

# 5. Operational Management

## 5.1 Crew Resource Management (CRM)

CRM is an essential part of air ambulance operations and encompasses a wide range of knowledge, skills and attitudes including communications, situational awareness, problem solving, decision making, and teamwork. The elements that comprise CRM are not new and have been recognised in one form or another since aviation began, usually under more general headings such as 'Airmanship', 'Captaincy', or 'Crew Co-operation'. In the past, however, these terms have not been defined, structured or articulated in a formal way, and CRM can be seen as an attempt to remedy this. CRM can therefore be defined as a management system that makes optimum use of all available resources - equipment, procedures and people - to promote safety and enhance the efficiency of flight operations.

CRM is concerned not so much with the technical knowledge and skills required to fly and operate an aircraft but rather with the cognitive and interpersonal skills needed to manage the flight within an organized aviation system. In this context, cognitive skills are defined as the mental processes used for gaining and maintaining situational awareness, for solving problems and for taking decisions. Interpersonal skills are regarded as communications and a range of behavioural activities associated with teamwork. In aviation, as in other walks of life, these skill areas often overlap with each other, and they also overlap with the required technical skills. Furthermore, they are not confined to multi-crew aircraft, but also relate to single pilot operations, which invariably need to interface with other aircraft and with various ground support agencies in order to complete their missions successfully.

Aviation and clinical considerations are intensified, in terms of risk, by the nature of HEMS operations. Crew Resource Management (CRM) principles should be applied not only to flight operations but to the medical decision-making which is intrinsic to HEMS missions. Human factors and team working should be formally accounted for, both in recruitment and selection, as well as day-to-day working. The medical, operational, charity, aviation and Ambulance Service facets within air ambulance organizations sometimes have objectives that appear to be in conflict and this needs to be managed.

This risk can be operationally managed by pre-planning ways to mitigate or avoid error by using CRM. There is a wealth of expertise, experience and research from the aviation industry, and more recently from anaesthesia, about how to use CRM to improve the safety and efficiency of organisations involved in risky work.

CRM training and recurrent training is an essential part of all aircrews' annual training requirements. Multi-disciplinary attendance at the CRM training sessions is essential practice to be able to operate to the highest clinical and aviation safety standards.<sup>37</sup>

## 5.2 Landing Sites



Emergency Service Helicopters using aircraft capable of Class 1 performance standards do not require a licensed facility when landing at a hospital. In these situations the Civil Aviation Authority authorises the helicopter operator to use helipads, which are Performance Class 1 compatible, and places the onus on the operator for inspecting the sites.

All aircraft operators hold directories for all landing sites at hospitals within the areas covered by Air Ambulances in the UK. All operations should ensure access to both this

database and military landing site guides. These details are produced in a common format and should be kept up to date by the Helicopter Operator for each respective hospital.

**Health Building Note 15-03: Hospital Helipads** describes the requirements and options for new helipads compliant with regulatory requirements at both existing and new hospitals, and provides guidance on their operation and management.<sup>38</sup> This is not a stand-alone document as the helicopter operator has the responsibility of deciding

whether a helipad is safe for use. Therefore, expert aviation advice should be sought before committing to design and expenditure. This advice could be from an independent helicopter consultant or from the Ministry of Defence, along with advice from the operator of the local ambulance helicopters. This Health Building Note is intended to provide basic guidance, which complements and interprets the relevant legislation and standards.



There are three principal options for siting a hospital helipad:

- **at ground level.** Ground-level helipads can be relatively cheap to build and operate but may be some distance from the Emergency Department
- **on a rooftop.** Helipads built on rooftops (ideally above the Accident and Emergency department to ensure a short transit for the patient) can remove any constraints on future building plans, they provide the greatest choice of obstacle-free helicopter airways, and they reduce the environmental impact on the hospital and its neighbours. However, fire cover is required and can impact on the hospital services, increased time warnings of an incoming aircraft are required to ensure all staff are on site prior to landing, and pilots need to be elevated helipad trained. Where a secondary site needs to be used, this reduces the effectiveness of the mission due to increased transit times and increased transfer movements for the patients
- **on a low structure or mound** near to the Accident and Emergency Department. This has some of the benefits of a rooftop site but costs less to construct and operate.

All options require airways clear of obstacles such as trees and buildings as well as a clear space for the helipad and its immediate surrounds. These criteria can be difficult to achieve, particularly at ground level in congested areas and on small hospital estates, and may compromise a hospital's future development plans.

Some charities are actively involved in the funding of Hospital helipads. The input of public funds into infrastructure developments needs to be carefully managed to ensure the long-term availability of the helipad.

Since helicopter-borne patients are likely to be in a time-critical condition, it is important that the time taken to transfer them between the helicopter and hospital A&E department is short and that the patient is protected as far as possible from adverse weather conditions. The safest, fastest and most efficient means of transfer is by trolley from the helicopter. Transferring patients from a helicopter to a road ambulance for the journey to A&E is always undesirable and often impractical, especially if they are connected to fluid, gas and electrical life-support systems. The best locations for a helipad are therefore in an open area immediately adjacent to A&E or on the roof above it, with trolley access.

If the landing site is remote from the receiving hospital, it is important to have robust agreements and procedures for the provision of the suitably equipped ambulances to transport the patients to/from the hospital.

When a hospital has an operational helipad, it is important that a dedicated link person should be

identified within the hospital management structure. This identified person will be responsible for the maintenance of communications between the parties and the dissemination of information to the appropriate person or department within their organisation.

The current availability of hospital landing sites does not meet operational and clinical needs. With future streamlining of NHS services the demand for capable helipads is rapidly growing, not only at the proposed “centres of excellence” but essentially also at the local referring hospitals. Preference as to the destination of patients transported by air ambulances is greatly influenced by the standard of the hospital helipad and its proximity to the receiving department. The need to include night approvals for helipads at key specialist units is pivotal to the success of night operations as air ambulance services develop.

### 5.3 Mutual Aid Agreements

Many UK Air Ambulance Services now subscribe to a mutual aid agreement. This ensures that cross-border coverage for incidents with multiple patients or paramedic-only crews requiring medical support is available. Bad weather contingency support arrangements should be made with Police ASUs, most of whom have a stretcher-fit modification and the ability to assist in out-of-hours primary HEMS transfers at the request of the ambulance service. Further capability may be offered by regionally-based Search and Rescue helicopters.

Mutual aid agreements can also increase the airborne assets that can be mobilised in the event of a major incident.

SAR aircraft are essential for search and rescue; however once a patient has been found and removed to a safe position, transfer to experienced fully qualified medical staff is advised. Since military SAR aircraft are often staffed by aircrew who hold State Registered Paramedic status, care needs to be taken to ensure that clinical teams have the appropriate expertise for the incidents they are attending. SAR aircraft may be available when the weather dictates that normal HEMS aircraft are unable to operate. Similarly, an incident occurring at night, or when temperature levels are conducive to ice formation on the leading edge of the rotors, threatens HEMS aircraft but not necessarily military or SAR helicopters.

### 5.4 Major Incidents

Civil protection in the UK is based on the concept of integrated emergency management. Emergency response is grounded in what local responders do on a day to day basis. The Civil Contingencies Act lists responders in Category 1 or Category 2. The Ambulance Service comes under Category 1, however voluntary services come under Category 2 which would include Air Ambulance Charities. Therefore an Ambulance Service that holds the lease on a helicopter would include that helicopter as its own

resource. On the other hand a charity that owns or leases a helicopter will need to determine the extent to which it can be used in a Major Incident. This decision should be made after discussions with the regional ambulance service(s).

There is an obvious role for HEMS in major incidents as was demonstrated by London’s Air Ambulance during the bombings when paramedic-physician trauma teams were delivered immediately and directly to the scenes. However both helicopters and trauma teams are a small part of the overall contribution to major incidents which is reflected proportionally in the planning. Fundamentally how this



resource is used is determined at a local level and dependent on the medical expertise on board and air operation limitations. Regional plans vary considerably, from little or no mention of helicopters to complex multifaceted protocols. Where there is more than one NHS Ambulance Service, agreements will need to be made with each of the Services.



