Air ambulance transport

Clinical Policy ID: CCP.1091

Recent review date: 1/2024

Next review date: 5/2025

Policy contains: Air ambulance; medical helicopter; trauma care.

Coverage policy

Air ambulance transport is clinically proven and, therefore, may be medically necessary when both of the following criteria are met (Centers for Medicare & Medicaid Services, 2018):

- Either:
  - Transportation could not have been provided by ground vehicles.
  - Great distances and/or times from pickup point to destination are involved.
- The use of air ambulance is justified by the member's medical condition, including but not limited to intracranial bleeding, cardiogenic shock, burns requiring treatment in a burn center, diagnosis requiring treatment in a hyperbaric oxygen unit, multiple severe injuries, and life-threatening trauma.

<u>Limitations</u>

Air ambulance transport is not medically necessary for circumstances not meeting the above criteria, including but not limited to the following (Centers for Medicare & Medicaid Services, 2018):

- Transport from a facility providing a higher level of care to a facility providing an equivalent or lower level of care.

- Transport for personal or convenience purposes, such as a return home.
- Transport beyond the nearest facility equipped to provide the most appropriate care for the patient's condition.

Alternative covered services

Ground ambulance.

Background

Air ambulance service plays an important role in access to the appropriate medical services. Air ambulances, first used for wounded soldiers during warfare, involve transportation of patients by a fixed-wing plane (when distances is the major consideration) or rotary-wing helicopter (when speed is the most crucial concern). Operated by government agencies or private organizations, these vehicles must include specifications for medical use (Loyd, 2023).

Air ambulance services are an important extension of emergency medical service systems of care, particularly for connecting outlying communities and tertiary/quaternary referral centers for acute care, specialty care, and trauma medicine. Weather is the main limitation to air transport, but relative contraindications include certain patient conditions such as uncontrolled violence, sensitivity to altitude, and the ability of the crew to manage the patient and expected complications in a confined space with limited patient access (Loyd, 2023).

State-of-the-art medical equipment must be available for patient treatment, and personnel must be trained and meet certification. Staffing typically includes paramedics, emergency medical technicians, and sometimes physicians and nurses; the number and type of staff on particular flights can vary by patient condition (Centers for Medicare & Medicaid Services, 2018). Equipment can include ventilators, medications, electrocardiographs, cardiopulmonary resuscitation equipment, and stretchers, so that care may be rendered during the flight.

The federal government considers accreditation of air ambulance programs to be voluntary, but some states require accreditation to operate. However, the federal Airline Deregulation Act of 1978 sought to create a competitive market environment for air carriers nationwide by prohibiting state or local governments from enacting laws or regulations related to a price, route, or service of an air carrier (Scarano, 2009). The (voluntary) Commission on Air Medical Transportation Systems grants accreditation of air ambulance programs (Commission on Accreditation of Medical Transportation Systems, 2018).

Of 15,366 emergency medical services professionals surveyed, 66.7% received helicopter air ambulance safety training, and 69.0% had received utilization training. Nearly three-fourths (74.2%) were trained in at least one helicopter air ambulance-related topic; authors note that many emergency medical services professionals have no training, even though they make decisions on requesting air ambulances (Crowe, 2015).

Findings

The National Association of EMS Physicians, the American College of Emergency Physicians, and the Air Medical Physician Association updated a position statement on appropriate use and integration of air medical services. Patients may derive benefit from air medical services when (Lyng, 2021, update of Floccare, 2013):

- Initiation or continuation of advanced or specialty care and expertise is not otherwise available from local hospital or ground emergency medical services resources.
- Expedited delivery of the patient to definitive care is required for time-sensitive interventions.
- Extraction, evacuation, and/or rescue from environments that are difficult to access due to geography, weather, remote location, distance, and other factors that limit timely access to a patient or transport by

ground emergency medical services.

An American College of Surgeons 2021 guideline for field triage provides recommendations and a triage structure for civilian trauma systems in which maximal resuscitative care is appropriate. The recommendations do not apply to patients with limited goals of care. Recommendations for transport allow flexibility to account for the local variability in emergency medical services systems. The guideline provides situational criteria for directing who should be transported to the highest trauma level available within the geographical constraints of a regional trauma system, including consideration of air medical services (Newgard, 2022).

Low to moderate quality evidence suggests the benefit of air ambulance transportation is in reducing the time necessary to connect specialized care to the patient. The patients most likely to benefit from air ambulance transport are: those whose condition is time critical and early treatment can be provided; the level of care needed cannot be provided at the transferring facility; ground transportation presents a risk to health and safety; and the appropriate level of skill and equipment are available during transport (Newgard, 2022).

Medicare regulations first issued in 2009 and last updated in 2018 explain the medical necessity criteria for use of air ambulance transport. Air transport is justified if travel from pickup point to destination is not possible or very difficult using ground transportation – such as when water or mountains are situated between the two. Great distances or times (30 – 60 minutes or more) needed to move the patient also supports use of air transport, as does severity of certain conditions listed (Centers for Medicare & Medicaid Services, 2018).

Patients treated at specialty hospitals that arrive by air transport tend to have higher severity levels than other patients. A study of 270 intensive care unit patients brought by helicopter versus 2,070 brought by other means showed the helicopter group had a higher percentage of temporary cardiac pacing (10.4% versus 8.0%), ventilator management (28.1% versus 17.9%), intra-aortic balloon pumping (17.0% versus 10.9%), percutaneous cardiopulmonary support (5.2% versus 2.3%), electrical defibrillation (10.0% versus 4.5%), and therapeutic hypothermia (3.4% versus 0.4%) (Hata, 2011).

