

AIR AMBULANCE REVIEW

SEPTEMBER 2018 ISSUE

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Sarah Watson
Editor, ITIJ



INTRODUCTION

A wealth of articles pertinent to the global aeromedical industry sits before you in this, our second edition of *ITIJ's Air Ambulance Review* for 2018. We talk to air ambulance operators at bases around the world to uncover some interesting case studies that demonstrate how far air medical crews are willing to go to get their patients back home. We focus on the wellbeing of medical crews, which is an important aspect of the aeromedical business that insurers may not always be fully informed of, especially when it comes to pricing. For instance, if a quote for a long-haul repatriation is more expensive than you thought it might be, could it be that this is because the air ambulance company is using more than one flight team in order to make sure the medics are appropriately rested and give your patient the best care? This topic is under discussion on pages 24-34 in our features on dealing with fatigue related specifically to long-haul repatriations, and fatigue management awareness for

the wider industry. Elsewhere, the intense training that flight medics undertake is recognised on pages 4-8, as is the importance of embracing a 'Just Culture' of safety (pages 36-37) – imperative to keeping everyone who flies in an air ambulance aircraft as safe as possible, whether they are crew or patients. Meanwhile, the ongoing evolution of medical interiors of aircraft is the focus on p 16. New materials, technology and innovation from experts in the field of in-flight medical care are bringing the highest-quality of medical intervention to new heights. We also get the latest thinking on the value of accreditation from global air ambulance operators, and we talk to Carlos Salinas of Jet Rescue about his career and the challenges of operating a in Latin America. If you'd like to contribute to 2019's *Air Ambulance Review* publications, please get in touch at editorial@itij.com!

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TRAINING TO THE HIGHEST STANDARD

The training courses flight physicians and nurses must undertake are undoubtedly onerous, but they leave them prepared to deal with the most critical patients in challenging conditions, according to **James Paul Wallis**



Being an international fixed-wing air ambulance medical crew member is a demanding role. Typically, as part of a team of two, you have charge of a patient who may require monitoring and intensive care, with limited equipment and little back-up in the cramped confines of a business-class jet thousands of feet above the Earth. It's no wonder that this specialised work requires a wealth of training, both before first stepping onboard and on an ongoing basis.

INITIAL TRAINING

Even before applying to join an air medical service, there's the small matter of completing the training to become a doctor, nurse or paramedic and building up time hands-on with patients, likely in a hospital setting. Regardless of medical experience on the ground, however, a new medical crew member will require specific training in the peculiarities of working onboard an air ambulance. Compared to a hospital, for example, the air ambulance offers a more limited range of equipment, and crew members often work in relative isolation. Importantly, crew members also need to understand the effect that flying has on the patient's physiology. For one thing, even in a pressurised cabin, the air pressure during flight will be lower than at sea level, which reduces the amount of oxygen the patient takes in with each breath and can cause any gas pockets within the body (for example trapped air after a traumatic injury to the chest or head) to expand. Other factors to consider include the physical effects of lifting and shifting the patient to get them into the plane, and the impact of acceleration and deceleration at different phases of the flight. While such initial training is good practice everywhere, in some jurisdictions it's mandatory. For example, Inger Lisa Skroder, CEO and Founding Member of Trinity Air Ambulance in Florida, US, commented that her company offers in-house training for flight physiology, which is a requirement of the Florida Department of Health. There may also be aspects of training that are required by an accrediting body. For example, Chaleece Caldwell, flight nurse at Angel Medflight of Arizona, US, commented: "We are required to provide documentation of our education logs, certifications and licensure to NAAAMTA [National Accreditation Alliance for Medical Transport Applications]." AirCARE1 International's training is also designed with accreditation requirements in mind. Conducted in-house, initial training includes classroom and practical sessions, said Denise Waye, President. She explained what the training involves: "The didactic training covers Commission on Accreditation of Medical Transport Systems (CAMTS) / European Aero-Medical Institute (EURAMI) requirements such as patient assessment, patient loading and unloading procedures, flight physiology, stressors of flight, fatigue factors, air medical resource management, aircraft orientation and safety, in-flight medical emergencies, quality management, survival training, and HAZMAT ... Our new hires then

take training flights where they are exposed to the different types of patient transports."

Flight physiology is a complex subject. In his capacity as aviation medicine specialist, Dr Thomas Buchsein trains doctors starting work at FAI Air Ambulance, Germany, on the essentials of flight physiology before their first mission. Along with a 45-minute presentation, candidates are provided with a web link to a free download of a comprehensive flight physiology textbook to further their learning.

CURRENCY AND UPSKILLING

After initial training, medical staff benefit from ongoing training to keep their skills fresh, referred to as staying 'current'. Some skills are more likely than others to require refreshing. As an example, intubation (inserting a breathing tube) is a tricky procedure that must be done quickly and done right, but it's seldom performed mid-flight as patients in fixed-wing aircraft tend to be fairly stable and either do not require intubation or are intubated before transport.

Speaking as CEO and Medical Director of AMREF Flying Doctors at ITIC Global 2014, Dr Bettina Vadera commented that currency training is particularly important for staff who work on air ambulances full time. This is because they don't have regular exposure to critical care cases due to their lack of hospital-based clinical work. She mentioned that a review of the service's past cases

SOME SKILLS ARE MORE LIKELY THAN OTHERS TO REQUIRE REFRESHING

had shown that staff rarely performed intubation in the field and during flight, but it was nonetheless a crucial intervention, and one that can affect the outcome for the patient.

To knock off the rust, medical crew members can attend periodic refresher training. At FAI Air Ambulance, Dr Thomas Buchsein said: "We require [flight medics] to show evidence of a yearly ALS refresher (offered by us once a year, but we also accept ERC or AHA-approved providers)." Alternatively, staff can spend time working in a ground-based clinical setting focusing on areas that they rarely see in the aircraft, but should be prepared to handle. Medical crew members at Air Alliance Medflight, which has its HQ in Germany, spend at least a quarter of their time working in a hospital – either in intensive care or anaesthesia – to stay current in these fields, noted Medical Director Dr Gert Muurling. Trinity Air Ambulance is another provider whose staff benefit from exposure in other settings, explained Inger-Lisa Skroder: "99.9 per cent of our staff are actively >>

working in a healthcare setting such as a hospital and/or rescue.”

Of course, going beyond maintaining currency, crew members can work to upgrade their skills. Skroder commented: “Our staff are very proactive, with most continuing their education. For example, some of the paramedics have become registered nurses (RNs) and the RNs are obtaining their Masters.”

Angel Medflight requires that all clinicians (paramedics and RNs) become certified as FP-C (Flight Paramedic Certification) or CFRN (Certified Flight Registered Nurse) within six months of joining the company, explained Chaleece Caldwell, adding: “Those who do not have certification when hired are provided with study materials and classes to assist them in this process.”

EXTERNAL TRAINING PROVIDERS

Air ambulance operators typically provide at least some elements of training in-house, but may also make use of courses offered by external training organisations. Dr Muurling said that even with the wealth of knowledge and experience of its staff in bases across the UK, Germany and Austria, he can see a benefit in gaining outside input. Giving his personal opinion, he said: “It is good to have an external presenter from time to time, who might highlight different details of certain topics compared to the ones we highlight.” By way of example, Denise Waye of AirCARE1 International, said: “We outsource our initial intubations at a skills lab for our new hires at a centre that provides military clinical training. We felt this would provide the highest level of training for a skill that has low volume, but a high impact if

done incorrectly.”

Patrick Schomaker, Director of Sales and Marketing at European Air Ambulance (EAA), said that although EAA conducts most of its

GOING BEYOND MAINTAINING CURRENCY, CREW MEMBERS CAN WORK TO UPGRADE THEIR SKILLS

training in-house, external providers are used for specific topics such as infectious disease or tactical trauma. EAA uses a number of providers, a requirement being that they are certified by the National Association of Emergency Medical Technicians (NAEMT). As examples, he listed mass casualty situation training at Rambam Health Care campus in Israel and the Anvers Institute of Tropical Diseases in Belgium. Conversely, EAA recently created a new training facility as part of building its new headquarters, and this year, the centre began accepting students from other providers. Patrick commented: “We are gradually expanding the selection of courses we offer and also can do custom-made courses for clients with specific requirements.”

While FAI Air Ambulance doesn't send its new doctors on external courses, the service does prefer applicants who have passed the three-day DIVI Intensive Care Transport Course. The course is offered several times a year in various cities around Germany, by medical bodies such as NGOs, universities and rescue services, according to a curriculum established by the German Interdisciplinary Association (Deutsche

Vereinigung) for Intensive Care and Emergency Medicine, Dr Buchsein explained.

One organisation that specialises in training air ambulance medical crew members is CCAT

Aeromedical Training, which is based in the UK but has an international following. Director Dr Terry Martin described how the educational packages cater for a range of training needs – from initial training to highly experienced healthcare professionals working in patient transport, retrieval, commercial airline repatriation, medical assistance and travel insurance. The main base is at the University of Surrey, Guildford, UK, which Dr Martin said attracts students from around the world – most participants on the basic foundation level entry course are from overseas. He added: “CCAT Aeromedical Training currently uses training bases in Thailand, China, the Middle East and Canada on a regular basis. Often, the courses delivered outside of the UK are bespoke for local needs and resources, but they follow the structured format of the UK core curricula.”

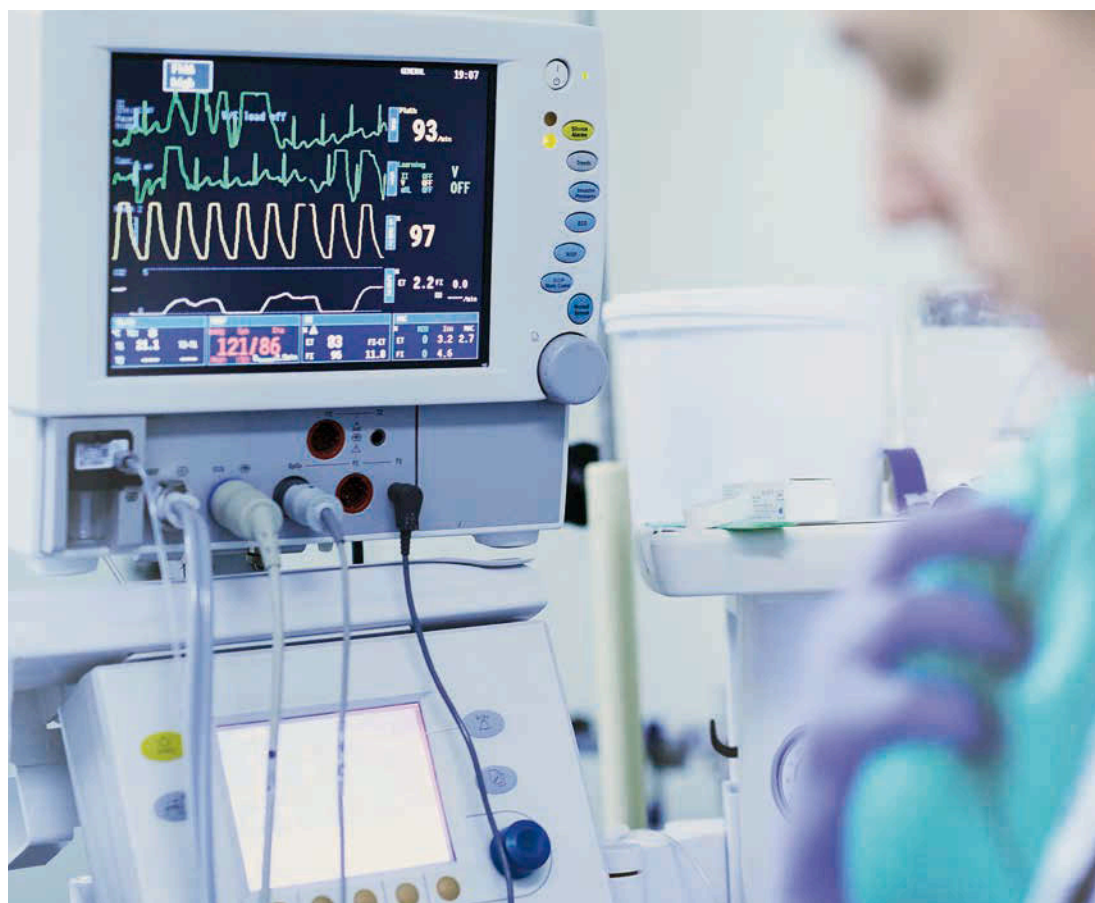
Students who successfully complete the CCAT foundation level training package are encouraged to sit an advanced level course within three years, and/or to attend higher level courses or study days in specialist areas such as HEMS and helicopter retrieval, paediatric intensive care transport, neonatal retrieval, ECMO transport and commercial airline repatriation.

Medical staff can also access training remotely via the internet. For example, prior to attending the CCAT Aeromedical Training basic foundation level entry course, students are offered a pre-course distance-learning package that introduces ‘new concepts and a unique way of thinking about aeromedical risks’, said Dr Martin.