In order to co-ordinate this resource to its maximum potential all HEMS / Air Ambulance Operations must have a Major Incident Plan that has been produced in conjunction with all essential services, receiving hospitals and, essentially, the funding charitable organization. There must be a clear and documented agreement between the charity's trustees and the Ambulance Service(s) documenting the scope of the role of the aircraft in the event of a major incident. The aircraft can fulfil multiple roles during the course of a major incident, for example:

**Tactical scene assessment from the air** - On initial approach to the scene the aircraft is ideally placed to perform a detailed reconnaissance of the entire scene. From a tactical point of view (silver command), this early information can be useful for establishing effective command structures.

**Deployment of helicopter crew to scene (difficult or remote access)** - Initial command from the Ambulance Service (forward incident officer / Bronze Command) can be established in any remote location and effective communication links can also be set up directly from the scene. Some early tasks for the HEMS Crewmembers acting as Bronze Commanders may include delegating to others:

- Triage Officer
- Casualty Clearing Officer
- Ambulance Loading Officer
- Ambulance Holding Point Officer.

**Deployment of further ambulance/emergency personnel to scene** - Rapid situation reports can allow Ambulance Control to send appropriate resources, including external agency resources such as fire service, police, urban search and rescue and mountain rescue personnel. The aircraft can also be used to transport specialists from these agencies to the scene if required.

**Deployment of medical/surgical/trauma teams to scene** - Similarly, medical teams from the designated receiving hospitals can be flown to the scene. The speed of transfer by air means that medical and surgical teams can be flown directly from hospitals outside the initial catchment area of the incident, leaving the closer hospitals fully staffed for the reception of casualties.

**Delivery of medical equipment/supplies to scene** - The aircraft can be effectively used to transport medical equipment and supplies to the scene if required.

**Rapid transportation of time-critical patients to designated hospitals** - Due to the speed of the aircraft, patients can be transferred to appropriate receiving hospitals capable of delivering specialist definitive care. In addition, the flexibility of the aircraft also means that patients do not necessarily have to be transferred to the nearest receiving hospital, but can be flown further afield to ease the pressure on these hospitals.

In order to ensure safe operating practices, all HEMS crewmembers should have a thorough working knowledge of their local major incident plan. This will ensure their understanding of the aircraft and aircrew roles at the scene of a major incident.

The development of a coordinated Air Asset Major Incident Response Plan was started in October 2012. The AAA, British Helicopter Association and the National Police Aviation Service are due to publish the HELP guidance document in 2013.

## 5.5 Handover and Shift Start

To encourage good team working and communication each service should have a multidisciplinary operational meeting at the beginning of each shift; this meeting will be logged and will include documented equipment checks, review of weather, local issues and any guideline or SOP changes.

Each service must hold a monthly (max permitted six weeks) multidisciplinary operational meeting to include review of incidents occurrences / lessons learnt. This meeting should be minuted and reviewed by the local Clinical Advisory Group.

## 5.6 Standard Operating Procedures

It is essential that each air ambulance unit has a set of Standard Operating Procedures (SOPs). All Operating SOPs must be subject to an all-party annual review, and improvements made as applicable.

A list of the minimum SOPs that a service should have in place can be found in Appendix D.

## 5.7 Health and Safety

Within the overall risk management arrangements, risk assessments should be undertaken for areas specific to each aspect of operating an air ambulance. These will cover the operating base as well as areas away from the operating base. The risk assessments should include but not be limited to:

- Aircraft mobilisation
- Scene landing site control
- Safety whilst at scene public / patients / personnel
- Medical equipment use / stowage
- Medical gases use / stowage
- Each hospital landing site
- Patient handover arrangements
- Refuelling – both on and off base site
- PR events – aircraft continued availability
- Visitors to airbase / helipad
- PPE requirements / use.

The control, review and update of these assessments should be undertaken in accordance with individual operations procedures. Best practice would suggest an annual review of all assessments, with exploration of new areas of safety concerns, developing defined workstreams and timeframes to address issues raised. Risk assessments should be made available, and ideally undertaken, with the local Ambulance Service to ensure best practice and to satisfy their requirements for patient and, where appropriate, staff safety.



Although generic risk assessments formats are available, individual operations are encouraged to use a format that can be incorporated and understood by other agencies involved with service delivery.

The findings of the risk assessment should be reported to the Multidisciplinary Health and Safety Committee, which will also be responsible for monitoring actions taken as a result of any risk assessment.