missions really need to be under the command and control of one operation with a centralized dispatch location. The seven personnel from DeWitt would not only be cross-trained in HAZMAT and fire duties, but we would be able to place an EMT on the first pumper going out to an incident. This is precisely what most civilian fire departments are doing. Currently, if a dispatch call goes to DeWitt and they can not respond because they are using EMTs for routine transports, we have to make a second call for backup support from Fairfax County. This is costing precious time. In line with the Secretary of Defense's recent communications, we really need to be thinking 'best business practices' and work towards eliminating duplications of effort and unnecessary complications in the delivery of services.

This option is favorable for the Fire Department with respect to response time if backup support is needed. EMT personnel and assets collocated with the fire department would allow for a quicker overall average response time, since the fire department handles EMT dispatches. The DeWitt leadership has less command and control over the seven personnel; specifically, the personnel can no longer be used for hospital related missions (patient transport and as assistants in the ER). Additionally, there is the greater potential that, with less assets available, a patient transport mission would have to be contracted out, resulting in additional costs to DeWitt; therefore, average cost is greater for this COA.

COA 3 - Contract out the Patient Transport mission.

General Discussion. Currently the DeWitt Ambulance Section handles patient transports with assigned equipment and personnel. Contracting out the patient transport mission would result in increased costs, loss of TDA slots, less command and control, less personnel available for work in the ER, and no change in the average response time.

Conclusions and Recommendations

Based on the decision matrix, the DeWitt Commander should maintain the status quo; that is, do not contract the patient

transport mission, and do not transfer the EMS mission to the Fort Belvoir Fire Department.

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Appendices

Total Calls	1,838
Total Vehicle Mileage	48,605 miles
Total Time on Calls	133,832 minutes
Average Transport Time	190 minutes
Average Transport Miles	52 miles
Average EMS Time	18 minutes
Average EMS Miles	7 miles
Average Additional EMS	$44.10

Table 1. FY97 Ambulance Section Workload Data.
Source: Mr. Rusty Pearson, Ambulance Section Supervisor

Cost Category	Amount
Civilian Salaries	$263,161.40
Military Salaries*	175,000.00
Vehicle Lease	28,848.00
Mileage Cost	14,193.12
Supply Cost	3,213.00
Contracted Ambulance and Air Evacuation Cost	51,465.96
Total Operating Costs	$535,881.48
Total Number of Calls	1,838
Average Cost Per Call*	$ 291.56

* Approximate number, for comparison use only when evaluating against civilian contract costs.

Table 2. DeWitt Ambulance Section Costs, FY97
Source: Mr. Rusty Pearson, Ambulance Section Supervisor

Decision-Making Matrix													
			Weighted	Cost		Weighted			Weighted	Facility	Weighted	Total	
	Response	Rank	Value	Per	Rank	Value	TDA	Rank	Value	Needs	Value	Weight	Overal
	Time		1.7	Run		1.5			1	Rank	1.6	Score	Rank
COA 1	3.5	2	3.4	$291	2	3.0	19	1	1	1	1.6	9.0	1
COA 2	3.4	1	1.7	$275	1	1.5	12	2	2	3	4.8	10.0	2
COA 3	3.5	2	3.4	$441	3	4.5	19	1	1	2	3.2	12.1	3

Table 3. Decision-Making Matrix