



Manatee County Government
112 Manatee Avenue West
Bradenton, FL 34205

April 21, 2026

VIA CERTIFIED MAIL

(Tracking Number: _____,

Auri Miller, Aeromed Program Director
Tampa General Hospital
1 Tampa General Circle, Tampa, FL 33606

RE: Approval of Tampa General Hospital Aeromed Certificate of Public Convenience and Necessity (COPCN) Application for Renewal Consideration

On April 21, 2026, a duly noticed public hearing was held on Florida Health Sciences, Inc., d/b/a Tampa General Hospital, Aeromed ("Aeromed") application for a Certificate of Public Convenience and Necessity ("COPCN") to provide Advanced Life Support transport services within Manatee County, Florida ("Application").

Pursuant to Section 2-13-55 of the Manatee County Code of Ordinances and the specific factors outlined therein, the Manatee County Board of Commissioners (the "Board") reviewed and considered Aeromed's COPCN Renewal Application and supporting documentation, the Public Safety Director's report and recommendation, and all testimony and information submitted at the public hearing. Accordingly, the Board finds that Aeromed satisfied its burden and that public convenience and necessity will be promoted with the approval of Aeromed's COPCN Renewal Application.

Therefore, this letter shall constitute written notice of the Board's approval of Aeromed's Renewal Application. The Public Safety Director shall issue Aeromed its COPCN.

On behalf of the
BOARD OF COUNTY COMMISSIONERS
MANATEE COUNTY, FLORIDA

Tal Siddique, Chairman

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PUBLIC SAFETY DIRECTOR'S REPORT AND RECOMMENDATION
FOR COPCN APPLICATION RENEWAL

EXECUTIVE SUMMARY

The matter for review before the Board of County Commissioners (the "Board") is the renewal application for a Certificate of Public Convenience and Necessity (COPCN) by Florida Health Sciences, Inc., d/b/a Tampa General Hospital, Aeromed ("Aeromed"), to provide Advanced Life Support (ALS) and Basic Life Support (BLS) aeromedical transport services within Manatee County (the "County").

In accordance with Section 2-13-55 of Manatee County Ordinance 17-041 (the "Code"), the Board is required to consider this application and the Public Safety Director's report during a duly noticed public hearing. All required supporting documentation has been received and verified.

The Manatee County Department of Public Safety recommends **APPROVAL** of the application. This recommendation is based on Aeromed's current and previously demonstrated:

- **Financial Readiness:** Proven stability to maintain continuous operations.
- **Staffing Capabilities:** Qualified personnel levels meeting County standards.
- **Regulatory Compliance:** Consistent adherence to the Manatee County Code of Ordinances.

BACKGROUND

A Certificate of Public Convenience and Necessity (COPCN) is a formal authorization issued by a local government body that permits an Emergency Medical Service (EMS) provider to operate within a specific jurisdiction. This regulatory requirement is established under Florida Administrative Code (FAC) 64E-2.032, which empowers counties to issue COPCNs to ambulance services proposing operations within their boundaries, pursuant to Sections 401.25(2)(d) and (6), Florida Statutes.

While the Florida Department of Health (the "Department") maintains the authority to license both transport and non-transport ambulance services, state licensure is often contingent upon local approval. Specifically, a provider must secure a COPCN from each county in which it intends to provide pre-hospital Advanced Life Support (ALS) treatment or transport, Basic Life Support (BLS) transport, or intra-county and interfacility services. The Department issues licenses for ALS, BLS transport, ALS non-transport, or air ambulance services only to the extent that such services are authorized by the underlying COPCN.

In jurisdictions where a county does not require a COPCN, the Department may license a service, provided all other statutory requirements are met. Furthermore, licensed

services may operate without a COPCN under limited legal exceptions, such as active mutual aid agreements or during state-mandated responses to disasters and mass casualty incidents.

Pursuant to FAC 64J-1, ALS and BLS transport services are subject to specific operational definitions and standards. To maintain compliance, every provider is mandated to ensure—and formally document within personnel records—that all EMTs and paramedics hold current certifications issued by the Department. Furthermore, providers must ensure all operational vehicles are equipped and permitted in strict accordance with the standards outlined in FAC 64J-1.

Aeromed, a private, not-for-profit 501(c)(3) corporation established in 1989, operates as a hospital-based, traditional model ALS aeromedical ambulance transport program across 23 counties of Florida, including Manatee County. In August 2013, Aeromed entered a strategic partnership with Metro Aviation, Inc. to provide Federal Aviation Administration (FAA) Part 135 air medical aircraft operations. Under this collaborative framework, Aeromed maintains exclusive responsibility for all clinical operations, while Metro Aviation, Inc. is the FAA Part 135 certificate holder, exercising full operational control and maintenance oversight of the Aeromed aircraft fleet.

In alignment with this operational history, Program Director Aurelia Miller, acting on behalf of Aeromed, submitted a request for COPCN extension pending the issuance of an updated Certificate of Insurance. This request was reviewed and approved by the Public Safety Director pursuant to Section 2-13-56(b)(4) of the Manatee County Code, to prevent the discontinuation or interruption of essential life support services.

On or around January 15, 2026, Program Director Aurelia Miller, acting on behalf of Aeromed, submitted the renewal application and requisite fees for Aeromed's COPCN in compliance with Section 2-13-55(f) of the Code. A comprehensive copy of the application and all supporting documentation is incorporated herein as **Exhibit "A."**

Following the initial filing, Aeromed and County personnel engaged in correspondence to clarify the submitted documentation. The Department of Public Safety has since completed its investigation and formal review of the application and associated data. Consequently, with the filing of this report, Aeromed's COPCN application is deemed complete and is hereby presented for the Board's consideration.

LEGAL AUTHORITY AND STANDARD OF REVIEW

The State of Florida delegates authority to counties to approve or deny Certificates of Public Convenience and Necessity for emergency medical services providers through the "Emergency Medical Services Act" in Chapter 401, Part III of the Florida Statutes. Specifically:

1. **Section 401.25(2)(d)** allows counties to adopt ordinances providing reasonable standards for ambulance services and issue ambulance licenses.
2. **Section 401.25(6)** permits counties to adopt ordinances ensuring proper ambulance services, transportation, vehicles, equipment, and personnel are available.
3. **Section 401.25(4)** requires counties to establish pre-hospital EMS plans addressing system configuration, operations, and providers.

This Act allows counties to establish standards, plans, and ordinances governing ambulance services within their jurisdictions.

Accordingly, Manatee County enacted Ordinance No. 17-041 pursuant to the authority provided in Chapter 401. A copy of this Ordinance is attached hereto as **Exhibit "B."** The Ordinance outlines the requirements for obtaining a COPCN for ALS and BLS Transport services within the County. It establishes standards for applications, renewals, staffing, vehicle permitting, and other operational criteria that providers must meet.

Standard Renewal Review:

Pursuant to Code Section 2-13-55(c)(2)-(d), the Board shall consider the following:

- This Report;
- Aeromed's completed renewal application and any documentation and information submitted in support of the same;

AEROMED COPCN APPLICATION

A copy of Aeromed's complete COPCN Renewal application is attached hereto as Exhibit "A."

Financial Information:

The Public Safety Department reviewed Aeromed's provided financial statements and a two-year pro-forma budget (2023–2024) (see Exhibit "A"). Aeromed demonstrates adequate financial resources and stability to meet operational requirements and continue providing ALS aeromedical transport services within Manatee County, consistent with Certificate of Public Convenience and Necessity standards. The Public Safety Department has identified no concerns.

Fiscal Year	Operating Revenue	Operating Expenses	Net Income
2023	\$2,484,483.00	\$2,400,308.00	\$123,275.00
2024	\$2,537,817.00	\$2,450,576.00	\$127,722.00

Insurance Information:

Coverage is maintained through STARR Insurance Companies and Zurich American Insurance Company.

Fleet/Vehicle Information:

Five (5) ALS rotor-wing aircraft are listed and permitted.

Personnel Information:

The program employs 46 state-certified Paramedics (27 of whom are dual-credentialed as Registered Nurses) and 16 FAA-rated pilots.

Additional Report Findings:

- **Communications and Interoperability:** Aeromed holds a valid Federal Communications Commission (FCC) Radio Station Authorization, confirming their technical capacity for seamless integration with the County's designated air medical radio frequencies.
- **Operational Readiness:** Aeromed maintains a fleet of four (4) aircraft strategically stationed throughout Central Florida, providing coverage 24 hours per day, seven days a week. Each aircraft is manned by a primary flight crew consisting of a Pilot, a Flight Nurse/Paramedic, and a Flight Paramedic.
- **Command and Control:** The Aeromed Communications Center operates in direct coordination with the Metro Aviation Operations Control Center. This facility is staffed 24/7 by two FAA-certified Communications Specialists, ensuring continuous operational oversight and mission safety.
- **Industry Accreditation:** Aeromed has maintained continuous accreditation from the Commission on Accreditation of Medical Transport Systems (CAMTS) since

April 2013. This voluntary accreditation signifies adherence to the highest national benchmarks for safety, quality of care, and medical transport standards.

- **Administrative Compliance:** The renewal packet (Exhibit "A") includes the required Fictitious Name Detail for Aeromed, satisfying local administrative filing requirements.
- **Performance History:** A review of County records indicates ***no reported performance issues or safety violations on file***, demonstrating a consistent history of reliable service delivery to the citizens of Manatee County.

RECOMMENDATION

Based upon the Department of Public Safety's comprehensive investigation and formal review of Aeromed's COPCN renewal application, supporting documentation, and operational data as detailed in this report, the Public Safety Director concludes that the **applicant has met all statutory and local requirements.**

Accordingly, it is the recommendation of the Director that **Aeromed's COPCN be renewed** for the provision of ALS aeromedical transport services within Manatee County.

EXHIBITS

- A. Aeromed COPCN Renewal Application and supporting documentation.
- B. Manatee County COPCN Ordinance 17-041.

Public Safety Director's Report and Recommendation Regarding Aeromed's COPCN Application is respectfully submitted on March 3rd, 2026.

Submitted by: Jodie Fiske
Public Safety Director



April 21, 2026 - Regular Meeting

Subject

Execution of the Approval of Tampa General Hospital Aeromed's Certificate of Public Convenience and Necessity (COPCN) Application Renewal Letter, Sean Dwyer, EMS Chief - All Districts

Category

CONSENT AGENDA

Briefings

Briefing Provided Upon Request

Contact and/or Presenter Information

Sean Dwyer, EMS Chief, sean.dwyer@mymanatee.org, ext. 1668; James Crutchfield, Public Safety Deputy Director, james.crutchfield@mymanatee.org, ext. 1648.

Action Requested

Authorization for the Chairperson to sign the Approval of Tampa General Hospital Aeromed's Certificate of Public Convenience and Necessity (COPCN) Application for Renewal Letter.

Enabling/Regulating Authority

Florida Statue 125.01, Florida Statue 401.25(1), Ordinance 17-041 and Manatee County Code 2-13-55(a)

Applicable Advisory Board

N/A

Background Discussion

This agenda item was continued from March 24, 2026.

Tampa General Hospital Aeromed has provided aeromedical ambulance transport services in Manatee County under a previously approved Certificate of Public Convenience and Necessity (COPCN). Having met all renewal requirements, including fee payment pursuant to Ordinance 17-041, the application has undergone a comprehensive staff review. Staff recommends approval, and the renewal is now before the Board for consideration.

Attorney Review

Not Reviewed (No apparent legal issues)

Instructions to Board Records

Email a copy of the approved agenda and signed letter to Sean Dwyer (sean.dwyer@mymanatee.org) and James Crutchfield (james.crutchfield@mymanatee.org)

Distributed 4/24/26, RT

Cost and Funds Source Account Number and Name

0010007101 EMS Operations

Amount and Frequency of Recurring Costs

No recurring costs



Department of Public Safety
2101 47th Terrace East
Bradenton, FL 34203
Phone: (941) 749-3500
mymanatee.org

March 19th, 2026

NOTICE OF NEW CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY (COPCN) APPLICATION

To: All Current COPCN Certificate Holders in Manatee County

This notice is to inform you that the Manatee County Public Safety Department has received a complete application for a Renewal Certificate of Public Convenience and Necessity (COPCN) from:

Applicant: Tampa General Hospital Aeromed
Type of Service: Advanced Life Support (ALS) Air Ambulance Services (rotor and fixed)

In accordance with Manatee County Ordinance 17-041, Section 2-13-55(a), this notice is being transmitted to all current COPCN certificate holders upon the complete filing of a new COPCN application.

The application has been filed with the Public Safety Department on the required county form and includes supporting documentation, along with the nonrefundable application fee as set by resolution.

Current certificate holders may review the application at the Public Safety Department during normal business hours. The application will be reviewed in accordance with the procedures outlined in Ordinance 17-041.

Please contact the Manatee County Public Safety Department if you have any questions regarding this notice or the COPCN application process.

VACANT
District 1

AMANDA
BALLARD
District 2

TAL SIDDIQUE
District 3

MIKE
RAHN
District 4

Dr. BOB MCCANN
District 5

JASON
BEARDEN
At Large

GEORGE W.
KRUSE
At Large



AEROMED

MANATEE COUNTY COPCN RENEWAL APPLICATION

December 2025





Manatee County
Department of Public Safety

**CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY
NON-GOVERNMENTAL ENTITY
MEDICAL TRANSPORTATION SERVICE LICENSE APPLICATION**

Please type. Answer all questions that apply to the level of service to be provided. Attach additional sheets as needed.

STATEMENTS AND MATERIALS SUBMITTED WILL BE SUBJECT TO VERIFICATION

CHECK TYPE OF APPLICATION FOR CLASSIFICATION OF SERVICE

☐ New

☒ Renewal

Florida Health Sciences, Inc. dba Tampa General Hospital

Name of Service

1 Tampa General Circle Tampa

FL

33606

Mailing Address

City

State

Zip Code

813-844-7400

Telephone

1. President and Chief Executive Officer- John D. Couris jcouris@tgh.org

Owner's Name

Email Address

1 Tampa General Circle Tampa

FL

33606

Mailing Address

City

State

Zip Code

(Attach names of elected officials)

2. Aurelia Miller- Aeromed Transport Program Director 813-844-7172(O), 812-606-0815 (C) aureliamiller@tgh.org

General Manager/Contact Person

Telephone

Email Address

3. Date incorporated/formation of business association: see attached (Attachment # included)

(Attach articles of incorporation; names and address of shareholders along with number of outstanding shares.)

4. Attach FCC license/communications contract: (Attachment # included)
5. Address of present/proposed main station and any substations (attach list if more than three (3) substations):

Main Station: See attached

Substation: _____

Substation: _____

Substation: _____

6. Financial Information: (Attachment # included)

Provide a financial statement as listed in Manatee County Administrative Code Section 15-37.

7. Insurance: (Attachment # included)

Provide copies of Certificates of Insurance

8. Vehicle information: Complete and attach appropriate form.
9. Personnel information: Complete and attach appropriate form.

10. All COPCN applicants:

A. Attach contract with a medical director as provided by State Law and include copy of DEA license.

B. Attach current medical treatment / transport protocols.

C. Identify staffing patterns and operational hours for each permitted vehicle in your fleet.

Additional requirements:

1. Minimum of three (3) letters of reference **sealed and attached to application packet.**
2. Completed local and state criminal background checks for each owner, manager, officer and/or director. (INTERNET BACKGROUND CHECKS ARE NOT ACCEPTABLE.)
3. Preceding five years business experience.
4. The financial ability of the applicant to provide the proposed services based on, at minimum, attach the following criteria:
 - a. Audited financial statements or federal tax returns or, for newly formed corporations, personal audited financial statements from the principal(s), as defined by the county administrator;
 - b. Pro forma statements;
 - c. Credit and bank references, and current official credit report;
 - d. Disclosure of any and all pending liabilities.
5. Attach the management plan of the applicant.

All applicants:

1. Return signed, notarized application along with a non refundable application fee of \$500.00, made payable to the Manatee County Board of County Commissioners.
2. Renewal applicants: COPCN/License and Vehicle permit fees will be processed separately (COPCN Application fees will be \$500.00 and Vehicle permit fees will be \$100.00 per vehicle) see fee schedule for breakdown.



AEROMED

Re: Manatee County COPCN application: List of all Officers, Directors, and Shareholders (Name, Address, Position).

- a) Tampa General Hospital: 1 Tampa General Circle Tampa, Florida 33601-1289
 - i) Business Phone # (813) 844-7758
 - ii) 24-hour Dispatch Phone # (813) 844-7400 or 1-800-727-1911
 - iii) Fax Phone # (813) 844-5773
 - iv) Contacts:
 - (1) John Couris, President, CEO
 - (2) Melissa Golombeck, Executive Vice President, COO
 - (3) Michele Moran, VP of Emergency Department, Trauma Services, and Aeromed Transport Program
 - (a) Phone Number Office (813) 844-3282
 - (b) Phone Number Cell (630) 272-9483
 - (4) Aurelia "Auri" Miller, Program Director
 - (a) Phone Number Office (813) 844-7172
 - (b) Phone Number Cell (812)606-0815
 - (c) Email: aureliamiller@tgh.org
- b) Metro Aviation, Inc., 1214 Hawn Avenue, Shreveport, LA 71107
 - i) Business Phone # (800) 467-5529
 - ii) Mike Stanberry, President, CEO
 - iii) Kenny Morrow, COO
 - iv) Todd Stanberry, Director of Business Integration
 - (a) Phone Number Office (318) 222-5529 or (800)467-5529
 - (b) Email: tstanberry@metroaviation.com

Aurelia Miller

Signature of Owner/Manager

Program Director

Title

STATE OF FLORIDA

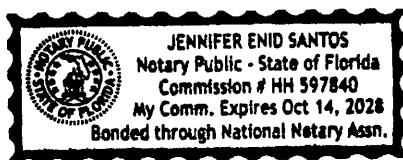
COUNTY OF MANATEE

Sworn to (or affirmed) and subscribed before me this 23rd day of December, 2025, by

Aurelia Miller

(name of person making statement).

Seal



[Signature]

(Signature of Notary Public - State of Florida)

(Print, Type, or Stamp Commissioned Name of Notary

Public)

Personally Known: ☒ OR Produced Identification ☐

Type of Identification Produced: _____



A E R O M E D

Re: Manatee County COPCN application: Previous experience and employment record of principal owners/operator:

Florida Health Sciences, Center, Inc. d/b/a Tampa General Hospital, Aeromed is a private, not-for-profit Corporation that has been in operation since March 1989. Metro Aviation, Inc. has been in operation since 1982 and is an industry leader in Part 135 air transport operations, aircraft completions, and air transport safety training. Tampa General Hospital, Aeromed partnered with Metro Aviation, Inc. in August 2013 to provide Part 135 air medical aircraft operations to include Manatee County, Florida. Tampa General Hospital is responsible for clinical operations of the program. Metro Aviation, Inc. is a Federal Aviation Administration Part 135 certificate holder and is responsible for Operational Control of Aeromed aircraft and maintenance. Aeromed and Metro Aviation, Inc. leadership teams work collaboratively to promote safety, clinical excellence, and customer service.