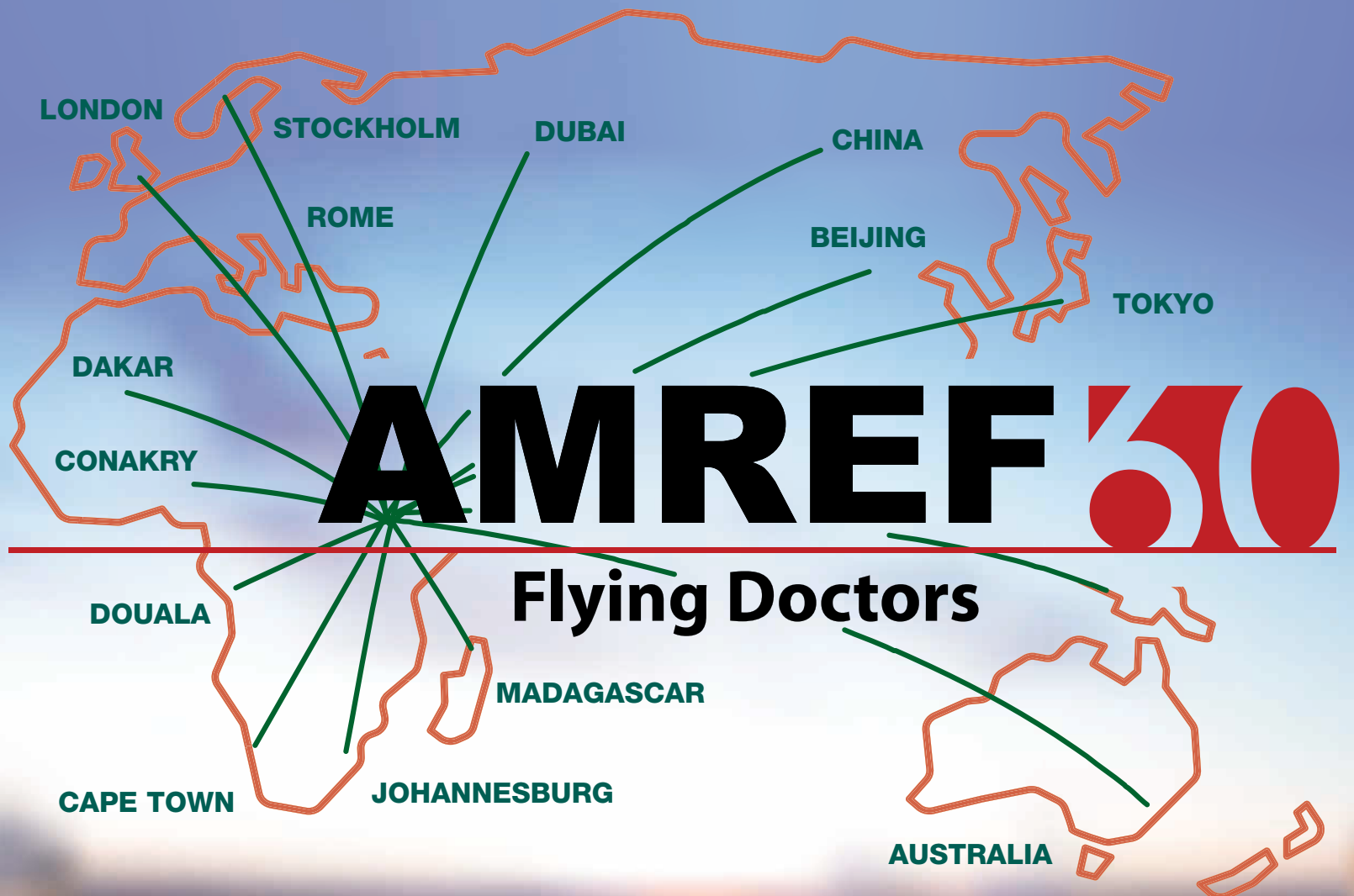
CONSTANT PROGRESS

In many ways, training is a way of life, a journey without end. For example, Denise Waye explained that AirCARE1 International provides monthly training sessions based on CAMTS/EURAMI requirements, in addition to what the company feels the training needs are. She said: “This training takes place online where our employees read the information and take the required quizzes. They come to class prepared and are given scenarios based on the monthly training. There is a high level of discussion on treatment plans/actions and appropriate outcomes. During monthly continuing education meetings, we also discuss appropriate quality management reviews along with our operational risk assessments. Our trauma training is on an annual basis with information written specifically for our scope of practice by our medical director.”

Medical science and practice is constantly >>



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evolving, so quite apart from initial training, maintaining currency and skills building, there's always something new to learn. Chaleece Caldwell noted that Angel Medflight supports clinicians to attend conferences and outside education opportunities such as the Air Medical Transport Conference (AMTC) and cadaver labs. The service's staff also benefit from monthly online education, guest lecturers and education provided by the medical directors.

At CCAT Aeromedical Training, Dr Martin is continuously updating the information taught on his courses: "Every training package has a 'living curriculum' that is constantly updated and improved, based on current practice, related best evidence, and feedback from our students and our faculty of instructors."

The expertise of flight doctors and nurses who are so dedicated to their roles comes at a price, for sure – but it is without doubt an investment that pays for itself 100 times over. Proper preparation, after all, is the key to success in most aspects of life, and when it comes to medical treatment onboard an aircraft thousands of feet over the ocean, then successful outcomes are what matter most. ■

INTO THE OUTBACK

While typical fixed-wing missions are essentially interfacility transports of relatively stable patients, things are a bit different for Australia's Royal Flying Doctor Service (RFDS), whose fixed-wing crews may be called to remote locations in the Outback for what's better described as a 'delayed primary' response to incidents. The organisation puts new recruits through their paces with training that includes simulated missions. For example, last September, a group of emergency medicine registrars took part in an intensive three-week training programme to prepare them for providing care in the Outback. Simulated missions included treating a farmer severely injured by an overturned tractor with a brown snake lurking nearby; a pregnant woman needing to deliver urgently; a man with severe blood loss; a patient with a brain injury; and patients (and onlookers) who were a few drinks worse for wear.

RFDS South Eastern Section Senior Medical Officer and Lead Trainer Dr Peter Brendt explained that the training aims to teach doctors 'to expect the unexpected'. He added: "They are all advanced clinicians, but they've previously worked in hospitals with big teams where medical testing equipment is available. In the Outback, we are usually hundreds or thousands of kilometres away from the nearest hospital, without access to different specialists that would be found in a large hospital. Our doctors have to do all the tasks which are done by different doctors in hospital."

Beyond the pure medical skills, the training helps doctors to learn how to manage a scene, how to work with flight nurses and pilots, and how to cope with high-stress situations with a flexible approach, said Dr Brendt.



PATIENT SIMULATORS

The RFDS is among many providers who take advantage of realistic simulators that 'closely resemble real-life' patients, as Dr Brendt explained. One model is used as an outdoor trauma simulator. Staff can practise intubation and surgical airway interventions, and it can bleed from a selection of orifices, said Dr Brendt. Another model that Dr Brendt said can 'give birth 25 times within a couple of hours' is used to train for a range of complications. He explained: "If you have an obstetric emergency in a hospital setting, the patient can go to theatre and maybe get a caesarean section. We can't do them in the middle of the Outback, so having 'Lucina' to practise for scenarios like this is very beneficial."

The RFDS is also working on plans for its training centre in Dubbo, which include plane fuselage mock-ups to help doctors and nurses train in the environment in which they'll work.

European Air Ambulance has been conducting training using patient simulators for a number of years and now has a dedicated, specialised training facility. For added realism, the simulators can be 'treated' onboard aircraft. So that others can observe and benefit from each scenario, live footage of the treatment is screened outside the aircraft. One aspect of simulation training that is particularly effective is the repeatability – situations can be played out more than once, and there's the chance to try out new techniques.

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CASE STUDY

MAN VS ELEPHANT

ACE Air & Ambulance reports on an urgent medevac from a game reserve, where the patient's critical condition meant last-minute changes to the transfer plan

Running an air ambulance in Zimbabwe that specialises in remote rescue inevitably means that the majority of our workload is for primary calls and trauma. It will come as no surprise, then, that wild animals feature in a significant number of these calls. Elephants top the list of offenders – there are high numbers of them in the region, and their unpredictability, coupled with their immense size and strength, mean they present a real danger to locals and visitors alike.

CALL FOR HELP

Just before 10 a.m., the call centre received a notification requesting the evacuation of a patient from a remote game park across the border in Malawi. The request was 'to activate as soon as possible' and medical details provided were that the patient had been injured by an elephant around 7 a.m., that he had a deep laceration to the upper abdomen, an open fracture to his leg and a puncture wound to his thigh. His blood pressure was reported as 76/69 mmHg with a pulse rate of 122, indicating to our team that he was in severe hypovolaemic shock.

The patient had been taken from the scene to a local clinic adjacent to a dirt airstrip. Our records showed that the dirt airstrip was not suitable for anything other than light single engine aircraft and would not accommodate our King Air fleet. Our dispatchers quickly established that the nearest serviceable airport suitable for our aircraft was some 80 kilometres from the clinic, and the journey from clinic to airport – on dirt roads in very poor condition – was estimated at two hours.

PRACTICALITIES

In many of these cases, the biggest delay to take off is due to difficulties in obtaining flight clearance, either into the country or for onward clearance, which can sometimes take many hours. In certain African countries, the clearance can only be given by the military and will only be granted with a letter from a local doctor (a problem when the patient is in a remote safari area with no doctors!). Fortunately, in this instance, we had developed a good relationship with the relevant authorities and within an hour of receiving the call, clearance was granted to fly our aircraft into the serviceable airport.

Once the King Air had cleared customs, our flight medical team and its equipment were loaded onto a helicopter based at the serviceable airport and flown to the patient's side. Simultaneously,

a ground ambulance was dispatched by our local service provider that would (in theory!) conduct the two-hour road trip to transfer the stabilised patient to the air ambulance with our medical crew.

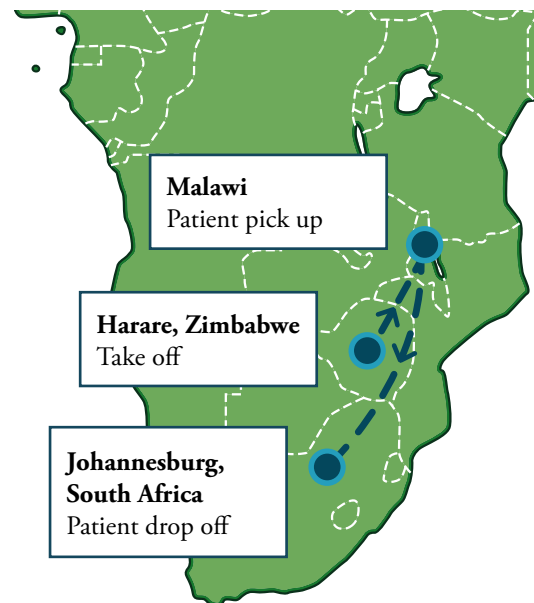
ACE's air ambulance took off from Harare 90 minutes after the initial call, landing at the serviceable airport just over an hour later. The air ambulance crew carries jump bags containing essential medical equipment which were taken with them on the helicopter, as it was not configured for air ambulance work. In addition, the crew took an oxygen cylinder and portable ventilator and were then on their way to the patient.

During this time, our dispatch centre had established which hospital in South Africa (the selected patient destination) would be best suited to receive the patient and arranged for a ground ambulance to meet the aircraft when it landed. Importantly, it had obtained Port Health Clearance from the authorities, allowing us to bring the patient into the country.

PATIENT CONDITION

The medical flight team arrived at the clinic at 1.30 p.m., some six hours after the injury had occurred. The 'clinic' turned out to be nothing more than a mud and thatch hut alongside the airstrip. Details of how the incident happened then unravelled. At around 7 a.m. that morning, an elephant had attacked a safari vehicle and overturned it. The occupants had all jumped out of the vehicle and run away from the scene, but the patient had stopped at some point to take a photograph of the incident and this caused the elephant to attack them. Although there was a doctor and nurse in attendance, no start had been made at resuscitation and they didn't have any equipment to set up an intravenous drip, nor did they have any painkillers. This is a common scenario in remote clinics in Southern Africa. Examination by the medical team showed quickly that the patient's injuries were more severe than had been previously described. There was a degloving injury to the chest on the left. This exposed a number of fractured ribs and a contused, collapsed lung. Through this hole in the chest wall the heart was visible. The injury to the thigh was very extensive, exposing the bone around the hip and there was a severe open fracture of the leg. In addition to the patient's very low blood pressure and high pulse rate which indicated hypovolaemic shock, the patient had a dangerously low oxygen saturation level.

The medical team started the patient on oxygen and established intravenous infusions before closing the chest wound and inserting a chest drain. This resulted in a normal oxygen saturation



level and improvement in the patient's blood pressure. After an hour had passed, the team felt that the patient's condition was stable enough for them to be moved. At this point, however, it was deduced that the journey by road was not a reasonable option. The patient was still critically ill and in considerable pain when moved, despite intravenous pain relief. If a road trip was to be undertaken, it would have had to be done at a very slow speed, which would result in a significant delay in getting the patient to the air ambulance and the oxygen cylinder may not have lasted for the full duration.

Enquiries were made with contacts in the area and a local safari operator made a Cessna 208 available (the helicopter that had transferred the medical crew was not suitable for patient transport). Prior to this short flight, insurance, indemnity and consent forms had to be completed. The patient's weight was at the upper limit of the air ambulance stretcher, which, along with the bulky vacuum mattress used to support the patient's fractures, made loading and managing the chest drain in-flight difficult, but the process was accomplished nonetheless.

Once the patient was successfully transferred into ACE's air ambulance at the airport, the patient's vital signs continued to improve and the team had a relatively uneventful flight to South Africa before finally handing over the patient to the waiting trauma team in Milpark Trauma Unit, Johannesburg, at 9 p.m. that night. The patient survived surgery and has recovered substantially. ■

AUTHOR

Dr Charles Crawshaw is Medical Director for ACE Air & Ambulance (Pty) Ltd in Zimbabwe. He is a founder member of the British Association of Spinal Surgeons and is a consultant in medico-legal cases for the UK's NHS litigation authority and the Medical Defence Union.

