



**2024 January 8-13, 2024**  
ANNUAL MEETING  
Specialty Workshops, Scientific Assembly & Trade Show

# Controversies in Air Medical Care

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I, (Frank Guyette), have no commercial relationships to disclose.

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### LEARNING OBJECTIVES

1. To evaluate the risks and benefits associated with air medical transport
2. To address some of the controversies associated with air medical operations
3. To describe the role of the medical director in an air medical system

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**Interventions**




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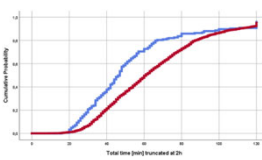
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**What is the Benefit of HEMS?**



**Table 5: HEMS vs EMS stratified for measures of morbidity**

| Potential Positive variable         | Total (n=1285) | Survived (n=1075) | Dead (n=210) | p-value |
|-------------------------------------|----------------|-------------------|--------------|---------|
| ISS < 9 (n=855), better prognosis   | 855 (66.5)     | 750 (87.8)        | 105 (12.2)   | 0.496   |
| EMS                                 | 546 (64.1)     | 466 (85.4)        | 80 (14.6)    |         |
| HEMS                                | 309 (35.9)     | 284 (91.6)        | 25 (8.0)     |         |
| Total                               | 855 (66.5)     | 750 (87.8)        | 105 (12.2)   |         |
| ISS >= 9 (n=430), worse prognosis   | 430 (33.5)     | 325 (75.6)        | 105 (24.4)   | 0.034   |
| EMS                                 | 315 (73.2)     | 230 (73.0)        | 85 (26.8)    |         |
| HEMS                                | 115 (26.8)     | 95 (82.6)         | 20 (17.4)    |         |
| Total                               | 430 (33.5)     | 325 (75.6)        | 105 (24.4)   |         |
| GCS < 8 (n=228), worse prognosis    | 228 (17.7)     | 185 (81.1)        | 43 (18.9)    | 0.031   |
| EMS                                 | 158 (69.2)     | 125 (78.5)        | 33 (20.8)    |         |
| HEMS                                | 70 (30.8)      | 60 (85.7)         | 10 (14.3)    |         |
| Total                               | 228 (17.7)     | 185 (81.1)        | 43 (18.9)    |         |
| GCS >= 8 (n=1057), better prognosis | 1057 (82.3)    | 990 (93.6)        | 67 (6.4)     | 0.103   |
| EMS                                 | 1157 (82.3)    | 1025 (88.5)       | 132 (11.5)   |         |
| HEMS                                | 899 (82.3)     | 965 (107.3)       | -66 (-7.4)   |         |
| Total                               | 1057 (82.3)    | 990 (93.6)        | 67 (6.4)     |         |

Competitive advantage gained from the use of helicopter emergency medical services (HEMS) for trauma patients: Evaluation of 1724 patients M. Weinlich\*, P. Martus, I. M.B. Blaib, H. Wyene, F. Walchera, S. Piateka, J.P. Schüttrumpf

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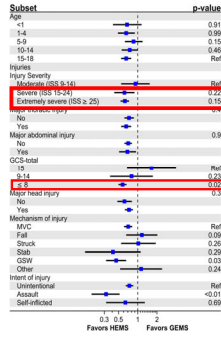
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**Benefit of HEMS in Pediatric Trauma**

**Method**

| Method                         | OR (95% CI); p-value  |
|--------------------------------|-----------------------|
| Unadjusted mortality           | 1.6 (1.4-1.7); <0.001 |
| MLR -standard                  | 0.5 (0.5-0.6); <0.001 |
| MLR -controlled for clustering | 0.5 (0.4-0.6); <0.001 |
| Propensity score matching      | 0.7 (0.6-0.8); <0.001 |

Favors HEMS | Favors GEMS



**Journal of Pediatric Surgery**  
Original Article • Volume 57, Number 1, February 2022

Current use and outcomes of helicopter transport in pediatric trauma: a review of 18,291 transports<sup>1,2,3,4,5</sup>