Aeromed:

The Aeromed program is a highly qualified and experienced hospital-based, traditional model air transport program that has been in service since 1989. Aeromed safely transports patients from the scene of an accident/event as well as providing expert care for complex, inter-facility transports. Aeromed completed 1,887 patient transports in FY 2024 and 1,809 patient transports in FY 2025. Aeromed successfully obtained Commission on Accreditation of Medical Transport Systems (CAMTS) Accreditation in April 2013, reaccreditation in 4/2016, 4/2019, 4/2022, and 4/2025 demonstrating program, hospital, and aviation vendor commitment to meeting the highest air medical industry standards. Aeromed is experienced in the transport of trauma, burn, cardiac/STEMI, transplant, surgical, pulmonary, high risk obstetric patients, pediatric, and other complex patient populations to include Aortic Emergency, intra-aortic balloon pump, ventricular assist device, and extra corporeal membrane oxygenation (ECMO) patients. Aeromed medical crews complete comprehensive initial and continuing education requirements annually to include advanced certification in accordance with CAMTS accreditation standards. Aeromed maintains a continuous quality review/performance improvement process to include voluntary submission of quality data to the GAMUT registry. Aeromed medical protocols are developed in conjunction with USF and TGH Specialty services to provide the most current, evidence-based clinical care to promote the best patient outcomes possible. In addition, the Aeromed program prides itself on value-based care maintaining reasonable air transport rates with ethical billing practices with no balanced billing of patients to date.



AEROMED

Metro Aviation, Inc.:

Metro Aviation is dedicated to providing safe, high-quality aviation and maintenance services for their customers/partners. Metro provides services to include traditional aircraft operations, completions, maintenance, and training to allow customers to safely and effectively accomplish their mission profile. Metro operates more than 140 aircraft in more than 35 programs in 22 states throughout the US. Since 1995, Metro Aviation, Inc. has been the Part 135 provider for Holmes Regional Medical Center's First Flight air medical program in Melbourne, Florida. Florida Hospital in Orlando joined the Metro family in 2005, and Aeromed partnered with Metro Aviation in 2013.

Metro Aviation requires Pilots to possess 2,000 hours for Pilot in Command (PIC) positions as well as 500 hours of cross country flight time and 100 hours of night flight time. Metro Maintenance Technicians must have current FAA airframe and Power Plant Mechanic Certificate and at least 3 years' experience.

Metro Aviation is recognized by the FAA for achieving and maintaining the highest level, level 4, Safety Management System status. Metro Aviation operates from and conducts extensive training at its 12,000 square ft. training center in Shreveport, LA. As Metro continues to expand, the company remains true to the values set forth 43 years ago and truly welcomes each customer into the Metro Aviation family.



AEROMED

Re: Manatee County COPCN application: List of address and/or describe the location of your base station and all substations.

Base	Address	Base phone #	Chief Flight Nurse (CFN) Name and Cell #
Aeromed 1	Tampa General Hospital 1 Tampa General Circle Tampa, 33606	813-844-7810	Alisha Burnett 315-416-1444
Aeromed 2	Sebring Regional Airport 128 Authority Lane Sebring, 33870	863-655-6030	John Bitner 813-352-5456
Aeromed 4	Winter Haven Regional Airport 3000 21 st St NW Hangar #10 Winter Haven, 33881	863-533-4713	Tracy Sanderson 813-486-4854
Aeromed 5	Punta Gorda Airport 27377 Mooney Ave. Punta Gorda, 33982	813-844-5995	Jimmy Holt 352-585-2595

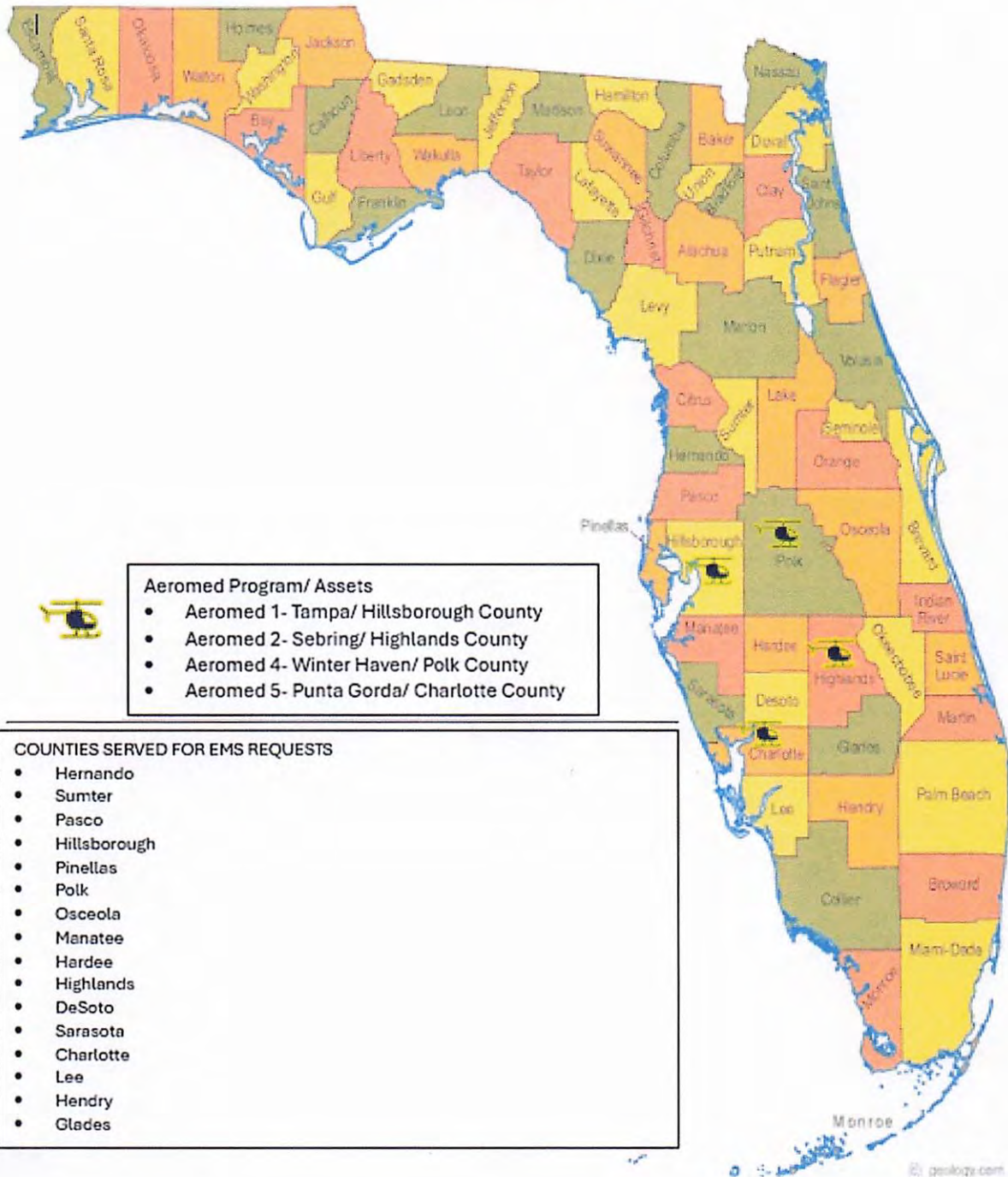


AEROMED

Re: Manatee County COPCN application: The proposed geographic area or areas to be covered by our service. Illustrated by use of attached map.

Aeromed provides prehospital and critical care interfacility air transport services in West Central Florida to include primary and secondary service in 23 counties in Florida. Aeromed completes air transports from North Florida locations to include Gainesville, Jacksonville, and Tallahassee as well as southern locations to include Miami, Ft. Lauderdale, and Palm Beach. Aeromed maintains 4 bases of operation in Hillsborough, Polk, Highlands, and Charlotte Counties with one dedicated program back up aircraft to minimize maintenance related out of service time. These bases are considered regional assets serving the counties in which they are based as well as primary, secondary, and tertiary surrounding counties. Reference the attached map.

AEROMED





AEROMED

Re: Manatee County COPCN application: Type and number of vehicles organization uses for operation and back up.

The Aeromed- Air program operates 4 aircraft bases as per the attached base spreadsheet with one dedicated backup aircraft for the program. Aeromed utilizes a Bell 407 GX aircraft as a dedicated backup to ensure continuity of operations for patients and referring customers.

Reference the below Aeromed aircraft spreadsheet for specific aircraft data.

Make	Base	Model	Year of Manufacture	Permit #	FAA Registration/Tail #/ Chassis Number	Serial #	Color Scheme
Airbus Helicopters	Aeromed 1/Tampa	BK117 C2e	2020	2021	N911TG	9855	blue/yellow
Bell Helicopter	Aeromed 2/Sebring	407 GX	2012	1744	N922TG	54375	blue/yellow
Eurocopter	Aeromed 4/ Winter Haven	EC135 P2	2008	2129	N941TG	0667	blue/yellow
Eurocopter	Aeromed 5/ Punta Gorda	EC135 P2+	2017	2130	N951TG	0942	blue/yellow
Bell Helicopter	Program Spare	407 GX	2012	1747	N955TG	54379	blue/yellow



AEROMED

Re: Manatee County COPCN application: Hours and days of operation.

Aeromed and Metro Aviation, Inc. operate 4 bases of operation (reference map and base information) with each aircraft operating 24 hours per day, 7 days per week. Each aircraft is staffed with a highly experienced, ALS/critical care trained crew comprised of a Pilot, Flight Nurse/Paramedic, and Flight Paramedic.

The Aeromed Communications Center is located at Tampa General Hospital and is staffed with two FAA-certified Communications Specialists 24 hours per day, 7 days per week. The Aeromed Communications Center is directly linked with the Metro Aviation, Inc. Operational Control Center at all times. Aviation and Medical Director support is also available 24 hours per day, 7 days per week.



AEROMED

Re: Manatee County COPCN application: Types of persons that Aeromed proposes to transport.

Aeromed provides the following services and receives comprehensive ongoing didactic training to care for and transport the following patient populations:

- Pre-hospital (scene) transport
- Critical Care, inter-facility transport
- Specialty Care transport to include:
 - Neonatal patient transport: NICU transport team and at minimum one medical crew member who functions as safety officer during air transport
 - Intra-aortic balloon pump (IABP) transport
 - Ventricular Assist device (VAD) transport
 - Extracorporeal membrane oxygenation (ECMO) transport
- Search requests
- Organ and/or Transplant Team transport
- Public relations requests (as approved by Aeromed Administration)
- Disaster Response as requested by FL DOH or other requestors and as approved by Aeromed Administration

Patient Populations:

- Trauma
- Cardiac
- Pulmonary
- Stroke/Neurological emergency
- Aortic Emergency
- Surgical
- Medical
- High Risk Obstetrical
- Burn
- Spinal Cord Injury
- Amputation/near-amputation
- Transplant
- Neonatal (utilize NICU transport team)
- Adult
- Pediatric
- Geriatric



AEROMED

Re: Manatee County COPCN application: Rate structure and method of collection of fees.

Aeromed is dedicated to keeping our rates, fares, and charges competitive and aligned with national air medical industry standards. We have benchmarked with other air transport programs and find that our rates are below the national average. Current Aeromed rates and charges are as follows:

Lift off: \$22,571.00

Loaded statute mileage rate: \$227.00

Aeromed prides itself on ethical billing practices and does not engage in balanced billing as a standard practice. Aeromed partners with Quick Med Claims to bill patient insurance carriers for air transport services.



AEROMED

Re: Manatee County COPCN application: How services will be accessible to the indigent.

Aeromed is a hospital-based, traditional model air transport program affiliated with Tampa General Hospital. Tampa General Hospital is a private, not-for-profit health system committed to providing world-class, value-based care for all Florida citizens and visitors irrespective of their ability to pay. As the regional Academic, tertiary, and quaternary care health system, we understand we will deliver charitable care as part of our mission to care for everyone, every day.



A E R O M E D

Re: Manatee County COPCN application: Additional information

Qualification of Personnel:

All Aeromed/Metro Aviation, Inc. Pilots are rated commercial pilots with a minimum of 2000 flight hours with most exceeding this required minimum. Aeromed Flight Nurse/Paramedics are required to have a minimum of 5 years Critical Care and Emergency experience. Flight Nurse/Paramedics are required to have a Florida RN license and Florida Paramedic certificate with the following requirements: basic life support (BLS), advanced cardiac life support (ACLS), pediatric advanced life support (PALS), neonatal resuscitation program (NRP), DOT Air medical crew core curriculum content completion, ATLS audit or approved advanced trauma course completion, and water egress training. Aeromed Flight Paramedics are required to have a Florida Paramedic certificate with a minimum of 5 years ALS experience. Flight Paramedics are required to maintain BLS, ACLS, PALS, NRP, DOT air medical crew core curriculum content completion, ATLS audit or approved advanced trauma course completion, and water egress training. Aeromed Flight Nurse/Paramedics and Flight Paramedics are required to obtain national advanced certification such as CFRN, CCRN, CEN, FP-C, or CCP-C as per Commission on Accreditation of Medical Transport Systems (CAMTS) Accreditation within 2 years of hire. In 2020, Aeromed updated infectious disease transport processes and conducted comprehensive simulation training to ensure our teams were providing the safest, highest quality care and transport for high acuity COVID patients.

Maintenance:

All Aeromed/Metro Aviation, Inc. Mechanics are extremely experienced and receive extensive training. Aircraft are maintained as per FAA established guidelines.

Metro Aviation, Inc. Safety Management System:

Metro Aviation, Inc. has met the highest recommended safety management system standards as per the FAA, entering level 4 in 2013.

CAMTS Accreditation:

Aeromed was awarded CAMTS accreditation in April 2013 with full reaccreditation in April 2016, April 2019, April 2022, and April 2025 demonstrating program commitment to maintaining the highest industry standards regarding Leadership/Management, Quality, Utilization Review, Education and Training, and Safety. See attached certificate.



AEROMED

Re: Manatee County COPCN application: Certification of fictitious name, two-year pro-forma budget, personnel roster, Medical Director, state license, FCC license, and insurance.

Certification of fictitious name:



DIVISION of
CORPORATIONS
an official State of Florida website

[Previous on List](#) [Next on List](#) [Return to List](#)

[Filing History](#)

Fictitious Name Detail

Fictitious Name
AEROMED

Filing Information
Registration Number G13000052453
Status ACTIVE
Filed Date 06/04/2013
Expiration Date 12/31/2028
Current Owners 1
County HILLSBOROUGH
Total Pages 3
Events Filed 2
FE/EIN Number 59-3458145

Mailing Address
ONE TAMPA GENERAL CIRCLE
TAMPA, FL 33606

Owner Information
FLORIDA HEALTH SCIENCES CENTER, INC.
ONE TAMPA GENERAL CIRCLE
TAMPA, FL 33606
FE/EIN Number: 59-3458145
Document Number: N97000003941

Document Images

[06/04/2013 -- Fictitious Name Filing](#)

[05/01/2023 -- Fictitious Name Renewal Filing](#)

[04/09/2018 -- Fictitious Name Renewal Filing](#)

[Previous on List](#) [Next on List](#) [Return to List](#)

[Filing History](#)



AEROMED

Two-year pro-forma budget:

Florida Health Sciences Center, Inc and Subsidiaries
Consolidated Income Statement
In Thousands

	Two Year ProForma	
	2023	2024
Operating Revenues		
Net Patient Service Revenue	2,198,201	2,264,147
Other Operating Revenue	286,282	273,670
Total Operating Revenue	2,484,483	2,537,817
Operating Expenses		
Salaries and Wages	831,926	828,559
Employee Benefits	197,563	215,425
Professional Fees	69,595	70,291
Medical Supplies	315,764	325,237
Pharmaceuticals	232,942	239,930
Other Supplies	38,175	39,320
Purchased Services	335,374	342,081
Utilities and Rent/Lease	61,594	62,210
Assessments	26,245	27,170
Medical Professional Costs	100,215	101,217
Insurance	43,358	43,792
Other Expense	26,661	26,928
Depreciation and Amortization	85,741	93,612
Interest Expense	35,155	34,804
Total Operating Expenses	2,400,308	2,450,576
Operating Income	84,175	87,242
Investment Returns	38,430	38,430
Donations, Income Tax, and Other	670	2,050
Net Income	123,275	127,722

FLORIDA HEALTH SCIENCES CENTER, INC. FINANCIAL INFORMATION

Operating Revenues (in millions)

Per Audit for respective years and MD&A for bonds

	2022	2023	2024
Total Operating Revenues	\$2,150.5	\$2,618.8	\$3,424.5
Operating Margin % of Total Operating Revenues	.2%	3.6%	3.4%

Community Benefits / Unreimbursed Costs (in millions)

Per Form 990 - Most recent years available

	2022	2023
Financial assistance at cost (Charity Care)	\$51.2	\$51.0
Unreimbursed Medicaid Patient Care Costs	\$140.2	\$184.1
Unreimbursed Means-Tested Government Program Care Costs	\$22.3	\$23.9
Community benefit programs and services	\$26.6	\$42.8
Total Community Benefits	\$240.3	\$301.8
Unreimbursed Medicare Patient Care Costs	\$23.9	\$40.6
TOTAL (Community Benefits and Unreimbursed Medicare Patient Care Costs)	\$264.2	\$342.4



A E R O M E D

Personnel roster: Medical

Last Name	First Name	Hire Date	RN License	Paramedic Cert
Adkins	Keland	04/13/2015	RN9526801	PMD522290
Angell	Todd	01/21/2024		PMD532800
Bitner	John	05/01/2010	RN306385	PMD523569
Blanchard	Brian	03/04/2019	RN9414343	PMD538013
Buell	Caitlyn	01/04/2016	RN9427043	PMD532340
Burnett	Alisha	11/19/2012	RN9351712	PMD528672
Burnett	Matthew	11/19/2012	RN9350430	PMD524831
Charczenko	Rebecca	01/24/2022		PMD536834
Cheek	Justin	06/02/2024		PMD530234
Connell	Noah	05/04/2009		PMD504208
Curren	Kelly	08/18/2008		PMD200304
Delinski	Daniel	06/02/2025	RN9681272	PMD547933
Denicourt	Adam	02/17/2020		PMD522566
Diaz	Megan	05/01/2023	RN9334011	PMD538737
Freas	Robert	12/01/2008	RN9271962	PMD514738
Gardner	Nathan	01/20/2025		PMD534994
Giannetti	Lorenzo	05/29/2022	RN9303584	PMD523672
Gonzalez	Micheal	08/19/2024		PMD529272
Hamilton	Tricia	12/08/2014	RN9363182	PMD528209
Hess	Sarah	08/01/2006	RN9233298	PMD518659
Holt	James	02/11/2002	RN3234652	PMD 17802
Hughes	Chadd	10/21/2002	RN9188741	PMD514896
Huston	James	01/20/2020		PMD535304
Keffeler	Jotham	07/08/2002	RN9188997	PMD511240
Kresge	Daniel	05/10/1992	RN2835822	PMD 19693



