GUIDELINES FOR AIR MEDICAL RESPONSE

Decision Making Guidelines for Air Medical Transport

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

Signed Michael B. Ross
Abstract

The introduction of helicopters into the treatment model for transporting critically injured patients to facilities that can provide appropriate definitive care has forever changed the face make up of the Emergency Medical System. The Bedford, Texas, Fire Department is an organization that provides care and transport of patients utilizing firefighter paramedics assigned to fire department based Mobile Intensive Care Units. This research project looked at one aspect of the organizations patient care system. The use of air medical helicopters to transport critically injured patients to trauma centers. The Concern is that with the department’s service area only fifteen miles from a trauma center; is the department properly utilizing this resource. The specific problem for this research is that the Bedford Fire Department firefighters are presented with conflicting, non specific information regarding the indications for the use and capabilities of air medical resources forcing them to make transport decisions based on individual perceptions and guesswork. The purpose of this research is to provide Bedford Fire Department personnel with a better understanding of the role of air medical resources so the member can make a more informed decision as to the method of transport of critically injured patients. Descriptive research was performed to answer the following research questions: (a) what procedures are currently in place for utilizing air medical resources, (b) what are the capabilities of air medical providers, and (c) what are other agencies doing to address issues related to air medical response? The research found that the overall process of determining the need for and requesting a helicopter were satisfactory. It was recommended that changes in the dispatching and tracking of available air resources be implemented to reduce the time it takes to have a helicopter respond.
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Trauma Decision Making Guidelines for Air Medical Transport

Introduction

The ability for a firefighter in the field to make accurate and timely decisions about the care and transport of critically injured patients is a crucial link in the patient’s chances for survivability. The use of a helicopter to deliver a critically injured patient to a trauma center within the first hour after the injury has forever changed the treatment model for trauma victims; especially in rural or outlying areas. Firefighters working in urban setting, like the Bedford Fire Department (BFD), have also recognized the need for helicopters to transport their critically injured even though they are much closer to trauma centers than those in rural settings.

Since 1972 when Denver’s Saint Anthony’s Hospital established the first civilian medical helicopter, the availability of air medical responses to emergency scenes has become a growing industry (Rittenberry, 2007). Furthermore, Rittenberry (2007) estimates that there are now over 792 medical helicopters in service throughout all fifty States.

The problem is that the BFD firefighters are presented with conflicting, non specific information regarding the indications for use and the capabilities of air medical resources forcing them to make transport decisions based on individual perceptions and guesswork. The purpose of this research is to provide BFD personnel with a better understanding of the role air medical resources so the member can make a more informed decision as to the method of transport of critically injured patients.

Descriptive research will be utilized to answer the following research questions: (a) what procedures are currently in place for utilizing air medical resources, (b) what are
the capabilities of air medical providers, and (c) what are other agencies doing to address
issues related to air medical response?

Background and Significance

The City of Bedford is predominately a residential community where two heavily
taveled freeways intersect five miles west of Dallas/ Fort Worth International Airport,
Texas. Geographically, Bedford is between Dallas and Fort Worth, a major urban area
known as the Metroplex. The average daily traffic flow through Bedford is 180,000
vehicles per day (J. L. Pollard, personal communication, August 14, 2008). The city
limits encompass 10.1 square miles and a population of approximately 48,000 people.
Bedford is bordered on all sides by incorporated cities thus preventing the City from
annexing additional land. Development has recently slowed due to the lack of available
land but the population continues to increase due to multi-family residential and
retirement communities being developed on the remaining land. Currently 97% of the
land is developed (W. C. Siblon, personal communication, February 19, 2008).

The BFD is responsible for preventing the loss of life through fire inspection and
prevention programs, emergency medical services (EMS) at the mobile intensive care
unit (MICU) transport level, and fire suppression within the city limits of Bedford. Fire
suppression is also provided, by contract, to the southern portion of Colleyville. In
addition, the BFD is a member of the Northeast Fire Department Association (NEFDA),
a local association comprised of 13 neighboring fire service organizations that share
costs, equipment, and personnel for highly specialized but infrequently needed services
including hazardous material incidents, bomb threats, and technical rescue responses.
Currently, the operations division staffs three ALS transport ambulances, three fire apparatus with at least one paramedic assigned to it, and one shift commander’s vehicle staffed with a chief officer who is also a Paramedic per work-day (Shift). All personnel above the rank of Firefighter are trained to the Paramedic level up to and including the Fire Chief. Daily minimum staffing is 16 personnel per shift. Excluding administrative personnel, firefighters work a 24-hour shift with 48 hours off between shifts.

The department responds to approximately 3,900 emergency medical calls per year and has shown a 10% annual increase in call volume over the past 9 years. Of those approximately 2,400 are treated and transported. Of the 2,400 transports, almost one-third or 750 are trauma related calls for service and 145 of these patients are critical enough to be transported to a trauma center. Approximately 10 percent or 13 of these patients are transported by helicopter annually.

Bedford is located within 25 miles of seven trauma centers, the closest being fifteen miles away, including two pediatric centers and one burn center. The City has a large hospital located within its city limits that has an emergency department that can handle most calls for service that are transported by BFD personnel but the hospital is not capable of managing a patient who is seriously injured needing trauma surgery.

There are two air medical helicopter providers who respond to Bedford’s requests for air medical transport. The closest is PHI, with a base 12 miles from Bedford and the other company is Careflite, with a base 15 miles from Bedford. Both providers are private companies and have additional helicopters based around the Dallas/Fort Worth area. If
the two closest helicopters are at their base they are able to respond to a scene in Bedford within six to eight minutes.

