



Prospective Observational Evaluation of Patient Care Provided by Critical Care Air Transport Teams

**Col Joseph Maddry, MD, USAF, MC
Shelia Savell, PhD, RN
59th MDW S & T/ECRC**

FINAL REPORT

Date: 16 January 2024

**59th Medical Wing
Office of the Chief Scientist
1632 Nellis, BLDG. 5406
JBSA Lackland AFB, TX 78236-7517**

DISTRIBUTION A. Approved for public release; distribution is unlimited.

DECLARATION OF INTEREST

The views expressed are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components. The voluntary, fully informed consent of the subjects used in this research was obtained as required by 32 CFR 219 and DODI 3216.02. The views of manufacturer are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the Department of the Air Force. No Federal endorsement of manufacturer is intended. This work was funded by Project Code Number AC19EC05. Authors are military service members, employees, or contractors of the U.S. Government. This work was prepared as part of their official duties. Title 17 USC §105 provides that 'copyright protection under this title is not available for any work of the U.S. Government.' Title 17 USC §101 defines a US Government work as a work prepared by a military service member, employee, or contractor of the U.S. Government as part of that person's official duties.

NOTICE AND SIGNATURE PAGE

Using Government drawings, specifications, or other data included in this document for any purpose other than Government procurement does not in any way obligate the U.S. Government. The fact that the Government formulated or supplied the drawings, specifications, or other data does not license the holder or any other person or corporation or convey any rights or permission to manufacture, use, or sell any patented invention that may relate to them.

Qualified requestors may obtain copies of this report from the Defense Technical Information Center (DTIC) (<http://www.dtic.mil>).

Prospective Observational Evaluation of Patient Care Provided by Critical Care Air Transport Teams



Michèle F. Tavish

Michele Tavish, DHA
Program Analyst
En route Care Research Program
59MDW Office of the Chief Scientist

Robert T. Gerhardt, MD, MPH, FACEP, FAEMS, DHA
Director, Trauma & Clinical Care (STT)
59MDW Office of the Chief Scientist

This report is published in the interest of scientific and technical information exchange, and its publication does not constitute the Government's approval or disapproval of its ideas or findings.

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202- 4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.				
1. REPORT DATE 16 Jan 2024		2. REPORT TYPE Final Report		3. DATES COVERED Oct 2018 – Dec 2023
4. TITLE AND SUBTITLE Prospective observational evaluation of patient care provided by Critical Care Air Transport Teams			5a. CONTRACT NUMBER	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Shelia Savell, PhD, RN Col Joseph K Maddry, MD, USAF, MC			5d. PROJECT NUMBER AC19EC05	
			5e. TASK NUMBER	
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) 59MDW/ Science and Technology 1632 Nellis St. Bldg 5406 JBSA Lackland TX 78236			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution A: Approved for public release; distribution is unlimited.				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT- Per the USAF En route Critical Care Pilot Unit there were 788 CCATT evacuations between January 2019 and December 2022. We excluded patients with no 3899 (n=60), no TMDS record (n=20), TRAC2ES issues (n=15) and other (n=9). An additional 63 pediatric patients were also excluded. We successfully abstracted data from 621 patients. We have accomplished multiple data analyses with the data from this study, leading to three publications and 10 presentations, some of which will be hi-lighted in this report.				
15. SUBJECT TERMS- CCATT, evacuations, COVID-19				
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT: UU	18. NUMBER OF PAGES 21
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U		
			19b. TELEPHONE NUMBER (include area code) 210-471-1622	

TABLE OF CONTENTS

List of Figures	2
List of Tables	2
Preface	3
Summary	3
Background.Methods.Results.Conclusions	3
• Manuscript 1	3
• Manuscript 2	6
• Manuscript 3	9
• MHSRS 2022 Podium 1	11
• MHSRS 2022 Podium 2	15
• MHSRS 2022 Poster 1	18
• MHSRS 2022 Poster 1	19

LIST OF FIGURES

Manuscript 2: Figure 1 PMR with percent documentation8
Presentation 1: Figures 1-5.....12
 Fig 1 33899L Form
 Fig 2 Flight Information
 Fig 3 Frequently used fields
 Fig 4 Infrequently used fields
 Fig 5 Major events comparison

Presentation 2: Figures 1-3..... 16
 Fig 1 Results
 Fig 2 Medical diagnoses & Nonbattle Injuries
 Fig 3 Results

LIST OF TABLES

Manuscript 1: Tables 1-3.....4
 Table 1 Demographics
 Table 2 Respiratory Characteristics
 Table 3 Inflight analgosedation

Manuscript 2: Tables 1-37
 Table 1 Baseline characteristics
 Table 2 Rarely used data fields
 Table 3 Major event box vs. flowsheet

Manuscript 3: Tables 1-3.....10
 Table 1 Patient characteristics
 Table 2 Inflight interventions
 Table 3 Inflight events

Prospective Observational Evaluation of Patient Care Provided by Critical Care Air Transport Teams

PREFACE

This study was originally funded to accomplish a prospective evaluation of Critical Care Air Transport Team (CCATT) patient evacuations between January 2020 to December 2022. Due to COVID 19 obstacles, to include work from home mandates, data collection was delayed. We were able to resolve issues and resume data collection in 2022, and have since completed a retrospective study of the inclusive years, plus 2019. In 2022, the En route Care Research Center was awarded funds from JPC-6 that will allow us to complete a prospective study of CCATT evacuation to include data downloaded from in-flight monitors. The results of this study were foundational in the success of the current study, which has prospective and retrospective components.

SUMMARY + BACKGROUND + METHODS + RESULTS + CONCLUSIONS

Per the USAF En route Critical Care Pilot Unit there were 788 CCATT evacuations between January 2019 and December 2022. We excluded patients with no 3899 (n=60), no TMDS record (n=20), TRAC2ES issues (n=15) and other (n=9). An additional 63 pediatric patients were also excluded. We successfully abstracted data from 621 patients.

We have accomplished multiple data analyses with the data from this study, leading to three publications and 10 presentations, some of which will be hi-lighted in this report.

PUBLISHED MANUSCRIPTS

1. Descriptive analysis of COVID-19 aeromedical evacuations by Critical Care Air Transport Teams

Maj William T. Davis; Maj Patrick C. N; Julie E. Cutright; Shelia C. Savell; Allyson A. Arana, PhD; Brooks McCarveld; Lt Col Joseph K. Maddry

Air Med J. 2022 Jan-Feb;41(1):47-51. doi: 10.1016/j.amj.2021.09.005.

Abstract

Objective: Preserving air medical evacuation capabilities for critically ill patients with coronavirus disease 2019 (COVID-19) required innovation for en route care logistics, training, and equipment. The aim of this study was to describe characteristics and in-flight interventions for patients with suspected COVID-19 requiring air medical evacuation by US Air Force critical care air transport teams (CCATTs).

Methods: We performed a retrospective chart review of patients with suspected COVID-19 requiring air medical evacuation by CCATT from April 2020 to February 2021. We included patients with an available CCATT medical record and transport with COVID-19 infection isolation precautions. CCATT medical records were the data source, and we performed descriptive analyses of patient characteristics and in-flight interventions.

Results: We reviewed 460 records and identified 16 patients for inclusion. The Transport Isolation System (50%) and Negatively Pressurized Conex (31%) were commonly used portable

biocontainment units. The median patient age was 48.5 years, and 94% were male. All patients required oxygen supplementation, with 8 (50%) receiving mechanical ventilation. In-flight interventions among intubated patients (n = 8) included vasopressors (50%), paralytics (25%), and patient-ventilator asynchrony management (63%).

Conclusion: Patients with COVID-19 requiring CCATT transport were older than prior military en route care cohorts, and in-flight interventions for patient-ventilator asynchrony were commonly required during mechanical ventilation.