Brian R. Englem<sup>1,2</sup>, Kristy L. Ralton<sup>1</sup>, Jina Kim<sup>3</sup>, Mark L. Shapiro<sup>3</sup>, John E. Scarborough<sup>3</sup>, Henry E. Rice<sup>1</sup>, Okima O. Adibe<sup>1</sup>, Elisabeth T. Tracy<sup>1</sup>

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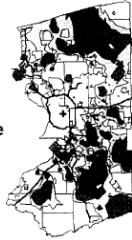
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### Controversy #2: The Benefit of HEMS is Speed

- HEMS travels ~120-140 mph, covers straight line distance

- Air zones
- Buffer zones
- Ground zones
- ◆ Helicopter base
- ✚ Trauma Center



Lerner EB et al AEM 1999

Figure 3. Air, ground, and buffer zones in the study area.

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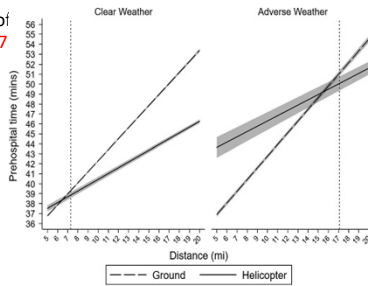
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### At what distance does the speed of the helicopter reduce the prehospital time?

- Distance threshold for the benefit of HEMS- HEMS faster then GEMS @ 7 miles. Range (5.4-35) miles.
- In heavy traffic 6.5 miles
- Off peak hours 7.9 miles
- Adverse weather 17.1 miles
- Clear weather 7.3 miles



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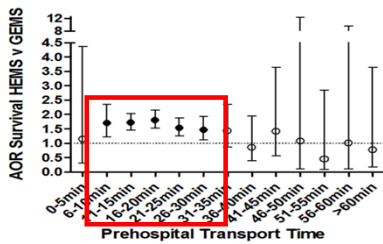
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### Helicopter transport improves survival following injury in the absence of a time-saving advantage

Johnson R, Baines, MD, MS; Mark L, Coatsworth, MD; Francis X, Cooper, MD, MPH; Mathews R, Rosenberger, MD, MPH; Tschida S, Thomas, MD; Russell M, Panchal, MD; Timothy R, Miller, MD; Andrew R, Prokman, MD; and Jason L, Sperry, MD, MPH; Prehospital, PA, and Medicine, NY

### SURGERY



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### Benefits of HEMS

1. Speed
  - Ground is typically faster at short distances
  - Must account for traffic, terrain, and weather
  - Ground may be the only option
2. Level of Care
  - Prehospital critical care services
  - Greater scope of practice, equipment, and training
3. Oversight
  - Online access to experts and receiving physicians
  - Regionalized command vs. destination command

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### Controversy#3: HEMS is Risky

**Unacceptable Risk: The Troubling Medical Helicopter Safety Record**

Source: <http://www.popularmechanics.com/technology/aviation/safety/medical-helicopter-safety-crashes>

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### Risk: Actual vs. Perceived

Slide provided by Tom Judge

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HEMS versus Ground Ambulance: **Safety**

Ground EMS

- 0.67 injuries per 100,000 miles
- 3% of injuries are fatal
- 0.02** deaths per 100,000 miles\*

Helicopter EMS

- 2 deaths per 100,000 flight hours
- 120 miles per flight hour
- 0.017** deaths per 100,000 miles\*

\*relies on multiple assumptions actual rates are not available

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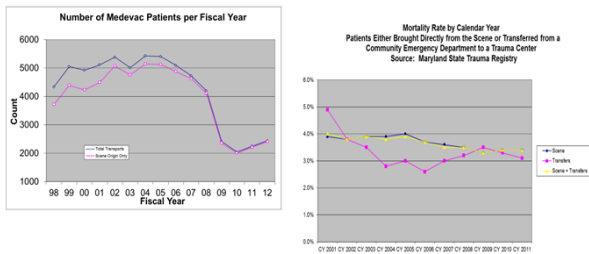
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Controversy #4: Safety can be achieved by operating less



