

Helicopter Emergency Medical Services (HEMS) Night–Time Landing Site Proposal for Harberton

NB the name of the author has been redacted for reasons of privacy

Harberton 27th May 2018

At the recent consultation meeting held in Harberton Village Hall I asked about Helicopter Emergency Service (HEMS) costs relative to land ambulance (EMS), which could be considered central to the Devon Air Ambulance Trust (DAAT)’s proposal. The presenter replied he hadn’t been asked the question before, and the meeting continued with the practicalities of installing a night landing capability and an emphasis on saving lives. I had come with an open mind, and was surprised that my question was sidestepped. After some thinking and some online research the same night, I could understand why DAAT specifically focussed on the night landing site – there are some inconvenient points, both night and day.

Points About HEMS

- Over 20 years [1996, 2002, 2003, 2010, 2013 – see Appendix 1], the literature has shown little evidence that HEMS operations produce a substantial benefit in saving lives and patient outcomes compared with land-based Emergency Services (EMS), and has noted several drawbacks, such as actual transfer times, cabin noise, space restrictions and difficult patient monitoring.
- There may be gains in daylight HEMS operations involving casualties with severe blunt trauma (such as Road Traffic Accidents) and/ or at remote locations. That is not the issue here – development of a landing site for night-time operations. Even in the case of remote locations, a helicopter may not be able to find a safe, level landing site as close to the patient as it needs. If you are three fields in from a minor road, at the bottom of a slope, it may be impossible to reach and evacuate you to hospital within the ‘golden hour’.
- A scenario in which an ambulance crew attend a patient at night time in Harberton with a decision to make about how best to transport them direct to hospital or the helicopter landing site for onward transfer would show that same crew would be well on their way to Torbay/ Derriford by the time a helicopter had arrived, loaded that patient and taken off again, at a fraction of the cost, in more comfort and with better monitoring.
- In the real world, helicopters don’t even take off or fly in the manner and with the speed implied by the charities in their promotional videos; twin turbine helicopters take 2-3 minutes after cockpit checks to get airborne, so from receiving the call to getting on the way to an incident, 4-5 minutes seems a likely response time from the ‘scramble’ call. Then there is the “15-minute” flight time; all told, it could take 20 minutes for a helicopter to arrive in Harberton.

- The DAAT presentation to the public provided no tables or figures by which to make a considered decision; the only chart I recall was a map of Devon for rolling out a network of night time landing sites; it lacked operational analyses, calculation of benefits and costs, or comparison with conventional EMS. In effect, the meeting was less a public consultation than advocacy – one of the problems surrounding some charities is that they increasingly operate as lobby groups, deploying commercial marketing techniques [The Guardian, 2013], and it could be construed that DAAT’s aim is to make themselves indispensable, everywhere, all the time. At some stage, with their increasing costs, will HEMS charities be lobbying for more funding? Where will it come from, given that evidence in their favour is thin and bodies like the Department of Health are likely to prefer the operational evidence and economics of conventional EMS; night time landing sites could end up as political white elephants.
- DAAT’s website states that it operates on £7.4m per year. Given the 720 hours of flying they did in 2017, that is equivalent to over £10,000 per mission hour. What is the equivalent cost of the land-based NHS Ambulance Service?
- DAAT’s website, relaunched after the public consultation in Harberton, and which none of the councillors had visited when I asked them at a later monthly meeting, shows that 59% of incidents are equestrian and 27% motorcycle accidents – daytime recreation in other words - yet I recall from the public meeting an emphasis on the ageing population needing a night-time helicopter for heart attacks and brain haemorrhages, the kind of incidents where a paramedic has to be present, probably already with an ambulance, to assess the patient before choosing the mode of transport.
- There has been no discussion of the safety of night time operations over a built-up area, nor weather conditions which prevent helicopter operation. We have a lot of long, stormy winter nights in Devon – up to what weather states can DAAT fly? Will there be nights when there is no coverage? What are the safety implications of single pilot night time operations?
- There was no discussion of the suitability of Harbertonford’s night time landing site, already up and running and barely a mile/ five minutes away from Harberton. Why is DAAT so keen on rolling out so many sites (two proposed for Totnes)? Doesn’t a central Harberton site represent the slimmest of marginal gains? How dense does the county network of landing sites have to be and by what criteria?
- Research [Blake, Ward, Lockey: 2002] shows that the confinement and noise of a helicopter’s cabin is a ‘contraindication’ in many medical circumstances, as they are such difficult places to work in. The alternative - dull and routine for some - is a more spacious, quieter road ambulance making its way to hospital on calm night time roads. There, with a paramedic better able to monitor your vital signs and work around you, you are in a better situation and your outcomes just as good.
- Helicopters are impressive, dynamic and dramatic, especially on TV. They are their own best publicity, highly visible and trade on their technological edge and excitement, but an emergency evacuation by helicopter is not necessarily the reliable success suggested by imagery shown on the news or countless tidy narratives in TV dramas. A ‘rescue’ operation you have witnessed personally, or heard about, or seen briefly on TV news,

does not necessarily equate with improved survival chances of patients or better outcomes in the broader picture or longer run. Talking to health professionals, there is scepticism about support for emergency helicopter services while local hospitals - which could deal with many cases - are reduced or closed. The charitable status of these air ambulance organisations and their high public visibility gives a fundraising prominence which seems to excuse them from evidence-based public health decisions or proper recognition and allocation of emergency service provision. It is as if the symbolic ‘top cover’ that helicopters provide distracts from the more effective but severely stretched emergency services on the ground, and the shortcomings of NHS funding can be disguised by the publicised presence of an ‘express’ emergency service.