A E R O M E D

Lindner	Matthew	12/10/2023		PMD533537
Maslonka	Justin	05/14/2018		PMD523574
McNally	Kyle	03/16/2015		PMD522253
Miller	Aurelia	08/15/2016	RN9235532	PMD517437
Miller	Kyle	01/19/2015		PMD515588
Miller	Scott	06/06/1994	RN2903102	PMD01060
Nelson	Charles	04/19/1999		PMD13652
Pearson	Richard	03/05/2007	RN9213405	PMD531844
Peterson	Jessica	11/15/2023	RN9433404	PMD524722
Rader	Mariya	02/27/2017	RN9449997	PMD534683
Recinella	Kim	06/05/2023	RN9411257	PMD539840
Richardson	Donald	06/04/2001	RN2793692	PMD17762
Sanderson	Tracy	03/14/2001	RN9175288	PMD205819
Stevenson	Wendi	11/03/2014	RN9363653	PMD527618
Sukovich	Cory	08/07/2023		PMD527185
Tavakoli	Renee	07/25/2011	RN9293069	PMD531529
Turgeon	Cedric	08/18/2008		PMD201623
Vazquez	Luis	05/06/2024		PMD533270
Velar	Thomas	10/25/2021		PMD512198
Wood	Amanda	04/14/2025	RN9481048	PMD544555
Wright	Luke	01/21/2024		PMD526864



A E R O M E D

Personnel roster: Aviation

Pilot	Certificate / Type	Medical
Bastien, Christopher A.	3182392 / ATP	Oct-25
Bendall, Graham P.	3798631 / Comm	Mar-26
Boudreau, Mark G.	3777514 / Comm	Dec-25
Dennison, David M.	3036012 / Comm	Jan-26
Edgar, Ted O.	3317571 / Comm	Dec-25
Fuller, Danielle	3224790 / ATP	Dec-25
Jolly, Karl D.	3395580 / ATP	Dec-25
Koehler, Sara A.	2737969 / Comm	Feb-26
Linares, Stephen G.A.	3388159 / ATP	Feb-26
Loftin, Michael 'Chad'	3507075 / Comm	Oct-25
Moruzzi, Robert 'Robb'	4174848 / Comm	Aug-26
Myers, Alexander C.	3334022 / Comm	Aug-26
Myers, John H. III	3340989 / Comm	Apr-26
O'Shannon, Stuart K.	3339472 / Comm	Feb-26
Thompson, Scott R.	2806587 / ATP	Jul-26
Wineka, Brent	2849073 / Comm	Dec-25



Attestation of Recruitment and Employment Policy Compliance

This attestation is made on behalf of Tampa General Hospital and affirms that the organization's Recruitment and Employment Policy govern all employment offers and pre-employment screening requirements and takes precedence over any individual attestation, representation, or understanding to the extent of any inconsistency.

On behalf of Tampa General Hospital, the following is attested:

1. Employment Offers

Any written offer or verbal confirmation of employment is contingent upon the satisfactory completion of the pre-employment screening process. Such offers do not constitute an employment contract and do not alter the at-will nature of employment with Tampa General Hospital.

2. Post-Offer Screening for Candidates

In accordance with established policy, all candidates who accept an offer or conditional offer of employment are subject to post-offer screening, including but not limited to the following:

Criminal History Check

- o A criminal history check is conducted on all candidates who accept offers or conditional offers of employment.
- o A conviction, plea of guilty or nolo contendere (no contest), or disposition of adjudication withheld for a crime relevant to the duties of the position may be grounds for disqualification.
- o In making determinations, Tampa General Hospital considers the seriousness and nature of the offense, time elapsed, evidence of rehabilitation, the position applied for, and the job-relatedness of the conviction or disposition.
- o A candidate with an arrest pending disposition or an outstanding warrant for arrest may be deemed ineligible for consideration until the matter is resolved and a final disposition is issued. An arrest pending disposition is defined as an arrest occurring within the last eighteen months that has not resulted in a conviction or other final disposition and remains pending.
- o Background check consent documents are valid for the duration of employment and may be used for internal investigative purposes at any time during active employment.

Medicare Sanction Check



- o Candidates are screened against the Office of Inspector General (OIG) database to verify the absence of prior Medicare fraud or other sanctionable conduct.

This attestation confirms that the Recruitment and Employment Policy is the controlling authority and is applied consistently. This attestation acknowledges compliance with the policy and does not replace, supersede, or override it.

The undersigned certifies that this attestation is accurate and complete to the best of their knowledge.

Signature: Martyn Flowers
Martyn Flowers
Senior Human Resources Business Partner
Tampa General Hospital



AEROMED

Medical Director License:

STATE OF FLORIDA DEPARTMENT OF HEALTH DIVISION OF MEDICAL QUALITY ASSURANCE		
DATE	LICENSE NO.	CONTROL NO.
MARCH 12, 2024	OS 15248	103842

THE OSTEOPATHIC PHYSICIAN
NAMED BELOW HAS MET ALL REQUIREMENTS OF
THE LAWS AND RULES OF THE STATE OF FLORIDA

EXPIRATION DATE: MARCH 31, 2026

STEPHANIE MICHELE TERSHAKOVEC
1 TAMPA GENERAL CIRCLE
TAMPA, FL - 33606

Ron DeSantis
GOVERNOR

Joseph A. Ladapo, MD, PhD
STATE SURGEON GENERAL

Scan QR Code for
License Authentication

DISPLAY IF REQUIRED BY LAW

STATE OF FLORIDA
DEPARTMENT OF HEALTH
DIVISION OF MEDICAL QUALITY ASSURANCE

THE OSTEOPATHIC PHYSICIAN
NAMED BELOW HAS MET ALL REQUIREMENTS OF
THE LAWS AND RULES OF THE STATE OF FLORIDA

STEPHANIE MICHELE
TERSCHAKOVEC

EXPIRATION DATE: MARCH 31, 2026

LICENSEE SIGNATURE

CONTROLLED SUBSTANCE REGISTRATION CERTIFICATE UNITED STATES DEPARTMENT OF JUSTICE DRUG ENFORCEMENT ADMINISTRATION WASHINGTON D.C. 20537		
DEA REGISTRATION NUMBER	THIS REGISTRATION EXPIRES	FEE PAID
BF5651662	09-30-2027	\$858
SCHEDULES	BUSINESS ACTIVITY	ISSUE DATE
2,2N,3, 3N,4,5	HOSPITAL/CLINIC	08-07-2024
FLORIDA HLTH SCIENCES CTR TAMPA GENERAL HSPTL, PHCY DPT 1 TAMPA GENERAL CIR TAMPA, FL 336063571		

Form DEA-223 (9/2016)

Sections 304 and 1008 (21 USC 824 and 958) of the
Controlled Substances Act of 1970, as amended, provide
that the Attorney General may revoke or suspend a
registration to manufacture, distribute, dispense, import or
export a controlled substance.

THIS CERTIFICATE IS NOT TRANSFERABLE ON CHANGE OF OWNERSHIP, CONTROL, LOCATION, OR BUSINESS ACTIVITY,
AND IT IS NOT VALID AFTER THE EXPIRATION DATE.

DEA REGISTRATION NUMBER	THIS REGISTRATION EXPIRES	FEE PAID
BF5651662	09-30-2027	\$858
SCHEDULES	BUSINESS ACTIVITY	ISSUE DATE
2,2N,3, 3N,4,5	HOSPITAL/CLINIC	08-07-2024
FLORIDA HLTH SCIENCES CTR TAMPA GENERAL HSPTL, PHCY DPT 1 TAMPA GENERAL CIR TAMPA, FL 336063571		

Form DEA-223 (9/2016)

CONTROLLED SUBSTANCE-REGULATED CHEMICAL
REGISTRATION CERTIFICATE
UNITED STATES DEPARTMENT OF JUSTICE
DRUG ENFORCEMENT ADMINISTRATION
WASHINGTON D.C. 20537

Sections 304 and 1008 (21 USC 824 and 958) of the
Controlled Substances Act of 1970, as amended, provide
that the Attorney General may revoke or suspend a
registration to manufacture, distribute, dispense, import or
export a controlled substance.

THIS CERTIFICATE IS NOT TRANSFERABLE ON CHANGE OF
OWNERSHIP, CONTROL, LOCATION, OR BUSINESS ACTIVITY,
AND IT IS NOT VALID AFTER THE EXPIRATION DATE.

REPORT
CHANGES
PROMPTLY

REQUESTING MODIFICATIONS TO YOUR
REGISTRATION CERTIFICATE

To request a change to your registered name, address, the drug
schedule or the drug codes you handle, please:

1. visit our web site at deafirmenline.usdoj.gov - or
2. call our customer Service Center at 1-800-882-6339 - or
3. submit your change(s) in writing to:
Drug Enforcement Administration
P.O. Box 2630
Springfield, VA 22152-2630

See Title 21 Code of Federal Regulations, Section 1301.51
for complete instructions.



AEROMED

State License:



**STATE OF FLORIDA
DEPARTMENT OF HEALTH
BUREAU OF EMERGENCY MEDICAL OVERSIGHT**

AIR AMBULANCE SERVICE LICENSE

This is to certify that: FLORIDA HEALTH SCIENCES CENTER INC. Provider Number # 2905
DBA TAMPA GENERAL HOSPITAL, AEROMED
Name of Provider

1 TAMPA GENERAL CIRCLE TAMPA, FL 33606
Address

has complied with Chapter 401, Florida Statutes, and Chapter 64J-1, Florida Administrative Code, and is authorized to operate as an Air Ambulance Service subject to any and all limitations specified in the applicable Certificate(s) of Public Convenience and Necessity and/or Mutual Aid Agreements for the County(s) listed below:

CHARLOTTE, CITRUS, DESOTO, GLADES, HARDEE, HIGHLANDS, HILLSBOROUGH,
MANATEE, OKEECHOBEE, PASCO, PINELLAS, POLK, SARASOTA
County(s)

Michael Hall, Section Administrator
Emergency Medical Services
Florida Department of Health

THIS CERTIFICATE EXPIRES ON: 01/17/2026

This certificate shall be posted in the above mentioned establishment



AEROMED

FCC License:



Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: HILLSBOROUGH COUNTY HOSPITAL AUTHORITY

ATTN: BRIAN TURNER
HILLSBOROUGH COUNTY HOSPITAL AUTHORITY
1 TAMPA GENERAL CIRCLE
PO BOX 1289
TAMPA, FL 33601

Call Sign WQUJ274	File Number 0008547102	
Radio Service AF - Aeronautical and Fixed		
Station Class FA		
Coast Id	Sel Call	Aviation Id

FCC Registration Number (FRN): 0006164339

Grant Date 04-24-2019	Effective Date 04-24-2019	Expiration Date 01-05-2029	Print Date 04-25-2019
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STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 Address: TAMPA GENERAL HOSPITAL HELIPORT
City: Tampa County: HILLSBOROUGH State: FL
Lat (NAD83): 27-56-17.3 N Long (NAD83): 082-27-32.9 W ASR No.: 1230459 Ground Elev: 1.0
No. of units:

Antennas

Loc No.	Ant No.	Frequencies (MHz)	Emission Designator	Output Power (watts)	Hours of Operation	Ant. Ht./Tp meters	Construct Deadline Date
1	1	000122.82500000	6K00A3E	10.000		38.0	

Control Points

Associated Call Signs

Waivers/Conditions:

Request for waiver of Section 1.949 granted on 04/24/2019. In future, licensee must comply with the Commission's procedures for license renewals. See Public Notice, DA 03-1974 (rel June 16, 2003)

Conditions:

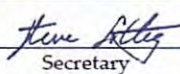
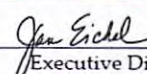
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

FCC 601-CG
August 2007



AEROMED

CAMTS Certificate:

The Board of Directors of			
			
Commission on Accreditation of Medical Transport Systems			
hereby awards accreditation to			
Tampa General Hospital Aeromed			
From April 8, 2025 to April 8, 2028			
Presented in recognition for substantial compliance with CAMTS Accreditation Standards in quality care and safety for patients requiring medical transport in the following categories:			
Modes of Transport	Patient Types (Care and Transport)	Patient Types (Transport Only)	Levels of Service
☐ Fixed Wing	☒ Adult	☐ Adult	☒ Critical Care
☒ Rotorwing	☒ PICU	☐ PICU	☒ Specialty Care
☐ Surface Critical Care	☒ IABP	☐ IABP	☐ Special Operations
☐ Ground ALS	☒ Perinatal	☐ Perinatal	☐ ALS (Air)
☐ Ground BLS	☒ Neonatal	☐ Neonatal	☐ ALS (Ground)
☐ Medical Escort	☐ ECMO	☐ ECMO	☐ BLS (Ground)
	☒ Inhaled Nitric Oxide (INO)	☐ Inhaled Nitric Oxide (INO)	
The Medical Transport Service is granted this Certificate of Accreditation by the authority of			
Commission on Accreditation of Medical Transport Systems			
An organization with equal representation from each of the following member organizations:			
Aerospace Medical Association Air Medical Operators Association Air Medical Physicians Association Air & Surface Transport Nurses Association American Academy of Pediatrics American Association of Critical Care Nurses American Association of Respiratory Care American College of Emergency Physicians American College of Surgeons Association of Air Medical Services Association of Critical Care Transport		Emergency Nurses Association International Association of Medical Transport Communications Specialists International College of Advance Practice Paramedics National Air Transportation Association National Association of EMS Physicians National Association of Neonatal Nurses National Association of State EMS Officials National EMS Pilots Association United States Transportation Command Liaison	
The Commission on Accreditation of Medical Transport Systems is dedicated to improving the quality of patient care and safety of the transport environment for services providing rotorwing, fixed wing, surface transport systems, and mobile integrated health.			
 Chair	 Secretary	 Executive Director	



AEROMED

Insurance:



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
12/29/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER MARSH USA LLC 1560 Sawgrass Corporate Pkwy, Suite 300 Sunrise, FL 33323		CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL: ADDRESS:	
CN103090951-1-GAW-25-26		INSURER(S) AFFORDING COVERAGE	
INSURED Florida Health Sciences Center, INC 1 Tampa General Circle Tampa, FL 33606		INSURER A: American Zurich Insurance Company NAIC # 40142	
		INSURER B: American Guarantee & Liability Ins Co 26247	
		INSURER C: Zurich American Insurance Company 16535	
		INSURER D:	
		INSURER E:	
		INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** ATL-005675718-05 **REVISION NUMBER:** 4
THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSURER	TYPE OF INSURANCE	ADDITIONAL SUBROGATION	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIED PER: ☒ POLICY ☐ PROJECT ☐ LOC OTHER:		GLA 2681161 - 19	05/01/2025	05/01/2026	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 1,000,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
B	☒ AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ OWNED ☐ AUTO ONLY ☐ HIRE ☐ AUTO ONLY ☐ SCHEDULED ☐ AUTO ☐ NON-OWNED ☐ AUTO ONLY		GLA 2681161 - 19	05/01/2025	05/01/2026	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ EACH OCCURRENCE \$ AGGREGATE \$
	☐ UMBRELLA LIAB ☐ OCCUR ☐ EXCESS LIAB ☐ CLAIMS-MADE DED RETENTION \$					EACH OCCURRENCE \$ AGGREGATE \$
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N/A	6482348 (AOS) 6482350 (FL) S/R \$500,000	10/01/2025 10/01/2025	10/01/2026 10/01/2026	☒ PER STATUTE ☐ OTHER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Re: Public Convenience and Necessity (COPCN) to operate in Manatee County, FL

CERTIFICATE HOLDER

Manatee County Board of County Commissioners
1112 Manatee Avenue West
Bradenton, FL 34205

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Marsh USA LLC

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ACORD 25 (2016/03)

The ACORD name and logo are registered marks of ACORD



AEROMED

STARR

INSURANCE COMPANIES
3354 Peachtree Road NE, Suite 1000
Atlanta, GA 30326

Certificate of Insurance

Certificate Holder: FLORIDA HEALTH SCIENCES CENTER INC., D/B/A TAMPA GENERAL HOSPITAL
1 TAMPA GENERAL HOSPITAL
TAMPA, FL 33601

Named Insured: METRO AVIATION, INC.
P.O. BOX 7008
SHREVEPORT, LA 71137

Policy Period: From: SEPTEMBER 1, 2025 To: SEPTEMBER 1, 2026

Policy Number: SASICOM60005725-16

Issuing Company: STARR INDEMNITY & LIABILITY COMPANY (30% LINE SHARE)
AND FOLLOWING MARKETS AS HELD ON FILE

This is to certify that the policy(ies) listed herein have been issued providing coverage for the listed insured as further described. This certificate of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policy(ies) listed herein. Notwithstanding any requirement, term or condition of any contract, or other document with respect to which this certificate of insurance may be concerned or may pertain, the insurance afforded by the policy(ies) listed on this certificate is subject to all the terms, exclusions, and conditions of such policy(ies).

Year	Aircraft: Make and Model	Reg No.	Insured Value	Deductibles NIM / IM	Liability Limit	
	ANY SCHEDULED AIRCRAFT OPERATED BY THE NAMED INSURED			AS ENDORSED	\$100,000,000	CSL INCL PAX

STARR INDEMNITY & LIABILITY COMPANY HAS A 30% LINE SHARE OUT OF 100% FOR THIS PLACEMENT. THE REMAINING PERCENTAGE IS PLACED ELSEWHERE AND NOT EVIDENCED HEREIN. THIS INSURANCE PLACEMENT IS ON A SUBSCRIPTION/QUOTA SHARE BASIS INCLUDING MULTIPLE INSURERS. STARR INDEMNITY & LIABILITY COMPANY'S OBLIGATION UNDER THE REFERENCED INSURANCE POLICY IS SEVERAL AND NOT JOINT MEANING THAT STARR INDEMNITY & LIABILITY COMPANY IS SOLELY RESPONSIBLE FOR THE LINE SHARE LISTED ABOVE AND IS NOT RESPONSIBLE FOR THE REMAINING PERCENTAGE OF THE PLACEMENT INSURED ELSEWHERE.

LOCATIONS: TAMPA GENERAL HOSPITAL, TAMPA GENERAL HOSPITAL BROOKSVILLE, TAMPA GENERAL HOSPITAL SPRING HILL, TAMPA GENERAL HOSPITAL CRYSTAL RIVER, AND TGH BRANDON HEALTHPLEX.

THE CERTIFICATE HOLDER(S) AND ITS AFFILIATES AND SUBSIDIARIES IS/ARE INCLUDED AS AN ADDITIONAL INSURED BUT ONLY AS RESPECTS OPERATIONS OF THE NAMED INSURED.

A WAIVER OF SUBROGATION AS RESPECTS PHYSICAL DAMAGE COVERAGE IS PROVIDED.