A systematic review of 37 studies on utilization of helicopter emergency medical services showed that studies did not agree on optimal utilization, but did produce a list of areas for improvement. These included a lack of systematic indexing, heterogeneous data reporting and weak methodological design, complicated identification and comparison of incidents, and sub-standard systematic reporting (Johnsen, 2016).

A Cochrane review of 25 studies of 163,748 persons found helicopter emergency medical services mortality was no different (unadjusted risk 1.02) than patients transported to medical centers by ground ambulance; adjusted survival used in nine studies documented a significantly increased survival in both helicopter and ground emergency medical services patients (Galvagno, 2013). A follow up to this review (28 studies, n = 282,258) found in six trials of subjects with brain injuries, there was no mortality reduction for helicopter compared to ground emergency medical services. In 21 trials adjusted for confounding factors, some found a benefit in use of helicopter emergency medical services, while others did not (Galvagno, 2015).

One 10-year review of 14,440 patients transported to a trauma center concluded that those transferred by helicopter were more severely injured, needed more interventions, and had a higher survival rate than those transferred by ground (Hannay, 2014).

Some reports have not upheld the efficacy of transporting patients by helicopter; one 10-year study of 14,405 traumatically injured children found that transport type was not associated with superior survival, intensive care unit length of stay, or discharge disposition, and 22.3% of helicopter emergency medical services transfers were not significantly injured (Stewart, 2015).

A review of 14,703 patients from six nations transferred in helicopters found that 2,327 patients (16%) required advanced interventions. Of these, tracheal intubation was attempted in 92%; the intubation failure rate was 14.5% on first attempt, and 1.2% overall. Authors noted complications in 13% of patients, which they considered a low rate (Sunde, 2015).

A study of 7,259 trauma patients requiring intubation during air transport revealed a success rate of 99.3%. The intubation failure rate for anesthetists was 0.4%, compared to 0.9% for non-anesthetists (Lockey, 2014). Another study comparing intubation success rates during 125,177 helicopter transports to a hospital found physicians had a significantly higher rate than non-physicians (98.8% versus 91.7%, $P = .003$). Non-physicians performed over 80% of the intubations (Crewdson, 2017).

Not surprisingly, increasing distance from an airbase to the hospital is associated with increased mortality; risk increases by 1% for each additional mile, based on a study of 244,293 adults treated at a designated trauma center in Pennsylvania (Rhinehart, 2013).

A much-contended air ambulance issue is appropriateness of utilization. Using National Trauma Data Bank data from 2007 to 2015, the proportion of patients transported by a helicopter decreased over time from 17.0% to 10.2% ($P < .001$). Overall mortality remained unchanged over the study period at 7.6% ($P = .545$), suggesting utilization has become more appropriate (Dhillon, 2018).

A review of 469,407 trauma patients transferred in 2014 (about 10% of which were taken by air ambulance) showed unadjusted mortality among patients transported by helicopter ambulance was higher than among those who used ground ambulance, 6.0% versus 2.9% ($P < .001$). However, after adjusting for age, Injury Severity Score, and gender, helicopter patients were 57.0% less likely to die ($P < .0001$) (Michaels, 2019).

A systematic review of primary aeromedical retrieval included 16 studies that found advanced health care providers reduced mortality. Greatest reductions were in patients with severe but survivable injuries, especially when early rapid sequence induction, endotracheal intubation, mechanical ventilation, thoracostomies, blood products transfusion, and treatment of hemorrhagic shock were used (Laverty, 2020).

A systematic review of 18 studies compared outcomes for physician-staffed helicopter emergency medical services with ground emergency medical services. Helicopter-assisted patients had superior outcomes in reduced mortality (three studies, odds ratio 0.68) and increased survival (two studies, odds ratio 1.2). Three studies found no difference between the two services in quality of life (Risgaard, 2020).

In 2022, we updated the references and added a new study. A systematic review of 30 studies of mixed quality found helicopter emergency medical services offer expeditious transport for patients with acute ischemic stroke and may reduce the need for sophisticated and costly hospital services in rural locations (Tal, 2021). However, differences in helicopter emergency medical services systems with regard to number of units in service, staffing models, and protocols produced inconsistent results across studies and prevented a clear determination of appropriate use for this population. The authors recommended further research. No policy changes are warranted.

In 2024, we added two guidelines (Lyng, 2021; Newgard, 2023) and a systematic review/meta-analysis to the policy. No policy changes are warranted.

The systematic review and meta-analysis included eight studies of moderate to high quality and examined whether helicopter emergency medical services improved outcomes in patients with acute ischemic stroke. Overall, 1,372 participants used helicopter transportation and 8,587 participants used ground transportation to stroke care centers. Compared to the ground transportation group, the helicopter group had fewer poor neurologic outcomes (27.6% versus 42.8%, odds ratio = .52, 95% confidence interval .46 to .60, $P \leq .001$) and comparable good neurological and mortality outcomes. The authors cited the value of helicopter transfer in bridging remote regions to a stroke center for timely and effective thrombolytic therapy (Florez-Perdomo, 2022).

References

On December 7, 2023, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were "air ambulance (MeSH)," "air ambulance," and "air transport." We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

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Policy updates

4/2014: initial review date and clinical policy effective date: 9/2014

4/2015: Policy references updated.

4/2016: Policy references updated.

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