The State of Texas does not have a state run helicopter program nor does it have a state wide dispatch. Bedford, like all other providers in Texas, must determine who to call based on individual need, resource location, and availability at the time of need.

Each air medical provider, as part of their education program, provide helicopter landing zone classes that train field personnel how to identify safe landing zones and how to safely work around helicopters. This author has attended these classes, provided by both companies, on a number of occasions, and each class syllabus contains a discussion on what types of calls a helicopter should be utilized to transport a patient. In both classes, the recommendations are generic. The class is not tailored to the individual department that it is being presented to. The helicopter providers service a vast array of organizations from rural with no medically trained personnel on scene to organizations like the BFD where there are numerous paramedics on scene working from almost identical treatment protocols as the helicopter crews. Therefore, because one organization needs a helicopter to respond, it does not mean the BFD needs a helicopter to respond.

BFD firefighters attend these classes and are told by the flight crews when to call for their service based on general guidelines. The BFD Firefighters also have a treatment protocol book that is utilized by numerous departments. The protocol book has recommendations for the use of helicopters, though the protocol book is very thorough, the same issues arise. The medical director is a very knowledgeable and respected member of the team. He is sought after as a leader in EMS and has contracted services to several departments with varied demographics and locals and therefore must look at the
big picture when making the recommendations. The protocols also allow the firefighter to use his or her discretion for calling a helicopter to transport the patient.

It is this discretion that allows the BFD personnel to actively think and do what is in the best interest of their patients. However, the information that the helicopter transport decisions are based on are not specific to the BFD, its location, or its ability to perform advanced procedures that once were only provided by flight crew medical personnel.

The topic of this applied research project (ARP) relates directly to content of the Leading Community Risk Reduction course offered at the National Fire Academy (NFA) in Emmitsburg, Maryland: The four phases of risk reduction are preparedness, mitigation, response, and recovery (National Fire Academy [NFA], 2006). By better understanding the capabilities of air medical responders and educating BFD personnel about helicopter response, they are better prepared to more efficiently mitigate and call for the adequate response to patients needing specialty trauma care. Furthermore, proper utilization of air medical resources can provide a faster recovery time for ALS transport units making them more readily available to respond to additional calls for service.

This ARP research topic is also relevant to the United States Fire Administration’s five-year objective of appropriately respond in a timely manner to emergent issues (United States Fire Administration [USFA], 2007). By studying the appropriate mode of transport for patients needing specialized care at a trauma center is an essential aspect in their potential for a full recovery.

**Literature Review**

Pre-hospital emergency activities require personnel to follow some sort of structured outline (Worley, 2008). Often these are in the form of policies, procedures,
treatment protocols, or contact with medical control. The City of Bedford follows such a structure. Worley (2008) continues that if activities fall outside the set structure a person must have critical thinking skills to mitigate the situation. Furthermore, BFD personnel are also afforded this latitude to be critical thinkers. The treatment protocols are to be interpreted as guidelines allowing latitude and discretion to be applied appropriately (R. Yamada, 2006). Flying time, distance, and patient condition are critical factors in determining the need for an air medical response (Mehra, 2000). Specific to air transportation of a critical patient, it should be considered only after field personnel have evaluated the circumstances surrounding the event, the mechanism of injury, and the initial patient survey (Yamada, 2006). The general criteria set forth in the BFD treatment protocols outlining the indications for a helicopter are as follows: (a) the patient requires critical life support in transit that is not available by personnel on scene, (b) the clinical condition requires that the time spent out of the hospital be as short as possible, (c) the potential for delays related to traffic and weather will worsen the patient’s condition, (d) the patient is located in an area that is inaccessible to regular ground transportation, and (e) the use of local ground transportation would leave the local area without adequate coverage (Yamada, 2006).

The National Association of EMS Physicians’ (NAEMSP’s) Air Medical Taskforce has recommended the following guidelines: (a) patients requiring critical interventions should be provided those interventions in the most expeditious manner possible, (b) patients who are stable should be transported in a manner that best addresses the needs of the patient and the system, (c) Patients with critical injuries or illnesses resulting in unstable vital signs require transport by the fastest available modality to a
facility capable of providing definitive care, (d) patients with critical injuries or illnesses
should be transported by a team that can provide critical care services (Thompson &
Thomas, 2003).

Lee Ferguson, a Firefighter Paramedic Field Training Officer with the BFD
stated that paramedics in training are required to fully understand the treatment protocols
including the indications for helicopter. As part of that understanding, the trainee must
know what their limitations are as they relate to the treatment of a critically ill patient. He
further stated that the trainee is expected to weigh the options as to whether it is in the
best interest of the patient to be transported by ground or if a helicopter is to be requested.
Firefighter Ferguson believes that though the indications for the use of a helicopter are
beneficial, they cannot take incident specific information into consideration like traffic,
time of day, weather or number of patients. This is where the Paramedic has to interpret
all the facts and make the best decision for his or her patient (L. L. Ferguson, personal
communication, February 10, 2008).

Bobby Sewell, Deputy Chief EMS added that the person in the field has numerous
resources available to make the decision to fly a patient. First, there are usually at least
four Paramedics on a critical scene. Not all are assigned to the ambulance; some are
assigned to the engine that responds with the ambulance. There is a team approach to
patient care and if the lead Paramedic has questions there are a number of experienced
personnel on scene to discuss such options. Second, The Battalion Chief on shift as well
as the administrative staff is always available by radio or phone to consult as is the
medical director. Though the field person is not responsible to make the decision which
helicopter service is to be requested, it is their ultimate decision if a helicopter is needed.
The dispatcher is tasked with determining which service is to be contacted based on availability and response time. The dispatchers have been directed to contact PHI first because their base is closest to Bedford and if they are unavailable then to contact Careflite. Any call where a helicopter is used to transport a patient is automatically sent to the quality assurance committee and reviewed to ensure that we are providing the best service for our patients. The assessment is not approached as a punitive measure; it is viewed as a learning tool (B. J. Sewell, personal communication, February 13, 2008).

Amy James, the communications supervisor for Bedford, provided specific information as to the process involved with requesting a helicopter. She stated that there were two types of requests. Standby requests where a helicopter service is advised that units are responding to a type of call that may require their services, examples include a shooting or a rollover accident. A launch request is where it has been determined that a helicopter is needed and the ground crew is requesting the helicopter to arrive to transport a patient. She advised that placing a helicopter on standby gives the dispatcher time to determine which helicopter is to be used. This standby time allows the dispatcher to make the notifications and determine who is available to respond so if they are requested to launch then the dispatcher knows who to call immediately and time is not spent determining who to call when one is needed to respond. It has take up to five minutes to determine which helicopter is available to respond due to having to call different companies and have them check the status of their crews. She also stated that the dispatcher had no way of knowing who was available until making the phone calls (A. L. James, personal Communication, February 13, 2008).
Helicopter emergency medical services (HEMS) are capable of providing levels of care above traditional Advanced Life Support certified paramedics and rapid transports to facilities that can provide definitive care (Foundation for Air Medical Research and Education [FARE], 2007). Helicopter air ambulances have unique capabilities and can be more than a mode of fast transportation; they can be a flying intensive care room (Mehra, 2007). Flight medical crews in Texas consist of a flight paramedic and a flight nurse who is a registered nurse and a paramedic (R. A. Byrd, personal communication, February 12, 2008). Byrd (personal communication, February 12, 2008) continued that though the standard of care is to have a paramedic and nurse assigned to a helicopter crew, it did not meet the state health code for staffing an emergency transport vehicle. Rotor wing aircraft that represent themselves as an emergency medical transport vehicle must be staffed according to the state codes and “Nurse” is not listed so all nurses assigned to helicopters must obtain a Paramedic certification. Emergency medical staff consists of one of the following: (a) emergency care attendant, (b) emergency medical technician, (c) certified paramedic, or (d) licensed paramedic (Texas Department of Health [TDH], 2004). A benefit of flying a patient is that if a critical patient is brought in by helicopter the patient can be delivered immediately to a surgery suite where an awaiting trauma surgery team can begin definitive care without the delay of stopping in the Emergency Department like ground crews are required to do (R. A. Byrd, personal communication, February 12, 2008). Byrd (personal communication, February 12, 2008) also stated that her skills as a critical care nurse and paramedic are better utilized in rural settings where the number of on scene paramedics is less. “We are finding that our treatment protocols are very similar to those of urban EMS providers and many of the invasive procedures we are tasked with
performing in rural settings are already performed prior to our arrival in urban settings”
(R. A. Byrd, personal communication, February 12, 2008).

The use of helicopter ambulances in urban areas presents a greater risk to patients and is not warranted because trauma centers are relatively close (Bledsoe, 2008). Bledsoe (2008) further states that there has been a steady increase in helicopter crashes over the past decade. He cites that eighty-three crashes resulted in seventy deaths and 62 injuries and compared to the twenty percent of patients that are flown actually benefitted from the capabilities of a rotor wing transport, it should bring into question the need for helicopters in urban areas (Bledsoe, 2008). Bledsoe (2008) recommends that helicopters be moved from urban areas and positioned around rural areas to be more readily available instead of waiting on them to come from an urban areas and suggests that if this cannot happen due to emotion that the State should take over fixed wing response.

There are risks associated with any medical intervention and the use of helicopters is no different (Ritenberry, 2007). Rittenberry (2007) continues that the safety of the crew and the patient is paramount and the risks of flying a patient, many times, are less than the risks associated with any invasive procedure that the patient is being flown to a trauma center to have performed. The Air Medical Safety Advisory Council promotes information sharing even among competing air medical companies as a risk mitigation tool to increase the safety of helicopter transport (Air Medical Safety Advisory Council [AMSAC], 2007).

Jerry Porter, a helicopter pilot with forty years of experience, six in EMS helicopters, states that the safety of his crew is his primary responsibility. When a call for service is received by the pilot, he or she makes the initial recommendation whether to
accept the flight or not based on weather, distance, fuel, and visibility. (J. C. Porter, personal communication, February 12, 2008). Porter (personal communication, February 12, 2008) added that there are strict guidelines and parameters that have to be factored to determine if, from a pilot standpoint, the mission is safe to accept. From there, the information is given to the flight medical crew to factor in patient treatment conditions. Together we make the decision to take the flight or not. The saying is “Three to go, one to no” meaning that all members have to be in agreement to accept the flight or we do not take off. The ground crew should not make any assumptions whether a helicopter is able to respond; if a helicopter is needed, call and let the flight crew make the determination (J. C. Porter, personal communication, February 12, 2007).

The North Central Texas Trauma Regional Advisory Council (NCTTRAC) is a state council designed to oversee the development, implementation, and operation of the North Texas trauma care system and is guided by accepted standards of care for the purpose of decreasing morbidity and mortality (Central Texas Trauma Regional Advisory Council [NCTTRAC], 2008). This committee has several sub committees, one of which is the Air Medical Committee (Air Committee) of NCTTRAC that is responsible for reviewing operational and clinical issues surrounding air ambulance services (NCTTRAC Air Medical Committee [AMC], 2008). This non-partisan committee is composed of members from all air medical providers in the region and work toward common goals (NCTTRAC AMC, personal communication, January 22, 2008). Currently the Air Committee is working on the following projects: standardizing access to service providers, and a flight request worksheet for transferring patients from ground to air crews.
**EMResources**, is a computer based program that tracks the availability of all members in the regions trauma system. The Air Committee is working to develop training programs that will bring this information to all dispatch and responder organizations in the region. A provider can log in and see immediately the status of all the helicopters in the region, no matter what company they represent. The program is constantly updated to show the most current status. Byrd (personal communication, February 12, 2008) advised that when companies get busy, there is a lag in updating the information but overall it is the most current information available. If all dispatchers used this program it would alleviate the need to shop for service. Shopping for service refers to a dispatcher having to make several calls to determine who is available and then choose who to use (AMSAC, 2007).

The Air Committee’s flight request worksheet is intended as a standardized worksheet to be completed by ground personnel requesting helicopter response. This worksheet provides the air crew pertinent information to be calculated in along with the other factors to determine if a call is safe to take. It further provides patient information that can be transferred to the facility that will provide definitive care (NCTTRAC AMC, personal communication, January 22, 2008)

These programs are intended to put the patient first above competition from private companies that provide the same service. Bledsoe (2008) offers that if these types of programs do not work then the state should take over and form a state wide air medical service.

In Minnesota, The Lake Head Fire Departments Mutual Aid Association comprising thirty fire departments in St. Louis County has addressed dispatching
concerns by, as an association, presenting concerns to the HEMS and requiring changes
to be made or services would suffer (Lake Head Fire Departments Mutual Aid

The Yukon Territory in Canada received funding from the state to establish an air
medical program that dispatched through a common center and provided the closest
resource to the scene (Cunningham, 1999).

The State of Texas Department of Health addressed the issue of ensuring critical
patients being delivered to a hospital by helicopter were flown to the most appropriate
facility (Department of Health, 2004). The result was a statewide transport protocol that
outlined specific types of injuries and flying distances addressing the link between the
helicopter and the hospital.

Life Com is a division of Air Methods who provides dispatch, flight coordination,
and logistical support for air medical programs across the country. The communication
center is responsible for dispatching eighty helicopters in thirty three states and evolved
as numerous air medical providers merged (Air Methods, 2008). Air Methods uses
“Interactive mapping, real-time flight dispatching, online weather radar, and global
positioning system technology” to provide the communication specialist the information
needed to dispatch the closest or most appropriate helicopter (Air Methods, 2008).

In summary, the hypothesis for this ARP was focused on the idea of improving
the BFD’s ability to utilize air medical resources for transporting critically injured
patients to trauma centers. This author found that there is no clear answer to the problem.
There are too many variables. The original intent was to examine the procedures and
capabilities of the local resources to determine a more specific rationale for using medical
helicopters as part of the BFD’s treatment regime. What this author found was that the current procedures that are outlined in the treatment protocols where in accordance with the national standard. Furthermore the variables related to the specifics of each call, the weather conditions, and the availability of aircraft were an ever changing element. The literary findings do show some question as to the efficiency of the process involved with notifying an air medical provider. The Bedford dispatcher must shop for service where states and regions that use a shared dispatch center or state ran helicopter programs do not have to spend time shopping for a helicopter. Safety and the use of a helicopter to transport a patient came into question. Bledsoe (2008) suggests that the low number of patients that actually benefit from the services of helicopters in urban settings outweighs the risk of flying over driving the patient to a trauma center. Whereas Rittenberry (2007) suggests that the danger is less than invasive procedures that are received once the patient arrived at the trauma center.

The State of Texas is addressing helicopter concerns at the regional committee level. The Air Medical sub-committee is working as a non-partisan group comprised of competing agencies to streamline the helicopter component of patient care through computer programs, training, and education. They appear to be putting the patient first and profit second.

The literature greatly influenced this author’s direction from initially working toward an action research paper where a specific document could be generated that would aid the decision maker in the field when best to call for a helicopter. What this author found was that there were too many variables to create a specific document and that a descriptive approach to the current situation would best benefit the organization. Instead
of creating more specific guidelines, this author intends this ARP to be a tool in informing the decision maker about the overall process of air medical response allowing him or her access to information that will assist the critical thinking process.

 Procedures

The literature review began by conducting a search for material at the National Fire Academy’s Learning Resource Center (LRC) in Emmitsburg, Maryland. The keywords “Air ambulance” and “Medical Helicopter transport” were entered into the LRC’s Online Card Catalog. The LRC has a vast amount of research projects, periodicals, and books related to fire and emergency services. Most primary context of the reviewed literature was focused on occupational articles for the flight crews or articles related to flight programs throughout the world. There was relevant information found about the history of the helicopter being used in civilian medical response as well as contact information for the national associations that represent medical flight companies and crews. Research at the LRC was conducted while this author attended the Leading Community Risk Reduction (R123) course during September of 2007.

Upon returning home from Emmitsburg, a search using the aforementioned keywords was conducted at the City of Bedford Public Library (Bedford Library). Though the Bedford Library has a more diverse collection than the LRC, relevant material was limited to a few selections. A Bedford Library staff member provided this author with access to the “TexShare” database. The database allowed access to the Ebsco Health Source Academic Edition (Ebsco), a web-based host for searching scholarly full text medical journals. Searching Ebsco, numerous refereed journal articles were reviewed but none were relevant to this topic.
The aforementioned key words were entered into the search engine Google and a broader list of relevant material was downloaded for review.

This author determined that to get specific information relevant to the purpose of this ARP, a focused look at the internal documents and procedures including incidents where the helicopter was utilized to transport a patient, as well as associated organizations that affect the way the BFD responds to incidents.