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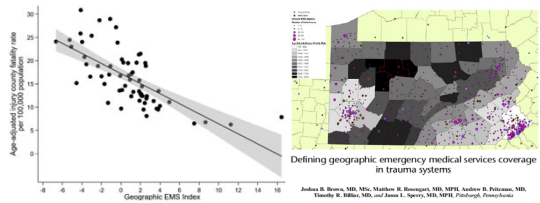
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Mortality: As a function of distance from a helicopter base



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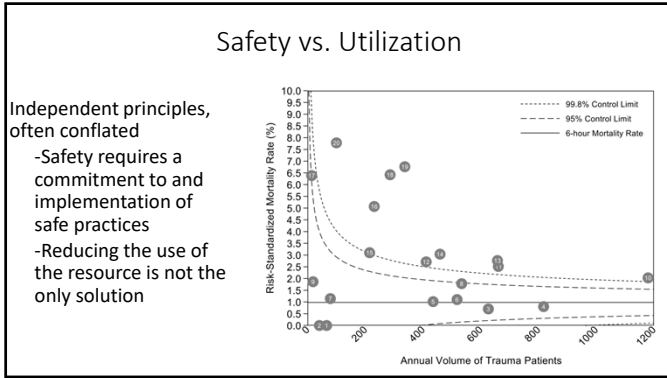
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### Safety vs. Utilization

- Safety initiatives need to be pursued independently
- Improvements in utilization require integration of HEMS into EMS systems
- Reimbursement needs to shift from volume-based reimbursement to acuity-based reimbursement

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### Safety and Cost in HEMS



~\$800-1000/  
Flight Hour



• ~\$1200-1800/  
Flight Hour

- Single engine
- Ability to provide minimal access to low density populations
- May have advantages at very high altitudes
- Visual Flight Rules (VFR) Operations
- Dual engines
- Night Vision Goggles
- Enhanced Weather Radar
- Enhanced Ground Proximity Warning Systems
- Traffic Collision Avoidance Systems
- Instrument Flight Rules (IFR) Operations
- 4 Axis autopilots w/ go around

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### Controversy #5: HEMS is expensive

State Court Ruling Prevents Price Gouging by Air Ambulance  
 Companies  
 roscd-empcy-2  
<https://www.kxii.com/news/2023/01/24/air-ambulance-price-gouging/>

"This is a great first step toward common sense in air ambulance fees," Mary Nichols, senior vice president and general counsel for Texas Mutual, said. "Air ambulances charge 500 to 700 percent of their costs. These charges are often \$40,000 or more versus actual costs of \$7,000 or so."

| Description of Charges                         | Quantity | Unit Price  | Amount           |
|--|----------|-------------|------------------|
| BASE RATE (REDUCED RATE)                       | 1        | \$38,000.00 | \$38,000.00      |
| UNASSISTED HELICOPTER WINGS                    | 25       | 250.00      | 6,250.00         |
| BLANKET (EXPOSABLE - YELLOW)                   | 1        | 25.00       | 25.00            |
| BLOOD PRESSURE GAUGE (NON-PORTABLE - ADULT)    | 1        | 250.00      | 250.00           |
| BLOOD PRESSURE MONITORING                      | 1        | 143.00      | 143.00           |
| ESSENTIAL MEDICAL SUPPLIES                     | 1        | 240.75      | 240.75           |
| COMMERCIAL INSURANCE PREMIUM - ALLI CROSS - CA | 1        | 280.25      | 280.25           |
| PARAMEDIC                                      | 1        | 250.00      | 250.00           |
| INTEREST                                       |          |             | 442.00           |
| <b>Total Charges</b>                           |          |             | <b>48,781.00</b> |

| Description of Payment                         | Payment Date | Amount           |
|--|--------------|------------------|
| INTEREST PAYMENT - ALLI CROSS - CA             | 4/3/2023     | 68.00            |
| COMMERCIAL INSURANCE PAYMENT - ALLI CROSS - CA | 4/3/2023     | 11,210.00        |
| <b>Total Credits</b>                           |              | <b>11,278.00</b> |