Table 1. Demographics and pre-flight COVID diagnosis and treatments

Analyzed patients (n=16)	
Origin	
Middle East	14 (87.5)
Europe	1 (6.3)
Asia	1 (6.3)
Destination	
Middle East	1 (6.3)
Europe	14 (87.5)
United States	1 (6.3)
Age, years	48.5 [38.8 to 55]
Male	15 (93.8)
Days since symptom onset	8 [4 to 11]
Past medical history*	
Diabetes	3 (18.8)
Hypertension	2 (12.5)
Smoking	1 (6.3)
Precedence Category	
Urgent	4 (25)
Priority	11 (68.8)
Routine	1 (6.3)
Portable Biocontainment Unit	
TIS	8 (50.0)
NPC	5 (31.3)
NPCL	1 (6.3)
Unknown	2 (12.5)
Pre-flight medications	
Antiviral agent	5 (31.3)
Corticosteroid	10 (62.5)
Antibiotic	12 (75.0)

Data are presented as median [IQR] or frequency (percentage).

*No patients had documented pre-existing cardiac (other than hypertension), pulmonary, kidney, liver, or neurologic conditions.

Table 2. Respiratory characteristics among intubated and non-intubated patients

		Non-intubated (n=8)
Pre-flight		
Supplemental O ₂ , L/min		4 [1-6]
O ₂ saturation, %		96 [93-97]
In-flight		
Supplemental O ₂ , L/min		4 [1-8]
Minimum O ₂ saturation, %		92 [85-93]
		Intubated (n=8)
Pre-flight		
O ₂ saturation, %		96 [93.5-96]
P/F ratio		159 [131-184]
Mechanical ventilation		
FiO ₂ , %		60 [55-70]
Respiratory Rate		14 [13-17]
Tidal Volume		450 [450-480]
PEEP		10 [5-10]
In-flight		
Minimum O ₂ saturation, %		93.5 [92.3-94.0]
Minimum P/F ratio		146 [104-155]
Maximum required ventilation settings		
FiO ₂ , %		60 [52.5-90]
Respiratory Rate		22 [16.8-24]
Tidal Volume		490 [450-540]
PEEP		10 [5.8-13.5]

All data are presented as median [IQR].

Table 3. In-flight analgo-sedation dosing for ventilated patients (n=8)

	Fentanyl	Propofol	Ketamine
IV gtt administered	8 (100)	8 (100)	2 (25)
IV gtt dose	100 mcg/hr {75-500}	43 mcg/kg/min {20-60}	18.5 mcg/kg/min {17-20}
IV push administered	1 (12.5)	3 (37.5)	2 (25)
IVP per transport	2	3 {1-3}	6 {5-7}
IVP dose	37.5 mcg {25-50}	20 mg {10-40}	100 mg {100-150}

All data are presented as frequency (percentage of ventilated patients) or median {range}.

2. Utilization of the En route Aeromedical Patient Movement Form by Critical Care Air Transport Teams

Krystal K. Valdez-Delgado BSN, RN; Kimberly L. Medellin, BSN RN; Allyson A. Arana, PhD; Maj Jonathan Hare, RN; Lt Col Joseph K. Maddry, MD; Maj Patrick C. Ng, MD; COL (Ret.) Elizabeth A. Mann-Salinas, PhD; Maj William T. Davis, MD

Mil Med. 2023 Nov 8;188(Suppl 6):436-443. doi: 10.1093/milmed/usad181

Abstract

Introduction: Understanding usage patterns of current paper-based documentation can inform the development of electronic documentation forms for en route care. The primary objective was to analyze the frequency of use of each field within the 3899 L Patient Movement Record documented by en route Critical Care Air Transport Teams. Secondary objectives were to identify rarely utilized form fields and to analyze the proportion of verifiable major events documented within the 3899 L form.

Materials and methods: We performed a retrospective review of 3899 L patient movement records for patients transported via Critical Care Air Transport Teams from January 2019 to December 2019. Scanned 3899 L forms were manually transcribed into a Microsoft Access database for evaluation and analysis. Proportions were calculated for completed fields. Major vital sign event frequency was compared for checkbox fields versus the vital sign flow sheet for each patient. We performed descriptive analyses for the proportion of charts with completed documentation in each evaluated field and the proportion of flow sheet events documented in major event fields.

Results: We analyzed 130 records. Fourteen of 18 (77.8%) demographic fields had a 75% or greater completion ratio. Sections with the largest proportion of rarely or never utilized fields (<1.5% completed) were procedures (77.8% of fields) and major events (63.9% of fields). Major event checkboxes had low sensitivity for documented events in the flow sheet: Change in heart rate greater than 20% (1 of 28 patients); increase in the fraction of inspired oxygen requirement of greater than 10% (6 of 23 patients); decrease in mean arterial pressure of greater than 20% (1 in 12 patients); and temperature less than 35.6°C (1 in 13 patients).

Conclusions: Many of the current 3899 L fields are highly utilized, but some 3899 L sections contain high proportions of rarely utilized fields. Major event checkboxes did not consistently capture events documented within the in-flight vital sign flow sheet.

Table 1. Baseline characteristics, n=130

Variable	Value (n=130)
Age	
Median (IQR)	29 (23-37)
Diagnosis (n)	
Disease (D)	58 (44.6%)
Battle Injury (BI)	41 (31.5%)
Non-Battle Injury (NBI)	28 (21.5%)
Unknown	3 (2.3%)
Ventilation Status (n)	
Ventilated	37 (28.5%)
Non-Ventilated	93 (71.5%)
Total CCAT Patients In-Flight (n)	
Median (IQR)	1 (1-2)
En route care time (min.)	
Median (IQR)	498 (300-600)

Table 2. Summary of rarely and never used data fields of the 3899 page 1 (n=130).

3899 Section Number and Title	No. Total Data Fields	No. of Rarely Utilized Data Fields	No. Never Utilized Data Fields
23. Pre-flight	22	2	0
24. Post-flight	22	1	1
25. Pre-flight Assessment	51	4	10
26. Post-flight Assessment	51	8	6
31. Major Events	36	12	11
32. Procedures	18	5	9
33. Equipment	37	6	5
34. Care in flight	27	3	1
35. Medical Decision Making	7	0	0

Table 3. Major event comparison of the 3899 checkboxes compared to the vital sign flowsheet (n=130).

	<i>SpO2</i> < 90%	<i>Heart rate</i> increase > 20%	<i>FiO2 increased</i> > 10%	<i>MAP</i> Decrease > 20%	<i>Temp.</i> < 96 F°
<i>Location of documentation</i>					
<i>Page 1 checkbox, n*</i>	10	1	6	1	1
<i>Page 2 flowsheet, n*</i>	3	28	23	12	13
<i>Checkbox Capture, %**</i>	333	3.6	26.1	8.3	7.7
**"n" represents the number of patients with a documented event for each cell.					
**Checkbox capture calculated as the number of checkbox events divided by the number of documented major events checkboxes on the 3899 page 1.					

Figure 1. 3899 Patient Movement Record En route Critical Care, Pg. 1, with percent documentation.