Appendix 1

1. **Helicopter operating costs are easily obtained**; offshore industry, business operators and even the military have clear ideas of hourly costs upon which to base their operations, charges or bids. The recent winners of the Search and Rescue service contract, Bristow, had such a clear idea that they were able to meet the requirements by offering a mix of medium and long range helicopters, closing some airfields (e.g. Chivenor), but still achieving the required rescue coverage. I went online, found a list of the air ambulance charities in the UK and the equipment they use (DAAT operates two Airbus EC 135 light twins); from another source there are estimates of the hourly operating costs. One of the characteristics of the air ambulance sector is that the national picture is fractured, with differing structures, operations and aims, so it is difficult to compare like with like. The result is a lack of common purpose or measurement, reducing accountability.
2. **Devon Air Ambulance’s website** was closed for upgrading at the time of the consultation meeting, but I visited it when it was relaunched a week later and at the subsequent parish council meeting brought it to councillors’ attention. Apparently no one on the parish council had looked at the reopened website; I offered this summary, drawn from their primary material:

Devon Air Ambulance Trust 2017 Review (publicity summary)

- ‘Our Impact’: 990 patients assisted
- 50% medical missions
- 12% children
- Deployed to 8% of incidents in darkness
- 720 hours flying time
- 59% of incidents are equestrian, 27% of incidents are motorcycle accidents, [14% unaccounted for]
- Because of patient confidentiality, DAAT only hear from 15% of patients, but invite people they have assisted to submit their stories.
- In 2017 it cost £6.4 million to run the service. In addition they need to raise £1m p.a. to build capital funds in order to replace aircraft after 10 years of service and to meet significant maintenance and repair costs, plus ambitious plans to extend operating hours.

3. **1996: Costs and Benefits of Helicopter Emergency Ambulance Services (academic.oup.com/ipubhealth)** Time spent on scene is longer for HEMS patients than ground ambulance

In both Cornwall and London, after taking into account differences in the nature and severity of injuries and patient characteristics, there was *no evidence of improved survival* in trauma patients attended by helicopter, despite the fact that the London HEMS had a doctor on board.

No evidence in the literature that HEMS improves survival rates or better patient outcomes. Some indications from the USA that very severely injured patients do better [Road Traffic Accident, blunt trauma], *but that less severely injured patients may do worse*. This finding mirrors results from previous research done in the United States.

There are limited circumstances in which a helicopter can improve on the pre-hospital performance of ambulance services in England and Wales, *and health benefits are small if they exist at all* [my italics]

4. **2002: Appropriate use of helicopters to transport trauma patients from incident scene to hospital in the United Kingdom: an algorithm (Black, Ward, Lockey) emj.bmj.com Vol 21 Issue 3**

Abstract

A simple algorithm has been produced to assist front line ground ambulance personnel, air ambulance crews, and immediate care doctors attending trauma patients in selecting the most appropriate mode of transport from the incident scene to hospital.

Extracts

The decision to use a helicopter is not straightforward, and a number of important geographical, physiological, and pathological factors need to be considered.

The transfer of a seriously injured patient by helicopter may be hazardous and transportation by road may often be a safer option. [my italics]

Knowledge of the resources at and journey times to local district and regional hospitals, and the location of their helipads or nearest landing sites, also needs consideration. A detailed estimate of total transport time from scene to hospital is required to ascertain whether road or air ambulance transfer will offer the fastest mode of transport to hospital. *When a helicopter is requested by a ground crew already on scene helicopter mobilisation and flight times may delay transfer times further. Road ambulance transfer is often a faster mode of transport than secondary air ambulance transfer in the UK* [my italics].⁶

We have failed to identify in the literature any comprehensive guidance on these issues suitable for field use. A telephone survey of England's air ambulances by one of the authors (JB) confirmed that air ambulance paramedics usually have to rely on their "professional judgement" to make potentially complex transport decisions.