This author researched the policies and procedures that govern how a BFD firefighter must perform emergency medical calls for service, specifically when helicopters are utilized. Furthermore, The BFD Treatment Protocols for Therapy (Protocols) was examined. The protocols outline treatment plans for different types of injuries and illnesses. Specific to critical or potentially critically injured patients, the protocols detail transport locations and modes of transportation.

A review of the incidents over the past four years, that is as far back as this author was able to research, where helicopters were utilized in the transport of patients to determine the average patient transfer times involved with such a response. The review was limited to response times because of confidentiality concerns. This author was not allowed access to patient statistics like age, gender, and condition.

As part of the literature review interviews were conducted. This author referenced the Executive Development (R123) EFOP Applied Research Self-Study Guide for guidelines about developing and conducting interviews (NFA, 2005, p. 32).

Many were no more than phone calls to key personnel throughout the City to gain statistical information relevant to the background and significance section of this ARP. However several were specific to the literature review. This author began
interviewing people that are part of the organization including Firefighter II Lee Ferguson, who was interviewed in person on February 10, 2008. Firefighter Ferguson was selected because he is one of the more experienced paramedics that are assigned to the ambulance on a regular basis. He is also a department field training officer (FTO) responsible for training new paramedics, call run review, continuing education for the tenured paramedics, and is instrumental in policy development and protocol revision. Firefighter Ferguson was asked the following questions: (1) what is the new paramedic taught regarding the use of helicopters as a mode of patient transport, (2) how do you view the information and training regarding requesting a helicopter, (3) what decision process do you use when making the determination to call for a helicopter, and (4) would you find a document specific to the needs of BFD responses helpful, why or why not?

Deputy Chief Bobby Sewell was chosen for his in-depth knowledge of the administrative rules and regulations that the BFD have to follow, his oversight of the Department’s quality assurance program, and he has been a State Certified Paramedic for over twenty-five years. The interview took place in person on February 13, 2008. Chief Sewell was asked the following questions: (1) does the BFD prefer one helicopter service over the other, and if so, why, (2) what resources does the person making the transport decision have in place to determine if a helicopter is needed, and (3) are all calls for helicopter transport reviewed in the quality assurance process, and if so, what is looked at?

Amy James, the Communications Supervisor for the Bedford Police Department was contacted because she is the head dispatcher in charge of all communication personnel for Bedford. The Bedford Police dispatchers also provide the dispatching for
the BFD. She was interviewed by phone on February 13, 2008 about the dispatch procedures followed when a helicopter is requested. She was asked the following questions: (1) are there written procedures in place for the dispatchers to follow when a helicopter is requested, and (2) what is the time frame from when a helicopter is requested by field personnel to when it has been confirmed that one will be en route? One follow up question was asked: do you have a way of knowing if a helicopter is available before you request it?

To better understand helicopter response, this author completed the paperwork to ride along with a flight crew to personally observe the job of a flight crew and experience firsthand what is involved with responding to, caring for, and delivering a critical patient to a trauma center by helicopter. The evaluation consisted of two, twelve hour shifts; January 14th and February 12th, 2008. Careflite was chosen due to this author’s lack of experience with this company. This author has extensive experience with PHI including working countless scenes with them. Furthermore the medical director and protocols for PHI are the same as those of the BFD.

Flight Nurse Rhonda Byrd was interviewed in person on February 12, 2008 while this author did a ride along with Careflite. She was the flight nurse assigned to the crew that day. While talking with her and learning of her extensive background, it was determined that she is enough of a subject matter expert to use as a reference in this ARP. Ms. Byrd was selected because of her in-depth knowledge of helicopter responses including patient treatment requirements and helicopter safety issues. She is a Registered Nurse and a Paramedic with 10 years of patient care experience and is a NCTTRAC AMC member. Ms. Byrd was asked to look through the BFD treatment protocols and
compare them to her own to identify treatments that required their service to perform.

She was also asked the following questions: (1) do you see your skills as a nurse being
more utilized in rural or urban settings, (2) how often do you feel the helicopter is called
when it should not have been, and (3) what benefits are there to the patient that is
delivered to a trauma center by helicopter verses being delivered by a ground ambulance?

Pilot Jerry Porter, was the pilot assigned to the crew this author was riding out
with and was determined to meet the requirement as a knowledgeable source for
interviewing for this ARP. Mr. Porter has been a pilot for 40 years, and has been an EMS
helicopter pilot for the last six years. He was asked the following questions: (1) who
makes the final determination whether a flight is accepted by the crew or not, (2) what
factors go into the decision, and (3) what are the limitations of the helicopter? One follow
up question: What info do you need from ground crews requesting a helicopter?

This author attended two meetings of the Air Medical Work Group that is part of
the North Central Texas Trauma Regional Advisory Committee. The first was on January
22, 2008, and the second was on March 11, 2008. This work group is made up of
members of all air medical companies that serve the North Central Texas Region. The
members include administrators, doctors, pilots, nurses, paramedics, and non helicopter
agencies representatives like fire departments and private ground EMS providers. This
committee looks at issues related to air medical response including dispatch, safety,
training, and availability notifications.

There were a number of limitations associated with this ARP. First, this ARP did
not compare the indications for helicopter use to the medically critical patient. Those
patients with strokes and cardiac problems who are under similar time treatment
constraints as trauma victims that has to be rabidly transported to medical centers similar distances away.

Second, this ARP did not take an extensive look into response times as they relate to helicopter response compared to transporting critical patients by ground to a trauma center. A more accurate representation of the time it took to get a patient to appropriate care, the times must be followed past the point where the BFD turns patient care over to the flight crew. It must follow the patient to the hospital and even to the point of when the life saving procedures start. That scope was outside the limitations and time constraints of this ARP.

Third, this document does not take all scenarios into consideration. The personnel in the field must base their transport decision on the facts associated with each case. This document is intended to be a reference to assist the field personnel in making the appropriate decision.

Finally, this ARP did not examine the base knowledge and assumptions made by the individual members of the BFD. This was a change from the intended purpose until the research directed this author toward a descriptive approach to information gathering to provide an informative resource to assist with critical thinking.

Definition of Terms

Air Medical – For this ARP it is a helicopter that is credentialed to transport patients from a scene to a hospital and is staffed with medically trained personnel.

Trauma Center – A hospital holding the designation of a Type I or Type II trauma center having surgical staff on site 24 hours a day.
Results

In reviewing BFD’s indications for helicopter protocol it was found to fall in line with the recommendations set forth by the National Association of EMS Physicians.

A closer look at the thirty calls where a helicopter was used to transport the patient, the following was noted: The average time it took the firefighter to request a helicopter was three minutes. The shortest was one minute and the longest was ten minutes. The average time it took from when the helicopter was requested to when the helicopter was lifting off with the patient was 21 minutes. The shortest was 12 minutes and the longest was sixty-one minutes. There were three cases where the time was greater than thirty minutes and it was found that in each case there was a lengthy extrication where the patient was trapped in a vehicle and had to be extricated. There was one instance where a helicopter was requested but the flight was turned down by the flight crew because of inclement weather. There were also 21 times where the ground personnel requested a helicopter being placed on standby but was canceled after the crews evaluated the patient.

Several interviews were conducted; their responses are as follows.

Firefighter Lee Ferguson:

What is the new paramedic taught regarding the use of helicopters as a mode of patient transport? The new paramedic is first told to learn the protocol related to helicopter use. From there he or she is expected to evaluate the patient’s condition to determine if they need to be transported to a trauma center. They are advised that if the nature of the call indicates the possibility of needing a trauma center then the Paramedic is to place the helicopter on standby. He or she is taught to not just look at the mechanism
of injury but to couple that with the overall condition of the patient, look at the environmental factors, time of day, weather, etc., and form a decision based on all relevant factors to determine if the patient needs a trauma center, then if transport by helicopter is in the best interest of the patient.

How do you view the information and training regarding requesting a helicopter? The training is adequate but is not specific. There are too many variables to list every time a helicopter might be needed. The recommendations are all encompassing and should be used as guidelines. I have been a paramedic for ten years and knowing what is in the best interest of the patient is a learned skill. One cannot just read a list and make a determination. I guess they can but it is not an informed decision based on knowledge and experience. There is no substitute for experience.

What decision process do you use when making the determination to call for a helicopter? I look at the mechanism of injury, and then determine if the patient is critical. I then look at the time of day and knowing the traffic in this area based on my experience decide if I think I can beat the helicopter to the hospital. If it is rush hour no way, if it is three in the morning I am sure I can because we are only 15 minutes from there. I have learned that if I choose against the helicopter I need to transport immediately after stabilizing the patient and continue life saving interventions en route.

Would you find a document specific to the needs of BFD responses helpful, why or why not? Not really, I think the document we have is adequate and coupled with training and experience gets the job done.
Deputy Chief Bobby Sewell:

Does the BFD prefer one helicopter service over the other, and if so, why? The dispatchers have been directed to contact PHI helicopter first. They are the closest base. There is no central dispatch for air medical response and to reduce the amount of time spent finding a helicopter we call the closest first.

What resources does the person making the transport decision have in place to determine if a helicopter is needed? At the minimum, there will be two paramedics and three Emergency Medical Technicians on scene, usually there are at least four if not five. These Paramedics work together on all patient care decisions and the decision to call for a helicopter is no different. Furthermore, the on-duty Battalion Chief, who is a Paramedic, and the operational administrative staff, all of whom are Paramedics are only a radio or phone call away.

Are all calls for helicopter transport reviewed in the quality assurance process, and if so, what is looked at? The calls are automatically sent to the quality assurance process. Helicopter use is one of a dozen indicators for the call to be forwarded. The call is reviewed for patient condition, time of day, weather and the times involved with transporting the patient. This is a learning tool and not used as punitive. We are constantly trying to improve our service to the community.

Communications Supervisor Amy James:

Are there written procedures in place for the dispatchers to follow when a helicopter is requested? The procedures for requesting a helicopter are not written down as procedures. The process is passed on through training to new dispatchers. The written
document that we do have states that PHI will be contacted first because they are the closest helicopter.

What is the time frame from when a helicopter is requested by field personnel to when it has been confirmed that one will be en route? If the helicopter is available it only takes a minute to request it and give the requested information. If the helicopter is not available then it takes several minutes to call someone else and determine if they are available. If they are not then we must determine how long I will take the next closest helicopter to respond, relay that information to the scene commander and if they still want a helicopter then we have to call them back. This has taken up to five minutes.

One follow up question was asked: Do you have a way of knowing if a helicopter is available before you request it? No, we are not aware of any status until we call the provider. That information would be nice to have though.

Flight Nurse/Paramedic Rhonda Byrd:

Ms. Byrd was asked to look through the BFD treatment protocols and compare them to her own to identify treatments that required their service to perform. She stated that there were different drugs used to treat similar conditions but both were acceptable. From a scene to facility standpoint, the BFD Protocols were as encompassing as those used by Careflite. The specialized training that would be beneficial is dealing with interfaculty transfers where specialty drugs and equipment are commonly required.

Do you see your skills as a nurse being more utilized in rural or urban settings? In rural settings, for example, many rural providers are faced with needing to secure an airway but the patient is still conscious. We have the ability to paralyze a patient and
secure the airway. Most urban providers are capable of paralyzing a patient and the same patient would already have a secure airway prior to our arrival.

How often do you feel the helicopter is called when it should not have been? There are times, when looking back; the patient would have had the same outcome if they had been taken by ground. Furthermore, I do not second guess the responders that call us. I was not there to see the conditions that made them decide to call us.

What benefits are there to the patient that is delivered to a trauma center by helicopter versus being delivered by a ground ambulance? We have the ability to take the patient directly to the surgery suite from the helipad instead of stopping in the emergency department for evaluation. This reduces the amount of time it takes to start definitive surgical care.

EMS Helicopter Pilot Jerry Porter:

Who makes the final determination whether a flight is accepted by the crew or not? I receive the initial call for service and determine if the weather and visibility allow for the flight. Then, the medical crew assesses the patient information and we collectively decide if we are going to accept the mission. We have a saying three to go and one to no. It’s not a democracy, if one person declines the mission is not taken.

What factors go into the decision? There are flight visibility rules that are established to meet safety concerns; fog, cloud cover, rain, snow, and Ice are all taken into consideration.

What are the limitations of the helicopter? Weight limits and range are the big ones. The helicopter can only carry so much weight and the weight of the fuel must be calculated into the formula so I cannot tell you that we cannot have a patient over 300
pounds, for example. It will have to be calculated at the time of the call because the amount of fuel in the helicopter is never constant.

One follow up question: What info do you need from ground crews requesting a helicopter? As a Pilot I do not need anything but a location and the patient weight. I can work my calculations off of that.

To better understand helicopter response, this author completed the paperwork to ride along with a flight crew to personally observe the job of a flight crew and experience firsthand what is involved with responding to, caring for, and delivering a critical patient to a trauma center by helicopter. Upon arrival the first thing that was done was a safety briefing explaining what parts of the helicopter were off limits and should be avoided in the aircraft is running. This author was shown how to safely be restrained in the helicopter, how to use the emergency exits, and preplanned where to meet if the aircraft goes down. This led to a review of the medical equipment on board and this author’s role and limitations on calls. Shortly after the orientation the first call was received. The pilot checked weather radar, calculated fuel and crew and patient weight then said the call fell into the parameters that would make for a safe flight. The crew accepted the flight and we took off. The pilot was in almost constant communication with different control towers as well as the DFW International Airport. The second crewmember riding up front was on constant lookout for private aircraft that might enter their flight path. Arriving at the scene, a crew member made radio contact with the landing zone coordinator on the ground and working together safely landed the helicopter. The crew exited the helicopter and went to where the patient was. Care was given and transfer was made. The patient was loaded in the helicopter and we lifter off toward the trauma center located 35 miles
away. The flight took 12 minutes. The patient was transferred to the Emergency Department and the helicopter returned to its base. This process was repeated with almost identical actions from the entire crew five times during the time this author rode out.

On one particular call, the helicopter landed at the scene and the pilot had to recalculate the carrying capacity of the helicopter because the patient’s weight had been calculated wrong by the ground crew. The helicopter would not safely carry the newly calculated weight so this author was left behind to give an adequate margin of safety for the transport to the hospital. This author was returned to the base by a fire department vehicle that was on scene.

Once the aircraft returned to the base, charts were completed and the medical supplies were restocked. During the down time the crews studied protocols and procedures. The pilot checked the helicopter on a regular basis and took it out of service twice to double check equipment that did not appear to function properly. Throughout the day the pilot would check weather and visibility to stay on top of changing conditions.

This author attended two meetings of the Air Medical Work Group that is part of the North Central Texas Trauma Regional Advisory Council. Both meetings had a large attendance comprised of several members of each competing air medical company as well as physicians, administrators, and fire department members from across the region. The first committee meeting began by reaffirming that the committee was to address concerns that affect the industry and that company alliances have no place in this type of forum. The discussion led to a demonstration of EMSystems, a computer tracking program that provides up to the minute status for all air medical helicopters in the region and spent a good part of the meeting discussing a plan to disseminate this information to
all responder agencies in the region. There were many suggestions but no final decision was made. The remainder of the meeting was spent discussing a recommendation for a standardized form to be used by response agencies when requesting a helicopter. The form was in its development phase and no action was taken at this meeting.

The second meeting opened with the same speech about working together and went into a discussion of what color shirts should be ordered for an upcoming event. The meeting ended early.

Discussion

Initial preconceptions about the hypothesis focused this author’s research around one thought; If BFD firefighters had a department specific document that outlined the indications for utilizing a helicopter to transport critically ill patients, it would improve efficiency and the quality of care I making the appropriate transport decisions. Through the course of the research it became clear that the current program is in line with national standards. However, areas that can be improved upon were identified and discussed later in this ARP.

The first research question asks what procedures are currently in place for utilizing air medical resources. Worley (2008) states that emergency activities follow some form of structure. The Bedford Fire Department is no different. There are procedures and policies that relate to many situations on and off emergency scenes. As it relates to air medical response into Bedford, the guidelines are laid out in the medical protocols. Dr. Roy Yamada is the Medical Director who’s protocols the firefighters use to treat patients. The indications for helicopter listed in the protocols are listed as guidelines to allow the personnel in the field to take all aspects of the call into consideration and
through critical thinking make a transport decision (Yamada, 2006). These guidelines correlate with the recommendations that are established by the NAEMSP (Thompson & Thomas, 2003). The ability for a decision maker on the scene to be able to use critical thinking and evaluate the information to make the most appropriate decision is crucial. Ferguson (personal communication, 2008) states that evaluating key factors pertaining to calls and critical thinking is introduced early on in a trainees FTO program and his or her abilities to refine these skills improve over time with experience. Sewell (personal communication, 2008) adds that the decision maker has a support system in place where critical decisions may be made from a team approach with peers, administration and medical direction being involved if needed.

Once the decision is made to request a helicopter the process involved is a combination of written and unwritten procedures. The steps involved with contacting and securing a helicopter are not written down but who to call first is (A. L. James, personal communication, February 13, 2008). The procedure can be lengthy at times and the dispatcher is uncertain of who is available until the helicopter companies are contacted.

The second research question asked what are the capabilities of air medical providers. Helicopters are flying intensive care rooms Mehra (2007), as are the ambulances that the BFD respond in. The units are certified through the State as Mobile Intensive Care Units (MICU’s), the highest classification given to an emergency transport vehicle. However, the helicopter arrives with a critical care nurse that is trained in more advanced procedures that are often above the abilities of ground based responders (FARE, 2007) and (R. A. Byrd, personal communication, February 12, 2008). The protocols are very similar to those of the BFD so the difference in treatment options in
almost none. The difference lies in the nurses’ ability to do special procedures and administer drugs that are usually reserved for patients that are being transferred from one hospital to another and not appropriate for scene responses (R. A. Byrd, personal communication, February 12, 2008). Helicopters are able to travel at greater speeds than ground vehicles and are not subject to traffic or road conditions. The concerns over the safety of flying a patient were found to be in question. Bledsoe (2008) believes that there is little use for a helicopter in an urban setting because of the shorter travel distance of urban calls. Whereas Rittenbery (2007) argues that helicopter transport has a higher survivability rate than some invasive procedures used in hospitals to treat trauma victims.

Porter (personal communication, February 12, 2008) added that the flying capabilities of the helicopter are based on several complex calculations involving distance, fuel weight, patient weight, and weather conditions. The calculations are contingency-based on the time of the call so there is no need in the field personnel assuming if a helicopter can fly or not. It is best to call if you need one and let the flight crew make the determination if it is safe to fly or not.

The third question asked what are other agencies doing to address issues related to air medical response. If a government system similar to the Yukon Territory (Cunningham, 1999), as recommended by Bledsoe (2008) or a centralized private communication center (Air Methods, 2008) were in place the dispatcher would not have to shop for service (AMSAC, 2007). A system where one communication center maintained the status of every available helicopter time may be saved in the dispatching of these resources. The State of Texas is working on a possible solution to the shopping problem in the state. The NCTTRAC Air Medical Committee has adopted a program that
is internet based and maintains the status of all helicopters in the region (NCTTRAC AMC, personal communication, January, 22, 2008). NCTTRAC AMC (personal communication, January 22, 2008) is currently developing a training program to bring this information to all the dispatch centers in the North Texas Region.

To summarize this discussion it is believed that the recommendations for transport set forth in the BFD treatment protocols are adequate and fall within the scope of the NAEMSP recommendations. This was a change from this author’s initial assumption that the recommendations needed to be tailored to the department. Further research revealed that the guidelines, training, and process are established to allow the field personnel to use critical thinking skills to make informed decisions regarding the best way to transport a trauma patient.

By interviewing personnel that represent every aspect of the helicopter transport process from the on-scene decision maker to the pilot flying the aircraft, there is a process that works. Though many of the steps are unwritten, the system accomplishes its goal. This author does believe that there are ways that the system can be improved. Without this research this author would not have had an understanding thorough enough to see the perceived gaps in the system and be able to make recommendations. If this author is correct the organizational implications of providing a better understanding of the air medical process will improve the BFD’s ability to transport critical patients to the most appropriate facility in the quickest manner.

Recommendations

The research suggests that overall the process of determining the need for and requesting a helicopter to transport a critical patient works. However, after the literature
review, interviews, meeting attendances, and helicopter crew observations, the following recommendations are made.

First, this author should work with the Training Officer to develop a critical thinking course and include decision making as it relates to determining mode of transport for critically injured patients. This would allow a venue to present the context of this ARP to the organization as part of an overall class on making informed decisions in all aspects of the organization’s mission. This author has worked for the BFD for twenty years and was unaware of the details behind helicopter response. Knowing this information will benefit this author the next time a transport decision has to be made and it can only be assumed that others would also benefit from this information.

Second, The Training officer and the dispatch communications supervisor should coordinate with the NCTTRAC to gain additional information on the EMSystems program and develop a protocol for its implementation into the request procedure. This has the potential to reduce the time the dispatchers are shopping for an available helicopter.

Third, a long range recommendation is for the NEFDA, working with the air medical providers and NCTTRAC AMC to develop a plan for a combined air medical dispatch center. This would allow cost sharing benefits as well as making it a less complicated process for the ground response agencies requesting a helicopter. If dispatch was centralized combined with the EMSystem, the closest helicopter would receive the call and their availability status would be known by the ground dispatcher with one phone call. This would also reduce the competitive nature of response and truly put the patient first. Furthermore, there would be economic incentives by positioning helicopters where
the need is. They will be closer, which will reduce the response time and being closer
they will get the call generating revenue. Currently many of the helicopters are located
atop downtown hospitals away from where they are truly needed.

Finally, The BFD Quality Assurance Committee should reevaluate how data is
collected and make provisions to follow patient’s progress past the point of care transfer
to the final outcome. This would provide more accurate data to be evaluated at a later
date to reassess the findings of this ARP.

In conclusion, this ARP has only skimmed the surface of how helicopter response
fits within the treatment model of the critically injured patient. The initial intent was to
produce a department specific document that outlined the need for helicopters but the
research proved that the issue is too complex with many variables that are not constant. It
is important that the decision maker on the scene take all pertinent information into
account and use critical thinking when deciding if the patient warrants a helicopter. It is
recommended that future research study the times associated with a ground unit
transporting to a facility and the patient reaching definitive care verses the use of a
helicopter.
Reference List

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