



# Highly Reliable Patient Handoffs in Austere Environments: Field-based Evaluation of Combat Casualty Care Handoff Training

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**GOAL: Delivering Standardized and Reliable Patient Care to Support Distributed Maritime Operations (DMO) and Expeditionary Advanced Based Operations (EABO)**

## Background

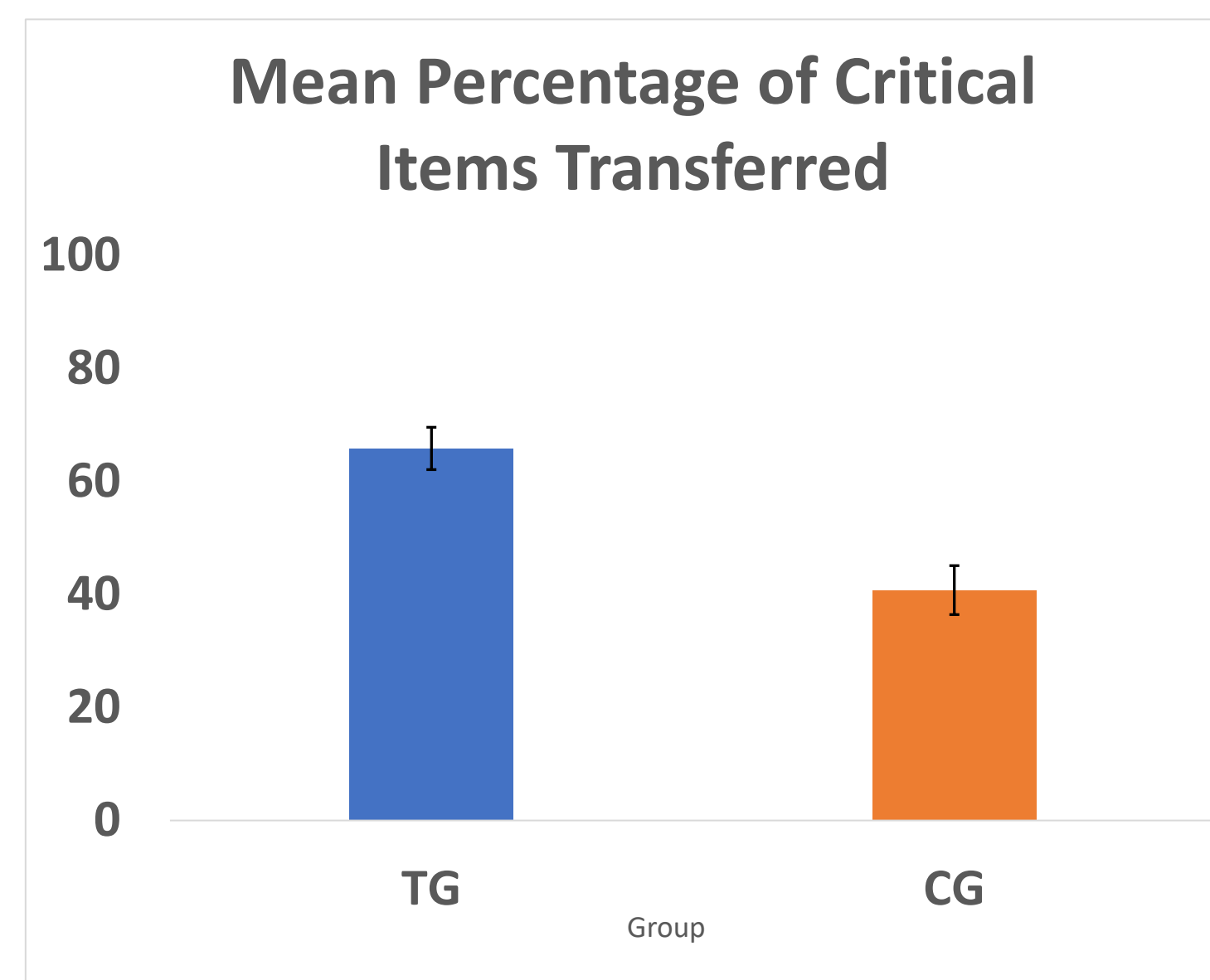
- The pivot to DMO and EABO Warfighting concepts enables our forces to achieve effectiveness where land, air, sea, and information superiority are challenged, logistics are contested, and forces are distributed over large distances.
- These concepts introduce new challenges for patient handoffs including maintaining information integrity.
- The loss of critical information during patient handoffs leads to treatment delays or medical errors<sup>1,2,3</sup> and contributes to the 70% of sentinel events in medical care that are attributable to miscommunication<sup>4</sup>.
- The Joint Commission established standardized patient handoffs as a National Patient Safety Goal in 2007<sup>5,6</sup>. Over 15 years later, challenges remain with amplifying factors associated with military trauma care<sup>7</sup>.
- “Effective Combat Casualty Care Handoff Operations” (ECCCHO) includes a protocol and training to standardize patient handoffs based on team performance research and best practices in the field<sup>8,9</sup>.
- This effort used tier 2 equivalent trainees in a field exercise to determine if ECCCHO-trained individuals are better prepared to transfer critical information about patients and explicitly transfer responsibility for patient care compared to those who receive standard Tactical Combat Casualty Care handoff training (TCCC).