DATA PROTECTED BY PRIVACY ACT OF 1974										PERMANENT MEDICAL RECORD							
1. Name		2. SSN		3. Cite #		4. Age	5. Sex	6. WT	7. Ht	8. Allergies		9. Precedence U P R		10. Date/Time			
11. Originating facility				12. Destination Facility				13. AC / Tail #		14. AE/CCAT unit		15. CCAT pts Total #		16. Hrs En Route			
17. Diagnosis: <input type="checkbox"/> D <input type="checkbox"/> NBI <input type="checkbox"/> BI																	
18. Preflight Procedures:																	
19. Alt. Restriction <input type="checkbox"/> Y-FL: <input type="checkbox"/> N		20. Max Cabin Alt.		21. O2 Req/Delivery Type: _____ Lpm / %		Ventilator <input type="checkbox"/> LTV <input type="checkbox"/> 731		Mode <input type="checkbox"/> AC <input type="checkbox"/> SIMV <input type="checkbox"/> PC		FiO2	TV	Rate	Peep	22. FTT size / location _____ cm @ _____ <input type="checkbox"/> Nasal <input type="checkbox"/> Oral <input type="checkbox"/> Trach			
23. Pre-flight Time		T	SpO2	RR	HR	BP/MAP	ICP/ CPP	CVP	Bladder P	pH / BE	PaO2	PC O2	Na / K	Hgb / Hct	ICa / HCO3		
24. Post-flight Time		T	SpO2	RR	HR	BP/MAP	ICP/ CPP	CVP	Bladder P	pH / BE	PaO2	PC O2	Na / K	Hgb / Hct	ICa / HCO3		
25. Pre-flight assessment / Time:				26. Post-flight Assessment / Time:				27. IVF <input type="checkbox"/> None		28. Lines <input type="checkbox"/> None		29. Tubes <input type="checkbox"/> None		30. Drains/Dressing			
Neurologic: E: _____ M: _____ V: _____ GCS: _____ Pupils R: _____ mm Reactive <input type="checkbox"/> Y <input type="checkbox"/> N L: _____ mm Reactive <input type="checkbox"/> Y <input type="checkbox"/> N Sedated: <input type="checkbox"/> Y <input type="checkbox"/> N Paralyzed <input type="checkbox"/> Y <input type="checkbox"/> N				Neurologic: E: _____ M: _____ V: _____ GCS: _____ Pupils R: _____ mm Reactive <input type="checkbox"/> Y <input type="checkbox"/> N L: _____ mm Reactive <input type="checkbox"/> Y <input type="checkbox"/> N Sedated: <input type="checkbox"/> Y <input type="checkbox"/> N Paralyzed <input type="checkbox"/> Y <input type="checkbox"/> N				LR <input type="checkbox"/> NS <input type="checkbox"/> 5% Alb 1/2NS _____ meq K Rate: _____ ml/hr		Line #1 _____ Line #2 _____		Foley <input type="checkbox"/> Y Size: _____ Color/Character/Assess _____		Type/location _____ Type/location _____			
Cardiovascular Rhythm <input type="checkbox"/> Regular <input type="checkbox"/> Irregular <input type="checkbox"/> Tachy <input type="checkbox"/> Murmurs <input type="checkbox"/> Gallops <input type="checkbox"/> Rubs <input type="checkbox"/> Cap Refil: _____				Cardiovascular Rhythm <input type="checkbox"/> Regular <input type="checkbox"/> Irregular <input type="checkbox"/> Tachy <input type="checkbox"/> Murmurs <input type="checkbox"/> Gallops <input type="checkbox"/> Rubs <input type="checkbox"/> Cap Refil: _____				LR <input type="checkbox"/> NS <input type="checkbox"/> 5% Alb 1/2NS _____ meq K Rate: _____ ml/hr		Line #3 _____		CT#1 <input type="checkbox"/> R <input type="checkbox"/> L Suct <input type="checkbox"/> Y _____ cmH2O Air Leak <input type="checkbox"/> Y <input type="checkbox"/> N		Other _____			
Respiratory Wheezing <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B <input type="checkbox"/> CTA Bilat <input type="checkbox"/> Dimin Bases Otherwise Clear Rales <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B Rhonchi <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B				Respiratory Wheezing <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B <input type="checkbox"/> CTA Bilat <input type="checkbox"/> Dimin Bases Otherwise Clear Rales <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B Rhonchi <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> B				Other: _____ ml/hr		A - Line <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> R <input type="checkbox"/> L <input type="checkbox"/> Rad <input type="checkbox"/> Brac <input type="checkbox"/> Axil <input type="checkbox"/> Fem <input type="checkbox"/> Ped		CT#2 <input type="checkbox"/> R <input type="checkbox"/> L Suct <input type="checkbox"/> Y _____ cmH2O Air Leak <input type="checkbox"/> Y <input type="checkbox"/> N		Other _____			
Gastrointestinal <input type="checkbox"/> Open Abdomen <input type="checkbox"/> Soft <input type="checkbox"/> Distended <input type="checkbox"/> Tympanic <input type="checkbox"/> Pain <input type="checkbox"/> Mass <input type="checkbox"/> Hernia <input type="checkbox"/> Bowel Sounds Present				Gastrointestinal <input type="checkbox"/> Open Abdomen <input type="checkbox"/> Soft <input type="checkbox"/> Distended <input type="checkbox"/> Tympanic <input type="checkbox"/> Pain <input type="checkbox"/> Mass <input type="checkbox"/> Hernia <input type="checkbox"/> Bowel Sounds Present				31. Major Events/Location: <input type="checkbox"/> Airway Loss <input type="checkbox"/> Cardiac Arrest <input type="checkbox"/> SpO2<90% <input type="checkbox"/> AHR>20% <input type="checkbox"/> ↑ O2 Requirement >10% FiO2 or >2 lpm <input type="checkbox"/> AMAP>20% <input type="checkbox"/> Temp <96 F <input type="checkbox"/> Arrhythmia <input type="checkbox"/> Tachy <input type="checkbox"/> Brady <input type="checkbox"/> Narrow <input type="checkbox"/> Wide <input type="checkbox"/> Loss Extremity Pulse: <input type="checkbox"/> Loss of Line: _____ <input type="checkbox"/> Loss of Tube/Drain: Type/Site: _____ Bleeding: Site: _____ Est Vol: _____ ICP>20 <input type="checkbox"/> CPP<60mm Hg <input type="checkbox"/> ΔBladder Pressure: _____ <input type="checkbox"/> ETT Cuff Rupture <input type="checkbox"/> Rapid Decompression <input type="checkbox"/> Fire/Fumes <input type="checkbox"/> AC Divert <input type="checkbox"/> Tail Swap <input type="checkbox"/> Pre-Flight Facility <input type="checkbox"/> Post-Flight Facility <input type="checkbox"/> Ambus To <input type="checkbox"/> Ambus From <input type="checkbox"/> Enplaning <input type="checkbox"/> Deplaning <input type="checkbox"/> Ascent <input type="checkbox"/> Descent <input type="checkbox"/> Altitude <input type="checkbox"/> Trauma/Critical Incident Activation <input type="checkbox"/> Code # _____ <input type="checkbox"/> Other: _____									
Musculoskeletal <input type="checkbox"/> Weakness <input type="checkbox"/> Pain X-Fix RUE <input type="checkbox"/> LUE <input type="checkbox"/> RLE <input type="checkbox"/> LLE <input type="checkbox"/> Pelvis <input type="checkbox"/> Normal Sensation <input type="checkbox"/> Normal ROM				Musculoskeletal <input type="checkbox"/> Weakness <input type="checkbox"/> Pain X-Fix RUE <input type="checkbox"/> LUE <input type="checkbox"/> RLE <input type="checkbox"/> LLE <input type="checkbox"/> Pelvis <input type="checkbox"/> Normal Sensation <input type="checkbox"/> Normal ROM				32. Procedures Enroute: <input type="checkbox"/> Intubate <input type="checkbox"/> Surgical Airway <input type="checkbox"/> CPR <input type="checkbox"/> Chest Tube <input type="checkbox"/> Art Line <input type="checkbox"/> Rad <input type="checkbox"/> Fem <input type="checkbox"/> Central Line <input type="checkbox"/> PIV <input type="checkbox"/> Splint Modification <input type="checkbox"/> Hemorrhage Control <input type="checkbox"/> ABG <input type="checkbox"/> VBG <input type="checkbox"/> Dressing Change <input type="checkbox"/> Foley <input type="checkbox"/> NG/OG <input type="checkbox"/> Escharotomy <input type="checkbox"/> Other: _____									
Pulses Right Left Carotid Radial Fem Pedal				Pulses Right Left Carotid Radial Fem Pedal				33. Equipment Used Enroute/ Issues: <input type="checkbox"/> Propaq <input type="checkbox"/> HeartStart MRx <input type="checkbox"/> IV Pump <input type="checkbox"/> ambIT <input type="checkbox"/> Suction <input type="checkbox"/> EZ-IO <input type="checkbox"/> iStat <input type="checkbox"/> SMEED <input type="checkbox"/> Ventric <input type="checkbox"/> Parynch ICP <input type="checkbox"/> Interface Ctrl Unit <input type="checkbox"/> Codman Exprs <input type="checkbox"/> VAC <input type="checkbox"/> C-Collar <input type="checkbox"/> VSB <input type="checkbox"/> NATO Litter <input type="checkbox"/> OSL <input type="checkbox"/> Floor <input type="checkbox"/> PSP <input type="checkbox"/> Stanchion <input type="checkbox"/> SLS <input type="checkbox"/> Head First <input type="checkbox"/> Feet First <input type="checkbox"/> Front <input type="checkbox"/> Rear <input type="checkbox"/> Rt <input type="checkbox"/> Lt <input type="checkbox"/> AC Power <input type="checkbox"/> ECAS <input type="checkbox"/> Freq <input type="checkbox"/> PTLOX <input type="checkbox"/> AC O2 <input type="checkbox"/> Power Loss <input type="checkbox"/> User Error <input type="checkbox"/> Eq Failure <input type="checkbox"/> Other: _____									
36. Meds/Drips/Tube Feeds/Dose/Time 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.				37. RX-received/waste/ turn-over 38. RT Rank/Name/Skill level: Signature: _____				34. Care In Flight: <input type="checkbox"/> O2 Administration <input type="checkbox"/> Std Mech Ventilation <input type="checkbox"/> Adv Mech Ventilation <input type="checkbox"/> J-Tube Feeding <input type="checkbox"/> ET Cuff Pressure Check <input type="checkbox"/> Oral Care <input type="checkbox"/> Wright Respirometer <input type="checkbox"/> Ventric <input type="checkbox"/> Parynch <input type="checkbox"/> IBP Monitor <input type="checkbox"/> NIBP Monitor <input type="checkbox"/> ICP Monitor <input type="checkbox"/> Chest Tube Management <input type="checkbox"/> Drain Management <input type="checkbox"/> Blood Product Transfused <input type="checkbox"/> Antibiotics <input type="checkbox"/> IV Narcotic Analgesia <input type="checkbox"/> IV Sedation <input type="checkbox"/> NMB <input type="checkbox"/> Complex Wound/Dressing A <input type="checkbox"/> VAC A <input type="checkbox"/> 3% NaCl <input type="checkbox"/> Mammilol <input type="checkbox"/> Inhaled Bronchodilators <input type="checkbox"/> DVT Prophylaxis <input type="checkbox"/> Burn Flowsheet <input type="checkbox"/> Other: _____									
39. RN Rank/Name/AFSC: Signature: _____				40. MD Rank/Name/AFSC: Signature: _____				35. Medical Decision Making in Flight / Comments: <input type="checkbox"/> Cardiovascular <input type="checkbox"/> Pulmonary <input type="checkbox"/> Thoracic <input type="checkbox"/> Neurologic <input type="checkbox"/> Abdominal <input type="checkbox"/> Renal <input type="checkbox"/> Analgesia/Sedation									

AF 3899L, 20140107, V2.0



3. A Descriptive Study of Casualties Evacuated Out of Afghanistan by Critical Care Air Transport Teams During the Withdrawal of US Troops

Darren Baldwin, M.A.A., BS, RN; Allyson A. Arana, PhD; Shelia C. Savell, PhD, RN; Julie Cutright, BSN, RN; Kim Medellin, BSN, RN; Maria Castaneda MS, Col Vikhyat S. Bebarta, MD; Maj William T Davis, MD; Lt Col Joseph K. Maddry, MD; Maj Patrick C. Ng, MD

Mil Med. 2023 Sep 13:usad342. doi: 10.1093/milmed/usad342

Abstract

Introduction: The War in Afghanistan ended in August 2021. Evacuation from the country was a large effort during the last days of the conflict. During evacuation efforts at Kabul Hamid Karzai International Airport, a suicide bombing occurred necessitating emergent medical care for many injured troops and civilians. The U.S. Air Force Critical Care Air Transport Teams (CCATTs) played a role in the medical care provided during the operations in Afghanistan. We report on in-flight events and interventions that took place during the final days of the Afghanistan withdrawal.

Materials and methods: We performed a retrospective chart review of patients requiring aeromedical evacuation from the Afghanistan theater of operations by CCATT from July 1 to August 30, 2021. From the CCATT patient care record, data abstractors collected patient characteristics, flight information, vital signs, laboratory values, in-flight interventions, and in-flight events in a study-specific electronic database. We performed descriptive analyses of patient characteristics and in-flight interventions. This study was approved by the San Antonio Institutional Review Board.

Results: Nine patients were included in this analysis. Seven out of nine patients were foreign nationals; the remaining two were U.S. Marines. Five patients suffered penetrating injuries from gunshot wounds and four suffered blast injuries. Six received intravenous narcotic analgesia. Four received intravenous sedatives, and four received antibiotics in flight. Two patients required chest tube management. One patient received blood. Three patients were in acute respiratory distress.

Conclusions: Severe injuries were sustained during the withdrawal efforts at the end of the War in Afghanistan. Critical Care Air Transport Teams played a role in the care and evacuation of patients out of theater during this unique and unprecedented time. Even given the limitations associated with retrospective studies and a small sample size, information reported in this study can help inform future decisions, and aid in preparatory efforts for future operations, that may require medical care by CCATT.

Table 1. Patient characteristics

Variable	Percent of sample (n=9) or median (range)
Male gender	78%
Age	30 (19-30)
Personnel type	
Foreign national	78%
US military	22%
Flight precedence	
Urgent	78%
Priority	22%
Cause and mechanism of injury	
GSW – penetrating	44%
Blast – complex	22%
Blast – blunt	11%
Blast – burn	11%
Blast – penetrating	11%

Table 2. In-flight interventions

Variable	Percent of sample (n=9)
IV narcotic analgesia	67%
Mechanical ventilation	56%
Antibiotics	44%
IV sedation	44%
Supplemental oxygen	22%
Chest tube management	22%
Blood products	11%

Table 3. In-flight events

Variable	Percent of sample (n=9)
HR < 60 bpm	33%
HR > 100 bpm	33%
SBP < 90 mmHg	33%
SpO2 < 94%	44%
PaO2 < 80 mmHg	33%
PCO2 > 45 mmHg	33%
ETCO2 > 50 mmHg	33%
Temperature > 99.5°F	44%
PaO2/FiO2 ratio < 300	33%

MHSRS 2022 PODIUM PRESENTATIONS

1. Frequency of use for form fields in en-route critical care medical records to inform electronic health record development

Krystal Valdez-Delgado, BSN, RN; Alejandra Mora, MS; Kimberly , BSN, RN; Allyson Mireles, PhD; Joseph Maddry, MD; Patrick Ng, MD; William Davis, MD

Abstract

Background: Improving documentation was the top research priority identified by the Committee on En Route Combat Casualty Care. Limited data describing current paper-based charting practices are available to inform the development of en route care electronic health records. Reducing time demands for documentation is critical to enable sufficient time for patient care and operational tasks for en route care teams with limited manpower. The primary objective of the study was to analyze the frequency of use for different form fields within the form 3899 Patient Movement Record for En Route Critical Care during usual Critical Care Air Transport Team (CCATT) documentation. Secondary objectives were to identify rarely utilized form fields and to analyze the proportion of verifiable major events documented in the major events checkboxes.

Methods: We performed a retrospective review of 3899 patient movement records for patients who were transported via CCATT from November 2018 to February 2021. Hard-copy 3899 forms were manually transcribed into an electronic Microsoft Access database for evaluation and analysis. Eight sections of the form were evaluated: demographics, pre-flight assessment, post-flight assessment, major events, and vital sign flowsheet. The calculation was of the proportion of records that had each specific field filled out on the 3899 form. Major event checkbox (CB) fields were compared to the vital sign flowsheet (FS) for major events related to vital signs.: SpO2 < 90%, Heart Rate increase > 20%, Increase in FiO2 Requirement >10%, Mean Arterial Pressure of Greater decrease >20%, Temperature Less Than 96 F°, Tachycardia (more than 120

beats per min.), Bradycardia (less than 60 beats per min.), Increased Cranial Pressure of Greater than 20, Cerebral Perfusion Pressure of less than 60mmHg, and any Change in Bladder Pressure from Baseline. We performed descriptive analyses for the proportion of charts with completed documentation in evaluated fields and proportion of flow sheet events documented in major event fields.

Results: A total of 158 records were included for analysis. Of the 20 fields within the demographics section 17 fields had over a 70% completion ratio (70.9%-100%), with the lowest ranking fields being Altitude Restriction (27.8%) and Allergies (27.2%). Of the 158 records, 34.5% (n= 56) were identified as ventilated patients. For ventilated patients, all ventilator settings were present for 94.6% of charts. Among pre and post-flight assessments, Central Venous Pressure and Bladder Pressure were notable for 0% use. Additional rarely utilized fields included cardiovascular fields of Irregular, Rubs, Gallops, and Murmurs (all <2.5% use), respiratory fields of rhonchi, rales, and wheezing (all <4.5% use), gastrointestinal fields of Open Bowel, Distended, Tympanic, Pain, Mass, and Hernia (all <4% use). Notable discrepancies for major event checkbox documentation out of total flow sheet events included change in heart rate greater than 20% (2 of 78 events); increased in FiO2 requirement of greater than 10% (11 of 49 events); change in mean arterial pressure of greater than 20% (1 in 56 events); temperature less than 96 F° (1 in 15 events).

Conclusion: While many of the current 3899 fields are highly utilized, there was a proportion of rarely utilized fields. In addition, major event check boxes did not consistently capture all the events observed within the in-flight vitals flow sheets.



3899L Form



AF 3899L, 20140107, V2.0

Study Objectives:

- 1° Analyze frequency of use for fields in the 3899 Patient Movement Record
- 2° Compare prevalence of major events in checkboxes versus vitals flowsheet



Flight Information



	All Subjects (n=158)
Median Age [IQR]	29 [12.3-41.3]
Minutes inFlight [IQR]	500 [300-615]
Mechanically Ventilated	46 (29%)
Reason forTransport	
Disease	83 (53%)
Ble Injury	42 (27%)
Non-Ble Injury	29 (18%)
Year of Transport	
2018	2 (1%)
2019	139 (88%)
2020	13 (8%)
2021	3 (2%)



Frequently Used Fields



- 75-100% Demographics
- Pre-flight Procedures
- Vital Signs
- Mechanical Ventilation Settings (n=46)
- Pre-flight Exam: Neuro, Resp, GI, Skin
- Other: Equipment Used, Care In Flight

- 50-74% Diagnosis
- Pre-flight Exam: Cardiac, MSK
- Post-flight Exam: Neuro, Cardiac, Resp, GI, MSK, Skin
- Other: Medical Decision Making

AP 3899L 28146107, V2.0
 0-25%
 26-49%
 50-74%
 75-100%

2. Evacuation of patients with disease nonbattle injury by critical care air transport teams

Kim Medellin, BSN,RN; Shelia Savell, PhD; Allyson Arana, PhD; Julie Cutright BSN,RN; Maria Castaneda, MS; Col Vikhyat S Bebarta,MD; Maj William T Davis, MD; Lt Col Joseph K Maddry, MD; Maj Patrick C Ng, MD

Abstract

Introduction: Although most en route care studies focus on patients with combat-related traumatic injuries, a significant number of Critical Care Air Transport Team (CCATT) evacuations are of patients with medical (nontraumatic) critical illnesses (e.g., cerebrovascular accident, myocardial infarction [MI], overdose, and sepsis). Similarly, nonbattle injuries in deployed service members are not usually the focus in the study of the en route care of casualties. However, they contribute to morbidity and mortality during military conflicts, and increase demand on medical resources. A recent analysis of nonbattle injury among those deployed to Iraq and Afghanistan, determined approximately one-third of all injuries over a 12-year period were nonbattle. In 10,203 casualties, the most common mechanisms of nonbattle injury were; falls (21%), machinery or equipment (18.8%), blunt objects (10.8%), gunshot wounds (7.1%), and sports (6.8 %). It is not clear what proportion of those injured required evacuation by CCATT.

In 2012 and 2013, the Armed Forces Health Surveillance Center reported that in these reports of both critical and noncritical medical evacuations, there were almost five times more evacuations secondary to disease and nonbattle injury (DNBI) compared to battle-related injuries. Historically, noncombat medical illnesses have often required greater hospital resources with subsequent higher lost person-days; and thus, they confer a greater impact on operational capability. The disease processes of critically ill patients can progress suddenly, requiring expeditious transport to higher level care facilities. CCATT addresses the needs of the critically ill patients by providing advanced medical care during transport. Extensive medical resources and medical provider training are required to care for critically ill medical patients in theater. However, limited knowledge and data are available regarding the air evacuation needs of critically ill DNBI patients. As part of an evolving medical system, military medicine must continuously strive for optimal medical care delivery in theater. A key component for optimizing health care delivery in a combat setting is evidence gathered from the field during wartime.

Published studies focusing on the aeromedical transport of medical patients are limited. Previous studies have evaluated DNBI admitted to medical facilities in the combat theater but did not focus on critically ill medical patients or include the patients' aeromedical evacuation from theater. Other studies have provided epidemiological data regarding DNBI aeromedical transports and CCATT missions; however, these studies did not evaluate the patient's clinical course or therapies provided during en route care.

Objective: The purpose of the study was to describe critically ill DNBI patients evacuated by CCATT from any theater of operation from January 2019 to December 2021.

Specific Aim: Characterize the critically ill patient population with DNBI transported by CCATT and evaluate the in-flight procedures and events.

Materials and Methods: We performed a retrospective chart review of patients with DNBI conditions requiring aeromedical evacuation by CCATT from January 2019 to December 2021. We queried the CCATT Pilot Unit for all aeromedical evacuations related to DNBI during the

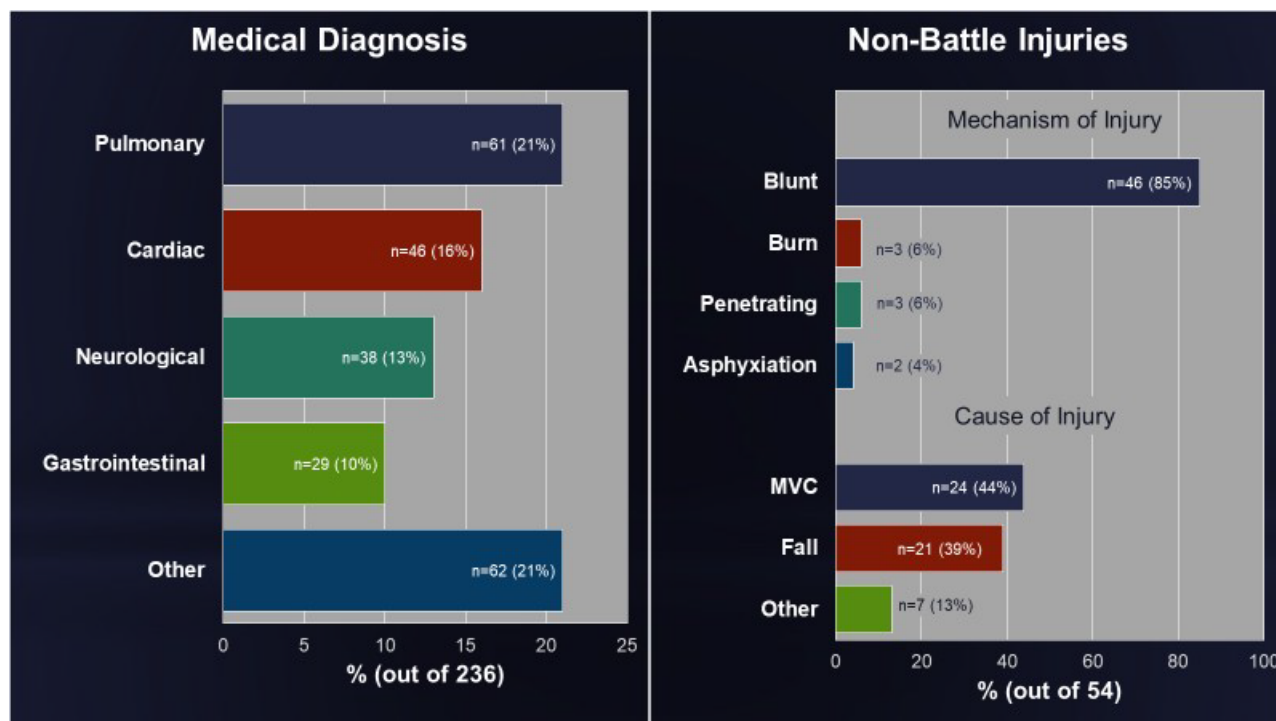
study period and included patients with a CCATT form 3899 indicating critical care treatment in flight. Data abstractors collected patient characteristics, flight information, in-flight interventions, and in-flight events. Quality control consisted of secondary review of all records to insure accuracy and consistency of data. We performed descriptive analyses of patient characteristics and in-flight interventions.

Results: We reviewed the charts of 319 patients evacuated via CCATT between January 2019 and December 2021. We excluded 67 patients with battle injuries, leaving 252 for analysis. Of these patients, 192 (76%) were disease and 60 (24%) were non-battle injuries. Most patients were male (n=206, 82%) and US citizens (n=237, 94%), and had a median age of 31 [IQR 23-41]. Most flights originated in the Asia/Pacific region (n=84, 33%), the Middle East region (n=80, 32%), or Europe (n=58, 23%). Nearly all flights were destined for the US (n=135, 54%) or Europe (n=103, 41%).

The most common diagnoses were neurological (n=52, 21%), respiratory (n=42, 17%) and cardiovascular (n=35, 14%). Of the 60 non-battle injuries, 47 were blunt and most were caused by falls (n=24) or motor vehicle crashes (n=22). Seven percent of all patients (n=17) had a history of smoking or tobacco use, 1 (<1%) had a history of coronary artery disease, 22 (9%) had a history of hypertension, and 7 (3%) had a history of diabetes. About quarter of patients (n=58, 23%) received mechanical ventilation in flight and over half (n=143, 57%) received supplementary oxygen in flight. Common medications administered en route included narcotic analgesia (n=83, 33%), antibiotics (n=63, 25%), and sedative agents (n=61, 24%).

Conclusions: Disease and non-battle injury are common. CCATT teams must be prepared for a wide spectrum of disease and non-battle injury processes. Characterization of the missions involving DNBI can help inform leaders and guide training to prepare for common DNBI. This data is a subset of an ongoing effort to further characterize CCATT missions involving DNBI.

Results	Patient Characteristics	n (% of 290)
	<ul style="list-style-type: none"> ➤ We analyzed data from 290 patients over 339 encounters <ul style="list-style-type: none"> ➤ 127 patients in 2019 ➤ 76 patients in 2020 ➤ 136 patients in 2021 ➤ 236 (81%) were medical patients ➤ 54 (19%) had non-battle injuries <ul style="list-style-type: none"> ➤ 38 (13%) had COVID-19 ➤ 8 (3%) were self-injuries 	Median age [IQR] Male sex BMI <18.5 BMI 18.5-24.9 BMI 25-29.9 BMI 30-39.9 BMI >40 BMI not available History of hypertension History of smoking History of diabetes History of CAD History of CKD



Results

Medications/fluids/blood	n (% of 339 encounters)
DVT prophylaxis/anticoagulants	141 (42%)
IV narcotic analgesia	130 (38%)
IV sedation	104 (31%)
Antibiotics	96 (28%)
Normal saline	72 (21%)
Lactated ringers	68 (20%)
Tylenol	55 (16%)
Vasopressors	23 (7%)
Paralytics	16 (5%)
3% saline	13 (4%)
Insulin	8 (2%)
Blood	3 (1%)

Interventions	n (% of 339 encounters)
Supplementary oxygen	173 (51%)
Mechanical ventilation	86 (25%)
Oral care	46 (14%)
Drain management	19 (6%)
Chest tube management	17 (5%)
ICP monitoring	6 (2%)

DESCRIPTIVE ANALYSIS OF COVID-19 AEROMEDICAL EVACUATIONS BY CRITICAL CARE AIR TRANSPORT TEAMS: AN UPDATE FROM 2021

Maj Patrick C Ng, MD^{1,2}; Maj William T Davis, MD^{1,2}; Julie Cutright, BSN, RN¹; Jill Lear, BSN, RN¹; Darren Baldwin, MAA, BS, RN¹; Shelia C Savell, PhD, RN¹; Kim Medellin, BSN, RN¹; Col Vikhyat S Bebarta, MD³; Lt Col Joseph K Maddry, MD^{2,4}; Allyson A Arana, PhD¹



¹United States Air Force En route Care Research Center/59th MDW/ST Fort Sam Houston, TX; ²Brooke Army Medical Center/San Antonio Military Medical Center, Fort Sam Houston, TX; ³CU Anschutz Center for COMBAT Research, Aurora, CO; ⁴US Army Institute of Surgical Research, Fort Sam Houston, TX

Background

- The evacuation of patients during a pandemic presents unique challenges to en route care team members, including isolation precautions during flight
- A Medical Surveillance Report described 225 air evacuations of patients with COVID-19 in CENTCOM (n=186) and EUCOM (n=39) but did not describe those transported by Critical Care Air Transport Teams (CCATT)
- We previously described 16 patients evacuated by CCATT from March 2020 to February 2021

Objectives

Describe characteristics and in-flight interventions for patients with COVID-19 requiring aeromedical evacuation by CCATT in 2021, to add to previously analyzed data

Methods

- Retrospective chart review of patients with COVID-19 requiring evacuation by CCATT from March 2020 through December 2021
- Inclusion criteria:
 - Flight date between Mar. 2020-Dec. 2021
 - CCATT medical record available
 - Received critical care treatment in flight
 - COVID-19 diagnosis (clinical or PCR)
- Data source: CCATT record, form 3899
- Compared characteristics and interventions of patients from year 1 of pandemic (Mar. 2020-Feb. 2021) to year 2 of pandemic (Mar. 2021-Dec. 2021)

Results

- Study included 38 patients with COVID-19 evacuated by CCATT
- 17 patients evacuated in year 1 (March 2020 – February 2021)
- 21 patients evacuated in year 2 (March 2021 – December 2021)
- No significant difference between year 1 and year 2 in demographics
 - Overall median age: 41 years (IQR 31-53); 84% were male
 - Overall median time to symptom onset: 9 days (IQR 6-12)
 - Overall median time en route: 6 hours (IQR 3.5-9)
- 21 patients were mechanically ventilated (8 in year 1, 13 in year 2)
- 17 patients were not ventilated (9 in year 1, 8 in year 2)

Table 2. In-flight respiratory characteristics among intubated patients

Variable, median [IQR]	All patients (n=21)	Year 1 (n=8)	Year 2 (n=13)
Minimum SpO ₂ %	92 [85-94]	94 [89-94]	90 [83-93]
Minimum P/F ratio	123 [66-158]	124 [104-153]	98 [60-170]
Maximum required ventilation settings			
FiO ₂ %	60 [40-100]	60 [50-90]	60 [40-100]
Respiratory rate	20 [16-24]	22 [17-24]	18 [13-26]
Tidal volume*	435 [245-500]	490 [450-540]	300 [190-440]
PEEP	10 [10-14]	10 [6-14]	11 [10-14]



Figure 1. Negatively Pressured Conex (NPC)

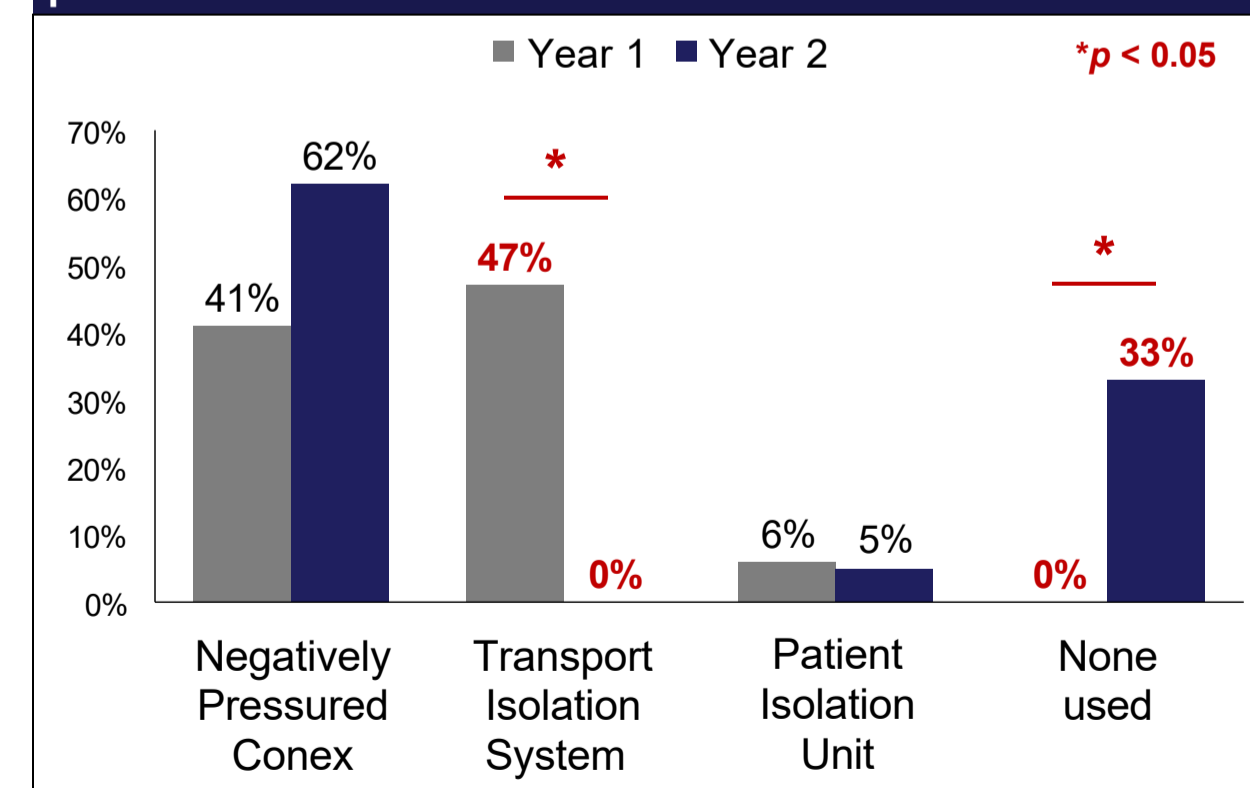
Conclusions

- **Most patients were transported in a portable biocontainment unit, but use of biocontainment units in transport decreased in year 2**
- **During year 2 of CCATT COVID-19 evacuations, fewer patients had pre-flight fever**
- **Low rate of comorbidities in this military population**

Table 1. Patient characteristics

Variable, n (%)	All patients (n=38)	Year 1 (n=17)	Year 2 (n=21)
*p < 0.05			
Patient history			
Diabetes	6 (16%)	3 (18%)	3 (14%)
Hypertension	7 (18%)	3 (18%)	4 (19%)
Smoking	4 (11%)	1 (6%)	3 (14%)
Pre-flight interventions & fever			
Antivirals	18 (47%)	6 (35%)	12 (57%)
Steroids	27 (71%)	11 (65%)	16 (76%)
Antibiotics	30 (79%)	13 (77%)	17 (81%)
DVT prophylaxis	36 (95%)	17 (100%)	19 (91%)
Fever*	17 (45%)	12 (71%)	5 (24%)
In-flight IV analgesedation in ventilated patients			
Fentanyl	20 (95%)	8 (100%)	12 (92%)
Propofol	21 (100%)	8 (100%)	13 (100%)
Ketamine	6 (29%)	4 (50%)	2 (15%)

Figure 2. Use of biocontainment units in CCATT transports of patients with COVID-19



Acknowledgements

CCATT Pilot Unit; 59th Medical Wing S/T; USAF En route Care Research Center
Funding: Air Force Medical Service, 711th Human Performance Wing

Corresponding author:
William.t.davis294.mil@health.mil

A Descriptive Study of Casualties Evacuated Out of Afghanistan by Critical Care Air Transport Teams During the Withdrawal of US Troops



Allyson Arana, PhD¹; Shelia C. Savell, PhD, RN¹; Julie Cutright, BSN, RN¹; Kim Medellin, BSN, RN¹;

Darren Baldwin, RN, MS¹; Col Vikhyat S. Bebarta, MD³; Lt Col Joseph K. Maddry, MD^{2,4}; Maj Patrick C. Ng, MD^{1,2}

¹United States Air Force En route Care Research Center/59th MDW/ST Fort Sam Houston, TX; ²Brooke Army Medical Center/San Antonio Military Medical Center, Fort Sam Houston, TX;

³CU Anschutz Center for COMBAT Research, Aurora, CO; ⁴US Army Institute of Surgical Research, Fort Sam Houston, TX

Background

- The end of a 20-year war in Afghanistan resulted in US troop withdrawal on August 30, 2021.
- ~ 7, 000 troops were in Afghanistan just prior to the withdrawal.
- A suicide bombing took place on August 26 during evacuation efforts at the airport in Kabul.
- Military medical service members among those deployed provided urgent medical care to those in need following the Kabul airport attack.
 - USAF Critical Care Air Transport Teams (CCATTS) evacuated casualties from Kabul to Landstuhl Regional Medical Center (LRMC).
 - Over 20 US military and civilians were medically evacuated to LRMC.