THE INSURANCE EVIDENCED BY THIS CERTIFICATE SHALL NOT APPLY TO, AND NO PERSON OR ORGANIZATION TO WHICH COVERAGE IS EVIDENCED IN THE CERTIFICATE SHALL BE INSURED FOR BODILY INJURY OR PROPERTY DAMAGE WHICH ARISES FROM THE DESIGN, MANUFACTURE, MODIFICATION, REPAIR, SALE, OR SERVICING OF AIRCRAFT BY THAT PERSON OR ORGANIZATION.

Certificate Number: AV187
Issued By and Date: AUGUST 15, 2025 (RH)

Star 10200 (6/06)

By

(Authorized Representative)



AEROMED

LOOKING GLASS

INSURANCE SERVICES, LLC

12555 High Bluff Dr. Ste 385
San Diego, CA 92130
(858) 321-3636

Policy Schedule

Named Insured: METRO AVIATION, INC.
Policy Period: From: SEPTEMBER 1, 2025 To: SEPTEMBER 1, 2026
Insurance Coverage(s): AIRCRAFT HULL & LIABILITY

SCHEDULE OF INSURERS

INSURERS	POLICY NUMBERS(S)
Star Indemnity & Liability Company	SASICOM60005725-16
Air Centurion on behalf of SiriusPoint America Insurance Company	ACQG-SP-00080-10
National Union Fire Insurance Company of Pittsburgh, PA through AIG Aerospace Insurance Services, Inc.	FQ 013468509-06
Allianz Global Risks US Insurance Company	A1GA001385725AM
Great American Insurance Company	QS E426958-07
XL Specialty Insurance Company	UA00017490AV25A
Continental Indemnity Company through Applied Underwriters Insurance Services	BAVQFHNLA011500_131001_03
Endurance American Insurance Company through W Brown & Associates	NQC6068084

SEVERAL LIABILITY NOTICE

The subscribing insurers' obligations under contracts of insurance to which they subscribe are several and not joint and is limited solely to the extent of their individual subscriptions. The subscribing insurers are not responsible for the subscription of any co-subscribing insurer who for any reason does not satisfy all or part of its obligations. LSW 1001 (Insurance)



AEROMED

Air Carrier Certificate:



US Department
of Transportation
Federal Aviation
Administration

Air Carrier Certificate

This certifies that

**METRO AVIATION, INC.
1214 HAWN AVENUE
SHREVEPORT, LA. 71107**

has met the requirements of the Federal Aviation Act of 1958, as amended, and the rules, regulations, and standards prescribed thereunder for the issuance of this certificate and is hereby authorized to operate as an air carrier and conduct common carriage operations in accordance with said Act and the rules, regulations, and standards prescribed thereunder and the terms, conditions, and limitations contained in the approved operations specifications.

This certificate is not transferable and, unless sooner surrendered, suspended, or revoked, shall continue in effect indefinitely.

By Direction of the Administrator

William Lloyd Kelley
(Signature)

Manager
(Title)

ASW-ESDO-03
(Region/Office)

Certificate number: HDNA610E

Effective Date: August 13, 1985

Reissued: November 15, 2007

Issued at: ASW-ESDO-03



AEROMED

Air Worthiness Certificates:

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1 NATIONALITY AND REGISTRATION MARKS N911TG	2 MANUFACTURER AND MODEL AIRBUS HELICOPTERS INC MBB-BK 117 C-2	3 AIRCRAFT SERIAL NUMBER 9855	4 CATEGORY Transport
5 AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to 49 U.S.C. § 44704 and certifies that, as of the date of issuance, this aircraft has been inspected and found to conform to its type certificate and be in condition for safe operation. This aircraft meets the requirements of the applicable airworthiness standards in Annex 8 to the Convention on International Civil Aviation, except as follows: NONE			
6 TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the FAA, this airworthiness certificate is effective as long as maintenance, preventative maintenance, and alterations are performed per the applicable Federal Aviation Regulations and the aircraft is registered in the United States.			
DATE OF ISSUANCE R- 20/Jul/2020	FAA REPRESENTATIVE //Signed by//Milton Kimmell Geltz, 06:34 PM, May 19, 2021		DESIGNATION NUMBER 294096223
Any alteration, misuse, or reproduction of this certificate for a fraudulent purpose may be punishable by certificate revocation, fine, and / or imprisonment. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT PER THE APPLICABLE FEDERAL AVIATION REGULATIONS. FAA Form 8100-2 (9-2019) Previous Edition May be Used Until Depleted			



AEROMED

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION
STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N922TG	Bell Helicopter Textron Canada Ltd 407	54375	Normal

5 AUTHORITY AND BASIS FOR ISSUANCE: This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein. Exceptions:

NONE

6 TERMS AND CONDITIONS: Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE	FAA REPRESENTATIVE	DESIGNATION NUMBER
(R) Nov. 28, 2012	<i>Jerry M. Keyser</i> Jerry M. Keyser	DART-830547-EA

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years or both.
THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2 (3-08)

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION
STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N955TG	Bell Helicopter Textron Canada Ltd 407	54379	Normal

5 AUTHORITY AND BASIS FOR ISSUANCE: This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein. Exceptions:

NONE

6 TERMS AND CONDITIONS: Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE	FAA REPRESENTATIVE	DESIGNATION NUMBER
(R) Dec. 12, 2012	<i>Jerry M. Keyser</i> Jerry M. Keyser	DART-830547-EA

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years or both.
THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2 (3-08)



AEROMED

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1. NATIONALITY AND REGISTRATION MARKS N911PX	2. MANUFACTURER AND MODEL EUROCOPTER DEUTSCHLAND GMBH EC135P2+	3. AIRCRAFT SERIAL NUMBER 0667	4. CATEGORY Normal
5. AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein. Exceptions: NONE			
6. TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.			
DATE OF ISSUANCE 30 SEPT 08	FAA REPRESENTATIVE Hilson K. Geltz	DESIGNATION NUMBER DART703008SW	
Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.			
FAA Form 8100-2 (8-02)		* U.S. G.P.O.: 1998 689-038	

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1. NATIONALITY AND REGISTRATION MARKS N911LF	2. MANUFACTURER AND MODEL Eurocopter Deutschland GmbH EC135 P2+	3. AIRCRAFT SERIAL NUMBER 0942	4. CATEGORY Normal
5. AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to 49 U.S.C. § 44704 and certifies that, as of the date of issuance, this aircraft has been inspected and found to conform to its type certificate and be in a condition for safe operation. This aircraft meets the requirements of the applicable airworthiness standards in Annex 8 to the Convention on International Civil Aviation, except as follows: None			
6. TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the FAA, this airworthiness certificate is effective as long as maintenance, preventative maintenance, and alterations are performed per the applicable Federal Aviation Regulations and the aircraft is registered in the United States.			
DATE OF ISSUANCE R 11 Apr 2017	FAA REPRESENTATIVE Richard G Cabra	DESIGNATION NUMBER DART- 834197- SW	
Any alteration, misuse, or reproduction of this certificate for a fraudulent purpose may be punishable by a fine not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT PER THE APPLICABLE FEDERAL AVIATION REGULATIONS.			
FAA Form 8100-2 (11-2015) Previous Edition Dated 04-11 May be Used Until Depleted			

AEROMED MEDICAL PROTOCOLS



Stephanie Tershakovec, DO
Medical Director-Aeromed
Updated January 2026

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Aeromed Medical Control

The Aeromed Medical Director has authorized Aeromed Medical Crew members to perform patient care, procedures, and administer medications as documented in the Aeromed Medical Protocols. The Aeromed Medical Protocols are developed collaboratively with Specialty Care Physicians and services to include: Transplant, Burn, Pediatrics, Neurology, Neurosurgery, Cardiac, Obstetrics, etc. to meet the needs of the patient populations served by the Aeromed transport program. The Aeromed Medical Director participates in Aeromed Quality Management and medical crew member training to ensure competency and currency.

Aeromed Medical Control is as follows:

- The Aeromed Medical Director will be the primary resource for Aeromed Medical Control.
- For Interfacility transports, the accepting Physician will be utilized for Medical Control.
- In the event the Aeromed Medical Director is not available, a designee will be selected and communicated to the Aeromed Program Director/Manager and Medical crewmembers to include:
 - TGH Attending ED MD
 - USF/TGH Senior Emergency Medical Resident
- Medical Control designees will receive training from the Aeromed Medical Director to meet the following requirements:
 - Board certified in Emergency Medicine and/or specialty equivalent.
 - Knowledge of Federal, State, and Local access to care laws.
 - Knowledge of Aeromed Flight Nurse/Paramedic, Flight Paramedic capabilities and scope of practice.
 - Knowledge of Aeromed Medical Protocols.
 - Knowledge of Aeromed aircraft and patient care capabilities.
 - Knowledge of altitude physiology and stresses of flight.

I. Standard Patient Care Requirements

- Regardless of the illness or injury, certain basic care requirements will be provided to all patients transported.
- A secure airway is mandatory. Tracheal intubation is preferred. LMA is the preferred rescue airway. Cricothyrotomy is to be used as the last resort in the event of a failed airway.
- IV/IO access is mandatory.
- Must take Aeromed monitor to scene call. Must place patient on Aeromed monitor upon every patient contact.
- All appropriate monitoring is mandatory throughout care and until care is transferred.
- The patient will be secured in the aircraft with a minimum of 3 cross straps and shoulder harness per CAMTS standards. If necessary, the patient can be further restrained for safety.
- Unconscious and multiple trauma patients will have an oral or nasogastric tube if not contraindicated by facial injury, and if time permits.
- All patients with altered mental status will have an Accu-check blood glucose done unless a recent (within 2 hours) blood chemistry from the referring facility demonstrates a normal or high blood glucose.
- All patients less than 1 year old will have an Accu-check blood glucose done unless a recent (within 1 hour) blood chemistry from the referring facility demonstrates a normal or high blood glucose.
- All saline locks shall be flushed at the referring facility to check for patency.
- All IV medication infusions will have the label checked for accuracy.
- Referring facility infusion pumps may be utilized to maintain continuity of infusions, such as tPA, if the pump is approved for use on Aeromed aircraft and crewmembers have received competency-based training for the approved infusion pump.
- All pt's with advanced airways: O2 saturation (SpO2), Capnography (ETCO2) and ventilator use are mandatory. Cuff pressure will be evaluated and maintained at 20-30cmH2O.
- Any medication drips that are currently being delivered to the patient will be called ahead in patient report to allow ample time to receive the medication from the pharmacy prior to the patient's arrival if possible.
- Continuous waveform capnography is required on ALL patients with advanced airways. A printed waveform strip will be attached to the chart as confirmation and at turnover of care.

II. Medical Emergencies

Anaphylaxis

- Quickly evaluate airway patency and cardiopulmonary status. Initiate CPR if indicated. Do not delay airway establishment.
 - o NOTE: Intubation may be difficult with laryngeal edema. If unsuccessful, cricothyrotomy should be performed.

- For mild reaction (itching, hives):
 - o Diphenhydramine (Benadryl):
 - Adult dose: 25-50 mg IV or IM
 - Pediatric dose: 1mg/kg IV or IM (Max dose 50mg), given slowly over 5-10 minutes
 - Contraindicated <6 months old

- For moderate reaction (dyspnea, wheezing, chest tightness):
 - o Albuterol:
 - Adult/Pediatric dose: 2.5mg/3ml NS updraft. Repeat x 2 if wheezing persists.
 - o Diphenhydramine (Benadryl):
 - Adult dose: 25-50 mg IV or IM
 - Pediatric dose: 1mg/kg IV or IM (Max dose 50mg), given slowly over 5-10 minutes
 - Contraindicated <6 months old
 - o Glucocorticoid:
 - Not helpful immediately in management but should be started in moderate or severe reactions early to prevent protracted or recurrent symptoms.
 - Methylprednisolone (Solu-Medrol):
 - Adult dose: 125mg IV push
 - Pediatric dose: 1mg/mg IV (Max dose 125mg)

- OR
 - Dexamethasone (Decadron)
 - Adult dose: 10mg IV push
 - Pediatric dose: 0.6 mg/kg (Max dose 10mg) IV push

- For severe reaction/anaphylaxis (SBP <90, stridor, severe respiratory distress):
 - o Epinephrine (for rapidly progressive worsening of symptoms):
 - Adult dose: 0.3 mg of 1:1000 (1 mg/ml) solution IM
 - Pediatric dose: 0.01 mg/kg (max dose 0.3mg) IM
 - The initial dose may be repeated q 5-15 minutes as needed if signs of severe reaction or shock persist after initial dose.
 - If anaphylaxis has resulted from an injection or sting, given one half of the second injection of Epinephrine 1:1000 0.1-0.3 ml in the sting or injection site to reduce antigen absorption. (DO NOT inject in fingers, nose, toes, or penis).
 - o Following epinephrine administration, administer the same treatment for moderate reaction.

- For shock or vascular collapse:
 - o Begin a large bore IV of normal saline. 1-2 liters of fluid may be needed in the adult in the first hour of therapy to maintain systolic blood pressure at or above 100mmHg. In pediatrics, use the largest bore IV possible, bolus with 20 ml/kg of normal saline and repeat if necessary.
 - Massive fluid shifts can occur rapidly due to increased vascular permeability, with transfer of up to 35% of the intravascular volume into the extravascular space within minutes.
 - o Continue to give IV fluids, as it may require 6-7 liters to restore intravascular volume in the adult patient. 100 ml/kg in the pediatric patient. Monitor for fluid overload/pulmonary edema.
 - o For cardiac arrest, administer Epinephrine 1:10,000 (0.1 mg/ml) solution IV (instead of 1:1000, or 1mg/ml, IM)

- Adult dose: 1mg IV, every 3 to 5 minutes
- Pediatric dose: 0.01 mg/kg (max dose 1mg) IV, every 3 to 5 minutes
- o In the setting of vascular collapse or cardiac arrest, the same treatment for moderate reaction should be performed in the post-resuscitative phase, if time allows.
- o Vasopressors may be needed if fluids and IM epinephrine fail to maintain an adequate blood pressure.
- Epinephrine infusion:
 - Adult/pediatric dose: 0.05 mcg/kg/min, titrate q 2-3 minutes by 0.05 mcg/kg/minute until BP and perfusion improve (Max dose 0.3 mcg/kg/min)
 - H2 blockers may be continued if already started at referring institution.
 - For angioedema – epinephrine therapy is generally most efficacious. Be prepared to intubate early if patient is not improving. Oral swelling can proceed rapidly.

Aortic Emergencies

History and Physical

- Obtain pertinent history and document accordingly. This includes, but is not limited to:
 - o Onset of chest/back/abdominal pain
 - o Quality of pain
 - o Any associated syncopal or stroke/TIA symptoms
 - o History of prior aortic surgery
 - o History of prior coronary events/intervention
 - o History of active/prior tobacco use and/or oxygen supplementation
 - o History of chronic renal insufficiency or contrast allergy
- Document physical exam findings that are pertinent to aortic emergencies including, but not limited to:
 - o Bilateral arm blood pressure
 - o Asymmetric pulses
 - o Neurological deficits
 - o Pulsatile abdominal mass
 - o Mental status
- Documentation of imaging modality used to make diagnosis
 - o If applicable, document classification of aortic dissection (if known).
 - Type A: involves ascending aorta
 - Type B: involves descending aorta only
 - o If applicable, document classification of aortic aneurysm (if known)
 - Ascending
 - Descending Thoracic
 - Thoracoabdominal
 - Abdominal

General Guidelines

- Rapid transport to a facility with Cardiothoracic/Vascular Surgery.
- Measures to control blood pressure and heart rate **without** delaying transport should be initiated.
 - o Goal: decrease pulsatile load and aortic stress (↓ BP, ↓ HR) to minimize chance of aortic rupture
- Keep patient warm with established measures (blankets, aircraft heater, etc.)
- Begin 2 large bore peripheral IV lines.
- Administer oxygen as necessary to maintain SPO2 greater than 92%.
- Pain management: see **Pain Management Protocol**
 - o Consider fentanyl over morphine due to short acting nature
 - o Consider lower dosing due to risk of hypotension/bradycardia and oversedation
- Avoid oversedation if possible. Sedatives/anxiolytics are very long acting and can rapidly decrease blood pressure when used in this patient population.
- Nausea/Vomiting: Ondansetron (Zofran) 4-8 mg IV PRN.
- Avoid intubation if GCS, airway protection, and vital signs are appropriate.

Impulse Control Guidelines

Blood Pressure and Heart Rate Goals in Aortic Emergencies		
Condition	Systolic Blood Pressure Goal	Heart Rate Goal
- Aneurysm, not ruptured - Dissection - Contained rupture - Pseudoaneurysm - Incidental finding of increased size aneurysm - Symptomatic endoleak - Endoleak causing any of the above	100-120 mmHg	Less than 80 (goal 60-80)
Confirmed or suspected rupture	90-110 mmHg	Less than 80 (goal 60-80)
<i>Maintain lowest SBP and HR that provides adequate peripheral perfusion, but SBP not less than 90 mmHg</i>		

- Continue Referring facility's prior medication for heart rate and blood pressure, if agents have been selected appropriately. Goal is rapid transport.
- Blood pressure should be monitored continuously via an arterial line if possible. If not possible, monitor BP via cuff pressure every 5 minutes.
- If vasoactive agents have been started and the BP is unstable, consider arterial line insertion if appropriately trained (see procedural protocol).
 - If there is a dissection through a subclavian artery, do not insert arterial line on side of dissection. If an arterial line has been inserted, it should be transduced and monitored during transport. **Do not delay transport.**
- Beta-blockers are first-line medications to administer for **SBP** and **HR** goals
 - Contraindications* for beta blockers (esmolol, labetalol, metoprolol): HR <50, 2nd or 3rd degree heart block, sick sinus syndrome, decompensated heart failure, cardiogenic shock. Use caution with HR <60.
 - Esmolol** is preferred agent as it is short acting and easily titratable.
 - Loading Dose: 1mg/kg over 1 minute (max 80mg)
 - Maintenance Dose: 150-300 mcg/kg/min, titrate every 4-5 minutes by 50 mcg/kg/min. **Re-bolus to be given with each up titration.**
 - Relative Max Dose: 300 mcg/kg/min

	Bolus	New Infusion Dose
Initiation	1mg/kg (Max 80mg)	150 mcg/kg/min
Titration	1mg/kg (Max 80mg)	200 mcg/kg/min
Titration	1mg/kg (Max 80mg)	250 mcg/kg/min
Titration	1mg/kg (Max 80mg)	300 mcg/kg/min

- Alternative beta-blockers include **Labetalol**
 - Labetalol:** 10 mg IV push over 2 minutes, repeat every 10 minutes as needed with double dose from last x 3 doses (10mg → 20mg → 40mg)

- Vasodilators are second-line medications to administer for **SBP** goals (do not give prior to beta-blockers as they can cause a reflex tachycardia, although *may provide initially if beta blockers contraindicated*)
 - o **Nicardipine (Cardene)**
 - Initial infusion: 5 mg/hr, increase 2.5 mg/hour every 5 minutes
 - Max Dose: 15 mg/hr
 - o **Sodium Nitroprusside (Nipride)**
 - Initial infusion: 0.25-0.5 mcg/kg/min, increase 0.25-0.5 mcg/kg/min every 2 minutes
 - Max Dose: 10mcg/kg/min
 - o **Clevidipine (Cleviprex)**
 - Initial infusion: 1-2 mg/hr, may double rate of infusion every 90 seconds
 - As the blood pressure approaches goal, the dose should be increased by less than doubling every 5-10 minutes
 - Recommended maintenance dose: 4-6 mg/hr
 - Max dose: 21 mg/hr
- **Metoprolol** is a second-line medication to administer for **HR** goals (SBP at goal, but HR >80)
 - o See above section on beta-blocker *contraindications*
 - o **Metoprolol**: 5 mg IV push over 2 minutes, repeat every 5 minutes as needed x 3 doses
- Hold vasoactive agents for systolic blood pressure less than 100 mmHg.

