Clinical Policy Title: Air ambulance transport

Clinical Policy Number: 18.02.02

Effective Date: September 1, 2014
Initial Review Date: April 16, 2014
Most Recent Review Date: May 19, 2017
Next Review Date: May 2018

Related policies:
None.

ABOUT THIS POLICY: AmeriHealth Caritas Pennsylvania has developed clinical policies to assist with making coverage determinations. AmeriHealth Caritas Pennsylvania’s clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by AmeriHealth Caritas Pennsylvania when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. AmeriHealth Caritas Pennsylvania’s clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. AmeriHealth Caritas Pennsylvania’s clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, AmeriHealth Caritas Pennsylvania will update its clinical policies as necessary. AmeriHealth Caritas Pennsylvania’s clinical policies are not guarantees of payment.

Coverage policy

AmeriHealth Caritas Pennsylvania considers the use of air ambulance transport to be clinically proven and, therefore, medically necessary when the nearest appropriate center for the treatment of a sudden trauma or injury is a great distance away, and if both of the following apply:

- The patient has a cardiovascular or other medical condition, such as intracranial bleeding, that requires neurosurgical intervention, a burn that requires a burn center, or a condition that requires a hyperbaric oxygen unit (this is not an all-inclusive list), and ground transport cannot arrive in a limited time frame due to traffic or geography.

- The use of air transport is more likely to prevent worsening of the illness or condition, or more likely to result in maximal functional capacity than the use of ground transport.

Limitations:
Air ambulance transport is considered not medically necessary for circumstances not meeting the above criteria, including, but not limited, to the following:

- 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 ambulances, first used for wounded soldiers during warfare, are transportation of patients by a fixed-wing plane or helicopter. Operated either by government agencies or private organizations, these vehicles must include specifications for medical use. They must make available state-of-the-art medical equipment 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.

The Association of Air Medical Services estimates about 550,000 air ambulance transports occur each year in the U.S. The most common conditions of persons that require an air ambulance include traumatic injuries, pregnancy complications, heart attacks, strokes, and respiratory conditions (National Association of Insurance Commissioners [NAIC], 2014). Equipment can include ventilators, medications, electrocardiographs, cardiopulmonary resuscitation equipment, and stretchers, so that care can be rendered during the flight.

The federal government considers accreditation of air ambulance programs to be voluntary, but some states require accreditation to operate. Accreditation can be acquired through the U.S. government and the (voluntary) Commission on Air Medical Transportation Systems (CAMTS, 2017).

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

For some types of patients, air ambulance plays a large role in access to the appropriate facility. For example, 26.7 percent of moderate to severely injured pediatric trauma patients in the U.S. from 2007 --
2012 arrived at the facility by air ambulance (Corrado, 2017).

Patients treated at specialty hospitals that arrive by air transport tend to have a higher severity than other patients. A study of 270 intensive care unit (ICU) patients brought by helicopter versus 2070 brought by other means showed the helicopter group had a higher percent 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).

**Searches**

AmeriHealth Caritas Pennsylvania searched PubMed and the databases of:
- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality's National Guideline Clearinghouse and other evidence-based practice centers.
- The Centers for Medicare & Medicaid Services (CMS).

We conducted searches on March 23, 2017. Search term was: “air ambulance.”

We included:
- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews**.
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

A collaboration of the Air Medical Physician Association (AMPA), the American College of Emergency Physicians (ACEP), the National Association of EMS Physicians (NAEMSP), and the American Academy of Emergency Medicine (AAEM) produced a guideline for air ambulance use. The group’s major finding was that patients benefit from the appropriate utilization of helicopter emergency medical services (HEMS). It also recommended a national HEMS Agenda for the Future to address HEMS utilization and availability and to support a research strategy for ongoing, evidence-based refinement of utilization guidelines (Floccare, 2013).

A guideline from the Scandinavian Society of Anaesthesiology and Intensive Care Medicine task force on pre-hospital airway management had several recommendations. These include that advanced, trained
providers consider using a supraglottic airway device after failed endotracheal intubation (ETI); only advanced providers perform ETI; providers consider videolaryngoscopy for ETI when direct laryngoscopy fails; and advanced, trained providers apply cricothyroidotomy in “cannot intubate, cannot ventilate” situations (Rehn, 2016).

A systematic review of 37 studies on utilization of HEMS showed that studies did not agree on optimal utilization, but did produce a list of areas for improvement (Johnsen, 2016).

A Cochrane review of 25 studies of 163,748 persons found HEMS 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 HEMS patients (Galvagno, 2013).

One 10-year review of 14,440 patients transported to a trauma center concluded that those transferred by helicopter (versus ground) were more severely injured, needed more interventions, and had a higher survival rate (Hannay, 2014). Another 10-year study of emergency transport (42,788 patients, of which 33.4 percent were transported by helicopter) in Germany showed declining utilization over time and provided a recommendation that HEMS be used more frequently (Andruszkow, 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 survival, ICU length of stay, or discharge disposition, and 22.3 percent of HEMS transfers were not significantly injured (Stewart, 2015).

A mortality analysis of injured children transported to trauma centers by either helicopter air ambulance or ground ambulance found similar mortality rates of 0.2 percent for both modes for children with low injury severity scores (ISS). Helicopter air ambulance patients had a significantly lower mortality rate (9.0 versus 11.1 percent) for those with high ISS (Polites, 2016).

