The Quadruple Aim: Working Together, Achieving Success

Colonel Beverly Johnson

26 Jan 2011
1. REPORT DATE       26 JAN 2011
2. REPORT TYPE
3. DATES COVERED 00-00-2011 to 00-00-2011
4. TITLE AND SUBTITLE
   En Route Critical Care: Evolving, Improving & Advancing Capabilities
5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER
5d. PROJECT NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER
6. AUTHOR(S)
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
   Headquarters Air Mobility Command Surgeon’s Office, Scott AFB, IL, 62225
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
   Approved for public release; distribution unlimited
13. SUPPLEMENTARY NOTES
   presented at the 2011 Military Health System Conference, January 24-27, National Harbor, Maryland
14. ABSTRACT
15. SUBJECT TERMS
16. SECURITY CLASSIFICATION OF:
   a. REPORT unclassified
   b. ABSTRACT unclassified
   c. THIS PAGE unclassified
17. LIMITATION OF ABSTRACT Same as Report (SAR)
18. NUMBER OF PAGES 45
19a. NAME OF RESPONSIBLE PERSON
En Route Critical Care

- Evolution of Critical Care Air Transport
  - Taking Aeromedical Evacuation to Higher Levels
- Improving Care Across the Continuum
  - System within a System
- Advancing Capabilities
  - Closing Gaps in the Continuum
  - Building Partnerships
  - Research, Training and Technology
EVOLUTION OF ENROUTE CRITICAL CARE
In the Beginning...
Patient Evacuation World War II

Point of Injury  Battalion Aid Station  Field Hospital

Time to CONUS: <90 days via Ship & Ground

Ship  General Hospital

Field Hospital

Max 90 days
then unit or home
Enter Air Evacuation

- **AE System Organized**
  - Despite resistance – proven
  - High Volume System for Patient Movement

- **Airlift**
  - Initially denied use of aircraft
  - Sporadic use of airlift

- **Medical Care in the Air**
  - Formal Flight Training
  - Flight Surgeons at Airheads
  - Nurses & Med Techs Inflight
Korean Conflict
Vietnam
Dedicated Airlift

- C-9 Nightingale
- Integrated Patient Support
  - Oxygen
  - Suction
  - Electrical
  - Special Care Area
  - Ramp
  - Medical Supplies
  - Cooking Facilities
- Limited Range
- Peacetime and Contingency
- Utilized for 30+ years
Continuous En-Route Care: Stable Patient

Historical Perspective

Casualty Evac - Evac Policy - 1 Day

Tactical Evac - Evac Policy - 7 Days

In Theater Hospital “Level 3”

Strategic Evac - Evac Policy - 15 Days

Definitive Care “Level 4”

Continuous En-Route Care: Stable Patient

Field Hospital “Level 2”

Battalion Aid Station “Level 1”
Critical Care Air Transport Begins

- 1988 Gen PK Carlton II presents idea
- 1994 Pilot Unit Stood Up
- 1995 First 6 months
  - Teams managed 20+ critical patients
  - Combat missions/trans-Atlantic missions
  - Supported non-combatant evacuation from Liberia
  - Supported Khobar Towers bombing victims
More than War-time Capability

Civilian Air Crash Guam
MacKay Trophy 2000
Proof Of Concept

USS Cole Oct 2000
Enroute Critical Care Saved Lives
Continue to Save Lives
IMPROVING CARE ACROSS THE CONTINUUM
Transformation

- AE is no longer transporting stable patients between two MTFs
- Care in air equal or higher than that on ground
- Care that is started on the ground will continue until final destination
- Patient Driven Special Teams
  - Critical Care Air Transport
  - Neonatal Intensive Care
  - Burn Team
  - Acute Lung Team
CONTINUOUS EN ROUTE CARE: AE System

INTRA-THEATER
Tactical AE

INTER-THEATER
Strategic AE

TACTICAL MEDEVAC/AE

AE Crews & CCATT

EMEDS/MA SF, FST

OCONUS Medical Center/ASF

Theater Hospital/CASF, CSH
CONTINUOUS EN ROUTE CARE: System of Systems

INTRA-THEATER
Tactical AE

TACTICAL MEDEVAC/AE
1-24 Hours

TACTICAL/STRATEGIC AE
24-72 Hours

INTER-THEATER
Strategic AE

CASEVAC/MEDEVAC
1 Hour

AE Crews & CCATT

68W, PA, FS, PJ, 4N, RN, SOFME/SOCCET, CCATT

Battalion Aid Station

EMEDS/MASF, FST

Theater Hospital/CASF, CSH

SABC/TCCC

Forward Resuscitative Care

Theater Hospital Care

Definitive Care

US Medical Center

OCONUS Medical Center/ASF

2011 MHS Conference
Ability to Move “Stabilizing” Patients
Without It…System Failure
ADVANCING CAPABILITIES
**GOAL:**
Maintain Equal or Greater Level of Care During Intra/Inter-Theater Patient Movements

**Continuous Increase in Level of Care Provided**
Surgery/Resuscitation
BACKGROUND
Current Lvl-II to Lvl-III Patient Movement
CONCERN

- Lowest Ever “Died Of Wounds Rate” Largely the Result of Integrated En Route Care “System of Systems”

- GAP: Ad Hoc Intra-Theater Movement of ICU-Level Patients Utilizing Assets Not Specifically Organized/Trained/Equipped for Critical Care Patient Movements
TACTICAL CRITICAL CARE EVACUATION TEAM (TCCET)
# TCCET Personnel/Training

<table>
<thead>
<tr>
<th>Nurse</th>
<th>AFSCs/Experience</th>
<th>Medical Training</th>
<th>Operational Req’t/Training</th>
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<tbody>
<tr>
<td></td>
<td>• 46M3 CRNA</td>
<td>• BLS/ACLS</td>
<td>• Operational support physical</td>
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<td></td>
<td>• SUBS: 46N3E Critical Care*</td>
<td>• ATLS/PALS</td>
<td>• Combat Skills Training (CST)</td>
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<td></td>
<td>46N3J Emergency Room*</td>
<td>• TNCC or ATCN</td>
<td>• SERE 100, HRC</td>
</tr>
<tr>
<td>*Experience: Active ICU/Critical Care or ER (US Level 1-2 Trauma Center)</td>
<td>• CCATT/CSTARS-C</td>
<td>• Joint En Route Care Course (JECC)</td>
<td>• RW ops familiarization incl. night ops (low light &amp; blackout conditions, NVG use, etc.)…JECC</td>
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</thead>
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<tr>
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<td>• 44E3A Emergency Dept Physician*</td>
<td>• BLS/ACLS</td>
<td>• Operational support physical</td>
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<td></td>
<td>• SUBS: 45A3 Anesthesiologist*</td>
<td>• ATLS/PALS</td>
<td>• Combat Skills Training (CST)</td>
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<td></td>
<td>44M3 Internal*</td>
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<tr>
<td></td>
<td>48R Residency Trained Flight Surgeon*</td>
<td>• CCATT/CSTARS-C</td>
<td>• RW ops familiarization incl. night ops (low light &amp; blackout conditions, NVG use, etc.)…JECC</td>
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<tr>
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MEDICAL EQUIPMENT

- Lightweight, Modular, Grab-n-Go Medical Supplies Approaching ICU Level Care
  - Rotary Wing or Fixed-Wing
  - Tight, Austere Environments
  - AFSOC & CCATT Equipment

- Personal Protective Ensemble
  - (PPE) To Accompany
Current Ad Hoc Solutions Result in Non-Standard Level of Care

Intra-Theater Movement of ICU-Level Patients
  – Presents Option for Care Gap in Non-AE Missions Lvl-II to Lvl-III
  – Must be Driven by Clinical Requirements

TCCET Developed to Fill Care Gaps and Augment CCATT

6 AF Personnel (2 Teams) & Equipment being prepared for summer deployment
Pain Management

- Epidural Management
- Regional Blocks
- Narcotic Administration
- Acupuncture
  - Feasibility Study Jan 11
Expanding Global En Route Care
AE InterFly: Advancing Interoperability
Air and Space Interoperability Council

- **Mission:** Working together to advance global AE response
- **Focus areas**
  - Medical Equipment
  - Clinical Capabilities
  - Command and Control
  - Doctrine
- **Goals:**
  - Publish Guidance on each nations capabilities
  - Exercises that demonstrate AE/Critical Care
Building International Partnerships
Civilian Partnerships

- ECMO Pediatric/Neonatology Consortium
- 58 y/o Male unresponsive to care
- Needed Adult ECMO
  - USA ECMO MD
  - USAF Neonatologist
  - Civilian Perfusionist
  - Civilian ECMO RN
- Transported to Iowa
Target Audience: Aeromedical evacuation, patient transport and critical care teams from any nation

This multinational consortium will allow nations to share advances in patient transport to include clinical management of patients, clinical and aircrew training platforms and new technology used to support patient care.
An aircraft’s ability to support rapidly developing medical capabilities is vital to continued advancement in En Route Care.
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- **1940**: C-47
- **1950**: C-131
- **1960**: C-141
- **1970**: C-9
- **1980**: C-17
- **1990**: C-130
- **2000**: KC-135
- **2010**: OIF/OEF

**En route AE Capabilities**

- **HIGH**: Medical capabilities (crew skills, training, equipment, special teams)
- **LOW":**
### AE Support Requirements

<table>
<thead>
<tr>
<th>Mission</th>
<th>Patient</th>
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<tbody>
<tr>
<td>Loading</td>
<td>Environmental</td>
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<tr>
<td>Configuration</td>
<td>Therapeutic oxygen</td>
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<tr>
<td>Systems</td>
<td>Electrical</td>
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<tr>
<td>Communication (Future)</td>
<td>Tele-Health (Future)</td>
</tr>
</tbody>
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Incorporate AE support requirements into aircraft design
Research, Training and Technology
En Route Care

The Future is Now......

Agency: GSD&M/Idea City
Client: U.S. Air Force
Title: “SCI FI/MEDEVAC”
Length: :60
ISCI: QYAF9148
Date: 10/12/2010

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Job Number: ACP9120012
Producer: NL Freedman