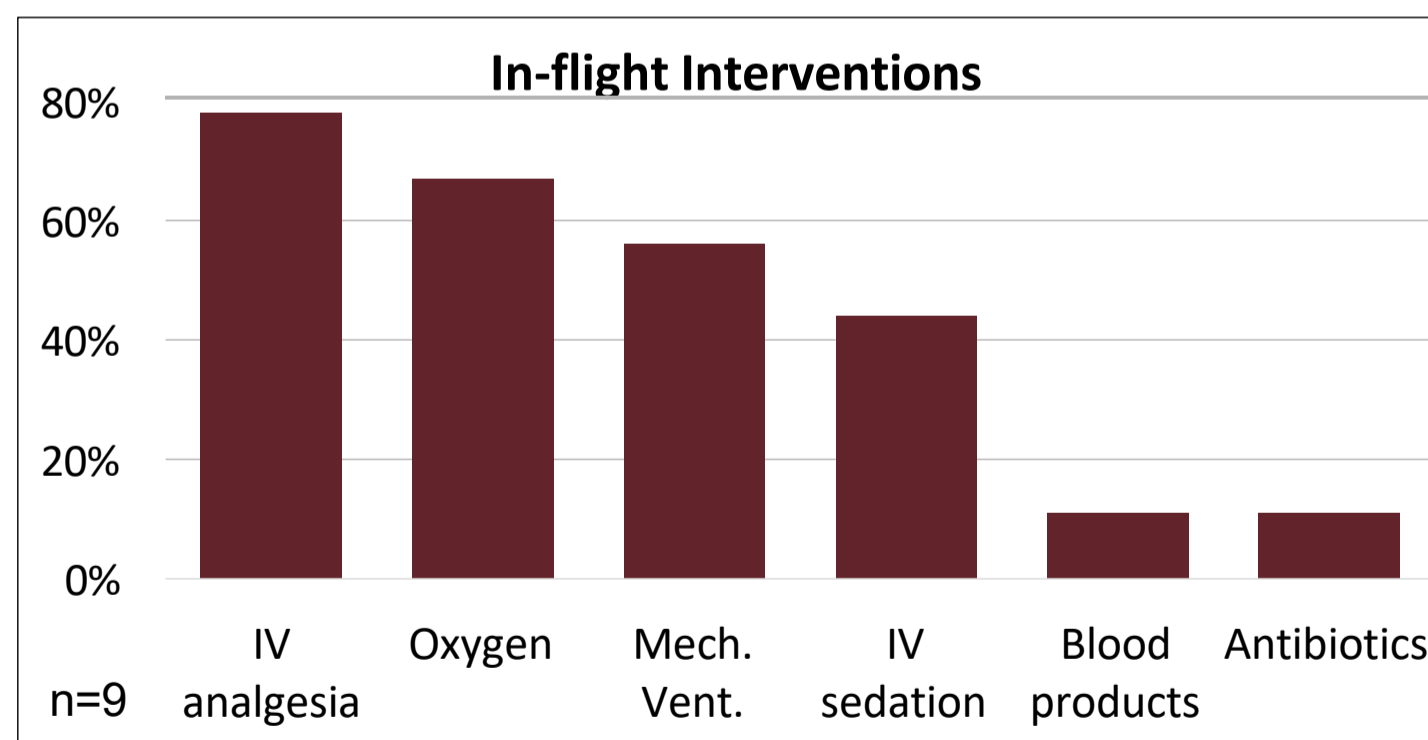
Objective

- To describe the critically injured patients evacuated by CCATT from Afghanistan during the final days of troop withdrawal

Methods

- Retrospective chart review of patients requiring aeromedical evacuation from Afghanistan via CCATT between July 1 to August 30, 2021.
- Included were all patients with available 3899 forms from the CCATT Pilot Unit.
- Exclusion: pediatric patients (n=6)
- Data collected: patient characteristics, flight information, in-flight interventions and events
- Descriptive analyses was conducted on patient demographics and in-flight interventions.

Further efforts are ongoing to better characterize missions executed during unstable periods in preparation for future battlefield situations

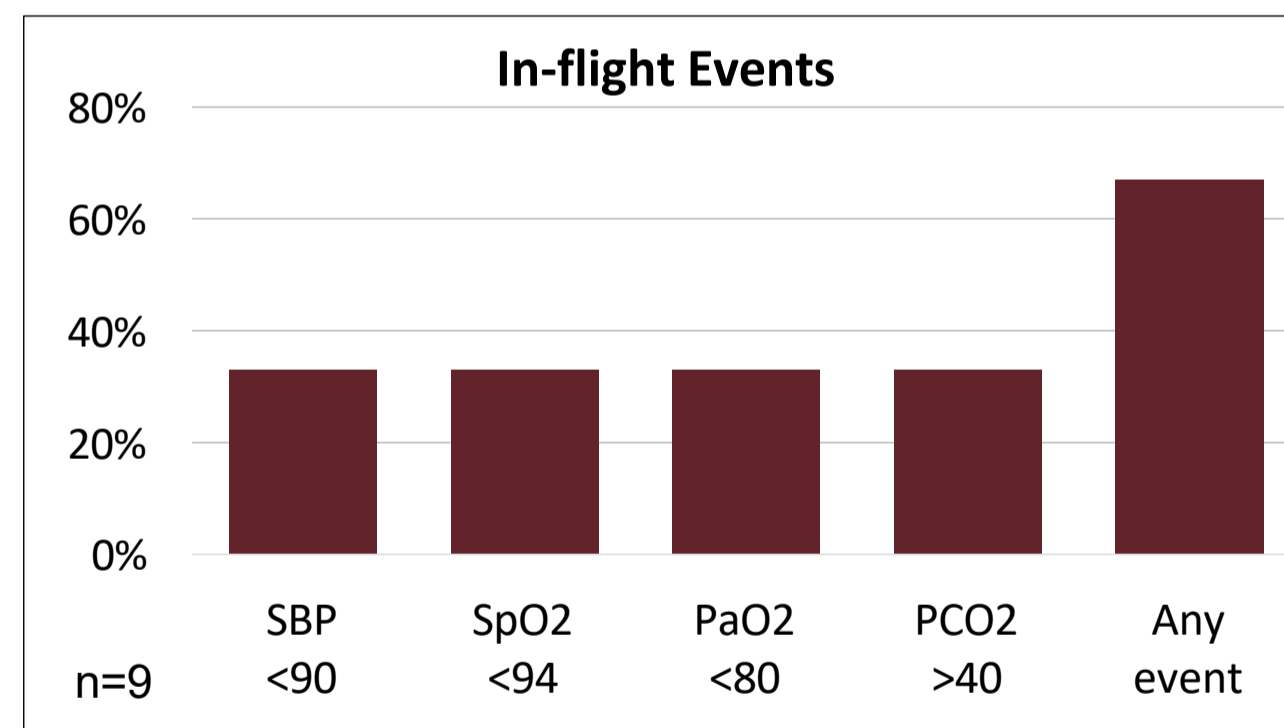


Limitations

- Retrospective, descriptive study
- Subjectivity despite trained data abstractors
- Analysis restricted to available data

Results

Patient Characteristics	n= 9
Age in years, mean (SD)	28.4 (4.2)
Male gender, % (n)	78% (7)
Precedence: priority, % (n)	11% (1)
Precedence: urgent, % (n)	89% (8)
Nationality: Afghanistan, % (n)	67% (6)
Nationality: United States, % (n)	33% (3)
Injury type: blast, % (n)	33% (3)
Injury type: penetrating, % (n)	56% (5)
Injury type: not documented, % (n)	11% (1)
Cause of injury: grenade, % (n)	56% (5)
Cause of injury: GSW, % (n)	11% (1)
Cause of injury: not documented, % (n)	33% (3)



Conclusion

- CCATT played a crucial role in the withdrawal.
- Further efforts are ongoing to better characterize missions executed during unstable periods in preparation for future battlefield situations.

Acknowledgements

USAF En route Care Research Center, 59th MDW S/T
Andre Gholson, En route Critical Care Pilot Unit