Hypotensive Patients

- For worsening hypotension, give fluids and blood only if systolic blood pressure is **less than 90 mmHg**.
- Bolus patient with 250 mL normal saline and repeat if needed x 3 boluses (warm if environmental conditions warrant). Consider giving blood if patient is still hypotensive after 3rd normal saline bolus (See Blood Protocol).
- If still hypotensive (SBP <90) after 2 units of blood, initiate a vasopressor.
 - o **Norepinephrine** is the preferred first line agent: 0.05 – 0.3 mcg/kg/min
 - o **Phenylephrine**: 0.4 – 5 mcg/kg/min

Asthma/Reactive Airway Disease/COPD

General Guidelines:

- ❖ Patient with a history of being intubated in the past may deteriorate rapidly.
 - ❖ Never sedate asthmatics unless necessary to facilitate endotracheal intubation. You may cause them to lose their respiratory drive.
 - ❖ Document bilateral lung sounds.
 - ❖ Continuously monitor SpO2 and EtCO2.
- Administer oxygen by nasal cannula 4-6 liters per minute in all patients except those with COPD. In COPD patients, administer oxygen with target SpO2 of 88-92%, to minimize the risk of worsening hypercapnia with excess supplemental oxygen. A non-rebreather mask should be used if the patient will tolerate it.
 - Albuterol 2.5 mg/3ml NS updraft. Consider giving 2 consecutive doses in adults as needed. Pediatric dose: 2.5 mg/3ml.
 - If no improvement with nebulizer treatment, consider use of positive pressure ventilation. May continue nebulizers with PPV.
 - Administer Glucocorticoid if wheezing persists after first nebulizer treatment.
 - o Methylprednisolone (Solu-Medrol)
 - Adult dose: 125mg IV push
 - Pediatric dose: 1mg/kg IV (Max dose 125 mg)
 - OR
 - o Dexamethasone (Decadron)
 - Adult dose: 10mg IV push
 - Pediatric dose: 0.6 mg/kg (Max dose 10 mg) IV push
 - Administer Magnesium Sulfate for severe reactions unresponsive to initial treatment
 - o Adult dose: 2 grams IV over 10 minutes
 - o Pediatric dose: 50 mg/kg IV over 20 minutes
 - Contraindicated if history of renal failure
 - Do not use if CHF suspected
 -
 - Epinephrine IM may be used in patients with extremis. Use with cautions in patients with history of cardiac disease or age >55.
 - o Adult dose: 0.3 mg of 1:1000 solution (1 mg/ml) solution IM
 - o Pediatric dose: 0.01 mg/kg (max dose 0.3mg) IM
 - o The initial dose may be repeated q 10-20 minutes as needed.
 - Consider intubation if the patient is showing signs of severe fatigue, cyanosis, confusion, or combativeness despite the above treatment.
 - o The patient should be intubated and ventilated to maintain SpO2 greater than 92%.
 - o Monitor airway pressures carefully. Barotrauma may be evidenced as increased pressure necessary to ventilate. Think of possible tension pneumothorax if the patient decompensates after intubation or PPV.
 - o Drug of choice for continued sedation after intubation in asthmatic patients is Ketamine (see drug protocol), although routine medications may be used (see Sedation protocol).
 - Ventilator settings:
 - o 4-6 ml/kg
 - o Prolonged I:E ratio
 - o Low to no PEEP (0-3 cm H2O)
 - o Maintain PIP <40 cm H2O (if possible)

Cardiac Arrest

Cardiac Arrest General Approach

In the event a patient suffers cardiac arrest in the presence of EMS, the absolute highest priority is to apply the AED/Defibrillator and deliver a shock immediately if indicated. In the setting of cardiac arrest not witnessed by EMS, perform CPR immediately and continuously while setting up for rhythm analysis and delivery of shocks. If shockable rhythm present, deliver shock without delay. It may be appropriate to avoid rapid transportation in order to prioritize quality chest compressions and early defibrillation when possible.

- Check responsiveness. Open airway, check breathing, feel for carotid pulse.
- If a pulse is not definitely felt within 10 seconds, immediately begin chest compressions while preparing to apply AED/Defibrillator.
 - o Determine cardiac rhythm and refer to appropriate protocol for further management actions.
- Manage airway with focus on minimal interruptions in chest compressions.
 - o 30:2 compression ratio for assisted ventilations. Bag valve mask is an acceptable method to manage airway – it may be preferable in many cases to prioritize compressions and defibrillation while waiting for return of pulses to establish an advanced airway.
 - We recommend placement of nasal cannula on high flow O2 for passive apneic oxygenation while giving assisted ventilations, and this nasal cannula should be attached to capnography on monitor to determine quality of chest compressions and resuscitation efforts.
 - o If unable to achieve quality ventilations with BVM, proceed with placement of supraglottic airway or endotracheal tube.
 - Either method of securing airway should be confirmed with capnography, and failure to achieve four-phase wave form capnography should result in removal of the airway.
 - Limit endotracheal tube placement efforts to two attempts. Failure to secure airway at this point should result in placement of a supraglottic device, with confirmation of placement of the SGA by capnography.
 - Waveform capnography strip should be printed and attached to patient care record as documentation of airway confirmation. Failure to do so can result in disciplinary action.
 - o Once advanced airway is established, maintain ventilation rate of 8-10 breaths per minute. Avoid hyperventilation as this will decrease venous return to the heart, resulting in decreased perfusion pressure to the brain and heart.
 - o Follow algorithm for specific rhythm.
 - o Establish peripheral IV or Adult Intraosseous Access (IO may be preferred if IV is not easily and quickly established)
 - All medications listed for IV access can be given IO
 - Endotracheal delivery of Epinephrine, Naloxone, and Atropine is an acceptable last resort if peripheral IV or IO access cannot be achieved.
 - When delivered via endotracheal tube, administer 2-2.5 times the IV dose diluted in 5-10mL of 0.9% NS or sterile water.

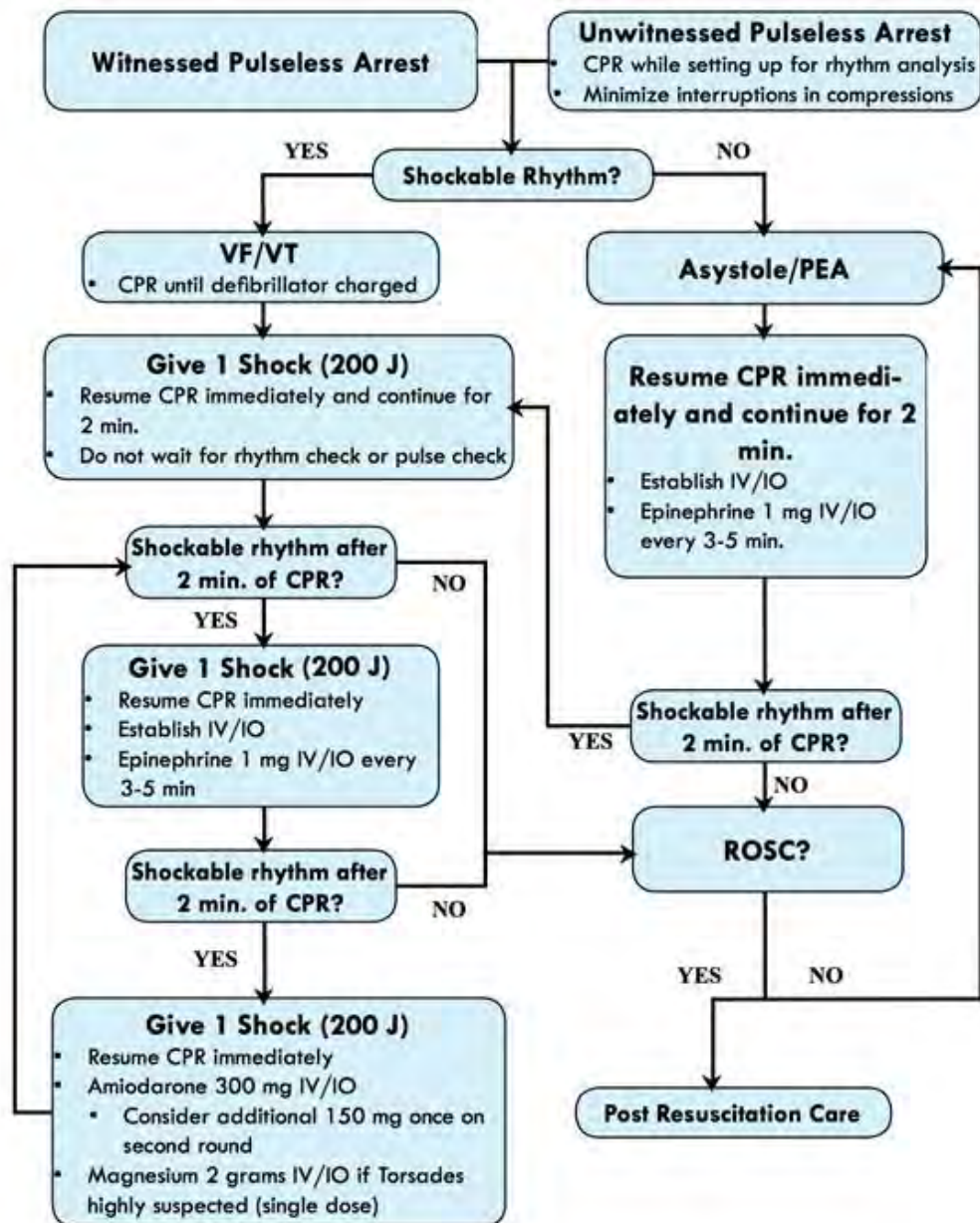
Important Principles for Cardiac Arrest Management

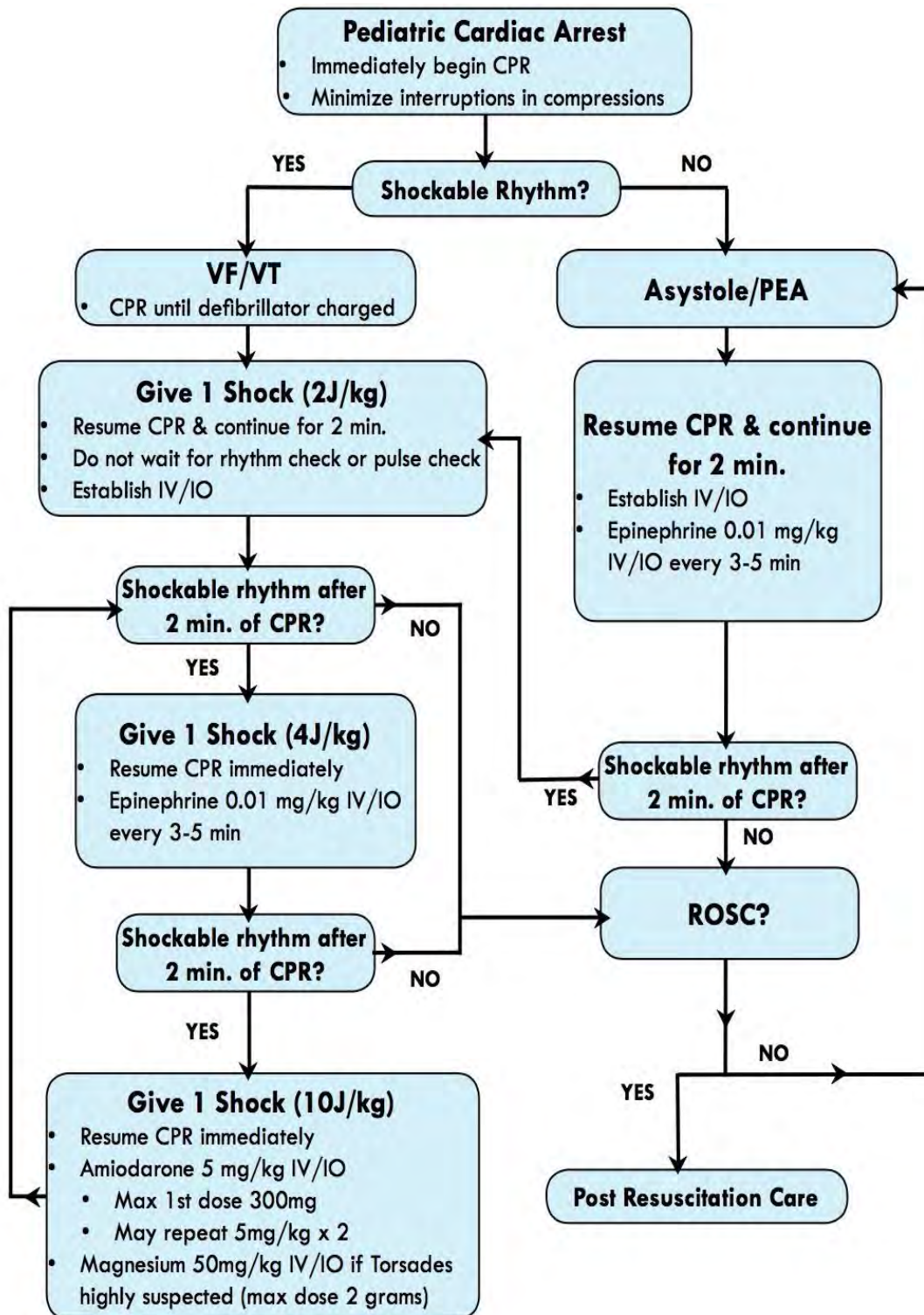
Minimize interruptions in chest compressions

- o Compressions should begin immediately upon identifying pulselessness
- o Compressions should be continuous (no pause for ventilation if advanced airway established)
- **Minimize time between ceasing compressions and delivering shocks in VF/VT**
 - o **Whenever possible, continue CPR while defibrillator is charging**
 - o **Avoid hyperventilation (use rate of 8-10 breaths/minute)**
- **Capnography is required on every patient with an ETT or SGA in place, and recommended for patients receiving BVM using nasal cannula with high flow O2.**
 - o Allows rapid assessment of ROSC (marked by a sudden increase in ETCO2 value).
 - o Consider the H's and T's that may have caused the arrest.
- In pediatrics, check blood glucose and treat glucose < 70mg/dL

H's	T's
Hypoxia	Toxins
Hypovolemia	Tamponade (Cardiac)
Hydrogen Ion (Acidosis)	Tension Pneumothorax
Hyperkalemia	Thrombosis, Pulmonary
Hypothermia	Thrombosis, Cardiac

Cardiac Arrest General Approach





Cardiac Arrest – Asystole (Adult)

- When asystole is seen on the cardiac monitor confirmation of the rhythm shall include a printed rhythm strip, as well as interpretation of the rhythm in more than one lead. Low amplitude V-Fib or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation.
- Follow Cardiac Arrest – General Approach Protocol
- Consider and treat possible causes

Potential Cause	Treatment
Hypoxia	Secure airway and ventilate
Hyperkalemia	Sodium Bicarbonate 1meq/kg IV/IO Calcium Chloride 1 gram IV/IO
Hypothermia	Active rewarming
Toxins (Drug Overdose)	See below

- Epinephrine 1:10,000 1mg IV/IO every 3-5 min during arrest
- Drug overdoses (see Overdose/Toxic Ingestion Protocol)
 - o Calcium Chloride 1 gram IV/IO for calcium channel blocker OD
 - Avoid if patient on digoxin
 - o Sodium Bicarbonate 1mEq/kg IV/IO for Tricyclic Antidepressant OD
 - o Naloxone 2mg IV/IO 4mg, IN if using a pre-packaged nasal injector
 - When narcotic overdose is likely, repeat every 3-5 min
 - May be given IM or via ETT if no IV/IO available

Cardiac Arrest – Pulseless Electric Activity (Adult)

- Follow Cardiac Arrest – General Approach Protocol
- Consider and treat possible causes:

Potential Cause	Treatment
Hypovolemia (most common cause)	Normal saline 1-2 Liters IV/IO
Hypoxia	Secure airway and ventilate
Hydrogen ion (acidosis)	Sodium Bicarbonate 1meq/kg IV/IO
Hyperkalemia (end stage renal disease)	Sodium Bicarbonate 1meq/kg IV/IO Calcium Gluconate 1 gram IV/IO
Hypothermia	Active rewarming
Toxins (drug overdose)	See below
Tamponade, cardiac	Normal saline 1-2 Liters IV/IO Expedite transport
Tension pneumothorax	Needle thoracostomy
Thrombosis, coronary	Expedite transport
Thrombosis, pulmonary	Expedite transport

- Epinephrine 1:10,000 1mg IV/IO every 3-5 min during arrest
- Drug overdoses (see Overdose/Toxic Ingestion Protocol)
 - o Calcium Chloride 1 gram IV/IO for calcium channel blocker OD
 - Avoid if patient on digoxin
 - o Sodium Bicarbonate 1mEq/kg IV/IO for Tricyclic Antidepressant OD
 - o Naloxone 2mg IV/IO, 4mg IN if using a pre-packaged nasal injector
 - When narcotic overdose is likely, repeat every 3-5 min
 - May be given IM or via ETT if no IV/IO available

Cardiac Arrest - Asystole/PEA (pediatric):

- Confirm the presence of asystole in two leads
- Minimize any interruptions in chest compressions
- Using the most readily available route, administer (during CPR):
- Epinephrine (1:10,000) 0.01mg/kg IV/IO every 3-5 min during arrest
 - o If no IV/IO available, Epinephrine (1:1,000) 0.1mg/kg (max of 10mg) diluted in 5mL of NS via endotracheal tube; give 5 manual ventilations after drug administered
- Treat any suspected contributing factors:
 - o If hypovolemic, administer normal saline 20mL/kg IV/IO bolus; may repeat x 2 (to a maximum total of 60mL/kg)
 - o If hypoxic, secure airway and assist ventilation
- BVM is sufficient to address hypoxia and assist ventilation
 - o If hypothermic, rewarm
 - o If hyperkalemia suspected (history of renal failure/dialysis):
- Calcium Gluconate 20mg/kg IV/IO (maximum dose 1 gram)
- Sodium bicarbonate 1mEq/kg IV/IO (maximum dose 50mEq)
 - o If toxin ingestion, see Pediatric Overdose Protocol
- Assess for tension pneumothorax:
 - o Unilateral decreased or absent lung sounds (may see tracheal deviation away from collapsed lung field)
 - o Evidence of hemodynamic compromise
 - o If tension pneumothorax suspected due to history or condition, perform pleural decompression at 2nd intercostal space, mid-clavicular line