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STAMP OF APPROVAL

For some air ambulance operators, accreditation equals an improved business – a way of showing insurers that they are at the top of their game. But there are others who are just as successful, but not accredited, perhaps finding the process too costly or time consuming. Is there a right answer to the question: is accreditation worth it? Femke van Iperen asks industry experts for their opinions

Denise Treadwell is President of AirMed International LLC, which is accredited by both US-based CAMTS (the Commission on Accreditation of Medical Transport Systems) and EURAMI (the European Aero-Medical Institute) in order to ‘stay up to date with standards across both the US and Europe’, said Treadwell. She testifies that in both markets, there has been what she refers to as ‘an increased accreditation value within the air medical community’. Many air ambulance operators consider accreditation a wise business move, which Treadwell believes is due to the emphasis placed by accreditation bodies on quality improvement and outcomes.

Some would say that accreditation is more important now than it has ever been, with Dr Laurent Taymans, President of EURAMI, arguing that being accredited is becoming a requirement when working with certain clients, rather than just being ‘nice to have’. He added: “As we see more and more programmes become increasingly more

professional, many large organisations require some sort of accreditation for air ambulance providers and will not work (except in certain exceptional circumstances) with non-accredited providers.” The increasing popularity of EURAMI, he believes, is testimony to the fact that more air ambulance companies recognise the benefits that accreditation can provide.

CHANGES IN ACCREDITATION

Accreditation bodies have to keep up with developments in air ambulance equipment, aircraft, personnel training, treatment modalities, and safety requirements. Thus, the standards to which they hold their accredited providers have evolved, and now extend to all aspects of patient transport, including

commercial medical escort services. CAMTS, for example, made changes to its 10th Edition Standards of 2015, in which the Advanced Life Support (ALS) and critical care transport standards included ‘more detail for expectations in clinical education, certifications and competencies, as well as equipment and interventions’, as Eileen Frazer, Executive Director of CAMTS explained. Accreditation processes must ‘evolve to meet the growing need of global markets’, according to Roylen ‘Griff’ Griffin, Executive Director and Founder of the US-based National Accreditation Alliance of Medical Transport Applications (NAAMTA). He explained:

“Specifically, aligning



the intent of the standard to correspond to the broader geographical differences. Equating the prescribed skills set and educational requirements with the licensure of a country. For example, NAAMTA will research a country's licensure requirements and identify the parallel skills to ensure medical staff meet compliance to the standards."

CAMTS, which has recently registered CAMTS EU in Zurich to address the needs of services beyond North America, has also developed an accreditation process that is specific to Special Operations, covering providers that offer medical services for large sporting and entertainment events. Special Operations accreditation is also available for tactical rescue services that operate in some of the more undesirable locations of the world, Frazer explained.

One of the most significant evolutions in the world of accreditation has been an added focus on Safety Management Systems (SMS), with an integration of organisational culture, noted Emma Roberts, Director of Safety for Florida-based REVA, Inc. According to Roberts: "As carriers become more mature in such systems, auditors are not just looking for policies to satisfy or 'check the box' for SMS requirements, they are looking for specific examples of how SMS are critical parts of our business process, and are interviewing all levels of employees to ensure the culture is present throughout."

CURRENT APPETITES

There are companies that consider accreditation to be not only imperative for their own company's success, but also a win-win situation for everyone involved. David Ewing, Executive Vice President of Global Markets for Canada's Skyservice Air Ambulance International, told *ITIJ*: "We strongly believe in the process; it's good for us, it's good for the insurers, it's good for our patients, and it's good for the industry."

He has a point, according to Dr Cai Glushak, International Medical Director of AXA Partners, who said: "We have made accreditation for air ambulances a top priority. It is critical, reputationally, for liability purposes as well as to extend our capacity, to rely on in-depth audits done by real experts."

Skyservice Air Ambulance International itself is accredited by EURAMI, chosen for its 'quality of auditors and proven industry experts on the board of directors', as well as by ARGUS International through its certificate holder, Skyservice Business Aviation, to 'receive further suggestions for improvement to remain on the top of our game'. Dr Taymans believes that 'many ambulance providers have a desire to codify the minimum level of quality of care required': "Patients will benefit whenever there is an increase in quality, and larger organisations also benefit through the reduced risk of serious adverse events and their reputational and financial liabilities."

Accreditation is often hailed as being stimulating for a company, keeping it on its toes to meet stringent requirements in safety and clinical

standards, said Roberts: "An outside auditor provides a third-party perspective that challenges the 'how it's always been' mentality, and requires

The company also looks for oversight and validation by other regulatory bodies and insurance providers, in order to 'provide another set of

AUDITORS ARE NOT JUST LOOKING FOR POLICIES TO SATISFY OR 'CHECK THE BOX' FOR SMS REQUIREMENTS

companies to really look at their processes." REVA is accredited by ARGUS Platinum, NAAMTA and EURAMI, as well as pending recommendation from IS-BAO, all of which were chosen for 'industry reputation and operational relevance'.

standards, best practices, and a second set of eyes with different objectives'. For Treadwell, it is beneficial for a company to be routinely checked against industry standards, also indicating that the company is seeking to >>

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improve on its current offering: “Accreditation doesn’t mean that you get it right every time or that you are ‘the best,’” she said, “but rather that you have a desire to obtain critical feedback and strive to improve.”

Accreditation within the international air ambulance sector remains voluntary, and there are providers who feel that the time and expense it takes to become and remain accredited is not

CONSUMER AWARENESS AND EDUCATION ARE PARAMOUNT

worth the resources needed.

Even those who are accredited recognise that the work a company has to put in before it can be accredited can be daunting. Roberts noted: “There is a very large workload prior to an auditor’s onsite visit. Whether it’s pulling records, reviewing manuals, providing references, or even just co-ordinating with required personnel, each audit is an enormous effort from the entire management team.”

Frazer of CAMTS understands that the additional cost can also be a contributory factor in the decision-making process: “Air medical services are expensive to operate, so adding in costs for accreditation is a decision managers often make based on the bottom line in their budget, because accreditation is not required.” However, she added: “Most companies that apply for accreditation see the value in having an outside audit to continue to improve the quality of the service they offer.”

There are operators who are concerned that an auditing processes may cause them to be ‘shut down or seen as less than top-notch’, noted Griffin: “Accreditation criteria sets an expectation for operators, hospitals, patients, and payers of insurance. There are fear factors associated with each of these populations that I personally would like to eliminate! If the industry saw accreditation as a support to their services, the return on investment would be readily evidenced.”

Although Roberts believes implementing change is generally a positive thing for an organisation, she also explained that with each new policy, process change, requirement for communication or training for front-line employees, there ‘can be some risk to the operation’. She cited a recent example of a new accreditor policy that required mechanics to wear gloves, which in fact turned out to be too bulky for the mechanics, who were unable to handle some of the smaller aircraft parts.

AREAS OF IMPROVEMENT

Treadwell believes that promotion of the value that

accreditation can bring is key to improving how accreditation is seen by the sector. “Like anything, there is always room for improvement, and consumer awareness and education are paramount. As an industry, we must continue to press forward with ensuring our customers understand why accreditation is important and take every step possible to put accreditation at the forefront.” Comparing the situation with the US nursing sector, where nurses can use their licences in participating ‘compact states’ without having to obtain new or additional ones, Treadwell would also value ‘more cross pollination of the accreditation services’, as it would ‘allow for a more universal set of standards’.

Ewing would call for an additional focus on details, as well as the introduction of a reporting process, he told *ITIJ*: “More stringent verification of aircraft maintenance and of patient care provided in the air and on the ground as well as an anonymous reporting process by insurers and assistance companies in terms of accidents,

incidents, and patient deaths.”

Other changes that could be on the horizon in the future include an increased focus on cross-industry understanding. CAMTS, for example, is working with assistance companies to, as Frazer described it, ‘demonstrate that recognising accredited services ensures a true level of quality’, foregoing the need for assistance company staff to ‘spend considerable time and effort to understand a non-accredited company’.

For Griffin, it is key for payers of insurance to have confidence in accreditation: “They need to understand accreditation criteria, processes, and steps toward quality and continuous improvement that comes with the accreditation process.”

Rather than looking to attract more business, he said, a medical transport company should use accreditation ‘to make its processes more robust, to hire the people that allow better patient outcomes, and to use data to make better decisions’. All in all, he said, “The best we can accomplish right now is: for the industry to trust accreditation.” ■



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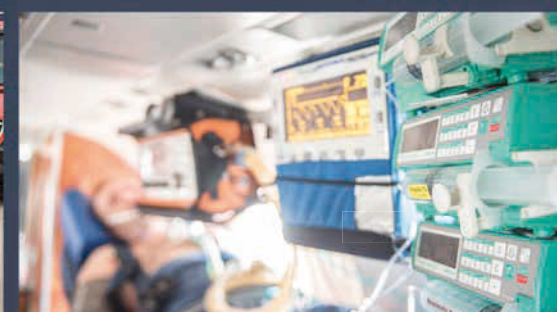


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TAKE THE NEXT STEP

The interior of an air ambulance has to be meticulously designed to incorporate the right equipment, and ensure that this equipment is to hand when the medical crew needs it. **Mandy Langfield** considers the latest developments in aircraft interior design

AIRCRAFT

It all starts, of course, with the selection of the aircraft itself – its size, its adaptability and its original purpose. While there are still jets in use that were originally designed as business aircraft and have been adapted for medical use, the more modern aircraft available for purchase are designed to be multi-purpose from their inception, and are thus better suited to their roles when it comes to ergonomics, ease of access to, and loading of, patients, and enhanced comfort for crews.

Pilatus had already enjoyed success with air ambulance operators thanks to its PC-12, which was rugged enough to cope with unpaved runways in Australia and Africa and pick up patients from the most remote locations in these areas. Its new PC-24 has improved on this template, with an increased operations level and faster top speed making it even more in demand. The fact its cabin altitude can be maintained at sea level up to Flight Level 230 is a

specific bonus

for critical care. Ignaz Gretener, VP General Aviation at Pilatus, told *ITJ*: “Based on the demanding customer requirements, Pilatus offers a fully customised medical interior which was developed in a joint partnership with a renowned Swiss EMS interior manufacturer after the latest standards in industry.” Aerolite is the aircraft’s interior manufacturer, and the development of the design for the air ambulance interior also had input from the Royal Flying Doctor Service, which hopes to accept its new aircraft in October and November of this year. Oscar Schwenk, Chairman of Pilatus, said that the air ambulance market is ‘a perfect fit’ for the PC-24: “This is a growing niche,” he says, “and the PC-24, with its many features – such as a large cargo door, roomy cabin and short-field performance – is a perfect fit for this market.”

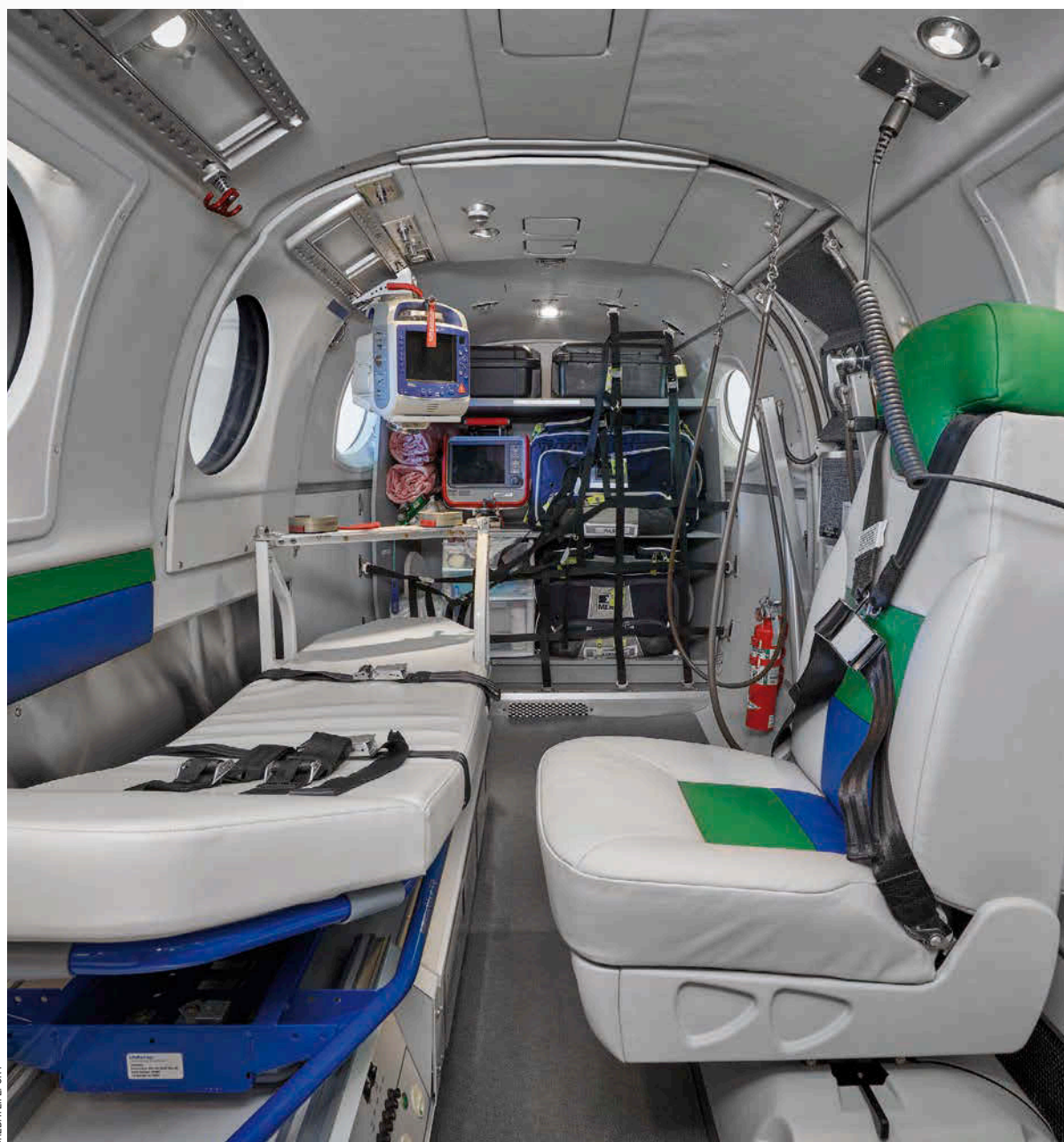
Martin Siegrist, Senior Vice President Technical at LCI, an aircraft leasing organisation, pointed out that patient care is now a key driver of aircraft design, particularly helicopters. He said: “The dimensions of the cabin, and the space available for medical crew to operate in, must be optimised to permit full access to the entire patient body from both sides at all stages of the flight. High ceilings provide for a more comfortable working environment, as does the ability to rotate and move the platform.”

The capacity to choose between different cabin configurations (i.e. positioning the stretcher in transversal or longitudinal direction) means that aircraft can also be further optimised for different mission types. “A wide and regular cabin allows medical equipment to be stored in dedicated areas close to the patient and easily accessible to the medical crew,” said Siegrist, “while the provision of a spacious, separate bagging compartment means that rescue equipment can be stored without compromising the working environment.” Gulfstream Aerospace Corporation offers a wide

MODERN AIRCRAFT... ARE DESIGNED TO BE MULTI-PURPOSE FROM THEIR INCEPTION, AND ARE THUS BETTER SUITED TO THEIR ROLES

variety of interior customisation options, as it configures each medevac aircraft based on each customer’s specific needs. “Every medevac aircraft is equipped with an electric patient loading system and can include a wide array of options,” explained Gulfstream’s development systems compressed medical Rich Nevitt, Director for Special Missions business unit. “Typical integrated include oxygen, suction and air components, permanent beds, ample oxygen capacity and electrical outlets for medical equipment. All Gulfstream aircraft are engineered for passenger and patient comfort, with 100-per-cent fresh air distribution,

soundproofing and low vibration.” Gulfstream has made considerable advancements in medevac cabin design over the years – from the functionality of the medical environment to medical crew ergonomics. The company recently designed and delivered a state-of-the-art Gulfstream G550 medevac to the Beijing Red Cross Emergency Medical Center. With the admirable aim of revolutionising in-flight medical care, the aircraft has been designed to provide emergency crews with the most effective – and safe – access to patients possible. “For example,” continued Nevitt, “the aircraft features a transitional operating table for 360-degree in-flight patient access – a medevac first. An exclusive patient loading system and >>



CREDIT: LIFEPOINT



THE DESIGN OF AN AIRCRAFT CABIN INTERIOR IS KEY TO ITS SUCCESS AS AN AIR AMBULANCE

CREDIT: AEROLITE

well-positioned medical equipment provide safe and efficient access to and from the aircraft's cabin." Gulfstream medevac interiors are designed with many of the same health attributes as other Gulfstream aircraft – including low cabin altitude pressure, advances in noise reduction and 100-per-cent fresh air. These optimal features contribute to an ideal medevac environment for critical care patients – and for medical professionals providing life-sustaining support.

WHAT'S ON THE INSIDE

The design of an aircraft cabin interior is key to its success as an air ambulance. Starting from the bottom up, the need for sealed heavy-duty flooring and washable interior liners is essential, and new materials coming on the market make these needs easier to fulfil. Aerolite has worked on B200, Challenger CL604 and Learjet fixed-wing aircraft, as well as a number of medical helicopters. It has developed a multitude of options over the years, demonstrating the wealth of choice now available to air medical operators. As companies often operate a variety of aircraft for air medical transfers, it is vital to have customisable options available. Aerolite's integral floors are either one or two-

piece machined aluminium assemblies, which provide points for mounting internal equipment in seat rails and at attachment points at the front. The EMS integral floor has a raised lip around the edge to contain any spillage and two drain holes at the front LH and RH sides, which mate with floor drains during installation. Running boards at the cabin doors give protection to the edge of the floor and provide non-slip surfaces. Attachment to the floor of the rotorcraft is made using track fittings, stops and screws. Spectrum Aeromed, based in the US, provides customised medical interior solutions to air ambulance companies around the world. Thomas Redder, Vice-President of International Marketing, told *ITIJ* that the team is 'constantly listening' to feedback from medical crews and air ambulance operators in order to enhance their offering, including organising Kaizen events to work on product improvements together. Some of the latest trends in customer demand that the company is seeing include:

- New electrical interfaces (e.g. USB connectors).
- Ease of disinfection.
- Integration of more complex medical devices (e.g. ECMO units, isolation chambers).
- Longer distances for flight (fewer fuel stops but

require more oxygen).

- Proper mounting of medical devices.
- Modular concepts to allow flexible system configurations.

Siegrist of LCI said that there is a range of new material and technology available including new, lightweight equipment, easier to clean surfaces and amenities that enable greater comfort for patients. He added: "A key factor is certification standards for brand new helicopters which are becoming ever stricter in order to maximise safety, and this in turn impacting weight constraints faced when operating helicopters. As a result, we are likely to see the development of extremely compact medical devices for use in EMS operations."

LifePort, a US-based company that designs and fits medical interiors into aircraft of all shapes and sizes, said that custom cabinets, additional storage underneath stretchers, and new-generation seats are examples of ways in which the company is optimising design to increase efficiency and comfort for both patients and crews. When it comes to the easy-clean surface options, the company uses LifeGuard, which provides anti-bacterial/anti-microbial surfaces, while the use of custom-designed

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floor overlays protect the aircraft from foreign fluid contamination. “Thicker mattresses, wider stretchers, and powered loading systems are all utilised to increase patient care and comfort,” explained Michelle Wynne, Head of Marketing and Communications for LifePort.

When it comes to the materials being used, Wynne explained that the use of new lightweight materials is dictated by a customer’s budget, and are specific to their operations, so there is no ‘one-size-fits-all solution’. She added: “Utilisation of carbon fibre, traditionally-machined aluminium, and 3D printed parts are all applications that we look to exploit.”

For clients, the process of selecting a medical

THE BUDGET DRIVES THE USE OF LOWER-WEIGHT MATERIALS OVER THEIR LOWER COST, DEPENDING ON CUSTOMER PRIORITIES

has designs for dedicated aircraft interiors using rail systems to attach the mounts. For multi-mission aircraft, Spectrum has designed a medical wall that attaches to the life support system, free from the interior walls to attach medical devices to. The medical walls are manufactured out of aluminium

year for US customers and global clients. Amy McMullen, Aircraft Configuration Co-ordinator for Metro, said that the company works closely with its customers to create Federal Aviation Administration-approved mounting provisions that function for the medical crew. She added: “The



CREDIT: GULFSTREAM

interior remains the same. Once they have determined their requirements, based on their mission profile, a budget evaluation can then take place. Wynne explained: “The budget drives the use of lower-weight materials over their lower cost, depending on customer priorities.” To limit additional expenses, existing designs are used where possible, although this can again be affected by budgetary constraints.

Medical advancements also mean new challenges for medical interior companies. Ricky Reno, Vice-President and Account Executive at Spectrum Aeromed, said that as new medical devices are used, new mounts need to be designed to accommodate these inside the aircraft. He explained: “With the development of the medical mounts, Spectrum Aeromed has designed new ways of mounting the medical mounts. Spectrum

or new lightweight composite material.” If the air ambulance operator does not want a medical wall, but still wants to be able to secure medical devices, Spectrum has designed a stretcher bridge that attaches to the stretcher. The stretcher bridge allows the medical team to secure the medical devices to the stretcher while transporting the patient from the aircraft to the ground transportation without removing the medical device from the patient, or laying the device on the patient during the transition.

Metro Aviation, which operates one of the largest fleet of air medical aircraft in the US, as well as offering a completions service, has developed customised medical interiors for medical helicopters across the US. It also holds more than 30 Supplemental Type Certificates (STC) and completes about 35 aircraft each

STC-approved interior that was designed when we completed the Michigan EC 155’s has proven to be a sufficient interior for our EC155 customers. The additions that have been made have been new monitor mounts or stretcher solutions as new equipment arrives onto the market.”

CHALLENGES AHEAD

More is being asked of pre-hospital emergency care providers, and international air ambulance operators, when it comes to the critical patients that they are transporting. With more complex patients come more complex medical devices, and thus, space and weight restrictions mean that lighter and smaller is the way for the future. With that in mind, carbon fibre and 3D printing may well unlock how air ambulances of the future can provide the right care with no compromise. ■



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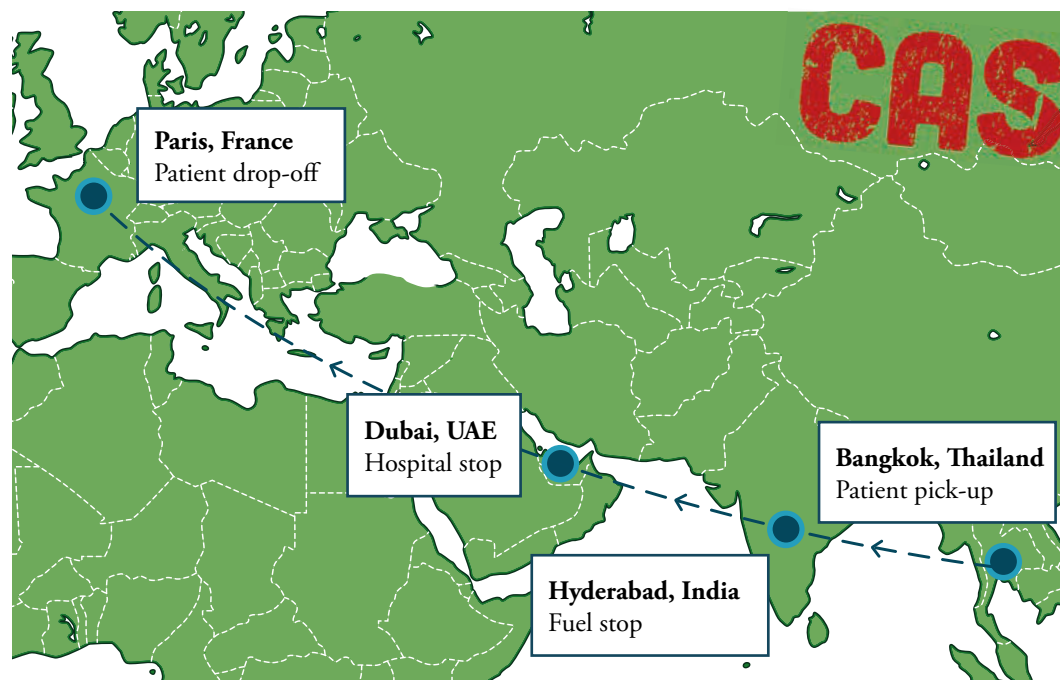
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CASE STUDY

MID-AIR EMERGENCY THREATENS MISSION

The key to success in aeromedical missions is detailed planning and preparation, but unforeseen logistical or medical complications can potentially throw everything off course in a matter of moments. A mid-air medical emergency threatened to do just that on a recent European Air Ambulance (EAA) mission, during the repatriation of a 23-year-old from Bangkok to Paris

SETTING THE SCENE

The patient had been knocked from her motorbike by a truck in Vietnam some weeks earlier, sustaining massive soft tissue damage, liver and pulmonary contusions, and multiple rib and pelvis fractures. After transfer to an intensive care unit in Bangkok, Thailand, she received weeks of treatment in isolation due to drug-resistant bacterial infections. But with her condition improving, the decision was taken to repatriate her to France for the next stage of her treatment; permanent wound closure. EAA's Mission Control Centre in Luxembourg began planning the transport, having been satisfied by information from the hospital that the patient was fit to fly. The necessary medical equipment was prepared, and the flight and medical crew set off. The handover in Bangkok was carried out utilising EAA's checklist-type transfer sheet. This guarantees that no pertinent issues – such as current medication, allergies, lab results, CD copies of imaging – are left behind. It also ensures that all medication required during repatriation is available and given at correct times. The Thai nurse in charge confirmed that all medications up to the time of handover were administered, including an adequate dose of low molecular weight heparin. The patient was then transferred via road to EAA's dedicated air ambulance at Bangkok's Don Mueang International airport, where the flight to Paris commenced. Non-invasive monitoring was carried out continuously, with oxygen administered via nasal cannula, a continuous morphine infusion via syringe pump, and all other medication as required.

A SUDDEN DOWNTURN

The patient remained stable for six hours, including a fuel stop in Hyderabad, India – but suddenly developed severe shortness of breath, nausea and vomiting. These symptoms were extremely worrying and indicated either a pulmonary embolism or pneumothorax (potentially caused by the multiple rib fractures she had suffered).

As standard lung auscultation is futile at cruising altitude with two engines blasting 7,000 pounds of thrust, an arterial blood gas (ABG) analysis was performed immediately with the point of care analyser onboard. The ABG confirmed severe hypoxaemia.