## Methods

- 48 second year medical students at Uniformed Services University of the Health Sciences enrolled in TCCC training were divided into a Treatment group (TG, n=16) and Control group (CG, n=32). Each participant completed two handoffs; each handoff was treated as an independent sample (32 TG handoffs, 65 CG handoffs) for the analysis.
- The TG received ECCCHO training with didactic lecture and demonstration of an effective handoff (30 minutes), followed by three practice scenarios with feedback. The CG received standard classroom TCCC training.
- 2 weeks later, participants were assessed in a field exercise. Scenarios, equated for difficulty based on Joint Trauma System’s training criteria, included 2 handoffs: Handoff 1 from field medic Sender (SDR) to a flight medic Receiver (RCVR); and Handoff 2 between SDR and ground medic (RCVR) at the Medical Treatment Facility (MTF).
- 2 researchers with expertise in applied research, team performance, and experimental psychology assessed: (1) **critical items transferred** from SDR to RCVR medic; (2) **transfer of the DD1380** (TCCC Card) from the SDR to RCVR; and (3) **explicit transfer of responsibility** for patient care between SDR/RCVR pairs.
- Independent Samples T-Test examined differences in percent of critical items transferred between TG and CG. Chi-Square Test for Independence (with Yates’ Continuity Correction) examined differences between TG and CG for the transfer of the DD1380 and responsibility for patient care.

## Results

- Significant differences of critical items transferred and the explicit transfer of responsibility of care were observed.
  - More critical items were transferred by the TG (M = 66.6%, SD = 21.2) vs. CG (M = 41.7%, SD = 34.6),  $p < .001$ , two-tailed, with a moderate effect,  $\eta^2 = .17$ .
  - Successful transfer of patient responsibility between SDR/RCVR pairs for the TG were higher than the CG  $\chi^2 (1, n = 95) = 59.8\%$ ,  $p < .001$ , with a large effect size,  $\phi = .816$ .
  - The CG explicitly transferred care 14% of the time, the TG did so 100% of the time.
- While the TG passed the DD1380 from the SDR to the RCVR 100% of the time and the CG passed it 85.9% of the time, these results were not statistically significant,  $\chi^2 (1, n = 95) = 3.31$ ,  $p = .06$ ,  $\phi = .225$ .



## Alignment to High Reliability Organization (HRO) Principles

- HROs operate in complex, high-hazard domains for extended periods without serious accidents or failures.
- DMO and EABO anticipate a complex battlespace in which injured warfighters will be moved across large distances between varying Roles of care and held at collections points for extended periods until reaching definitive care.
- The current effort demonstrates that purposefully trained patient handoffs can increase caregiver performance in a simulated austere battlefield environment.
- These factors combine to improve patient outcomes on future battlefields.

### The Five HRO Principles Applied to ECCCHO

#### Sensitivity to Operations

Working with a team of highly experienced frontline SMEs and practitioners to leverage real-time insights to develop standards and training that will enhance current processes and procedures.



#### Deferece to Expertise

Developed a diverse team of scientists, simulation & training professionals, to operationalize TCCC SME and practitioner guidance and experience into training to facilitate best practices for patient handoffs across the continuum of care.

#### Commitment to Resilience

Effective, standardized communications allows for identification and rapid recovery from off-nominal situations by both the sender and receiver of patient information.

#### Reluctance to Simplify

Patient care and movement from POI between and through the levels of care in a distributed environment will be extended and complex. Overreliance on the DD1380 to frequently communicate multiple handoffs in austere settings can adversely impact patient outcomes.

#### Preoccupation with Failure

Acknowledging that information loss during patient handoffs adversely impacts patient outcomes, especially on the battlefield; Understanding where the specific points of failure lie; and developing and implementing corrective procedures.

## Impact and Future Work

- Distributed Maritime Operations and Expeditionary Advanced Based Operations require distributing and repositioning self-reliant forces over large distances for extended periods of time. These concepts introduce unique challenges in caring for and moving injured warfighters across the care continuum.
- Using ECCCHO with tier 1 & 2 participants has demonstrated positive results in the classroom environment<sup>8,9</sup>.
- Current results demonstrate that ECCCHO-trained participants transferred more critical items about patients and demonstrated superior handoff skills when compared to legacy TCCC handoff training in the field environment.
- Subsequent evaluations will introduce a “a train-the trainer approach” and will measure ECCCHO effectiveness of instructors and trainees in military classrooms, schoolhouses, and in the field environment.

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