Cardiac Arrest – Ventricular Fibrillation/Pulseless Ventricular Tachycardia (Adult)

- Follow Cardiac Arrest – General Approach Protocol
- Defibrillate at 200J as soon as possible for witnessed VF/VT:
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Perform 2 minutes of compressions prior to defibrillation attempt in unwitnessed arrest.
- Analyze rhythm after 2 minutes of good CPR; if VT/VT persists:
- Defibrillate
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Epinephrine 1:10,000 1mg IV/IO every 3-5 min during arrest
- Analyze rhythm after 2 minutes of good CPR; if VT/VT persists:
- Defibrillate
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Amiodarone 300mg IV/IO bolus
 - o For persistent VF/VT, give Amiodarone 150mg IV/IO bolus on second round
- Continue cycle of CPR & Drug & Rhythm check & Shock as needed
- Transport to the nearest Emergency Department
- Additional interventions to consider in special circumstances:
 - o Magnesium Sulfate 2G IV/IO push over 1-2 min only if suspected polymorphic VT (torsades de pointes) or hypomagnesemic state (chronic alcohol, diuretic use)
 - o Sodium Bicarbonate 1mEq/kg IV/IO if suspected hyperkalemia (e.g. dialysis patient) or tricyclic antidepressant OD

Ventricular Fibrillation or Pulseless Ventricular Tachycardia (Pediatric)

- Defibrillate at 2J/kg (maximum 200 J on biphasic device)
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Analyze rhythm after two minutes of good CPR; if VF/VT persists:
- Defibrillate at 4J/kg (maximum 200 J)
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Epinephrine (1:10,000) 0.01mg/kg IV/IO every 3-5 min during arrest
 - o If no IV/IO available, Epinephrine (1:1,000) 0.1mg/kg (max of 10mg) diluted in 5mL of NS via endotracheal tube; give 5 manual ventilations after drug administered
- Analyze rhythm after two minutes of good CPR; if VF/VT persists:
- Defibrillate at 10J/kg (maximum 200 J on biphasic device)
 - o All subsequent shocks at 10J/kg (maximum 200 J on biphasic device)
- Continue CPR immediately after shock (do not stop to check pulse or rhythm)
- Amiodarone 5mg/kg IV/IO bolus (maximum individual dose 300mg)
 - o For persistent VF/VT, repeat Amiodarone 5mg/kg IV/IO bolus on second and third round (maximum total dose 15mg/kg)
- Continue cycle of CPR & Drug → Rhythm Check → CPR → Shock → CPR & Drug → Rhythm Check → CPR → Shock as needed
- Magnesium Sulfate 50mg/kg IV/IO for suspected torsades de pointes

Cardiac Arrest – Post Resuscitation Care

- Ensure appropriate monitoring (cardiac, O2 saturations, EtCO2)
- Ensure vital sign checks every 5 minutes
- Monitor for and treat agitation and seizures
 - o See **Sedation and Seizure Protocols**
- Monitor for and treat pain
 - o See **Pain Management Protocol**
- Assess any available lab work (electrolytes, CBC, etc) and correct/treat if able
 - o Attention to Magnesium, Calcium, Hemoglobin/Hematocrit
- If patient remains comatose post arrest and target temperature therapy has been initiated, maintain this therapy and monitor core temperature
- Treat hyperthermia/fever (>38°C) aggressively
- Treat hypoglycemia as indicated by **Hypoglycemia Protocol**
- Obtain a 12-Lead EKG and initiate STEMI Alert if criteria exists.
- Treat arrhythmias as indicated by **Cardiac Arrhythmias Protocol**
- If cardiac arrest reoccurs, refer to appropriate algorithm based on presenting rhythm.
 - o Total cumulative dose of Amiodarone should not exceed 450mg (300mg +150mg)
- *Optimize Ventilation and Oxygenation*
 - o Maintain airway. If patient airway has been successfully managed with BVM until this point, consider placement of advanced airway as per protocol.
 - o Titrate FiO2 to maintain saturation 94-99% or as appropriate to patient's condition
 - o If advanced airway is in place, target EtCO2 to 35-45mmHg unless patient condition requires different (i.e. – severe acidosis needing to maintain lower EtCO2 for compensation)
- *Assess and Treat for Persistent Shock*
 - o Identify and treat contributing factors – H's & T's – See specific Protocols as applicable
 - Hypovolemia
 - Hypoxia
 - Hydrogen Ion (acidosis)
 - Hypoglycemia
 - Hypo/hyperthermia
 - Hypo/Hyperkalemia
 - Tension Pneumothorax
 - Tamponade
 - Thrombosis
 - Trauma
 - o For hypotension (systolic BP < 90mmHg):
 - Administer NS 0.5-1 Liter bolus (adult) or 20ml/kg bolus (pediatric)
 - If hypotension not improved by fluid boluses, or when fluid boluses are contraindicated, titrate to maintain SBP >90:
 - Norepinephrine infusion at 0.05-0.3 mcg/kg/min
 - Epinephrine infusion at 0.05-0.3 mcg/kg/min
- *Transport Decision*
 - o Transport post arrest pediatric patients to a critical care pediatric facility if able
 - o Transport to nearest PCI (Percutaneous Intervention) Capable Hospital

Cardiac Arrhythmias

General Considerations

- Advanced Cardiac Life Support will be delivered by the Medical Crew to patients with dysrhythmias, according to the standards set by the American Heart Association Guidelines (see attached algorithms).
- Rapid scene survey: is there any evidence that personnel should not attempt resuscitation (DNRO, obvious signs of death, etc.).
- Any cardiac patient at increased risk for ventricular tachycardia, ventricular fibrillation or heart block should have multi-function pads placed on the thorax prophylactically, prior to transport.
- Assess and identify dysrhythmia. Document with rhythm strip.
- Secure airway and administer 100% O₂ via NRBM or BVM. Use extra caution in administering oxygen to patients with COPD. Use rate and depth of respiration, mental status, SPO₂, ETCO₂ to observe for signs of hypercarbia. If noted, reduce oxygen flow to 2 lpm via nasal cannula.
- Initiate IV access or IO.
- BCLS maneuvers are vital. Follow current AHA current AHA guidelines/standards.
- Perform 12-lead EKG on initial assessment if time permits, and always perform 12-lead EKG after cardioversion or administration of antiarrhythmic. Provide copy of all rhythm strips/EKGs to accepting hospital.

Bradycardia with a Pulse

- Universal Patient Care Protocol
- Assess for appropriateness based on clinical conditions
- Some adults or teenagers have a resting heart rate below 50 beats per minute, however this may or may not be an acute bradyarrhythmia
- Identify and treat the underlying cause
 - o Bradycardia can result from medications, cardiac disease (including myocardial infarction), respiratory disorders, toxins, head injury/trauma, or other serious causes
- Ensure a patent airway and provide oxygen if indicated
- Apply the cardiac monitor and identify the rhythm, check a blood pressure, and pulse oximetry
- Obtain IV access
- Perform a 12 lead EKG
- Examine for signs of hypoperfusion (hypotension, altered mental status, signs of shock, chest pain, symptoms of heart failure)
- If these are not present, monitor patient en route to the hospital
- If these are present:
 - o **Adult:** Administer Atropine 1 mg IV, and repeat every 3-5 minutes as needed, up to 3mg total
 - o **Pediatric:** Administer Atropine 0.02mg/kg (minimum 0.1mg maximum 0.5mg) IV, and repeat every 3-5 minutes as needed, up to 1.0 mg total
 - o If atropine is unsuccessful, consider one of the following interventions as second line therapy.
 - Transcutaneous Pacing **or**
 - Norepinephrine 0.05-0.3 mcg/kg/min IV drip **or**
 - Epinephrine 0.05-0.3 mcg/kg/min IV drip
 - o Bolus NS 500ml (adult) or 20ml/kg with max 500ml (pediatric) if there are signs of hypovolemia

- Strongly consider Online Medical Control consultation

Tachycardia with Pulse

- Universal Patient Care Protocol
- May be a primary dysrhythmia, such as atrial fibrillation, supraventricular tachycardia, or ventricular tachycardia with a pulse. Alternatively, tachycardia may result from another primary problem such as anemia, dehydration, hemorrhage, medication/drug use or withdrawal, anxiety or pain. Management of the patient will hinge on identifying whether the patient is **stable** or **unstable**, and identifying any underlying cause.
- Perform vital signs, paying special attention to blood pressure and oxygen saturation.
 - o Identify rhythm using cardiac monitor, and treat immediately if patient is unstable. If time allows, 12 lead EKG is preferred for interpretation of rhythm.
- Identify and treat underlying causes.
- Maintain patient airway, assist breathing as necessary, and provide supplemental oxygen if indicated.
- Refer to **Pain Management Protocol** if indicated.
- Unstable patients (as evidenced by hypotension, acutely altered mental status, signs of shock, ischemic chest pain, or acute heart failure) should be treated with synchronized cardioversion.
 - o **Adult:**
 - Initial recommended dose is dependent on rhythm
 - Narrow, regular: 50-100J
 - Narrow, irregular: 120-200J
 - Wide, regular: 100J
 - Wide, irregular: defibrillation dose (NOT synchronized)
 - May administer Midazolam (Versed) 1-2mg IV/IN prior to cardioversion if time allows.
 - o **Pediatric:**
 - Begin with 0.5-1J/kg; if not effective, increase to 2J/kg.
 - May administer Midazolam (Versed) 0.1mg/kg (max of 1-2mg) prior to cardioversion if time allows.
- Stable patients who are asymptomatic likely will not benefit from immediate treatment. It is certainly reasonable to treat these patients with close observation, and rapid transport as opposed to administration of an anti-arrhythmic medication.
 - o For patients who are not unstable, but who are symptomatic, determine whether rhythm is regular or irregular, and whether QRS complex is wide or narrow.
 - Irregular, narrow complex tachycardias (most likely atrial fibrillation), administer
 - Diltiazem 0.25 mg/kg (maximum 20mg) IV over 2 minutes.
 - May be repeated in 15 minutes if initial dose ineffective.
 - Use of diltiazem is contraindicated if patient has history of WPW (be especially concerned in the presence of atrial fibrillation with a widened QRS)
 - If Heparin drip already started, maintain at dosage/rate
 - Regular, narrow complex tachycardias (most likely supraventricular tachycardia if rate >160), attempt vagal maneuvers, then treat with adenosine if vagal maneuvers are unsuccessful.
 - Treatment of sinus tachycardia should be aimed at treating underlying cause, and not with vagal maneuvers or antidysrhythmic administration.
 - Vagal maneuvers can include having the patient bear down (instruct to contract abdominal muscles), having patient blow through a straw, or performance of carotid massage. Auscultate bilateral carotids to rule out bruit prior to

performance of carotid massage. Carotid massage is more effective when performed with patient in Trendelenburg position, if time allows.

- Vagal maneuvers can include having the patient bear down (instruct to contract abdominal muscles), having patient blow through a straw, or performance of carotid massage. Auscultate bilateral carotids to rule out bruit prior to performance of carotid massage. Carotid massage is more effective when performed with patient in Trendelenburg position, if time allows.
- Adenosine dosing:
 - ◆ **Adult:**
 - First dose, 6mg rapid IV push, followed by rapid NS flush.
 - Second dose of 12mg may be repeated in 3 minutes if initial dose is ineffective.
 - ◆ **Pediatric:**
 - 0.1mg/kg rapid bolus (max 6mg) followed by rapid saline flush.
 - Repeat in 3 minutes if needed with *Adenosine* 0.2mg/kg (maximum 12mg).
- **Adult only:** Diltiazem 0.25mg/kg (maximum 20mg) IVP may be given if SBP > 100 and vagal maneuvers and adenosine are ineffective.
 - ◆ Contact online medical control for recommendations regarding treatment with diltiazem for pediatrics if indicated.
- Regular, wide complex tachycardias (most likely ventricular tachycardia), administer Amiodarone:
 - **Adult:**
 - ◆ 150mg over 10 minutes.
 - ◆ Follow by maintenance infusion of 1mg/min for 6hrs.
 - After 6 hours dose should be reduced to 0.5mg/min
 - **Pediatric:**
 - ◆ 5mg/kg (maximum 300mg) over 20 minutes
- Torsades de pointes, or polymorphic VT, should be treated with Magnesium Sulfate:
 - **Adult:** 2G (in 100mL D5W), slow infusion over 15 minutes
 - **Pediatric:** 50mg/kg IV/IO (maximum 2G) over 10 minutes
 - Consider possibility of hyperkalemia as etiology of wide-complex tachycardia (especially in dialysis patients), and treat with Calcium Gluconate 1G IV/IO if suspected (see **Hyperkalemia Protocol**)
- Irregular, wide complex tachycardias:
 - Can include the following scenarios:
 - ◆ Atrial fibrillation with pre-excitation (eg, Wolf Parkinson White syndrome)
 - ◆ Atrial fibrillation with aberrancy (bundle branch block)
 - ◆ Polymorphic VT/torsades de pointes
 - DO NOT use AV nodal blockers as they can precipitate V-Fib (beta blockers, calcium channel blockers, digoxin, amiodarone, adenosine)
 - Procainamide if available. If not available, continue with transport.
 - ◆ **Adult:**
 - Loading Infusion: 20-50 mg/min (start at 20mg/min) until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given.
 - Maintenance infusion: 1-4 mg/min (not to be given long term).
 - Avoid if prolonged QT or CHF
 - ◆ **Pediatric:**
 - 15mg/kg given over 30-60 minutes or until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%.

Chest Pain/Cardiac Dysfunction – Adult

Advanced Cardiac Life Support (ACLS) will be delivered to these patients by the Aeromed Flight Crew according to the guidelines set by the American Heart Association (AHA). All cardiac patients will be transported on a cardiac monitor and defibrillator.

- Myocardial Infarction / Chest Pain (thought to be of cardiac origin)
 - o Obtain vital signs and pertinent medical history, including medications for erectile dysfunction / PDE-5 inhibitors (sildenafil/Viagra, tadalafil /Cialis, vardenafil/Levitra), and any medications given by the referring facility prior to arrival. Determine and document patient's level of pain and/or anxiety. Listen to both lung fields and assess respiratory effort.
 - o Obtain 12 lead EKG.
 - o Begin an IV of NS at KVO.
 - o Initiate supplemental oxygen therapy only for SpO2 <90%, respiratory distress, or other high-risk features of hypoxemia.
 - o Administer Aspirin 325 mg PO if not already received, unless contraindicated.
 - o Control chest pain by using:
 - Nitroglycerin – 0.4 mg sublingual if SBP >100. May repeat q 5-10 minutes x 3 doses.
 - Avoid NTG in patients with inferior MI or signs of RV infarct; or recent use of a PDE-5 inhibitor (sildenafil/Viagra, tadalafil /Cialis, vardenafil/Levitra)
 - May also use Morphine or Fentanyl (see **Pain Management Protocol**).
 - Patients with stable vital signs and no pain relief to above may be placed on NTG drip (see IV drug calculation section). Begin at 0.5 mcg/kg/min. Titrate to control chest pain, maintaining SBP of 90-100 mmHg.
 - o Consider treatment of tachycardia with metoprolol (Lopressor) 5mg over 1-2 minutes. May be repeated q5 minutes for 3 doses max.
 - Use with caution in patients with asthma or uncontrolled heart failure.
 - Use is contraindicated in patients with hypotension (SBP <100) or signs of shock.
 - o Treat hypotension (SBP <100) with NS 250-500cc bolus. If patient remains hypotensive after 2 boluses, prepare a Norepinephrine infusion. Dose: 0.05 – 0.3 mcg/kg/min. Maintain SBP >90.
- Do not treat isolated PVCs.

Gastrointestinal Emergencies

Abdominal Pain

- If pain is above the umbilicus, perform cardiac monitoring and 12-lead EKG
- IV NS KVO or IV lock
 - o If evidence of dehydration (tachycardia, dry mucous membranes, poor skin turgor), administer boluses of NS at 250mL (hold at 500mL if no hypotension)
- Administer ondansetron (Zofran) 4mg IV as needed for nausea/vomiting.
 - o For patients with moderate to severe pain, refer to **Pain Control Protocol**.

Upper and lower GI bleeding

- Two large bore IV's should be started with infusion of normal saline or lactated ringers.
- Prior to the administration of blood products, at least one of the following criteria must be met (see **Blood Products Protocol**).
 - o Medical illness/condition suggestive of significant blood volume loss evident by clinical presentation and supported by lab values (Hgb <7, Hct <21) if available.
 - o SBP <90mmHg x2 readings and sustained heart rate >120 following and/or other signs of hypoperfusion following 500 ml or 10ml/kg for pediatric patients <50 kg of crystalloid infusion (includes EMS/referring facility fluid administration).
- Administer ondansetron (Zofran) 4mg IV as needed for nausea/vomiting.
- In the pediatric patient, refer to Special Considerations in Pediatric/Infant Assessment and Resuscitation Circulatory Support

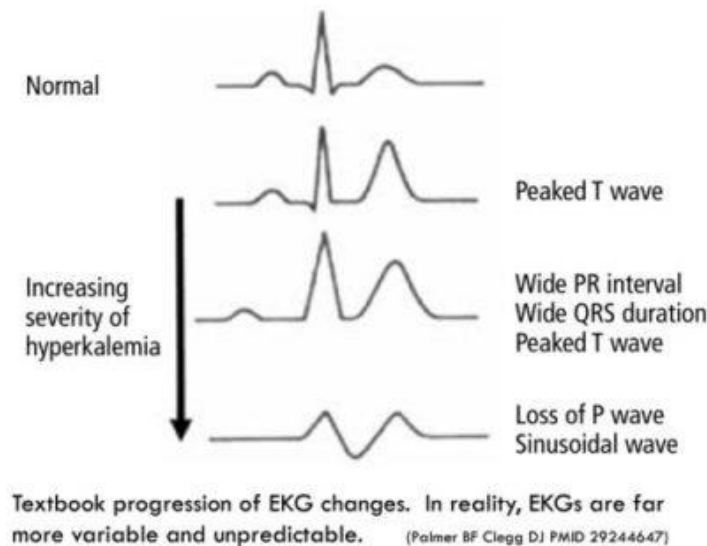
Bowel Obstruction / Ileus

- A large unclamped NG tube is necessary prior to transport. Low intermittent suction is desirable if available.
- Consider rectal tube insertion.
- Altitudes above 2000 feet should be avoided.