The oxygen supply was changed to a non-rebreathing mask and the flow was increased to the maximum of 15l/min. Thereafter, oxygen saturation levels increased from 75 per cent to 92 per cent. Fortunately, the patient remained haemodynamically stable under these conditions. However, as there was no possibility to confirm either of the two suspected diagnoses, the medical crew declared a medical emergency.

A 12-lead ECG raised concerns about some right ventricular stress. When the patient, who was awake and alert at all times, denied having received any subcutaneous injection in the morning, the medical crew suspected a pulmonary embolism caused by insufficient treatment with blood thinners. Immediately, 5,000 units of heparin were injected intravenously. Gradually things improved on board. Nevertheless, prompt hospital admission was imperative to obtain a final diagnosis of what caused the severe deterioration.

With the support of EAA's Mission Control Centre, who secured the necessary permissions, an ambulance was summoned to the tarmac at Dubai airport – which, although 15 minutes farther than Muscat, is significantly closer to hospital facilities. The patient was admitted to the Al Quasimi Hospital, where an emergency chest X-ray showed a bilateral ventilated lung, but blood tests disclosed elevated D-Dimers and Troponin, therefore

confirming the EAA medical team's primary diagnosis of a pulmonary embolism.

Taking into account treatment times, the patient's now-stabilised condition, the opinion of the EAA medical crew, ED doctor and the patient herself, and the fact that the best treatment options could effectively be carried out while in transit, it was decided to continue with the repatriation.

The patient remained stable for the rest of the journey to Paris, where she was taken by ground ambulance to the receiving hospital.

Dr David Sinclair, Medical Supervisor at EAA, said of the flight: "This mission presented unexpected challenges, both medical and logistical. But thanks to the quick actions of EAA's expert team – in the air and on the ground – we were able to adapt our flight and medical plans immediately. I'm pleased to say that the mission was successfully completed, and the patient returned to her home country safely and in a stable condition." ■

AUTHOR



Dr David Sinclair graduated from medical school in 1998 having studied at University of Tübingen (Germany), Dartmouth Medical School (NH, USA) and UC San Diego (CA, USA). He

finished his specialisation in anaesthesiology in 2004 and sub specialised in critical care medicine and emergency medicine. He is also certified in ATLS and travel medicine. He began working for Luxembourg Air Rescue* (LAR) in 2002 and was nominated medical supervisor in 2007. Dr Sinclair is board certified in Germany, France and Luxembourg.

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A large, dark, textured rock formation, possibly a cliff or mountain peak, dominates the left and center of the frame. The rock has a rough, porous appearance. The sky is a clear, gradient blue, transitioning from a lighter hue near the horizon to a deeper blue at the top. The text is overlaid on the rock formation.

**GOING
THE
DISTANCE**

MEDICAL CREWS FLYING AROUND THE WORLD TO COLLECT CRITICALLY INJURED PATIENTS ARE SUBJECT TO FATIGUE, SO ENSURING PROPER REST TIMES FOR THEM IS AN ESSENTIAL PART OF A COMPANY'S DUTY OF CARE.

TATUM ANDERSON REPORTS





It's a long-distance flight between Bangkok and Paris on a CL604. A patient, perhaps under mechanical ventilation, is monitored by a physician. A member of the patient's family accompanies the patient. A second member of the medical team is preparing hot dishes in an oven. Chances are the crew has flown into Bangkok from Paris to pick up the patient. Usually, while the flight crew is resting in Bangkok, the medical crew gets to work. "We manage three periods for our doctor and registered nurse team," said Dr Hervé Raffin of French air ambulance firm Medic'Air International. "First, they go to see the patient, meet the local treating doctor and start treatment. Second, they make sure they get around four hours sleep in the nearest comfortable hotel. Lastly, they return to the hospital to take the patient on the road to the airport for boarding." If the patient is unstable, there must be a very quick turnaround, Dr Raffin says: "For these acute patients, our target is to take off from Paris at a moment's notice, even during the night, to project our ICU team to the patient's bed in the shortest time possible." Dr Raffin says his company uses planes with wide cabins to help maximise crew and patient rest times. "For these long flights (12 to 24 hours), there must be room for one of the team to have real rest time on board when the two others are monitoring the patient," he said. Such an aircraft

has toilets, a galley with an oven to eat hot meals at any time and space for the team and a family member.

Marcy Phipps, Chief Flight Nurse at Global Jetcare, which specialises in long-haul repatriations, told *ITIJ* that it is detailed forward planning and

additional oxygen stores and other elements vital for long distances.

FEELINGS OF FATIGUE

Excessive stress and fatigue experienced by the crew has a direct impact on the patient. Fatigue,

IT'S UP TO THE AIR AMBULANCE COMPANY TO STIPULATE JUST HOW MUCH DOCTORS, NURSES AND OTHER MEDICAL STAFF GET TO REST ON A PLANE

logistical support that make such flights successful. "Long-haul air ambulance flights require advance planning for crew configurations and pilot changes," she said. In addition, medical crews must conduct pre-trip visits to assess and evaluate patients and allow ample time for collaboration with the sending team. "That ensures all medical preparations, including transport from the hospital to the aircraft, are in place," Phipps said. The team must also procure scheduled medications, food,

defined by the UN's International Civil Aviation Organization (ICAO), is: 'a physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crewmember's alertness and ability to safely operate an aircraft or perform safety-related duties'. Fatigue can be dangerous – it can lead to slower reaction times, poorer co-ordination, difficulties



sustaining attention, fixation and less creative problem-solving. Sleep is the only effective fatigue countermeasure because it allows the brain to recover, ICAO said.

Flight crew rest times are extremely well regulated – for example, by the Federal Aviation Administration (FAA) in the US and in Europe by the European Aviation Safety Agency (EASA). The rules stipulate exactly how long breaks must be for pilots and other staff flying the plane depending on the number of time-zones they cross and in which direction.

However, no such rules exist for medical crews. It's up to the air ambulance company to stipulate just how much doctors, nurses and other medical staff get to rest on a plane.

So, how does an air ambulance firm ensure both flight and medical crew have sufficient rest before flying a patient?

SOLUTIONS, NOT PROBLEMS

Some use bigger planes, as the more powerful a plane is, the less frequently it will need to stop for refuelling. Dependent on completion, weight, balance, and extras such as wing tips and extra fuel tanks, generally speaking, most of the mid-size jets like the Hawker 800/100, Gulfstream 280/550, Falcon 2000 or Challenger 604 can cover 11 hours with a single stop.

Smaller planes may require two or even three stops for scheduled refuelling. Each stop takes time because it involves landing, taxiing to the refuelling depot and then a wait for take-off. So, whereas a commercial flight may take 11 hours, the same journey could extend to 15 hours by air ambulance.

Some firms will state rest times, but may expect their crews to spend quite a lot of that rest on the plane. Robert J. Starr, Director of Medical Services at Air Ambulance Worldwide, said that's not ideal. "Being on the plane and resting is not getting rest, because you are still feeling the effects of altitude when you are flying even though the cabin is pressurised," he explained. "On an aeroplane you have a lot of noise and vibration and a lot of stressors. You have environmental, physical and psychological stressors."

A few companies even treat the medical crew in the same way as flight crew, said David Ewing, Executive Director, Global Market at Canada's Skyservice Air Ambulance. "Government rules only apply to the flight crew and not the medical crew, though we try to follow the same rules for both groups, when possible," he explained. "Also, the medical crew are encouraged when the patient is stable to have controlled rest within the cabin during long flights. That means taking turns closing their eyes and resting."

Another option is to change the medical team completely on the way. Medic'Air International said it recently evacuated a patient from Abidjan, Côte d'Ivoire to Montreal, Canada with a fuel stop in Paris, France to change pilots and the medical team. This is a strategy that helps with ultra-long flights, such as those from Africa to North America, for example.

Take another ultra-long flight: a crew based in Florida is taking a patient from Perth, Australia to Florida, US, via Bangkok. The air ambulance company could use two teams. They might send the first ahead on a commercial flight a day before the second crew, which flies the air ambulance

A KEY STRATEGY TO ENSURE THE WELLBEING OF A CREW IS TO FOSTER STRONG RELATIONSHIPS BETWEEN THE MEMBERS

itself. The pre-positioned crew could rest in a Bangkok hotel and then pick up the plane when it arrives 24 hours later, taking it to Perth and then back to Bangkok, where they are able to hand over to the original crew who have had time to rest.

Alternatively, a wing-to-wing agreement could be struck with another carrier. Here the flight to Bangkok is met by another carrier which has brought the patient from Perth, so that the patient can fly in more or less one flight back to Florida.

Or both teams might be expected to travel on the same flight from Florida, and swap in Bangkok, and are expected to rest while on the plane.

However, not all ambulance firms will want to entail increased costs – such as pre-positioning pilots – because that involves commercial plane tickets, hotels and taxis, or employing a wing-to-wing carrier. They will also have to get governmental permits and visas for flight and medical crews.

HOW MUCH IS IT WORTH?

Cost is inevitably a key consideration when planning a repatriation mission, and ensuring optimum crew rest can nudge costs up. "It is an increased cost for the insurer, so choosing wisely the company to undertake the mission in the first place is essential to a successful transport," said Ewing. "Typically, shortcuts taken are those to save money for the client and don't always work out. The saying 'the cheap becomes expensive' is often applied here."

Christoph Ullrich, Senior Manager, >>

International Network, for Germany's travel club ADAC, which operates its own air ambulance service, agreed. "It really depends on the philosophy of the operator," he said. "Although all the stakeholders in aeromedical transportation have to focus on costs, there are still some topics not to compromise on, like qualification of the medical teams, proper insurance and proper usage of your aircraft performance. A flight, for example, with a Learjet 35 with more than three technical stops with a patient on board would be a no-go for my company."

Hotels must be well chosen too, said Ullrich. Some firms will automatically choose an airport-based hotel. So, while the aircrew can reach their beds quickly, the medical crew will have to travel to the treating hospital after a long flight. If the hospital is based inside one of the world's megacities, the distances covered will be large. Plus, there's a high chance of travel problems, which will curtail the amount of rest the medical crew gets before the flight takes off again. "In huge cities like Bangkok, Mexico City or São Paulo, if you hit the rush-hour, the time from the hotel to pick up the patient can be three or five times as long compared with [the same journey] out of rush hour," he said.

If weather isn't factored in, that can lead to more

problems too. "If you go to Ho Chi Minh City in the rainy season, for example, you can't forecast the rainfall, but you have to take it into account because the traffic comes to a halt," he explained. "And nobody cares if you have a patient onboard or whether you're going to the airport."

Journeys may be particularly gruelling. A patient may have a back or spinal injury, for example, so the journey to the airport by road may well take longer, in order to minimise discomfort.

A key strategy to ensure the wellbeing of a crew is to foster strong relationships between the members, said Global Jetcare's Phipps. "Because we are rather a small company, our crew members fly together frequently and know one another very well. This results in our family-type camaraderie with all team members. They are sympathetic to the needs and idiosyncrasies of the others," she said. During long trips with stays in foreign, and occasionally remote, locations, support among crew members is vital to the wellbeing of all. That helps emotional support when far away from home. "It directly impacts the care of the patient and the success of the trip," Phipps said.

Trust amongst crew members and management is just as important, said Starr. The crew must be confident enough to declare when they are, for example, taking any medication or have

consumed alcohol. "If it makes them drowsy, the medical director reviews that and make sure they are always fit to fly," he said.

Take, as an example, a last-minute flight, in the early hours. The crew would be expected to declare exactly how much they may have drunk in the early evening. Some companies impose the so-called eight hours from bottle to throttle rule, to make sure they are fit to fly at the last minute. Air ambulance firms also tend to outsource food provision. Some will provide nutritious meals, fresh fruit, plenty of water and snacks for their crews and others, the odd sandwich and chocolate bar. Some encourage their crews to eat smaller meals and often, because larger meals are likely to make them drowsy.

CHOOSE WISELY, OR THE COSTS COULD RISE QUICKLY

The philosophy of an air ambulance firm, therefore, is vital when choosing one for a long-haul flight. "The insurer/assistance company needs to choose the right company, for the right mission at the right time for an uneventful, successful transport of their clients," said Skyservice Air Ambulance's Ewing. "We provide our clients with options and are transparent about those options in order for them to make an educated decision for the transfer." ■





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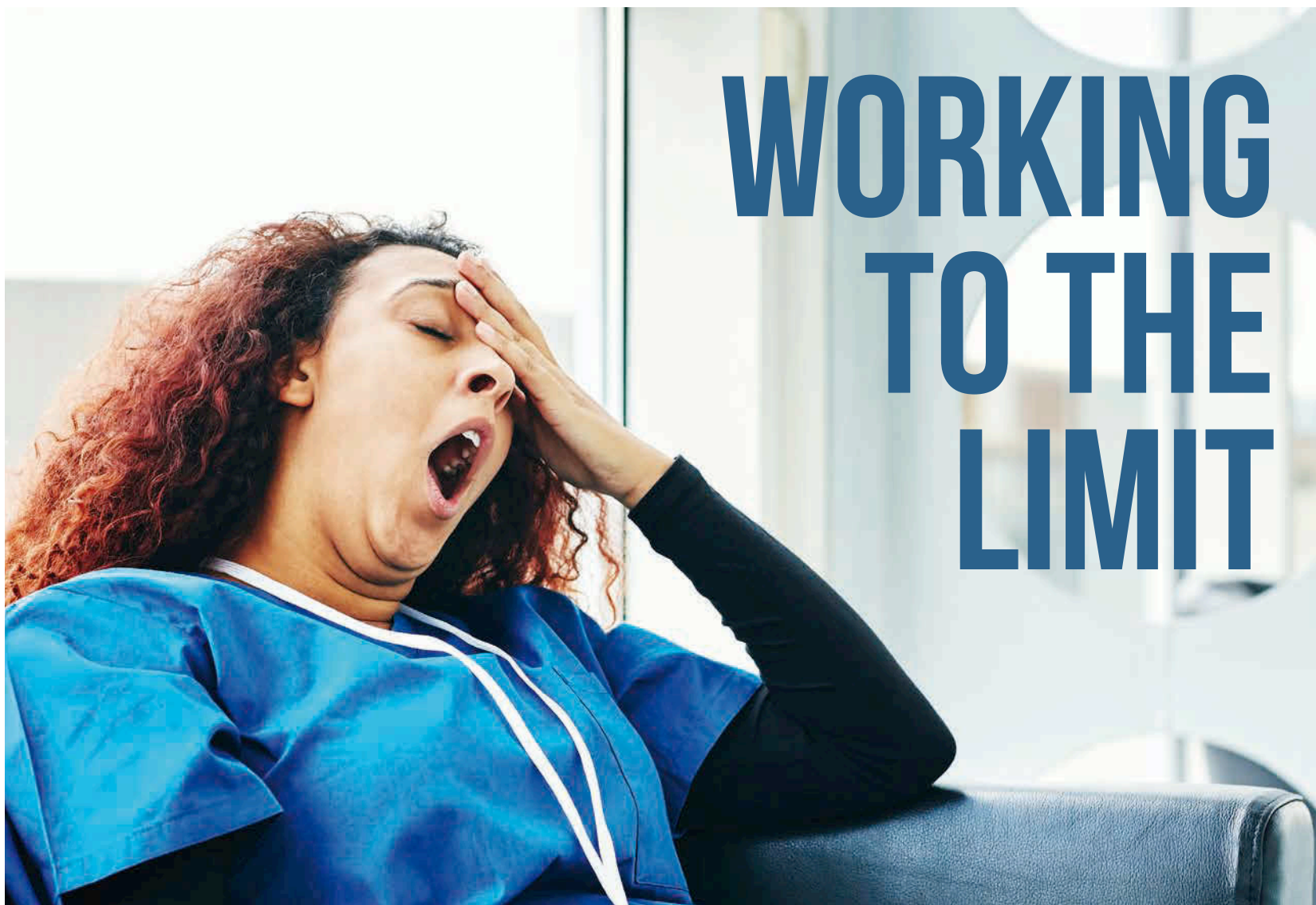


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WORKING TO THE LIMIT

Fatigue management in the UK: Is this being ignored by the retrieval and repatriation industry, or are there good examples in practice?

Authors: Stuart Cox and Kerryn McGowran (nee Reynolds)
(Royal College of Nursing, Critical Care and Flight Forum).

AIM

To explore what fatigue is and how medical professionals working in flight differ from their aviation and hospital colleagues.

INTRODUCTION

The fusion and learning between aviation and healthcare is apparent in air ambulance and commercial retrieval and repatriation, with healthcare learning from initiatives undertaken in aviation. There are many examples of aviation-to-healthcare translation: ground-breaking initiatives such as simulation training (Gaba, 2004); checklists for pre-theatre assessment (WHO, 2009); and Just Culture (Eurocontrol, 2012), all of which has changed healthcare for the better regarding safety and quality standards. However, one area healthcare is slow to adopt from aviation is fatigue management, its guidelines and regulation of medical professionals (doctors and nurses) who

are involved in retrieval and repatriation medicine. There has been an attempt to regulate working time in UK healthcare through the introduction of the Working Time Regulations (1998), which implemented the European Working Time Directive into UK law. These reduced the maximum working hours to 48 hours a week, averaged over 17 weeks, which could arguably be a step closer to the flight time limitation scheme as seen in the airline industry. However, within healthcare, and especially within the sub speciality of retrieval and repatriation medicine, there is evidence that problems with inadequate rest and fatigue continue to persist (McClelland et al, 2017). Is fatigue management being ignored by the industry and medical professionals undertaking retrieval and repatriation to the detriment of patient safety?

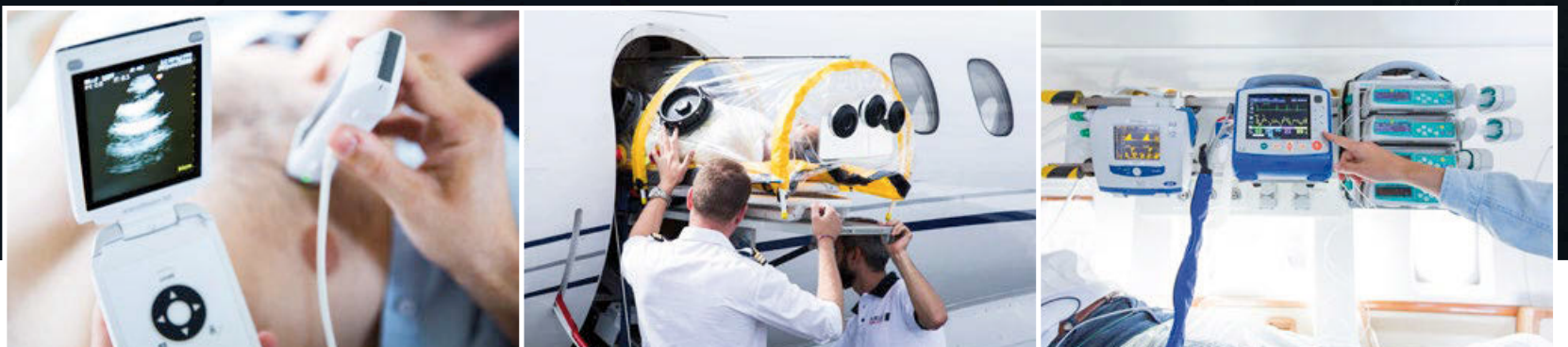
WHAT IS FATIGUE?

The Faculty of Intensive Care Medicine (2017) describes fatigue as ‘extreme tiredness resulting from mental or physical exertion or illness’. Susceptibility to fatigue depends on many factors, including those directly related to the individual such as their workload, home life, colleagues, critical care unit, and hospital. Further factors such as age, changes in family life, and our own physician and mental health often fluctuate the

effect of, and susceptibility to, fatigue. There are two types of fatigue, acute and chronic (The honourable company of air pilots, 2017). Acute fatigue is short term and can be experienced during a sequence of duties that may be within prescriptive limits. It is rectified by allowing a suitable period of rest for the individual member concerned. Chronic fatigue has long-term medical consequences, and can be brought on by irregular sleep patterns, circadian rhythm changes, eating at odd times, and a whole host of domestic and personal factors. As this disorganised time progresses, the normal pattern of life begins to break up and minor irrelevant things become very important to the affected person. Conversely, very important things become minor, so compliance with safety procedures, normal balanced speech and temper can change. Some of the behaviours and symptoms of an affected person can include aggression, ignoring warnings, feeling very depressed, crying and laughing inappropriately, and repeatedly falling asleep. This has a direct influence on crew resource management (CRM). There are a myriad of symptoms frequently misunderstood and misdiagnosed by those with limited knowledge. If left unchecked and undiagnosed, it can take many months, even years, to correct. Acute or chronic fatigue can affect our actions, >>



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causing deleterious effects on patient outcomes. The 1999 report *To Err is Human* stated that 98,000 patients die annually from preventable medical errors (Kohn et al, 2000). Does fatigue play a part in this, or even exaggerate the risk? Fatigue can be insidious and develop over months or years. It is very important that we look after both ourselves, and our colleagues' welfare. It's easy to forget in the rush to get home that it may be safer to have some food and drink and have a rest before travelling and putting yourself, and others, at increased risk. Sleep-related vehicle accidents account for up to 20 per cent of all road traffic accidents and drowsy driving is as important a factor in accidents as drink driving. If the flight crew or medical professional commutes by car, they should be reminded that they may be driving after lengthy periods of time on duty at the end of the mission. In addition, they may be at further risk due to crossing several time zones and their circadian rhythm for alertness may be at a low point due to travel. Medical professionals are not legally counted as flight crew, and are therefore not subject to flight time limitation schemes, thus lack overall fatigue management regulations specific to their role in flight. This is an area of concern for the authors as it allows individual companies to potentially task medical professionals to lengthy retrieval and repatriations

DOES FATIGUE MANAGEMENT DIFFER BETWEEN THE AVIATION INDUSTRY AND HEALTHCARE?

Yes, the aviation industry recognised in the 1950s that aircrew fatigue may have been a contributory factor in some aircraft accidents (CAP 371, 2004). *The Bader Report* (Air Navigation Order 1974) was commissioned and the Flight Time Limitation Board convened, with the object of regulating the hours worked by aircraft crew. Restrictions placed on the number of hours worked, developed over the years, have gone a long way towards ensuring that crew are sufficiently rested prior to commencing a flying duty period. In healthcare, following the traumatic death of an anaesthetic trainee who was returning home after a night shift, a study by McClelland et al (2017) in hospital fatigue demonstrated that fatigue is definitively prevalent among junior anaesthetists. This study found that fatigue has effects on

physical health (73.6 per cent), psychological wellbeing (71.2 per cent), and personal relationships (67.9 per cent). Fifty-seven per cent (55 to 59.1) stated that they had experienced an accident or near-miss when travelling home from night shifts.

The medical repatriation and retrieval environment (IATA 2018) has additional risks such as:

- A hypobaric environment, hypoxia and decreased humidity.
- Turbulence, vibration and noise.
- Discomfort arising from cabin layout and sustained relative immobility.
- Irregular lifestyle; especially with regard to sleep cycle, local time change, irregular shift patterns, family and social life.
- Repeated changing of team, climate, culture, work and off-duty routines.
- Changing time zones, disruption to circadian rhythm and jet lag.

This is exacerbated by the fact that not all medical specialists are occupationally screened for retrieval and repatriation work (unless working within helicopter emergency medical services). Medical standards for professional and private pilots have long been clearly specified in international regulations (ICAO, Annex 1, Chapter 6); however, there is generally no equivalent for medical professionals on flights. Exceptions do exist; a certain number of countries require cabin crew to be licensed to private pilot standards, but this does not apply uniformly for medical professionals. The airline may determine the appropriate pre-employment health assessment required causing potential variation in standards.

DOES FATIGUE MANAGEMENT DIFFER BETWEEN AIR AMBULANCE AND COMMERCIAL REPATRIATION AND RETRIEVAL?

The view of the Civil Aviation Authority (CAA) regarding air ambulance movements is that most companies view the medical professionals as 'passengers' and are thus not part of the flight crew. Hence, they do not have to train them in emergency safety procedures and fire and smoke drills. This is usually phrased in operations manuals as 'the person responsible for patients in air ambulances'. This then removes them from a formal flight-time limitation as stated by

The Air Navigation Order (2016). Conversely, this regulation does apply to the Commercial Air Transport aircraft operator. However, the following groups are currently exempt from these regulations:

- Air taxi operators of aeroplanes of 19 seats or less
- Emergency Medical Services (EMS).
- Single-pilot operations.
- Helicopter operations.

The guidelines are clear for actual aviation crew. Should these be adopted by air ambulance operators and assistance companies? There could be flight-time limitations added, including all the hours the flight medical specialist works in conjunction with working time directives, for example:

FATIGUE OF CREW – OPERATOR'S RESPONSIBILITIES

175 (1) The operator of an aircraft to which this article applies must not cause or permit that aircraft to make a flight unless:

- (a) the operator has established a scheme for the regulation of flight times for every person flying in that aircraft as a member of its crew;
- (b) the scheme is approved by the CAA;

175 (2) The operator of an aircraft to which this article applies must not cause or permit any person to fly as a member of its crew who the operator knows or has reason to believe is suffering from or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue as may endanger the safety of the aircraft or of its occupants.

175 (3) The operator of an aircraft to which this article applies must not cause or permit any person to fly in the aircraft as a member of its flight crew unless the operator possesses an accurate and up-to-date record for that person and for the 28 days immediately preceding the flight showing:

- (a) all dates and flight times; and
- (b) brief details of the nature of the functions performed in the course of those flight times.

FLIGHT TIMES – RESPONSIBILITIES OF FLIGHT CREW

177 (1) Subject to paragraphs (2) and (3), a person must not act as a member of the flight crew of an aircraft registered in the UK if, at the beginning of the flight, the aggregate of all that person’s previous flight times:

- (a) during the period of 28 consecutive days expiring at the end of the day on which the flight begins exceeds 100 hours; or
- (b) during the period of twelve months expiring at the end of the previous month exceeds 900 hours.

that may be incurred on a long haul flight with a scheduled airline.

ORIGIN: PERTH, AUSTRALIA DESTINATION: LONDON, UK			
	Perth – London (Direct)	Perth – Doha – London	Perth – Dubai – London
Sectors	1 sector	2 sectors	2 sectors
Total flight hours	17.20	20.15	22.30
Transit time	0	1.05	2.10
Total time zones crossed	8	8	8
Total estimated working time including check in and additional travel (6 hours)	23.20	26.15	28.30

JOURNEY LOG, CROSSING TIME BARRIERS AND OPTIONS

This journey log demonstrates flight routings for a medical repatriation from Australia (Perth) to London, and with aviation advances such as the Boeing Dreamliner more direct routes are now an option. This does not take into consideration the pre-hospital visit, the ambulance or taxi journey at the beginning or the end of the journey, handover to receiving care or the time taken to check in and collect luggage. This can add approximately six hours to any flight and is estimated in the working time. Consideration by the organising company needs to also include the journey from the person’s home to their end destination, which should also be included in total working time. These estimates do not account for potential flight delays

For a one-person medical specialist this is a considerable length of journey at best. It is also vital to consider the impact of travelling from London to Perth to pre-position prior to the transfer of the patient back to the UK. Some companies will add a second medical personal onto flights but this is not standard or consistent.