Persons with an ST-elevation acute myocardial infarction 30 days after cardiac interventional treatment moved from non-percutaneous coronary intervention (non-PCI) centers to PCI centers were the subject of a comparison of ground versus air transport. Of 195 patients in the study, those with ground transportation had a higher mortality rate (5.8 versus 2.7 percent) within 30 days after discharge. Authors agreed that more detailed analysis of differences in patient populations is warranted (Baylous, 2013).

A review of 14,703 patients from six nations transferred in helicopters found that 2,327 patients (16 percent) required advanced interventions. Of these, tracheal intubation was attempted in 92 percent; intubation failures were 14.5 percent on first attempt, and 1.2 percent overall. Complications were reported in 13 percent of patients, which authors considered a low rate (Sunde, 2015).

A study of 176 seriously ill neonates in Colombia compared those brought to a tertiary care center by air or ground. While mortality was higher for those brought by air (33.33 versus 7.79 percent), adjusting for risk found no difference in survival between the two groups (Alvarado-Socarras, 2016).
Intubation on 12 manikins by anesthesiologists were all successful, regardless of whether they were performed in an emergency room (ER) or a helicopter. Median intubation time was the same in the ER versus helicopters in daylight (16.8 and 16.5 seconds), while average time in helicopters in total darkness using night vision goggles was higher at 30.0 seconds (Gellerfors, 2015).

A large study of 7,259 trauma patients requiring intubation during air transport found a success rate of 99.3 percent. The intubation failure rate for anesthetists was 0.4 percent, compared to 0.9 percent for non-anesthetists (Lockey, 2014).

Another study examined 15 pediatric patients given packed red blood cells en route to a rural trauma center, due to severe anemia, known blood loss, and non-response to IV fluids. Five patients were also given plasma. The study documented an average hemoglobin improvement from 9.4 to 11.4 mg/dl, and a base deficit improvement from -7 to -5.7 at arrival. Four of the patients died, and three were unexpected survivors (Potter, 2015).

In Denmark, a review of anesthesiologists considering (1,081 cases), but then choosing to refrain from, pre-hospital advanced airway management (347 cases) found that only two of 347 such cases suffered immediate complications (Rognas, 2013).

Over time, services continue to be added to air ambulances. For example, thoracic ultrasound was evaluated, and 58 percent (41 of 71) eligible patients underwent the procedure in the air; 54 percent of these services were deemed good quality. Reasons why ultrasound was not done for other patients include lack of provider time and lack of space in the cabin (Roline, 2013).

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

A systematic review of HEMS costs and benefits found five studies failing to find any benefit associated with higher cost, while eight studies found various cost-effectiveness ratios (Taylor, 2010).

**Policy updates:**

A total of three guidelines/other and 14 peer-reviewed references were added to this policy.

**Summary of clinical evidence:**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
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<tbody>
<tr>
<td>Polites (2016)</td>
<td>Key points:</td>
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<tr>
<td>Mortality following helicopter</td>
<td>• Comparison of children transferred to trauma centers by air (helicopter) or ground ambulance.</td>
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### Citation vs. Methods, Recommendations

**versus ground transport of injured children**
- 8,218 children taken by air ambulance; 35,305 by ground ambulance.
- Mortality higher in helicopter group, all patients (4.0 versus 1.4%).
- Mortality equivalent equal in low-severity patients (0.2 versus 0.2%).
- Mortality lower in helicopter group, high-severity patients (9.0 versus 11.1%).

**Hannay (2014)**
- Injury severity, interventions, and outcomes among helicopter and non-helicopter patients at a trauma center
  - **Key points:**
    - 10-year review of 14,440 patients transported to an urban Level 1 trauma center.
    - Patients transported by helicopter had higher median injury severity scores, and were more likely to require ICU admission and blood transfusions.
    - Helicopter transport was associated with reduced overall mortality.

**Baylous (2013)**
- Air versus ground transport for patient with ST-elevation myocardial infarction
  - **Key points:**
    - Comparison of 195 patients with ST-elevation myocardial infarction 30 days after cardiac interventional treatment.
    - At 30 days after discharge, a larger percent of ground transport (versus air transport) patients had an infarction (17.5 versus 10.7%), had experienced a stroke (4.2 versus 2.7%), or died (5.8 versus 2.7%).

**Galvagno (Cochrane; 2013)**
- HEMS for adults with major trauma
  - **Key points:**
    - Randomized controlled trials (RCTs) and controlled clinical trials (CCTs) from January 2012.
    - 25 CCTs (163,748 subjects).
    - Heterogeneity precluded accurate estimate of overall effect.
    - Large multi-center studies warranted.

**Taylor (2010)**
- English-language studies reporting costs and benefits of HEMS
  - **Key points:**
    - 15 studies — annual costs (U.S. $), $115,777 — $5,571,578.
    - $3,258/life saved and $7,138 — $12,022/quality-adjusted life year (QALY) gained.
    - Additional research on local system characteristics needed.

### References

**Professional society guidelines/other:**


Cincinnati Children’s Hospital Medical Center. Best evidence statement (BESt). Postpartum mother


Peer-reviewed references:


Taylor CB, Stevenson M, Jan S, et al. A systematic review of the costs and benefits of helicopter

CMS National Coverage Determinations (NCDs):


Local Coverage Determinations (LCDs):


Commonly submitted codes

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

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