Establishing a definitive airway in-flight is fraught with difficulties in civilian rotary wing aircraft because of lack of patient access and difficulties in verifying correct tracheal

tube placement. For safety and communication purposes flight crew are likely to be wearing helmets, which creates further difficulties in clinical assessment. For these reasons, any degree of airway obstruction is a relative contraindication to helicopter transport unless a definitive airway can be secured before departure [my italics] If the resources for prehospital critical care are not available at the scene, but the scene has road access, then it may be safer to transport such patients by land ambulance to the nearest hospital using basic airway maintenance techniques. *This algorithm recommends that if the journey time by road is likely to exceed 45 minutes, and there are no resources for on scene critical care as defined in figure 2, then helicopter transport should still be considered.*[my italics]

High risk injury patterns

Restless and combative patients with *head injury* may also be extremely difficult to manage safely in-flight without resorting to sedation. This may further compromise the patient unless the airway has been definitively secured. *For these reasons, significant head injury as defined in figure 2 is a relative contraindication to helicopter transport without a definitive airway, irrespective of whether the airway is compromised or not [my italics].*

*Penetrating neck injury may result in rapid airway obstruction and this injury is a relative contraindication to helicopter transport without a prior definitive airway [my italics].*²⁰ This will necessitate RSI and tracheal intubation in salvageable patients.³⁹ In the absence of prehospital critical care, such patients should be transported to the nearest hospital's emergency department in the authors' opinion as rapidly as possible to access the required level of care to prevent secondary (hypoxic) injury.

Spinal cord injury is not a contraindication to helicopter transport unless it is associated with airway obstruction, hypoventilation, shock, or significant head or facial injury (fig 1). In the absence of such complications, helicopter transport should be actively considered as the transport mode of choice as it may reduce the potential for secondary spinal injury by providing a smooth and timely transfer to an ED.

5. 2003: A Review of Costs and Benefits of Helicopter Emergency Ambulance Services in England and Wales, A Report to the Department of Health (University of Sheffield)

“Overall the results of these studies were inconclusive”. Most studies report that a large proportion of patients attended are not severely injured and unlikely to benefit from HEMS.

There are two UK studies of the effect of HEMS on the quality of life of survivors. Neither found any benefit compared to land ambulance (EMS).

Helicopter safety at night/ in poor weather conditions has been a major issue in the USA.

6. **2010: Is it the H or EMS in HEMS that has an impact on trauma patient mortality? DP Butler (EMJ) <https://www.ncbi.nlm.nih.gov/pubmed/20679422>**

“The role and structure of HEMS in a modern trauma service is a debate that is likely to continue. It is also important to consider the benefits and capabilities of the emergency medical team separately from the transport method being considered”. Optimal transport method remains undecided, with conflicting data. No analysis of costs. *An effective helicopter EMS will ultimately depend on effective operating procedures and tasking protocols, clinical governance, and auditing of the helicopter EMS activity* [my italics].

The way in which an experienced team is delivered to the scene is open to debate. Since 1995, the Netherlands has changed its approach to prehospital care. Helicopter-transported medical teams (HMT), consisting of specially trained trauma physicians and paramedics, attend the scene of injury to provide an additional therapeutic option to that available with the GMT team alone, *but the helicopter only rarely transports the patient to hospital. Factors that contributed to that policy include the disadvantages of noise, disorientation and limited space when using helicopters for patient transfer.* [my italics]

7. **2013: The Guardian ‘Emergency Services: Air Ambulance Charities in Crisis’.(David Brindle)**

Air Ambulance charities have high capital and operating costs, relatively low utilisation, and receive criticism for their high savings ratios – they are inefficient at putting their funds to work. In addition, the self-described ‘Air Ambulance Service’, operating in the Midlands, has a CEO on a salary of £110,000 and a reputation for such effective marketing and fund raising tactics that it is accused of encroaching on the donation resources of neighbouring air ambulance charities.

At the Air Ambulance Association, which also represents three-quarters of ambulance services and the leading helicopter leasing operators ... it is unexceptional for a charity to be holding "£6m or £7m" in reserves to ensure its services could continue for up to 18 months in the event of a sudden loss of income, and/or to save for replacement aircraft.

8. **2013: Response to The Guardian article July 2013 on air ambulance funding: ‘Emergency Services: Air Ambulance Charities in Crisis’.**

‘Logicbomber’:

I speak as a doctor working in an English Emergency Department with some experience of these services...

With the exception of the London HEMS service there is a major lack of evidence that air ambulance retrievals to English Emergency Departments save lives or limbs when compared with road ambulance.

Figures show that for a typical provincial Air Ambulance service around 33% patients in fact go straight home from the Emergency Department. No more than 10% require ITU care. Of these 10% there is no evidence that arrival by air confers any survival advantage and in any case most could have come by road in a similar time. *It can thus be asserted that Air Ambulances are neither routinely ferrying sick patients nor saving lives.*

These services are useful for the few casualties who are genuinely unreachable by road and the very few who are both so sick/injured and so remote that the increased road ambulance time makes a clinical difference. Unfortunately this does not apply in the majority cases and these services are instead often used to support road ambulance services with their clinical workload and response time targets.

Whether these points are apparent to the public who put money in the collection tin, clothes in the bag, sponsor charity walks etc. is not clear. Such information does however need to form part of any decision-making on funding, cost-benefit, and future service provision.

[Later post]...The overall point is that people need to sit back and look dispassionately at the evidence for clinical patient-based outcomes (which could also include blood transfers, inter-hospital transfers etc), the geographical utility, the cost etc and then make sensible decisions on funding. This issue should be about facts - not opinions or political positions - as patient care is more important than these things.

End