Additional areas to take into account in terms of fatigue risk:

- Rest time for the medical specialist prior to leaving the UK to travel to Perth
- Impact of crossing time zones from East to West

to pre-position in terms of jet lag, and resulting disruption to their circadian rhythm before the transfer even commences.

- Short period of rest (24 hours minimum) on the ground in Australia before travelling back with the patient.

In terms of jet lag, if you travel across six time zones, it will typically take the body between three and five days to adjust. Jet lag causes tiredness, exhaustion, poor sleep quality and concentration and memory problems (NHS choices, 2017). These factors, coupled with general fatigue from physically working extended hours medically supporting a patient, mean the medical specialist is at a much higher risk than their hospital and flight crew colleagues. Conversely, there are routing options that can be considered to reduce fatigue and this is demonstrated with anticipated working times.

In this journey log, it is clear to see that with different time zones, retrieval and repatriation operations are not always conducive to a regular sleep/wake schedule and can affect sleep and circadian factors in two ways, which can further lead to fatigue (IATA, 2018). The first is as a result of duty periods occurring at unusual or changing times in the day/night sleep cycle and the second when there is a requirement for time zone crossings. This leads to:

1. Conflict between the environmental time (in the case of unusual or changing work schedules) or local time (in the case of changing time zones) >>



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and body times.

2. Circadian disruption when the body is required to adjust continuously between day and night schedules.

In addition, a further factor that can create sleep loss is a prolonged period of continuous wakefulness. So, should companies look at two sector (or more) flights with a different medical specialist to take over in transit to breakdown the risk of fatigue irrespective of cost but to add value to patient safety?

SUMMARY

The scope of the problem for fatigue management within the industry for medical professionals has not been addressed on a global scale. Some of this may be related to staffing availability, cost constraints for companies by using two professionals, and also a general lack of awareness of fatigue management. While some companies may have a robust policy on fatigue management, this is not a legal requirement to date. The length of time medical professionals should be expected to work should be similar to that within comparable clinical roles such as hospital length shift, with adequate break facilities and in an adequate location. It is also important that longer term factors are kept in mind; sleeping habits, social life, personal fitness, alcohol, caffeine, taking regular holidays and so forth. These are all very important to pay attention to in our attempts to prevent fatigue and this should be closely considered by companies and all medical professional hours in all roles should be recorded and monitored. Individual medical professionals should also be more aware of fatigue management, and also take ownership and accountability for its prevention in the planning and delivery of medical repatriations and to say 'no' to long retrievals or repatriations without safe rest. As Still (2014) stated, nurses who experience impairments due to fatigue, loss of sleep, and inability to recover between shifts are more likely than unimpaired nurses to report decision regret. For future management, it is key to use resources such as 'I'm safe' – a checklist adapted for clinicians to assess fatigue and fitness to work. This covers key areas such as: illness, medication, stress, alcohol, fatigue and eating. Awareness should be raised and all individual medical practitioners and assistance dispatches should ask these questions before sending staff on a repatriation, and the individual should also be empowered to risk assess themselves before the return leg of the flight.

Regulators and industry should look upon fatigue management as a crucial area to regulate and to ensure they have transparent plans for their professionals while keeping a log of hours worked in all roles. The Royal College of Nursing will shortly release the date of its fatigue symposium looking at creating guidelines for nurses working within the aviation industry.

KEY POINTS

1. There is no specific aviation law covering medical professionals' fatigue management nor flight time limitations. Companies should take action and

monitor all flight staff's hours, especially those working ad-hoc hours and freelance work to ensure compliance with working time regulations.

2. An industry-wide approach is required, viewing medical professionals in the same way as pilots and cabin crew, with change driven by medical professionals and regulators.
3. Assistance companies and medical professionals need an enhanced appreciation of fatigue management when planning a repatriation.
4. Medical professionals need to be empowered to say NO to retrievals or repatriations based on fatigue risk and the potential effects on patient safety. This can be achieved by heightened awareness of fatigue and its identification and management.
5. At home and before duty – get the best possible sleep before starting a trip. A nap can improve subsequent alertness and performance and will decrease the period of continuous wakefulness. If napping immediately before a duty period – limit the length of the nap to no more than 45 minutes. At other times, naps can

be longer.

6. The repatriation does not end until you are in a place of rest (i.e. at home) and corporate liability needs to be undertaken to ensure this is considered and factored into logistical planning.
7. On a trip – try to get as much sleep in every 24 hours away as in a normal 24 period at home
8. Trust your own physiology – if the crew member feels sleepy and circumstances permit, then they should sleep where possible, provided it is safe to do so. ■



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Disclaimers: This article was written outside their roles, but Stuart works for CEGA Group (Chares Taylor Company) and Kerryn works for International SOS.

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SAFETY AND 'JUST CULTURE' IN THE AIR AMBULANCE INDUSTRY

The nature of the risks involved in the air ambulance sector mean that providers must take a proactive approach to safety, which can involve shifting the emphasis away from punishment for errors, instead treating mistakes as learning opportunities, as James Paul Wallis explains

An air ambulance service is a hybrid beast that comes from the marriage of two separate industry sectors: aviation and medicine. At first glance, these sectors might seem to have little in common; medicine deals with the messy chemistry and biology of the human body, whereas aviation deals with the more sterile physics and mechanics of flight. However, they share a need for a proactive focus on safety, and the search for strategies to reduce risks is common to both fields. One such strategy is the adoption of the 'Just Culture' concept, wherein the reporting of errors and near-misses is encouraged so that systems can be improved, in the hope that this will reduce the likelihood of similar adverse events occurring in the future.

Earlier this year, US-based international fixed-wing air ambulance provider Reva released a white paper in which Emma Roberts, Director of Safety, discussed Just Culture and the steps the firm takes to ensure it operates with a high degree of safety. Some of the aspects of reporting and accountability might seem counter-intuitive to those who enjoy the comfort of an office-based environment, where even the worst of bad days may end in nothing worse than bankruptcy. In an air ambulance mission, the stakes are higher – to put it bluntly, the worst-case scenario with a medical flight is not loss of earnings, but loss of life.

LIVES ON THE LINE

Roberts told *ITIJ* why it's important for air ambulance providers to take positive steps to improve safety: "The air ambulance business is comprised of two of the most highly regulated, high-risk industries – aviation and healthcare. Actively focusing on safety isn't a choice, it is the way we do business. We focus on being proactive to avoid incidents before they occur, because our

people and our patients' lives are on the line." Explaining the Just Culture concept in the white paper, Roberts wrote: "A Just Culture is a culture in which front-line operators and others are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training." At the same time, though, 'gross negligence, wilful violations and destructive acts are not tolerated', she added. The aim of Just Culture, then, is to create an environment in which employees feel comfortable reporting issues so that improvements can be made. Roberts said in the white paper: "Nobody wants to tell on his colleague, but if that 'don't-tell-the-teacher' pressure doesn't exist, then reporting becomes a necessary step rather than a threat of 'I'm going to get you in trouble'. That comes with the feeling company management is looking out for workers, not looking over their shoulders while tapping feet." Key to this system is the reporting of hazards, so that steps can be taken to prevent accidents from developing in the future. Thus, improving safety

becomes a proactive, rather than reactive, task. To promote a 'free exchange of safety information between employee and management' at Reva, employees can report hazards through a web-based system, through a telephone hotline or via email.

of the US-based Commission on Accreditation of Medical Transport Systems). Writing on the benefits of following Just Culture in *AirMed&Rescue Magazine* (Issue 86, October/November 2017), he clarified how an organisation

exceptions, healthcare professionals rarely intend to do harm to their patients). They are extremely likely to have already learnt a lesson from the experience and are the least likely people to make the same error again."

In Just Culture, said Quayle, consoling the staff member would be the correct course of action for a simple, one-off, error. This would be followed by a review of the organisation's systems to see whether circumstances, policies or procedures made the error more likely to occur, and whether the systems require change. EAA's Paul Scott suggested the following steps: "The improvement (mitigation) in cases where the behaviour can be categorised as negligent conduct or violations without involving personal gain, can range from training, to rewriting procedures to avoid making the same mistake." Consider the words of Dr Lucien L. Leape of Harvard School of Public Health, who once stated: "Medical errors most often result from a complex interplay of multiple factors. Only rarely are >>

THE REPORTING OF ERRORS AND NEAR-MISSES IS ENCOURAGED SO THAT SYSTEMS CAN BE IMPROVED

Roberts noted in the white paper: "The most important piece is trust in the system. People have to know they're in no jeopardy when reporting. We do everything we can to maintain confidentiality. And we get back to them. We let them know they're making a difference."

Paul Scott, Safety and Compliance Manager at European Air Ambulance (EAA), agreed that confidentiality is prime importance in such a system: "The person reporting is not revealed in any of our reports." He added that steps are also taken to avoid potential conflict between the person being reported, and the person reported on: "In a case where a conflict between personnel would arise, we would encourage the other person to report their point of view in a formalised way." Scott also reflected on how staff attitudes can develop over time once a Just Culture model is introduced: "As [a Just Culture] evolves within the organisation, personnel will realise that the punitive attitude is not applicable to errors, mistakes or even, in some cases, a system-induced violation. As such, this will contribute to an increased reporting culture."


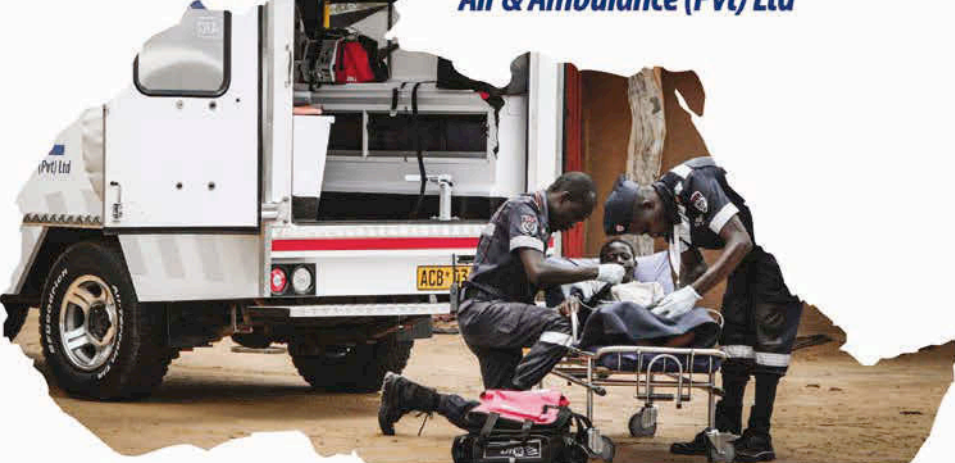
LEARNING VS PUNISHMENT

Air Alliance, which offers fixed-wing air ambulance services from bases in Germany, Austria and the UK under the Air Alliance Medflight brand, recently shared its approach to safety. Chief Operating Officer (COO) Captain Joachim Wirths explained how safety is embedded in a 'learning organisation' at the company. He noted that the International Civil Aviation Organization (ICAO), a UN specialised agency, published its Annex 19 in 2013, which describes how organisations should implement Safety Management Systems (SMSs). He commented: "What is unique about this is the fact that reporting is non-punitive. This was a culture shock for some nations and companies who are less tolerant to mistakes." He continued: "You only become better by analysing mistakes and by learning from them."




Emphasising the value of reporting, Roberts told *ITJ*: "Employee hazard reporting is one of the most valuable safety programmes because it brings to light concerns and issues before they become an incident."

David Quayle is Clinical Services Manager at Air Alliance Medflight and a site surveyor for accrediting body CAMTS EU (the European arm

should respond when errors are identified: "In my experience of some 28 years as a registered nurse, errors are often devastating to the individual [that makes them]. They do not require punishment, as they're already punishing themselves rather harshly in any event (with a few world-renowned

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they due to the carelessness or misconduct of single individuals.” That sentiment chimes with the idea that where problems are identified, it’s worth looking at what changes to procedures,

GROSS NEGLIGENCE, WILFUL VIOLATIONS AND DESTRUCTIVE ACTS ARE NOT TOLERATED

training and so forth should be made, accepting that an error can be produced by the organisation, not just the individual. It also suggests a particular shortcoming of a ‘blame’ culture – if an error is rarely down just to the individual, then limiting the reaction to punishing the individual will rarely

threat or a safety issue. No one wants to be working in an environment where threats exist. This also contributes to an increased reporting culture.”

RESPONSIBILITY REMAINS

There is sometimes a misconception that under the Just Culture concept, employees don’t have to take responsibility for their actions. It’s worth asking whether the non-punitive aspects of Just Culture would make staff feel freer to commit errors without fearing disciplinary action. Roberts, however, explained that while a Just Culture is not a ‘blame’ culture, neither is it a ‘no-blame’ environment. She added: “The way I see it, there are three types of safety cultures typically seen in an organisation. A ‘punitive culture’ is dangerous because it drives employee reporting into the ground. If someone is afraid to speak up in fear of getting in trouble, we lose invaluable data from the front line and we lose the opportunity to learn from our mistakes. On the other side of the coin, a

raising their hand and stopping the operation when something doesn’t feel right.”

RISK REDUCTION

To go back to our starting point, the issue here is that the risks air ambulance providers face, on both the medical and aviation sides, are serious. While reporting might be the obvious element, Roberts told *ITIJ* that the true goal of Just Culture is that every person in an organisation should actively participate in enhancing safety. Guardian Flight (the new name given to Air Medical Resource Holding Group after it was acquired by Air Medical Group Holdings) is headquartered in South Jordan, Utah, US, but operates some 100 planes and helicopter air ambulances from bases in 13 states under a number of sub-brand names that include Hawaii Life Flight and Eagle Air Med. Ultimately, according to the firm, adopting a Just Culture model has the power to save lives: “Our teams



address the root cause.

An example that would lead to a non-punitive result could be an aircraft having to divert and land as soon as possible due to a change in the patient’s condition, suggested Paul Scott of EAA. He said: “Having adjusted to the diversion with air traffic control, the flight crew receives priority routes and lands safely. During taxiing, it realises that the maximum landing mass was exceeded due to fuel that had not been consumed. Thereafter, the commander reports this fact and the maintenance staff carry out an overweight landing inspection.” Imagine the same scenario, said Scott, where the commander decides not to report the overweight landing: “This is an unacceptable behaviour where the Just Culture may well lead to disciplinary action. The Just Culture keeps a positive output by acting on the unwanted situation, treating it as a

‘no-blame’ culture allows individuals to be reckless without consequence. Every employee receives training and is aware of their responsibilities and we rely on them to act professionally. Not holding employees accountable can be just as dangerous as creating fear of disciplinary action.” As part of a Just Culture, there must be a line in the sand between acceptable and unacceptable behaviour, said Roberts.

Asked whether, following a Just Culture model makes staff feel less responsible in practice, she told *ITIJ*: “I think the important key here is that a Just Culture does not come with ‘get out of jail free cards’. Instead, the goal of a Just Culture is to expect each and every employee to act professionally and in accordance with their training and responsibilities, but also to create an atmosphere of trust in which they feel comfortable

practise open communication, transparency and an environment of trust and respect, which are vital prerequisites to safety. Guardian Flight applies leading Just Culture principles across the board along with non-punitive reporting to foster the absolute safest environment. Guardian Flight recognises our employees’ dedication to providing the highest quality care and we gratefully acknowledge a commitment to sharing all safety-related incidents or concerns throughout our organisation. Because of this diligence, lives are saved.”

The next time you spot something awry in your organisation, perhaps think twice rather than opting for a knee-jerk reprimand response. Just Culture may well be a good model to follow in any organisation – even those with nothing worse to fear than bankruptcy. ■



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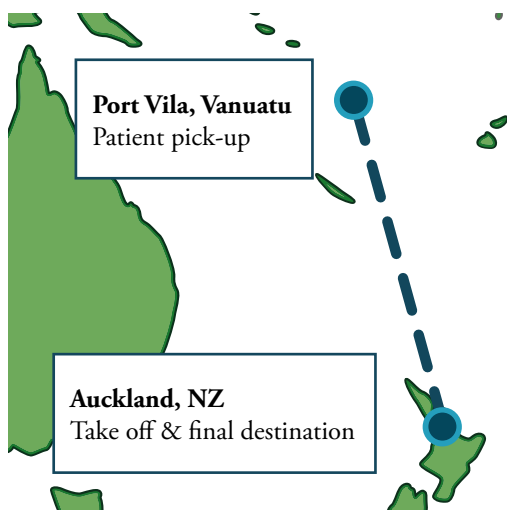
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CASE STUDY

TAKING EVERYTHING, INCLUDING THE KITCHEN SINK



The New Zealand Air Ambulance Service reports on a mission to repatriate a seriously ill New Zealander from a remote South Pacific island, where limitations in local services necessitate packing as many medical supplies as possible

In July 2017, Mission Control at New Zealand Air Ambulance Service (NZAAS) received a call from an assistance company requesting the urgent air ambulance retrieval of a patient from Port Vila in the South Pacific archipelago of Vanuatu, which lies approximately 2,216 km north of Auckland, New Zealand. The patient was a 60-year-old male with a suspected gastro intestinal (GI) bleed, who had presented that day to the Medipole Clinic in Port Vila with sudden onset of dizziness, orthopnoea, tachycardia and epigastric pain. After an initial assessment, an acute coronary event was excluded, and it was determined that the

likely diagnosis was active internal bleeding, which necessitated immediate transport to Auckland for ongoing assessment and treatment, as the clinic did not have access to endoscopy or blood products.

ACTIVATION AND PLANNING

Upon receiving activation from the assistance company, Mission Control notified the on-call intensive care flight team and Medical Director based at Auckland City Hospital, and updated the Captain and First Officer on duty that the mission was to proceed. The pilots and medical crew commenced their planning processes, aiming for wheels up within 90 to 120 minutes from Auckland.

Due to the patient's history of recent stenting of his coronary vessels, concomitant anticoagulants and signs of anaemia, it was suspected that he was bleeding from an undiagnosed gastro-intestinal ulcer and was at risk of a life-threatening

haemorrhage if the ulcer continued to erode the lining of his stomach. Patients with this condition require an endoscopy to confirm diagnosis, medication to reverse the anticoagulants and protect the lining of the stomach, and often a blood transfusion to support the oxygen carrying capacity of the circulation and perfusion of vital organs. If a gastric ulcer erodes a large blood vessel, there is the potential to bleed to death. The risk of this is considerably higher if it occurs in remote locations, such as Vanuatu, which are far from tertiary hospital level care.

The NZAAS ICU flight team decided to take a clotting medication Tranexamic Acid (TXA) which has been shown to be useful in the management of upper GI bleeding, and four units of O negative packed red cells, which would be dispatched from the blood bank at Auckland City Hospital immediately prior to departure. The blood was transported in a refrigerated bag able to maintain a



stable temperature for 24 hours if unopened. The administration of packed cells is essential treatment for haemorrhage, as crystalloids, even when judiciously administered, can dilute the important clotting factors further, which in turn exacerbates the bleeding.

The blood products were obtained, and the flight team met at the NZAAS base to review their plan of care, assemble all required supplies and equipment, and receive a final update via conference call from the referring Treating Medical Officer (TMO) in Vanuatu on the patient's condition.

While the ICU flight team discussed and prepared the necessary medical equipment, the pilots

streamlined process. The experience and knowledge of the NZAAS pilots ensured the seamless transition from activation to departure.

CHALLENGES

One of the challenges of healthcare provision in the Pacific is the limited financial and medical resources on many of the islands. It is essential, therefore, that the NZAAS medical team carries all supplies onboard the aircraft that may be required for the treatment of the patient. This includes syringes, needles, dressings, medications, monitors, portable ultrasound and i-STAT blood testing equipment, infusion pumps and an intraosseous drill. This is considered with meticulous detail as due to the isolation, there is nowhere else to acquire supplies and equipment that may have been forgotten, or is suddenly required.

Another consideration is the fact that the flying distances between Pacific islands are substantial, so accurate interpolation of weather forecasts and the computation of flight planning, fuel loading, weight and balance calculations are tailored to the meet the requirements of each mission. Alternate landing sites are few and far between, and the weather conditions can exacerbate the challenge of such flights.

PATIENT MANAGEMENT

On arriving at the local clinic in Port Vila, the NZAAS flight team received the handover from the TMO, transferred the patient onto the NZAAS

transport monitor, made a full physical assessment, and obtained consent from the patient to be transferred to Auckland via air ambulance, and receive blood products before administering the TXA. The first unit of blood was given, an intra-arterial line was placed for continuous monitoring of his BP and a final repeat of blood tests completed. Throughout this process, the patient remained haemodynamically stable and pain free. Less than an hour after arriving to the clinic, the NZAAS flight team were ready to depart with the patient suitably and safely prepared for transport, and were wheels up shortly thereafter. During the flight, the patient remained relatively asymptomatic but his Hb and haematocrit continued to fall, despite receiving a total of four units of packed cells. The return flight was slightly quicker due to the nature of winds, with a flight time of three hours, and the flight team arrived at Auckland City Hospital Emergency Department with the patient 10 hours after leaving NZ in the morning.

In Auckland City Hospital, the patient received an endoscopy confirming the presence of a gastric ulcer, which had most likely been compromised by the anticoagulants. On follow-up, the patient reported that he had recuperated very well, though his haemoglobin took five months to recover to previous levels. He was extremely grateful for his travel insurance and the service provided by Dr King at the Medipole Clinic, the medical assistance company, and NZAAS. ■

DUE TO THE ISOLATION, THERE IS NOWHERE ELSE TO ACQUIRE SUPPLIES AND EQUIPMENT THAT MAY HAVE BEEN FORGOTTEN

completed flight planning and preparation of the aircraft for an international retrieval, which incorporates many elements, and under short notice needs to be an incredibly efficient and

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PROFILE

CARLOS SALINAS

CEO OF MEXICO-BASED JET RESCUE

Carlos took time out of his busy schedule to answer a few questions about his background in the industry, and to highlight the many operational and medical challenges that come from operating in Latin America

How did you first get started in aeromedicine?

I was a paramedic working as the Operations Manager for a ground ambulance company in Guadalajara, Mexico. Richard Williams, who at the time was the owner of Air Evac International in San Diego, US, visited the company to market his services. Shortly thereafter, I started referring patients to Air Evac, and eventually got a job with Air Evac International.

How did your career progress to your current role as CEO of Jet Rescue?

Very early in my career I was placed in leadership roles. For example, at the age of 19, I was the Paramedic Lead Supervisor for former Mexican President Miguel De La Madrid's paramedic team. Being exposed to very demanding positions that young, plus my desire to succeed financially, led me to own various companies, including Jet Rescue.

What are your main responsibilities as CEO?

Can you talk us through a typical day in your role?

In the early days of Jet Rescue, I was mainly an operator. As the company has grown, I have been able to leave most of the operational side of the business to my ops team, although I still directly manage some key clients. Currently, I spend most of my time performing strategic and tactical planning to ensure that Jet Rescue continues to be a key player in the industry, as well as developing alliances and allocating the necessary resources to our staff so they always deliver an uncompromising level of care, meaning that they never have to apologise to one of our clients for not meeting – or exceeding – their expectations. I am also preparing the next generation of Jet Rescue executives so that they can be ready for leadership as I retire.

What are some of the biggest challenges you face when performing air ambulance missions in Latin America?

There are many operational and medial challenges when you operate in third-world countries. One of the main challenges we have to overcome is the lack of advanced medical care in most of the region

(with the exception of large cities). This lack of availability of high-quality care, combined with the inaccurate information that we receive, means that most of the time our teams have to provide advanced medical interventions on site when they arrive to pick up a patient. The accreditation organisation EURAMI has defined our type of work as programmes that have a 'delayed primary' role, i.e. collecting the patient from the nearest landing strip or airport to the point of injury or illness in order to deliver the patient to a primary receiving hospital emergency department (or other acute facility).

Typically, these flights are from remote areas to isolated hospitals. The necessary skill set for our flight medics is therefore similar to that of a HEMS (helicopter emergency medical services) team. Other operational challenges include the fact that most airports in the region are not open 24 hours a day, as well as militarisation in countries such as Venezuela and Bolivia, which limits our access to airports.

What, in your opinion, are the essential aspects of maintaining positive and productive working relationships with your clients in the insurance and assistance sectors?

To me, the most essential aspect of any relationship is honesty and transparency. Being honest and transparent with our clients builds trust, which is the single most important aspect of any relationship. Another essential aspect is reliability and performance. Jet Rescue is all about trust, reliability, availability and performance.

You also recently became CEO of security service provider Blackwater Global Protection. Have you been able to adapt your expertise as an air ambulance CEO to your new role?

Part of my previous experience has been in the field of law enforcement and military services, so putting all of these skills together has actually been very easy. One thing led to the other in this instance; some of our clients not only needed an air ambulance service out of our region, but they also needed someone on the ground assessing the whole case, giving accurate information, providing security detail, armoured vehicles and on-site intelligence. I see it as a complementary service, since we already had most of the logistics and assets in place. I am very entrepreneurial by nature, so I am always looking at parallel businesses that can complement each other and that no one else is able to provide with excellence.



Can you give an example of a recent operation that posed particular challenges for your organisation?

We recently transported an extremely ill patient out of Cuba. This patient was meant to fly – after the air ambulance leg from Cuba to Miami – on a commercial stretcher from Miami to Europe. Communication with the Cuban hospital and local assistance company, though, was almost impossible. The Cuban medical report stated that the patient was stable. Upon arrival in Cuba, however, our medical team found a patient whose condition was in fact extremely critical. We worked with the patient for almost eight hours to get her stable enough to fly to Miami. The patient was obviously not fit to fly on a commercial stretcher and remained in the ICU in Miami for several days. Eventually, we transported her by air ambulance from Miami to Europe.

What is your favourite aspect of your job?

Thinking! The fact that this is a very competitive and fast-changing industry poses a great challenge, not only to survive, but also to remain a key valued player. Bringing value to the clients require a lot of creative thinking and I love that. I schedule and spend at least three hours 'thinking time' every week. Also, I love the fact that every single day is different: different challenges, different missions.

Which three people – living or dead – would you invite to a dream dinner party, and why?

Steven Jobs – his creativity, innovation and philosophy are all attributes that I admire very much. He thought differently.
Napoleon – he was able to win battles against superior forces with minimal losses and was beloved by his people, many of whom felt he was invulnerable and could never be defeated. At one time, he had an inferior force, and was fighting two great empires, and defeated them both. We are a small company winning battles against larger and more powerful competitors.
Tony Robins – he has not forgotten his humble roots and uses part of his money to help needy people around the world. Obviously as a life coach he is amazing! ■

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