Hyperkalemia (Serum potassium >5.5 mEq/liter)

Treatment: Urgency of therapy depends on EKG findings and level of serum potassium. If serum K is **greater than 8 mEq/L**, if the EKG shows the changes of hyperkalemia, or if the patient is extremely symptomatic:

- Give Calcium Gluconate,
 - o Adult: 1 gram of a 10% solution IV over 2 minutes.
 - o Pediatric dose is 100 mg/kg. If EKG abnormalities persist, repeat in 5 minutes. This only has a beneficial effect for about 30 minutes. Immediately following calcium infusion, flush the line, then administer:
- Sodium Bicarbonate,
 - o Adult: give 50 mEq (1 ampule).
 - o Pediatric dose 1-2 mEq/kg. May repeat in 15 minutes if EKG abnormalities persist. Beneficial effect – causes shift of potassium from extra to intracellular space in one hour.
- Glucose and Insulin –
 - o Adult give 25 grams of Dextrose. The dextrose should be given over 5 minutes, then give 5 units of regular insulin IV. MUST check blood glucose prior to administration of insulin and dextrose.
 - o Pediatric dose: administer dextrose 0.5 gram/kg (max dose of dextrose 25 grams), then give 0.3 units of regular insulin added per gram of glucose (max insulin dose of 5 units). *Insulin will need to be diluted to allow for accurate and measurable dosing.*
 - o The serum glucose should be measured every hour for 5-6 hours after the administration of insulin, given the risk of hypoglycemia.



Hypoglycemia (Serum Glucose <70mg/dL)

Treatment: Urgency of therapy is dictated by patient's mentation/GCS. Goal is to replete glucose level to acceptable range and improve patient's mentation/GCS. *Ensure IV is patent and easily flushable as D50% can cause tissue necrosis if infiltration occurs.*

- Dextrose 50%
 - o If Glucose <70mg/dL
 - Adult:
 - Administer 25 g IV
 - Recheck glucose in 5-10 mins, if remains <70mg/dL,
 - ◆ D10 infusion and administer 100mL bolus OR
 - ◆ Repeat D50% dose of 25 g IV
- Dextrose 10%
 - o If Glucose <70mg/dL:
 - Adults
 - Administer: 100mL bolus of D10W
 - Recheck glucose in 5-10mins, if remains <70mg/dL, Repeat bolus of 100mL
 - Repeat this process until normal glucose level is obtained. Continue to monitor patient for mentation changes and repeat glucose readings as necessary.
 - Pediatric
 - Administer 2-4 mL/kg up to 250 mL at one time
 - Recheck glucose in 5-10 mins, if remains <70mg/dL, repeat bolus of 2- 4 mL/kg up to 250mL

Neonatal Resuscitation

This information is to guide the care of an unexpected delivery of a newborn.

- The vast majority of neonates require no resuscitation beyond maintenance of temperature and suctioning of airway.
 - o Place the infant in a warm environment. Quickly dry the infant and wrap with warm packs placed in blanket material. If unavailable, place infant naked against the warm body of the mother.
 - o Lie infant in supine position, with one inch of toweling under its shoulders to assist
 - ◆ in maintaining head position. If copious secretions are present, turn the infant's head to the side.
 - o Using manual bulb suction or DeLee suction trap, first suction the mouth and then the nose.
- Deep suctioning may induce a vagal response, including apnea and/or bradycardia.
- Suctioning should occur for no longer than 10 seconds at a time, allowing time between suctioning for spontaneous or assisted ventilation.
- Suctioning is ideally performed with a DeLee suction catheter after the head, but not the rest of the body, has been delivered.
- If suctioning is not completed prior to initiation of respiration, the trachea should be intubated to remove as much of the meconium as possible.
- The presence of watery or thin meconium does not require routine intubation.
- Most infants will be stimulated by drying and suctioning, inducing effective respirations.
 - o If respirations remain ineffective, try slapping or tickling the soles of the feet, or rubbing the infant's back.
 - o DO NOT try more vigorous methods of stimulation.
 - o If the infant fails to establish spontaneous and effective respirations after stimulation, positive pressure ventilation is required.
- Assessment of the Neonate:
 - o Respiratory Effort - Breathing rate and depth should increase immediately with brief stimulation; time should not be taken to stimulate the infant more than twice.
- Assisted ventilatory rate is 40 breaths/minute.
- Initial lung inflation requires pressures of 30-40 cmH₂O and in some, pressures as high as 60 cm may be needed. Less pressure is usually required for succeeding breaths.

- Endotracheal intubation is indicated:
 - When bag-mask ventilation is ineffective
 - When tracheal suction is required, as for thick meconium
 - When prolonged positive pressure ventilation is necessary.
- Heart Rate
 - If heart rate is <100/minute, immediately start positive pressure ventilation with oxygen at 100%.
 - If heart remains <60/minute after 30 seconds of assisted ventilation and showing no signs of improvement, chest compressions should be performed.
 - Chest compressions are done smoothly, on the sternum, just below the nipple line, at a rate of 120/minute.
- Color
 - If central cyanosis persists despite heart rate >100/minute and adequate ventilation, continue free-flow oxygen until the cause can be further evaluated.
 - Oxygen therapy is unnecessary for infants with peripheral cyanosis (blue extremities only), a condition common in the first few min. of life and due to sluggish peripheral circulation.
- Apgar Score - in a stable infant, record Apgar score (HR, respirations, muscle tone, reflex irritability, and color). DO NOT delay resuscitation when indicated by inadequate respirations and/or heart rate just to obtain an Apgar score.

Apgar scoring system chart

Score	0	1	2
Appearance	Blue or pale	Body pink; hands and feet blue	Completely pink
Pulse (Heart Rate)	Absent	Less than 100 beats per minute	More than 100 beats per minute
Grimace (Reflex Irritability)	Absent	Grimace	Grimace and cough or sneeze
Activity (Muscle Tone)	Limp	Some flexing of arms and legs	Active motion
Respiration	Absent	Slow, irregular; weak cry	Good; strong cry

Medications and Fluids

- Myocardial dysfunction and shock in the neonatal period are usually the result of profound hypoxia. Medications should be given if adequate ventilation and chest compression do not result in heart rate > 80beats/minute.
- Epinephrine
 - Indicated for asystole or spontaneous heart rate < 80 beats/minute despite adequate ventilation and chest compressions.
 - Dose is 0.01-0.03 mg/kg, via IV or ET tube, repeated every 5 minutes as necessary.
- Volume Expanders
 - Indicated in the presence of hypovolemia, such as evidence of acute bleeding from the fetal-maternal unit with:
 - Pallor that persists after oxygenation
 - Faint pulses with a good heartrate
 - Poor response to resuscitation with adequate ventilation.
 - Dose is 10 ml/kg, given over 5-10 minutes IV of:
 - O-negative blood cross matched with mother
 - 5% albumin/saline solution or other plasma substitute
 - Ringers Lactate or Normal Saline.
- Sodium Bicarbonate
 - Acidosis accompanying cardiac arrest is best treated with hyperventilation. Sodium bicarbonate may be used in a prolonged arrest unresponsive to other medications or if a profound metabolic acidosis is documented. It should NOT be used in brief episodes of bradycardia or arrest.
 - Dose is 2 mEq/kg of a 4.2% solution (4 ml/kg of 0.5 mEq/ml), slow IV push. If only the 1.0 mEq/ml solution is available it must be diluted with equal amounts of sterile water. Hypertonic solutions can cause intracranial hemorrhage in neonates.
- Naloxone Hydrochloride
 - Indicated for the reversal of respiratory depression in the neonate indicated by narcotics given to the mother within 4 hours of the delivery. Prompt and adequate ventilatory assistance should always precede its administration.
 - Naloxone can induce a withdrawal reaction in an infant of a narcotic addicted mother and should be used with caution if this condition is suspected.
 - The duration of action of narcotics may exceed that of Naloxone, and it may need to be repeated.
 - The dosage is 0.01 mg/kg (0.5 ml/kg) of a neonatal solution of 0.02 mg/ml. This may be repeated every 2-3 minutes as needed.

- Naloxone can be given IV& ET tube, or if perfusion is adequate, sub-q or IM.
- Dextrose (Glucox)
 - o Newborns requiring resuscitation may use much more glucose and become hypoglycemic. The newborns should have blood glucose level checked and monitored until several checks have been within normal range.
 - o Dose = 0.5 – 1.0 gm/kg given IV asD10W.

Obstetrical Emergencies

General Guidelines

Many high-risk OB transports are for reasons other than preterm labor. Treat these other problems per protocol and also implement the following general instructions.

Pre-hospital delivery - If there is not time to complete the transport the flight crew will assist the referring health care provider with the delivery if requested to do so.

Interfacility. Do not transport patients in active labor from one hospital to another when delivery is imminent. Assist the referring health care provider with delivery if requested to do so and notify NICU team of possible pending transport of new born.

- Ensure the mother's ABC's.
- Administer oxygen.
- Start an IV of LR or NS; Give a 1-liter bolus and run at maintenance if mother is hemodynamically stable. Treat shock as necessary.
- Transport the mother on her left side if possible.
- Obtain (at minimum) fetal heart tones at referring facility and upon transfer of care at receiving facility.
- If fetal Doppler is available for use during transport fetal heart tones should be monitored (at minimum) every 10 minutes and with any acute changes in maternal condition.
- Documentation of pertinent obstetrical history. This includes but is not limited to: maternal gravity and parity, estimated date of delivery, complications of prenatal care, gestational age, maternal blood type if known, contractions (presence, intensity, frequency, duration), status of cervix including documentation of time of last exam, status of membranes), fetal heart tone including decelerations.
- Contact the receiving physician immediately for any concerns you may have about the mother's care before and during transport. If this physician is not immediately available contact the Medical Director.
- Flight crew should attempt to obtain a copy of tocolytic monitoring strips from the sending and receiving facility if possible.

PRETERM LABOR MANAGEMENT

- Mild to moderate or irregular contractions maybe slowed with IV Magnesium. 5 grams IV over 10 minutes then 2grams/hour.
- Terbutaline (Breathine) 0.25 mg SC may be given once if the Magnesium bolus is not adequately controlling contractions.
- Monitor patient contractions for frequency, duration and intensity.
- All patient's receiving Magnesium should be assessed for DTR's. IF diminished or absent DTR's discontinue the Magnesium infusion.

IF DELIVERY IS IMMINENT

- Remain at the location, assist other health care providers to deliver and resuscitate if needed.
- Allow the delivery to proceed normally.
- In case of prolapsed cord place the mother in a shock position with her hips elevated on pillows. Insert a gloved hand into the vagina and gently push the baby's head off the cord. Transport while retaining this position. Do not remove hand until you are relieved by hospital personnel.
- Perform Accu check and manage accordingly.
- Two common causes of bleeding during pregnancy are abruptio placenta and placenta previa. For either of these conditions start an IV of LR or NS and run it to maintain blood pressure. Place patient in shock position remembering to keep her on her left side to assure the uterus doesn't compress the vena cava. Treat for hypovolemia, keep her warm and transport immediately. Do not use Pitocin.
- Consider the possibility of pregnancy in any female who is of reproductive age and complains of vaginal bleeding or abdominal pain.
- Multiple births are an unusual but possible occurrence. Be aware of that possibility and stay with the mother following the first delivery.
- Transport a pregnant female on her left side if possible.
- DO NOT attempt emergency C-section of a gravid trauma patient unless you have been trained in this procedure and witness a sudden demise of a previously healthy gravid mother.
- Clamp the cord 3-4 inches from abdomen and cut if infant at risk for complications of prematurity. Cover umbilicus with normal saline soaked gauze. Keep infant at level of uterus until cord is clamped .
- Assess Apgar score at 1 and 5 minutes.
- If baby is in distress resuscitate as needed. (See Neonatal Resuscitation protocol.)
- Put the baby to the mother's breasts and keep warm applying hat to baby's head.
- Allow placenta to deliver; do not pull on cord.
- Once placenta is delivered bleeding can be controlled by massaging the fundus.
- Administer Pitocin 10 units IM or 10-20 units in 1000 cc LR or NS IV titrated to control uterine bleeding (If available at the referring facility).
- If mother is bleeding heavily and exhibiting signs of shock massage fundus, increase IV flow rate, administer high flow oxygen and transport.

Pre Eclampsia

- For pre-eclampsia (B/P >160/>110) administer:
 - o Magnesium Sulfate 4 gm IV over 10 min. Then maintain at 2 gm/ hr.
 - o Document maternal reflexes if the patient is receiving magnesium sulfate.

Eclampsia

- If the mother is eclamptic, administer:
 - o Magnesium Sulfate 4 gm IV over 10 min. Then maintain at 2 gm/hr.
 - o Document maternal reflexes if the patient is receiving magnesium sulfate.
- Severe hypertension with systolic blood pressure > 160 mmhg or diastolic above 110 mmhg administer:
 - o Labetalol 10 mg IV.
 - o If B/P not controlled, repeat in 10 minutes at 20 mg IV
 - o If B/P not controlled, repeat in 10 minutes at 40 mg IV
 - o If B/P not controlled, repeat in 10 minutes at 40 mg IV for a cumulative max dose of 300 mg
- If seizures continue, give Versed 2 mg IV to a max dose of 10 mg. Refer to seizures protocol.

SPECIAL NOTES:

- If birth is breech allow infant to deliver to the waist without active assistance supporting the lower body only. Once the legs and buttocks are delivered the head can be assisted out. If head does not deliver easily insert a gloved hand into the vagina and create an airway.
- If the cord is wrapped around the infant's neck slip the cord over the head and off the neck. The cord may need to be clamped and cut if it is tightly wrapped.

Pediatric/Infant Assessment and Resuscitation

- Cardiopulmonary arrest in infants and children is rarely a sudden primary cardiac event as it is in adults. It is usually the end result of a progressive deterioration in respiratory and circulatory function.
- Survival from cardiac arrest in infants and children is low and of those who do survive many are neurologically impaired. Thus it is important to recognize the symptoms of respiratory failure and shock and promptly initiate therapy to prevent cardiac arrest.
- The heart rate as well as the respiratory rate in infants and children has a greater range and is more responsive to illness, exercise and emotion than in adults. For this reason frequent reassessments must be made in a distressed child.
- When pulmonary or circulatory instability exists time should be spent stabilizing the pediatric patient prior to transport with priority given to ventilation and oxygenation.
- Standard AHA pediatric BLS and PALS will be performed by the flight crew as outlined in those texts.
- Ventricular fibrillation is seen in less than 10% of pediatric cardiac arrests. The most prevalent rhythm disturbances are asystole or brady-arrhythmias. When V-fib is present in a child one should look for a metabolic etiology such as abnormalities in calcium, potassium and blood glucose as well as hypothermia and drug-related causes (particularly tricyclic antidepressant overdose).

Age Group	Respiratory Rate	Heart Rate	Systolic Blood Pressure	Weight in kilos	Weight in pounds
Newborn	30 - 50	120 -	50 - 70	2 - 3	4.5 - 7
Infant (1-12 months)	20 - 30	80 - 140	70 - 100	4 - 10	9 - 22
Toddler (1-3 yrs.)	20 - 30	80 - 130	80 - 110	10 - 14	22 - 31
Preschooler (3-5 yrs.)	20 - 30	80 - 120	80 - 110	14 - 18	31 - 40
School Age (6-12)	20 - 30	70 - 110	80 - 120	20 - 42	41 - 92
Adolescent (13+ yrs.)	12 - 20	55 - 105	110 - 120	>50	>110

Assessment of Respiratory Performance

- Signs of impending respiratory arrest include:
 - o Increased respiratory rate (RR), effort, and/or diminished inspiratory breath sounds.
- Diminished level of consciousness or response to pain.
- Poor skeletal muscle tone.
- Cyanosis - best seen in oral mucosa or nail beds. Peripheral cyanosis is more likely due to shock than to respiratory failure.
- Respiratory distress is evidenced by:
 - o Tachypnea
 - o Bradypnea - an ominous sign in an acutely ill child; causes include fatigue, hypothermia, and CNS depression.
 - o Retractions of accessory muscles; subcostal retractions, intercostal retractions, sternocleidomastoid usage with respirations.
 - o Stridor on inspiration
 - o Grunting respirations
 - o Prolonged expiration, usually accompanied by wheezing.
 - o Nasal flaring.
- A child with signs of acute respiratory distress should be immediately provided with humidified oxygen in the highest concentration available.
- If ventilation remains inadequate, assisted ventilation must be provided with a bag-valve-mask device and appropriately sized face mask. All assisted ventilation maneuvers should be performed with the child's head in the sniffing position except when C-spine injury is suspected.
- When prolonged ventilation is required or if ventilation remains inadequate with bag-valve-mask device endotracheal intubation is indicated. Size estimate should be based on Broselow tape reference.
 - o Internal diameter tube size can be estimated for children >1 year of age by the following formula:
 - Cuffed tube size = $(\text{age}/4) + 3$
 - Uncuffed tube size = $(\text{age}/4) + 4$
 - o Consider placing a gastric tube after bag-valve-mask ventilation is time permits.

Epiglottitis

- o Acute epiglottitis usually presents between the ages of 3-7 years with acute onset of fever, sore throat, drooling, muffled voice and inspiratory stridor. The child prefers to sit upright in sniffing position to maximize air exchange.
- o No interfacility transport of a child with suspected epiglottitis will be undertaken without definitive airway management by the health care professional present who is most skilled in managing this problem prior to transport.
- o Prior to intubation no procedures shall be performed which will agitate the child other than what is absolutely necessary to ventilate and oxygenate the child adequately.
- o Respiratory arrest can occur from total airway obstruction but is more often a combination of obstruction and fatigue.
- o Bag-mask ventilation with 100% oxygen should precede any attempt to intubate the patient or to perform emergency needle cricothyrotomy.

Foreign Body Obstruction

Children with foreign body airway obstruction will be managed as if they had epiglottitis.

Assessment of Cardiovascular Performance

- Organ perfusion is difficult to assess directly. It is dependent on cardiac output (heart rate X stroke volume) and perfusion pressure. Peripheral resistance and cardiac output determine blood pressure. Of all of these variables heart rate (HR) and blood pressure (BP) can be easily measured. The others are qualitatively assessed on physical exam by examining pulses and evaluating tissue perfusion.
 - o Hypovolemic shock is associated with a low cardiac output; however septic, anaphylactic, and neurogenic shock may be characterized by an increase in cardiac output and a low vascular resistance.
 - o Heart Rate - Normal heart rates in infants and children are age and anxiety dependent.
 - o Sinus tachycardia is a common response to stress and may be due to anxiety, fever, hypoxia, hypercapnia or hypovolemia, and requires further evaluation to determine the cause.
 - When tachycardia fails to compensate adequately hypoxia and hypercapnia with acidosis develop and bradycardia ensues.
 - o Bradycardia in a distressed child is an ominous sign of impending cardiac arrest.
 - o Blood Pressure - Normal BP is maintained as long as circulation compensates adequately with vasoconstriction, tachycardia and increased cardiac contractility.
- Hypotension is a late and often sudden sign of cardiovascular decompensation in children. Even mild hypotension is serious and must be treated quickly and vigorously since cardiopulmonary arrest may be close at hand.
 - o An observed fall of 10 mmHg in systolic pressure accompanied by tachycardia should prompt careful serial evaluations for other signs of shock.