Balance of \$8,310

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### Cost

Average Cost for HEMS transport \$6-15K  
 Charges range from \$7-50K  
 Medicare about cover the cost  
 Cost per life year saved \$2227-\$12,022  
 Tyler et al. A systematic review of the costs and benefits of helicopter emergency medical services. *Injury* 2010, 41(1):10-20.  
 Galvagno \$325K per life saved (QALY \$15,476) If ISS >15  
 QALY <\$50K considered cost effective  
 Cost of QALY decreases as severity of illness increases  
 Delgado QALY for all comers \$50-100K

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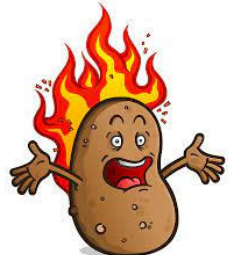
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### Cost Shifting and Incentives

- Profitability is dependent on high fixed cost and the payor mix
- Airline Deregulation Act prohibits states from setting prices of aviation services
- "No Surprises Act" Air Ambulances specifically can't balance bill



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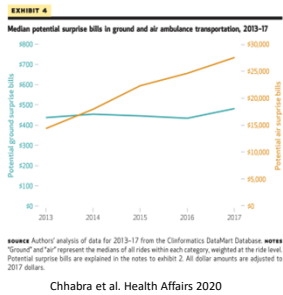
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### Cost Shifting and Incentives

- HEMS (like all EMS) is paid as a transport benefit
  - Payment is the same irrespective of the equipment or care delivered
  - Volume not value based care
- There is little incentive for HEMS services to negotiate with insurers
  - Multiple insurers over multiple states
  - Small volume per insurer per state limits bargaining power




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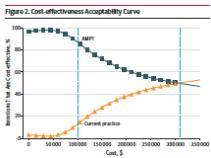
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### Can we make HEMS more cost effective?

| Criterion   | Points |
|---|--------|
| Chicago coma scale score <14                                      | 1      |
| Respiratory rate <10 or >20 breaths/min                           | 1      |
| Unstable chest wall fracture*                                     | 1      |
| Suspected hemorrhage or pneumothorax <sup>a</sup>                 | 1      |
| Paralysis   | 1      |
| Multiple trauma†  | 1      |
| Physiology plus anatomic criterion <sup>b</sup>                   | 2      |
| Helicopter transport should be considered if the AMPT score is ≥2 |        |



\* Any chest wall instability or deformity, including flail chest or multiple rib fractures on physical examination.  
<sup>a</sup> Absence of hepar source or effused hemorrhage along with objective signs of respiratory distress (eg, cyanosis, peripheral oxygen saturation < 92%, or signs of tension physiology).  
<sup>b</sup> Three or more anatomic body regions injured.  
<sup>c</sup> Any 1 physiologic criterion along with any 1 anatomic criterion present from American College of Surgeons Committee on Trauma National Field Triage guidelines.

Comparing the Air Medical Prehospital Triage Score With Current Practice for Triage of Injured Patients to Helicopter Emergency Medical Services: A Cost-effectiveness Analysis

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### Medical Director Perceptions




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### Patient Champion

- Provide Access to Care
  - Transport patients at same level of care
  - Support EMS systems
- Capacity Management
  - Move patients to resources
  - Maintain patients at receiving
- Solve problems
  - Clinical
  - Operational
  - Research



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### Clinician Advocate

- 3000 COVID +
- Illness/ FMLA / Labor shortages
- Clinician Wellness



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### Salesman / Demonstrating Value

Inreach

- I. Extra Shifts– Extra shifts picked up in the hospital on the crew's own time (i.e., not scheduled at CEM/STAT MedEvac).
- II. STAT MedEvac Ground Critical Care Support – Relocation to UPMC emergency department for additional support during increased census / volume / holds.
- III. "Fire Fighter" Support - immediate relocation to an Emergency department or ICU when critical needed.



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### Take Home Points

Helicopter EMS saves lives and can be cost effective for the right patient.

Appropriate utilization requires an integrated approach from the transport service Medical Director and the referring, receiving physicians.

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Questions?



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