

# POSITION PAPER

NATIONAL ASSOCIATION OF EMS PHYSICIANS

## FLIGHT PHYSICIAN TRAINING PROGRAM—CORE CONTENT\*

Stephen H. Thomas, MD, MPH, Kenneth A. Williams, MD, for the 2002–2003 Air Medical Services Task Force of the National Association of EMS Physicians

### PURPOSE

The purpose of this core content is to provide physicians with a comprehensive education in all of the components of air medical transports, including fixed- and rotary-wing transport. It is designed specifically to provide a physician with the knowledge and skills necessary to function effectively during air medical transport of critically ill and injured persons. The intent of this document is to present an outline for the core content of a flight physician training program. It does not define the necessary or optimal level of staffing for air medical transports.

This document, initially published in *Prehospital and Disaster*

---

Dr. Thomas is at Boston MedFlight and in the Division of Emergency Medicine, Harvard Medical School, Boston, Massachusetts; and Dr. Williams is in the Department of Emergency Medicine, Brown University, and the Air Medical Physician Association, Providence, Rhode Island.

Approved by the NAEMSP Board of Directors May 28, 2002. Received June 8, 2002; accepted for publication June 8, 2002.

Address correspondence and reprint requests to: Stephen H. Thomas, MD, MPH, Department of Emergency Services, MGH Clinics Building, Room 115, 55 Fruit Street, Boston, MA 02114-2696. e-mail: <thomas.stephen@mgh.harvard.edu>.

\*This document was initially published as: Krohmer JR, Hunt RC, Benson N, Bieniek RB. Flight physician training program—core content. *Prehosp Disaster Med.* 1993;8(2):183-4.

*Medicine* in April–June 1993 as a contribution of the 1992 Air Medical Services Task Force, has been updated in 2002 by the National Association of EMS Physicians (NAEMSP) Air Medical Services Task Force. The current Task Force members gratefully acknowledge the work of the previous document's authors: Jon R. Krohmer, MD, Richard C. Hunt, MD, Nicholas Benson, MD, and Russell B. Bieniek, MD.

### GOAL

Upon completion of the program, the flight physician will be prepared for the safe and efficacious transport of a critically ill or injured patient by air. The flight physician also will be knowledgeable in the medical and administrative aspects of the air medical program.

### DIDACTIC INFORMATION

#### History and Purpose of Air Medical Transport

1. Development of air medical transport in military and civilian settings
2. Models of program structuring
  - a) Hospital- vs. non-hospital-based
  - b) Vendor relationships
  - c) Transport brokering
3. Purpose of air medical transports

- a) Rotary-wing transport
  - b) Fixed-wing transport
  - c) Special issues of international transport including transport via the airlines
4. Indications for, and advantages/disadvantages of, air medical transport with overview of the relevant literature for trauma and nontrauma indications
  5. Crash statistics, causes, and efforts to improve safety
  6. Economics of air medical transport programs
  7. Overview of national air medical associations and relevant resources (e.g., the Air Medical Physician Association handbook, Commission on Accreditation of Medical Transport Systems standards, and "Best Practices" publication); awareness of the specialty of "aerospace medicine," a subspecialty of preventive medicine, and the relevant knowledge and resources available

#### Aircraft Operations, Air Traffic Systems, and FAA

1. Federal Aviation Administration (FAA) regulations
  - a) General knowledge of parts 91 and 135
  - b) VFR and IFR operations
  - c) Legislative controversies
  - d) No national regulation of medical care

## Air Medical Transport Equipment

1. Aerodynamics
  - a) rotary-wing aircraft
  - b) fixed-wing aircraft
2. Safety considerations (general)
  - a) rotary-wing aircraft
  - b) fixed-wing aircraft
  - c) emergency procedures
  - d) survival techniques
  - e) ground vehicle safety issues
3. Medical equipment
  - a) oxygen (liquid, internal, external)
  - b) monitor/defibrillator/pacer
  - c) expired carbon dioxide monitoring (colorimetric and continuous)
  - d) pulse oximeter
  - e) automated blood pressure monitors/Doppler
  - f) ventilators
  - g) intravenous (IV) pumps
  - h) neonatal isolettes
  - i) balloon pumps
  - j) other
  - k) security, restraint, and electrical interference issues of medical equipment
4. Communications equipment and procedures

## Flight Team Members/Roles

1. Air medical communications specialist
2. Pilot
3. Mechanic/maintenance
4. Medical director
  - a) direct medical oversight
  - b) indirect medical oversight
5. Medical crew—background/training/roles (teamwork)
  - a) flight physician
  - b) flight nurse
  - c) flight paramedic
  - d) special medical crew members

- i) respiratory therapist
  - ii) neonatal personnel
  - iii) perfusionist
  - iv) others
6. Medical fitness of crew members to fly

## Guidelines for Air Transport

1. Accessing the system
  - a) interfacility transfers
  - b) scene responses
2. Dispatching procedure
  - a) routine flights (rotary-wing and emergent and nonemergent fixed-wing transports)
  - b) pilot approval issues (e.g., weather, weight/balance considerations)
  - c) administrative approval
3. Guidelines for scene response
  - a) safety issues—extrication, fire, hazmat, landing zone selection
  - b) on-scene command
  - c) direct medical oversight
  - d) medical care issues on-scene (risk/benefit)
  - e) interface with ground EMS units
4. Guidelines for interhospital transfer
  - a) flight-team interaction
  - b) direct and indirect medical oversight
  - c) medical care issues prior to transfer (risk/benefit)
5. Guidelines for emergent and nonemergent fixed-wing response
6. Patient preparation for flight
7. Patient care by medical crew members
8. Receiving facilities
9. Coordinating ground transport
10. Flight following
11. Precautionary landings

## Flight Physiology

1. Gas laws

2. Effect of altitude on:
  - a) oxygenation
  - b) liquid/gas interfaces
  - c) temperature and humidity
  - d) medical equipment
3. Noise and vibration
4. Acceleration/deceleration forces
5. Special medical consideration
  - a) HEENT disease
  - b) cardiovascular disease
  - c) pulmonary disease
  - d) hematological disease
  - e) neurosurgical disease
  - f) ophthalmologic disease
  - g) gastrointestinal disease
  - h) orthopedic disease
  - i) burns
  - j) pediatric patient
  - k) air-embolism and bends injuries
  - l) others

## Legal and Ethical Issues

1. Refusal to transport
2. Termination of resuscitation during flight
3. Licensure when crossing state lines
4. Direct and indirect medical oversight at the scene
5. Flight prioritization

## Program Specifics

1. History
2. Policies and procedures
  - a) administrative
  - b) medical
  - c) integration of air transport program into regional disaster/MCI planning
  - d) post-incident plan for responding to crash of a transport vehicle
  - e) search and rescue procedures, where applicable
  - f) infection control
3. Documentation (medical charting and other documentation)
4. Equipment and personnel
  - a) staffing/scheduling

- b) stocking/cleaning
- c) equipment maintenance
- 5. Quality assurance/quality improvement/utilization review
- 6. Public relations—services/team composition
- 7. Education programs
  - a) EMS
  - b) landing zone

### **PRACTICAL ORIENTATION**

To be conducted by pilot(s), flight nurse(s), medical director, and communications specialist(s)

### **Aviation and Aircraft Safety**

1. Weight restrictions and weight/balance assessments
2. Weather minimums and overview of weather as relates to air transport
3. Routine aviation issues
  - a) helipad/hangar safety
  - b) routine aircraft ingress/egress
  - c) routine maintenance and refueling
  - d) aircraft startup/cooldown procedures
4. Landing zone criteria and safety
  - a) predesignated landing zones
  - b) emergency landing zones
  - c) LZ approach and assessment
  - d) LZ safety (rotorwash, rotor hazards)
5. Patient and equipment loading and unloading
6. Patient and team clothing and blankets
7. Refueling procedures
8. Routine flight activities
  - a) take-off and landing procedures
  - b) aircraft sighting/spotting
9. Aircraft equipment (including appropriate securing of equipment)
  - a) oxygen
  - b) restraints
  - c) stretcher
  - d) basics of radio and navigation
10. Emergency procedures/equipment
  - a) master switch
  - b) fuel shutoff
  - c) door jettison/emergency egress for land and water settings
  - d) fire extinguisher
  - e) survival kit and emergency locator beacon operation

- f) rotor brake (where applicable)
- g) oxygen shutoff valve
11. In-flight emergencies
12. Search and rescue operations/techniques

### **Communications**

1. Equipment orientation
2. Procedures

### **Medical Equipment**

1. Medications
2. Outline other equipment

### **Review Checklists and Operations**

### **Aircraft Tour and Orientation**

### **Case Scenarios**

### **Orientation Flight**

### **Bibliography**

1. Williams KA, Robinson KJ. Air medical transport. In: Principles of EMS Systems, 3rd ed. Dallas, TX: American College of Emergency Physicians, 2002.
2. Rodenberg H, Blumen IJ (eds). Air Medical Physician Handbook. Salt Lake City, UT: Air Medical Physician Association, 1999.