- o Normal blood pressure is age dependent.
- o Peripheral Circulation - This is best assessed evaluating the presence and volume of peripheral pulses and end organ perfusion.
- A discrepancy in volume between central and peripheral pulses may be due to vasoconstriction associated with hypothermia or may be an early sign of decreased stroke volume.
- Palpable pulse is related to pulse pressure (the difference between systolic and diastolic pressure) and becomes thready when this pulse pressure narrows.
- Septic shock in contrast is often characterized by a wide pulse pressure and bounding pulses.
- Loss of central pulses is a premonitory sign.
- End Organ Perfusion
- Decreased perfusion of the skin is an early sign of shock.
 - o As cardiac output decreases the line of demarcation between warmth and coolness ascends toward the trunk.
 - o Slow capillary refill (>2 seconds) is evidence of low cardiac output. Skin may be dusky or cyanotic.
- With sudden onset of brain ischemia a loss of consciousness may or may not be preceded by loss of muscle tone, generalized convulsions or pupillary dilatation.
- In shock, symptoms appear more gradually. Confusion and lethargy will be seen with the child lying still when undisturbed but combative and agitated when procedures are being performed.
- An infant >2 months old should recognize its parents faces. Failure to do this may only be recognized by the parents as "something is wrong" and may in fact be an ominous sign of cortical hypo perfusion or hypoxia.
- Urinary output is directly proportional to renal blood flow. The rate of urine output is a good indicator of therapeutic progress.
 - o Normal urine output is 1-2 ml/kg/hr. A flow of less than 1 ml/kg/hr in the absence of renal disease is a sign of poor perfusion.

Circulatory Support

- Establishing vascular access during cardiopulmonary resuscitation is crucial. Although some drugs can be given endotracheal during resuscitation infusion of fluids necessitates intravenous or intraosseous access.
- Large volumes of fluid can inadvertently be given causing post resuscitation complications; for this reason, infusion pumps must be used, with careful regulation.
- Maintenance IV fluids for a 24 hour period may be calculated using the following formula:
 - o 100 ml/kg for the first 10kgs
 - o 50 ml/kg for the second 10 kgs
 - o 20 ml/kg for the third 10kgs
 - o Dividing by 24 gives the hourly fluid requirement for the child.

Sample fluid calculations for a 23 kg child:

$$10 \times 100 \text{ ml} = 1000$$

$$10 \times 50 \text{ ml} = 500$$

$$3 \times 20 \text{ ml} = 60$$

$$\text{TOTAL: } 1560 \text{ ml}$$

Dividing this by 24 hours yields an hourly rate of 65ml

- The choice of volume expander is similar to adult resuscitation.
 - o Dextrose containing solutions can cause osmotic diuresis and are best avoided unless hypoglycemia is documented.
 - o Crystalloids are readily available; Lactated Ringers or Normal Saline may be used.
 - o Colloids are effective in rapidly expanding the intravascular compartment but have disadvantages.
 - o In trauma blood loss should be replaced by blood as soon as it is available.
- In volume expansion a rapid bolus (20 ml/kg) of crystalloid (NS or LR) is given and the patient is frequently reassessed. Additional boluses are given if needed. Blood should be administered if available to the pediatric trauma victim who demonstrates
 - o Evidence of hypovolemic shock despite two or three boluses of crystalloid solution.
The key to success is infusion of sufficient amount of fluid based on frequent patient re-assessment.
 - The child with hypotensive shock may require 40-60 ml/kg in the first hour of resuscitation; occasionally up to 100-200 ml per kg may be needed.
- O2- Should be used in any condition of respiratory difficulty (eg. croup, epiglottitis, severe asthma, foreign body obstruction), as well as in resuscitation in the highest available percentage.
 - o 100% for emergency intervention
 - o Humidified if possible

Defibrillation and Synchronized Cardioversion

- Pad size - largest pad size that allows good chest contact over the entire area and good separation between the two pads.
- Pad placement - heart should be situated between them. Anterior/posterior would be ideal but this is not always practical in resuscitation. Standard placement is right upper chest below the clavicle and the other to the left of the nipple in the anterior axillary line (Mirror image this for dextrocardia).

- Energy dose
 - o 2 J/kg for initial defibrillation doubled if unsuccessful and repeated twice at this dose if necessary.
 - o 0.5 - 1.0 J/kg for initial cardioversion and 2.0 J/kg for further attempts if initial cardioversion is not successful.
 - o Defibrillation Sequence - if V-fib is seen on the monitor follow current PALS Guidelines (see algorithm attachment to this protocol).

Abnormal Cardiac Rhythms

(Also see attachment) – PALS algorithms.

- Treatment of cardiac dysrhythmias in the pediatric patient is instituted only if:
 - o It compromises the cardiac output.
 - o It has the potential for degenerating into a lethal rhythm.
- Sinus Tachycardia - see table for normal heart rate according to age
 - o The etiology includes anxiety, fever, pain, blood loss and any other insult where an increased cardiac output is needed.
 - o Therapy is directed at the underlying cause.
- Supraventricular Tachycardia -(SVT)
 - o SVT with secondary shock may be difficult to differentiate from sinus tachycardia (ST) secondary to underlying illness such as sepsis or hypovolemia.
 - o Heart Rate - In ST is usually less than 200 beats/min.
 - In SVT it is more likely to be greater than 230 beats/min. P waves may be difficult to see in both. In SVT there is no beat to beat variations. ST may vary beat to beat.
 - SVT can terminate abruptly.
 - If SVT sufficient to cause cardiovascular collapse the CXR may show cardiomegaly. In ST it is usually of normal size.
 - In SVT QRS duration is normal 90% of the time.
 - o Stable
 - Treatment is Adenosine:
 - 1st dose 0.1 mg/kg RAPID IV push. (Max 6 mg).
 - 2nd dose 0.2 mg/kg RAPID IV push (Max 12 mg). Synchronized cardioversion (0.5-1.0J/kg).
 - Do not use Verapamil in infants. Avoid it in pediatrics if at all possible (especially tricyclic overdose).
 - o Unstable
 - Defibrillate 2 J/kg for initial dose. If unsuccessful double the dose 4 J/kg.

-
- Ventricular Tachycardia
 - o This is uncommon in the pediatric age group. Slow rates may be well tolerated but rapid rates compromise cardiac output and may degenerate into V-fib.
 - o Most children with VT have underlying structural heart disease or a prolonged QT interval. Other causes include hypoxia, acidosis, electrolyte imbalance or toxic insults (especially tricyclic overdose) which must be searched for and treated.
 - o Wide QRS tachycardia in an infant or child must be considered VT until proven otherwise.
 - o Therapy – see attached PALS algorithms.
- Brady dysrhythmias
 - o Hypoxemia, hypotension and acidosis interfere with normal function of the sinus and AV nodes and slow conduction through the normal pathways. Sinus bradycardia, sinus node arrest with a slow junctional or ventricular escape and various degrees of AV block are the most common terminal rhythms in children with cardiopulmonary arrest.
 - o Therapy is first to ensure good ventilation, oxygenation, chest compressions, followed by atropine and sympathomimetic medications, especially epinephrine.
- Asystole
 - o Check for absent or zero vital signs when straight line is seen in ECG monitor.
 - o Follow standard PALS protocol (see treatment Algorithm).
- Ventricular Fibrillation
 - o V-Fib is an uncommon terminal event in the pediatric age group especially in infants.
 - o Therapy should be directed to achieving adequate ventilation, oxygenation and chest compressions defibrillating only if V-Fib is demonstrated by ECG monitoring.
 - o The appropriate sequence for defibrillation has been outlined in the attached algorithms.
- Pulseless Electrical Activity (PEA) - any rhythm which results in some form of electrical activity but does not generate a pulse. This includes pulseless ventricular tachycardia, ventricular fibrillation, electromechanical dissociation, and agonal rhythms.
 - o Underlying causes must be looked for and corrected; these include hypoxemia, severe acidosis, tension pneumothorax, and hypovolemia.
 - o Treat as in standard PALS protocol.

Poisoning / Overdose

IF POSSIBLE, CONTACT POISON CONTROL FOR SPECIFIC ANTIDOTE INSTRUCTIONS PRIOR TO TRANSPORT (813-844-4444 OR 1-800-222-1222)

For any overdose or poisoning contact should be made with the Poison Control Center. Whenever possible, determine the agent involved, the time of the ingestion/exposure, and the amount ingested. Bring empty pill bottles, etc., to the receiving facility.

General Guidelines:

- Due to risk of contamination. **Never charge into a "hot zone," to rescue a patient.** Safe patient extrication at the scene should be accomplished by experienced pre-hospital personnel only.
- If respiratory depression is present and an overdose is suspected, administer Naloxone:
 - o **Adult:** 0.5mg via IV/IO/IM/IN route or 4mg IN if using a pre-packaged nasal injector (whichever is easiest)
 - o **Pediatric:** 0.1mg/kg (maximum dose 2mg) via IV/IO/IM/IN route (whichever is easiest) or 4mg IN if using a pre-packaged nasal injector
 - o Repeat Naloxone dosing as needed if response occurs
 - o Management of respiratory failure per **RSI Protocol**
- Treatment for specific toxin exposure is indicated only when patients are clearly symptomatic. In the absence of significant symptoms, monitor closely and expedite transport.

Organophosphates (insecticides)

- Symptoms include dyspnea, bronchorrhea, lacrimation, vomiting/diarrhea, weakness, paralysis, seizures
- Utilize appropriate Hazardous Materials precautions
- Administer Atropine:
 - o **Adult:** 2mg IV
 - o **Pediatric:** 0.02mg/kg (minimum dose 0.1mg, maximum 0.5mg)
 - o Repeat every 5 minutes until respiratory secretions subside
- If seizures present, see **Seizures Protocol**
- If respiratory failure present, see **RSI Protocol**

Tricyclic Antidepressant

- Symptoms include hypotension, arrhythmias, wide QRS complex (>0.09sec)
- Sodium Bicarbonate 1 mEq/kg IV (maximum 50 mEq)
 - o May be repeated in 10 minutes
 - o Pediatric consideration: dilute 1:1 due to high viscosity

Calcium Channel Blockers and Beta Blockers

- Symptoms include bradycardia, hypotension, heart blocks, hypoglycemia, and pre-syncope or altered mental status
- If bradycardia present, treat per **Bradycardia Protocol**
- If hypotension present, treat per **Hypotension Protocol**
- If hypoglycemia present, treat per **Hypoglycemia Protocol**
- If poisoning due to calcium channel blocker, administer Calcium Gluconate:
 - o **Adult:** 1G slow IV

- o **Pediatric:** 20mg/kg slow IV (maximum 2G)

Dystonic Reaction (can occur from antipsychotic drugs including haloperidol)

- Acute uncontrollable muscle contractions
- Administer Diphenhydramine:
 - o **Adult:** 25-50mg IV/IM
 - o **Pediatric:** 1mg/kg IV/IM (maximum dose 50mg)
 - Contraindicated <6 months old

Insulin Overdose

- Hypoglycemia and altered mental status due to excessive insulin
 - o Treat glucose < 70mg/dL (refer to **Hypoglycemia protocol**)

Opioids

- Respiratory depression, altered mentation (somnolence), possibly decreased blood pressure, pinpoint pupils, possibly cardiac arrest
- Treat with Naloxone:
 - o **Adult:** 0.5mg via IV/IO/IM/IN route or 4mg IN if using a pre-packaged nasal injector (whichever is easiest)
 - o **Pediatric:** 0.1mg/kg (maximum dose 2mg) via IV/IO/IM/IN route (whichever is easiest) or 4mg IN if using a pre-packaged nasal injector
 - o Repeat Naloxone dosing as needed if response occurs
 - o Management of respiratory failure per **RSI Protocol**
- Patients who awaken after treatment with naloxone (whether from EMS or through administration by layperson or other first responder) should be transported to hospital for further evaluation. It is very likely that the effect of the opioid they have used will have systemic effects for longer than the effect of naloxone (very short half life).
- ❖ If the ingestion is a caustic or petroleum agent, or the patient is obtunded do not induce vomiting. Provide appropriate-supportive measures and transport.
- ❖ Attempt to obtain the following information; name and quantity of substance inhaled or ingested, and time of ingestion/exposure.

Pulmonary Edema

General Guidelines:

- ❖ Consider possibility of pulmonary edema in patients with history of CHF, pedal edema, and elevated SBP.
 - ❖ Treatment of pulmonary edema will prevent hypoxemia and subsequent respiratory failure. Oxygenation is the highest priority.
-
- Administer high flow oxygen by mask with non-rebreather reservoir mask.
 - Start BiPAP @ 12/5 cm/H₂O and adjust as necessary.
 - Intubate patient if necessary.
 - Consider Foley catheter insertion if diuretics have been administered. Monitor and document I's & O's.

Congestive Heart Failure:

- o BiPAP as per protocol
- o Nitroglycerin – contraindicated if SBP <90 or if use of a PDE-5 inhibitor within the last 24 hours (sildenafil/Viagra, vardenafil/Levitra) or 48 hours for tadalafil /Cialis.
 - SBP > 160 – 1.2 mg sublingual
 - SBP > 120 – 0.8 mg sublingual
 - SBP > 90 – 0.4 mg sublingual
 - After administration of sublingual NTG, administer and titrate Nitroglycerin IV infusion at 0.5 – 2 mcg/kg/min
- o For hypotension (SBP <90)
 - Norepinephrine infusion: 0.05-0.3 mcg/kg/min **OR**
 - Epinephrine infusion: 0.05-0.3 mcg/kg/min
 - Dobutamine infusion at 2.5 – 20 mcg/kg/min titrated to maintain SBP >90
- Elevated head of bed to position of comfort
- For bronchospasm associated with acute pulmonary edema, administer Albuterol:
 - o Adult/Pediatric dose: 2.5 mg/3ml NS updraft. Repeat x 2 if wheezing persists.

Unconscious Patient

- If the patient has a Glasgow Coma Scale <8 intubate the trachea and assist respirations to maintain SPO2 greater than 92%.
- Perform a secondary survey and observe for signs of trauma. Immobilize cervical spine if trauma cannot be ruled out (see trauma protocols).
- Begin an IV with normal saline. Check Accu check (blood glucose level). For BS <70 refer to **hypoglycemia protocol**
- If the patient does not respond to Glucose administer Narcan. This may be given via the ETT or Intranasal if no IV access has been obtained.
 - o Adult Dose: 2 mg;
 - o Pediatric Dose: 0.02 mg/kg.
 - o May be repeated every 2-3 minutes for a total of 3 doses
- Obtain a quick history with emphasis on possible trauma, known medical conditions, medications, alcohol ingestion, possible suicide intention etc.
- Place an NG or OG tube and empty the stomach to prevent vomiting if this does not delay transport.
- Consider a foley catheter but do not delay transport for insertion.
- Hypotension:
 - o Adult: 1000mL Bolus.
 - o Pediatric 10ml/kg bolus; may repeat x 2.
- Restrain the patient prior to lift-off. Document circulation checks when restraints are used.

Seizures

- Establish and maintain an adequate airway.
- If there is no risk of C-spine injury, lay the patient in lateral decubitus position and ensure that the tongue is not obstructing the airway. This is to minimize risk of aspiration and protect the patient from further injury. Administer supplemental oxygen via nasal cannula or non-rebreather mask.
- A nasopharyngeal or oral pharyngeal airway may be placed for signs of airway obstruction after these initial maneuvers have been tried.
 - o Exercise caution when placing fingers in the mouth of a seizing patient; nasopharyngeal airway may be preferred to avoid provider injury.
- Consider intubation for status epilepticus that is unresponsive to medical therapy or if airway is compromised. Drug of choice for continued sedation after intubation in seizure patients is a benzodiazepine or propofol (see drug protocol). Propofol has anticonvulsant properties.
- If potential mechanism for trauma, immobilize the spine.
- Establish Vascular access.
- Check blood glucose: if BG <70, refer to **Hypoglycemia Protocol**.
 - o If IV dextrose stops the seizure, perform repeat blood glucose and give second dose of dextrose if blood glucose is still <80. Recheck blood glucose every 30 minutes.
- Observe the patient for 3-5 minutes and if the patient does not spontaneously stop seizing, then administer:
 - o Lorazepam (Ativan):
 - Adult dose: 2-4 mg IV slow push, repeated every 15 minutes.
 - Pediatric dose: 0.1 mg/kg IV slow push, repeated x2 every 15-20 minutes.
 - o Midazolam (Versed):
 - Adult dose: 2.5-10 mg IV/IM slow push, repeated every 5 minutes. 5-10mg Intranasal, divide between nares
 - Pediatric dose: 0.15-0.2 mg/kg IV/IM slow push, repeated every 5 minutes. 0.2 mg/kg Intranasal, divide between nares
 - IM midazolam is the preferred benzodiazepine in patients without IV access.
- Status epilepticus: defined as a single seizure lasting 5 or more minutes OR >1 seizure in a 5-minute period without return to baseline.
 - o Same treatment as above:
 - o If unable to control seizure with benzodiazepine, administer Levetiracetam (Keppra) 1500 mg IV slow push over 5 minutes (if weight ≥25 kg). If weight <25 kg, administer 60 mg/kg IV slow push over 5 minutes.
 - Max total dose is 60 mg/kg to include any pre-arrival or previously administered Levetiracetam (Keppra) dosing.
- For seizures in pregnant or post-partum patients (3rd trimester or <6 weeks post-partum), consider eclampsia and treat with Magnesium Sulfate 4 grams in 100 mL D5W IV/IO over 10 minutes. (See obstetrical emergencies protocol).

Sepsis

Identification:

- Sepsis – Global infection
 - o qSOFA (Quick Sepsis-related Organ Failure Assessment) – 2 or more suggest great risk of poor outcome
 - Altered Mental Status
 - Elevated Respiratory Rate (>22 breaths/min in an adult, or tachypnea related to age in pediatrics)
 - Hypotension
- Septic Shock
 - o Fluid resistant hypotension
 - o Elevated lactate levels
 - o Need for ongoing vasopressors

Management:

- Ensure adequate ventilatory/respiratory support
 - o If intubation is needed attempt to avoid the use of Etomidate
- Assess for possible source of infection (i.e. – UTI, pneumonia, etc)
- Review any lab work if available
- Document lactic acid level and timing of most recent blood draw
- Ensure broad spectrum antibiotic coverage before or during transport.
- **ADULT:** If hypotensive or lactate level >4 mmol/L initiate 30 ml/kg IV fluid bolus
 - o If hypotension persists or lactate remains >4 mmol/L initiate vasopressor support to maintain MAP 65 mmHg
 - Norepinephrine is the preferred first line agent. 0.05 – 0.3 mcg/kg/min
 - Consider adding Dobutamine for cardiac dysfunction (i.e. – Cardiac Index <2 L/min/ m², S(c)vO₂ <70%) 2.5 – 10mcg/kg/min
 - If hematocrit is <30 consider blood transfusion
 - If additional vasopressor support is needed:
 - