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NATIONAL TRANSPORTATION SAFETY BOARD

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P A T I E N T F I R S T
Air Medical Transport Alliance

(22 Pages)

Air Medical Transport Position Paper

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P A T I E N T F I R S T
Air Medical Transport Alliance

Safe Air with Quality Care

AirMed International, Birmingham, Alabama, USA

Flight For Life Colorado, Denver, Colorado, USA

Lifeflight of Maine, Bangor, Maine, USA

Mayo Clinic Medical Transport, Rochester, Minnesota, USA

Medcenter Air, Charlotte, North Carolina, USA

MedFlight, Columbus, Ohio, USA

Vanderbilt LifeFlight, Nashville, Tennessee, USA

It is the position of the Patient First Air Medical Transport Alliance that air medical service (AMS) missions can be completed safely and that those services are necessary for positive patient outcomes for victims of trauma and serious medical conditions.

The public has the expectation that all air medical transport programs are of comparable level of care, safety and efficiency. However, there are a number of questions a prospective customer should be asking, or a referring health care professional should be asking on the patient's behalf.

If I need an air ambulance, who do I call? What level of care will be provided? How safe will the aircraft be? Will air ambulance transport help the patient? How much will it all cost? These are all pertinent questions to be asked before placing a patient into an air ambulance; however, few people actually explore these questions prior to doing so. Some may feel that Air Medical Services (AMSs) are part of America's health care system and are already under stringent governmental oversight by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) and the Federal Aviation Administration (FAA); or some other regulatory body acting on their behalf. While others (referring health care providers) may just want the patient out of their hospital and do not look beyond that point. Neither view point is a safe one to possess.

Whom do I call?

This is usually the first question. And, it is the question that everyone in the AMS industry wants answered with their program's name. Often times, however, this question is answered with another question: "Who's closest?" As a response, the AMS industry has changed from having aircraft located at tertiary health care centers or airports, to a network of aircraft located strategically based on population, competition, and reimbursement potential. In theory, this would seem an excellent strategy that would bring critical care access to patients more expeditiously. However, if not regulated to maintain appropriate levels of patient care and safety, the benefits may not be worth the cost in terms of human lives or financially.

Little has been done to educate consumers on the varying levels of care provided by AMSs; a significant difference from other areas of health care.[1] Hospitals can be certified centers in a variety of care specialty areas, commonly called centers of excellence. Trauma center certification is currently our best example of a level system created to help guide consumers on level of expertise and capabilities provided. Most referring health care providers have a firm understanding of the American College of Surgeon's (ACS) trauma center designations through *The Optimal Care of the Trauma Patient*.[2] These designations were, in part, created to define the scope of care and educate health care providers and patients on the level of trauma care provided by trauma centers and have become the basis for trauma systems adopted by various states throughout the United States (US).

What level of care is provided?

Most AMSs have the option of obtaining accreditation by the Commission on Accreditation of Medical Transport Services (CAMTS). Accreditation is mandatory in 9 states and several counties within California and Nevada through individual state and county legislation.[3] CAMTS offers accreditation to both ground and air transport programs and can accredit programs as Basic Life Support (BLS), Advanced Life Support (ALS), or critical care transport (CCT); though most AMSs that are CAMTS certified are credentialed as a CCT.[4]

It is vital to note however, that the term "critical care" is subjective. As defined by CAMTS, a critical care AMS must, at minimum, have a licensed nurse on board the ambulance or aircraft as the primary care provider. The training of these care providers could be limited to the mission statement and scope of care of the individual program. This very basic definition of critical care services alone creates a tremendous disparity between AMSs. By the CAMTS definition, an AMS that has a nurse on board the aircraft, yet elects to only deliver care at an ALS level may still be considered CCT. Those AMSs not accredited by CAMTS, may unilaterally label the level of patient care delivered whatever they desire. As a result, any program, no matter their true level of care, can compete equally with programs offering the most highly-skilled intensive care. This scenario puts minimal care providers on par for consideration for transports and reimbursement with programs that utilize nurses or physicians who perform sophisticated transports with intra-

aortic balloon pumps or extracorporeal membrane oxygenation (ECMO), advanced invasive procedures and monitoring, invasive and non-invasive ventilation, blood product initiation, point of care laboratories, electrocardiograms, high risk obstetrics transports, and extensive critical care pharmaceuticals. Though AMSs are vastly different, this absence of standard enables all to be labeled "critical care", and as such may be mistakenly considered equivalent in their capabilities by researchers, consumers, and the public.

How safe is the aircraft?

AMSs are regulated by the FAA, part 135 requirements. Once met, AMSs are allowed to attempt any and all missions within the discretion of their mission profile. The Federal Aviation Regulations (FARs) set a minimum standard for pilots, but it is up to the individual AMS to decide if the proposed operation is safe and morally acceptable. Though the NTSB and FAA have become acutely aware of the crashes and deaths in the AMS industry and several recommendations have been made, no major rule changes have yet occurred.[5]

This has resulted in a scenario comparable to the level of care discrepancy provided by AMSs. There is no delineation between AMSs that invest in safety and those that do not change their practice. AMSs that have voluntarily adopted all of the NTSB and FAA recommendations through investment in additional training, equipment, and processes are still subject to compete with programs that choose not to, or are unable to, implement any safety measures beyond the FAA minimums for part 135. This has resulted in a wide disparity in safety which is destined to continue. Nevertheless, all AMSs are permitted to attempt any mission--from daylight interfacility transports to night time scene flights in remote regions of the country. Though the safety standards adopted by AMSs are vastly different, they may be erroneously considered equitable by customers, patients, and payers.

Will the air ambulance transport help the patient?

Outcome research, validating or invalidating air ambulance efficacy, challenges AMSs for a variety of reasons. As with all research, consistency of the independent variable (in this case treatment variable) is paramount in producing quality research. However, the inconsistencies between AMSs hinder any valuable large scale outcomes research. Canadian programs have

produced multiple, high quality studies, due in part to their ability to limit confounding variables in a government-regulated system. As the AMSs industry has grown over the last decade in the US, the disparity and inconsistencies in program capabilities, policies, and training has widened. This inconsistency not only creates confusion for consumers, but limits the industry's ability to document its mission with large scale outcomes research.

How much will the different options cost?

Of all the questions, this is the easiest to answer. Though nationally and regionally the cost of transport by AMSs varies, these charges are not a reflection of the level of care or level of safety provided. Generally, there is a lift-off charge and also a charge based on the loaded (patient on board) statute mileage traveled. Medicare holds the same misguided opinion of AMS as many consumers, and recognizes only the mode of transport and not the level of care provided:

- ***Rotary wing air ambulance*** *is the transportation by a helicopter that is certified by the FAA as a rotary wing ambulance, including the provision of medically necessary supplies and services.*[6]
- ***Fixed wing air ambulance*** *is the transportation by an aircraft that is certified by the FAA as a fixed wing air ambulance including the provision of medically necessary services and supplies.*[6]

Under the current model, if the mileage is equal, a patient picked up from a scene at night where Night Vision Imaging Systems (NVIS) was utilized and provided advanced critical care would be charged the same as a daylight flight from one hospital to the next where minimal care on board was rendered. As long as documentation includes a need for rapid transport, and air transport is 30 to 60 minutes less than ground transport, reimbursement is equal.[6]

Discussion:

Upon asking a few of the basic questions surrounding the use of air medical transport in the United States, one may surmise that the air medical industry has some serious, fundamental problems. Current payment systems financially reward AMS's to attempt missions with the least expenditures toward the delivery of quality patient care and safety, and keep profit margins higher. Moreover, the system does nothing to lessen the financial burden of programs that make

significant investments towards safety and clinical excellence. Thus there are no incentives to many to change the status quo. When low overhead with high profits versus high overhead with low profits is the choice presented to finance-minded companies or individuals, the choice to them is obvious. Bundle the financial incentives, or perhaps disincentives, with an industry that has few requirements for outcome / quality indicators and voluntary certifications processes and one can begin to understand the predicament faced today.[7]

The lopsided risk / benefit ratio has long been ignored and the unregulated expansion of the air medical industry has increased competition, thereby decreasing the number of patient transports that each aircraft and crew can accomplish. This could, at least partially, explain the increase in inappropriate utilization of air medical transportation. Additionally, research suggests that AMS programs that perform a low volume of flights have an eightfold higher accident rate than programs that fly more frequently; not to mention the potential for diminishing patient care competency.[8] This has also negatively influenced the decision making threshold for pilots, compelling them to attempt flights they previously would turn down. The 2005 research from the Pilot Safety Study Group highlights this issue. Of the 832 pilots surveyed, 37% did not feel that they were always supported by management or medical crews in their no-go decisions and 14% stated they have felt pressure to take flights because of the presence of competing programs.[9]

As air medical transport crashes increase, the public's confidence in the industry diminishes and the potential for underutilization can occur, thus increasing patient mortality and disabilities. Safety and overutilization statistics are indiscriminately applied to all AMSs, regardless of the medical oversight, quality control, safety standards, processes, and equipment they may utilize. Accidents can happen to any program, but currently, there is no process or forum for those who choose helicopter EMS for their patients, regulatory bodies, or the public to know which AMS programs are providing the highest level of care and safety. Furthermore, there are no specific program standards or a leveling system to compare with the mission attempted for officials to use in crash investigations.

Solutions:

The solutions to these issues are dependent upon the valuing of quality and safety over everything else by AMSs. Many programs are beginning to understand the dilemma and proactively solutions are being sought as to how to eliminate needless fatalities. The Association of Air Medical Services (AAMS) has waged its efforts toward self governance, believing that the efforts of the industry will demonstrate to government that regulation is not required. Certainly, there is value in assuring the air medical industry's involvement in any future regulatory changes. Yet, efforts must now be focused on wide-spread changes to the fundamental issues which continue to plague the industry, resulting in the tragic loss of human life. These issues may be best addressed by entities other than trade organizations, since their obligation is to represent a variety of interests within their broad constituencies.

Many AMSs across the country have voluntarily and proactively implemented all or some of the NTSB recommendations. Others have made little or no attempt to adopt any of the recommendations. Patient care delivery practices have evolved in various formats throughout the country as well. This has created a disparity which lends itself to a potential solution for the industry; a *truth-in-advertising* typing and validation system designed for patient care and safety. Once established, the level of patient care delivered and the level of safety provided by a program would be determinants for missions, based on the mission type and level of patient care needed Reimbursement could also be commensurate with the mission type and patient care needed. AMSs would also need to include the level of care and safety they provide on all advertising and outreach education materials.[10,11]

If carefully constructed, a typing and validation system would (1) match the most appropriate AMS to a mission type (e.g. high level operational and/or clinical missions completed by high level programs), (2) provide more adequate compensation for programs that have invested in quality and safety and less compensations for AMS's which opt not to invest, (3) allow referring health care providers, hospitals, EMS agencies, and the public to know what level of care and safety are being provided to them, thus giving them an informed choice in transport, (4) assist in maintaining optimal clinical and operational proficiency and competency through concentrating mission types toward AMSs with appropriate levels of experience and expertise, (5) provide a

prospective means of evaluating crash data by comparing the mission type with the safety level of an AMS and aid in creating a more accurate industry-wide incident and accident database,[1,12,13,14,15,16] (6) provide increased opportunity for industry-wide clinical outcome research through larger, combined studies of like programs, and (7) motivate investment on quality and safety across the industry rather than just increasing the number of aircraft.

The following pages attempt to illustrate the concept of what a typing and validation system may generally look like. A proposed tiered system would be created for both clinical capabilities and for operational safety. The clinical capabilities were modeled after the ACS-verified trauma centers with a Level One through Five (five being the lowest level of capability progressing to a level one, which has the most capabilities). Levels of operational safety were created similarly, but utilized the letters A through D (D being the lowest level of operational safety progressing to a level A, which has the most operational safety). Each AMS would then receive a dual rating; one rating for each area. If an AMS has multiple bases, each base and aircraft would have a separate rating.

It should emphasized that the level systems presented are conceptual, though many of the recommendations are based on materials from the NTSB, FAA, air medical transport organizations, accrediting agencies, and researchers from within the industry. This is not an attempt to develop a unilateral solution to the safety and patient care issues facing the air medical transport industry. Our group, *Patient First* Air Medical Transport Alliance, is a starting point of concerned member AMS providers. We recognize the need for and encourage collaboration with other subject experts in aviation, regulatory agencies, legislative, medical transport, reimbursement and patient advocacy organizations. Our objective is to create a safer future for helicopter emergency medical services and one that is base on providing the best possible patient care at an appropriate level and cost.

Resource Typing System for Air Medical Services

M E D I C A L C A P A B I L I T I E S

P A T I E N T F I R S T
Air Medical Transport Alliance

Level 1-Advanced Critical Care

Meets the Department of Homeland Security/Federal Emergency Management Agency's (DHS/FEMA) EMS Resource Typing[17] medical care requirements for a Type I disaster resource. In addition, this level includes highly specialized care of patients whose conditions are life-threatening and who require comprehensive intensive care and constant monitoring.

1. Provides all Level II services
2. Provides transport for patients with cardiac assist devices (Intra-Aortic Balloon Pump (IABP), ventricular assist devices (VAD), or extracorporeal membrane oxygenation (ECMO)
3. Provides point-of-care laboratory services in flight
4. Provides blood product initiation
5. Provides transvenous and epicardial cardiac pacing
6. Provides central venous/arterial line insertion & monitoring
7. Provides chest tube thoracostomy
8. Provides continuous high risk obstetric monitoring (toco & FHTs)
9. Actively conducts air medical research

Level 2-Critical Care

Meets the DHS/FEMA Resource Typing medical care requirements for a Type I disaster resource, In addition, this level includes specialized care of patients whose conditions could be life-threatening and may require care beyond that of ALS care.

1. Provides all Level III services
2. Provides invasive and non-invasive ventilation
3. Provides medication infusions beyond Level 3 (specifics must be addressed)

4. Provides 12 lead electrocardiogram (ECG) capability
5. Provides invasive line monitoring and maintenance
6. Provides intermittent high risk obstetric monitoring
7. CAMTS certified critical care service

Level 3-Advanced Life Support

Meets the DHS/FEMA Resource Typing medical care requirements for a Type III disaster resource (except that a nurse, mid-level or physician may substitute for the paramedic, and the AMS is not required to carry blood, but must be capable of maintaining a blood product infusion)

Level 4-Advanced Life Support Services

Meets the DHS/FEMA Resource Typing medical care requirements for a Type IV disaster resource (except that a nurse, mid-level or physician may substitute for the paramedic)

Level 5-Basic Life Support Services

Does not meet any DHS/FEMA Resource Typing care level, but provides state licensed medical personnel

Resource Typing System for Air Medical Services

ROTOR–WING AIRCRAFT & SAFETY CAPABILITIES

PATIENT FIRST
Air Medical Transport Alliance

Level A – Programs which consistently provide the highest standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete all EMS missions in remote areas during hours of darkness and/or technical rescue operations. Specific qualifications for this level may include but are not limited to:

1. All capabilities as Level B plus:
2. Platinum ARGUS Rating[7,18,19]
3. IFR current aircraft and pilots (single pilot or dual pilot IFR)[7, 9, 20]
4. Other advanced technology, processes or training (e.g. flight data or voice recorders) [5, 7, 14,21,22,23]

Level B – Programs which consistently provide the high standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete all EMS missions in uncontrolled landing zones during daylight hours and in controlled heliports[24] during hours of darkness. Specific qualifications for this level may include but are not limited to:

1. All capabilities as Level C plus:
2. Gold Plus ARGUS Rating[7,18,19]
3. Night vision goggle capability[5,10,12,13,20,21,25,26,27,28,29,30,31,32]
4. Obstacle avoidance warning systems (H-TAWS, TCAS)[5,10,12,13,14,19,21,27, 28,29,33,34,35]
5. No patient / light intrusion into the pilot compartment[19,27,29]

Level C – Programs which consistently provide the moderate standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete all EMS missions in controlled or uncontrolled landing zones during daylight hours. Specific qualifications for this level may include but are not limited to:

1. All capabilities of Level D plus:
2. Gold ARGUS Rating[7,18,19]
3. CAMTS Certification[12,19,25]
4. Active & appropriate use of operational control for aircraft operations[5,19,21,27,28,29,33,35,36,37,40,41]

Level D – Programs which consistently provide the minimum standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete EMS missions to and from controlled landing zones during daylight hours. Specific qualifications for this level may include but are not limited to:

1. No ARGUS Rating / ARGUS Silver Rating[7,18,19]
2. Complies with FAA Part 135 requirements whenever medical crews are on board[5,12,28,33,35]
3. Equipped with working radar altimeter[5,12,14,19,21,27,29,38]
4. Provides patient and crew climate control for patient transport
5. Evidence of active & appropriate use of standardized mission risk management tool(s)[5,7,13,14,19,21,27,28,29,30,35,38,39,40]
6. Evidence of active & appropriate use of interagency weather turndown communication process[1,19]
7. Evidence of annual Air Medical Resource Management (AMRM) training[1,5,7,12,25,13,21,29,31,40,41,42,43]
8. Evidence of interagency communication processes which enhance multiple aircraft missions and mitigate potential for collision.[1,19]

Resource Typing System for Air Medical Services

F I X E D – W I N G A I R C R A F T & S A F E T Y C A P A B I L I T I E S

P A T I E N T F I R S T
Air Medical Transport Alliance

Level A – Programs which consistently provide the highest standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete all EMS missions in remote areas or internationally.

Specific qualifications for this level may include but are not limited to:

1. All capabilities as Level B plus:
2. Platinum ARGUS Rating[7,18,19]
3. Other advanced technology, processes or training (e.g. flight data or voice recorders)[5,7,14,21,22,23]
4. APU equipped for operations in remote regions or involving international tech stops.
5. Trip oversight by Part 121 dispatchers for international operations.
6. All aircraft operated with two pilots.
7. For aircraft in excess 12,500 pounds, both flight crewmembers are type rated appropriately (PIC for the pilot in command and SIC for the second officer)

Level B – Programs which consistently provide the high standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete long range, domestic missions.

Specific qualifications for this level may include but are not limited to:

1. All capabilities as Level C plus:
2. Gold Plus ARGUS Rating[7,18,19]
3. Obstacle avoidance warning systems (TAWS, TCAS) [5,10,12,13,14,19, 21,27,28,29,33,34,35]

4. Uninterrupted communication with medical control to and from the aircraft.
5. Trip oversight by experienced aviation professionals.
6. Lavatory facilities available onboard the aircraft.
7. Redundancy of equipment (medical), electrical, medical gas, and pneumatic systems for operations in remote regions or international missions.

Level C – Programs which consistently provide the moderate standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete medium range, domestic missions.

Specific qualifications for this level may include but are not limited to:

1. All capabilities of Level D plus:
2. IFR current aircraft and pilots (single pilot or dual pilot IFR)[7,9,20]
3. Gold ARGUS Rating[7,18,19]
4. CAMTS Certification[12,19,25]
5. No patient/light intrusion into the pilot compartment[19,27,29]
6. Active & appropriate use of operational control for aircraft operations to include flight following procedures[5,19,21,27,28,29,33,35,36,37,40,41]
7. Oxygen capacity not dependent on ground support at every tech stop in remote regions or international tech stops.

Level D – Programs which consistently provide the minimum standards in pilot and crew training and education, safety and risk management processes, and aircraft capabilities. This level of competency and equipment can allow the programs to safely complete short range (regional) domestic missions.

Specific qualifications for this level may include but are not limited to:

1. No ARGUS Rating / ARGUS Silver Rating[7,18,19]
2. Complies with FAA Part 135 requirements whenever medical crews are on board[5,12,28,33,35]
3. Equipped with working radar altimeter[5,12,14,19,21,27,29,44]

4. Provides patient and crew climate control for patient transport
5. Evidence of active & appropriate use of standardized mission risk management tool(s) [5,7,13,14,19,21,27,28,29,30,35,38,39,40]
6. Evidence of annual Air Medical Resource Management (AMRM) training[1,5,7,12,25,13,21,29,31,40,41,42,43]
7. Adequate patient access allowed to achieve necessary medical interventions/assessments and in accordance with program scope.
8. Evidence of pre-mission planning to include:
   a) Confirmation of available medical oxygen at tech stops to assure adequate oxygen delivery throughout the transport
   b) GPU availability confirmation for non-APU equipped aircraft
   c) Appropriate aircraft utilization considering length of transport, patient condition and equipment needed, patient size (safe loading and unloading and patient access during flight), regional geography and aircraft performance in collaboration with medical direction.

Conclusion:

The first step to solving any problem is identifying the actual problem. To manage, and preferably mitigate, the ongoing safety issues within the air medical transport industry, all programs and aircraft must be identified and categorized to determine by common reference point the levels of safety and clinical care practiced throughout the country today. Once identified, health care and EMS agencies will have a more thorough understanding of the varied resources available to them and thus allow them to make appropriate, informed decisions toward the care deemed necessary for their patients. In addition, safety regulators can focus on pairing the most appropriate aircraft capabilities to the mission type to assure that only qualified AMSs are attempting missions which have historically proven to be of higher risk. Finally, reimbursement mechanisms can utilize clinical care and safety levels to support the needed investment and properly incent and motivate all AMSs to strive for quality levels appropriate to their region and mission, and most importantly result in safer, more efficient and higher quality care for patients.

P A T I E N T F I R S T
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Safe Air with Quality Care

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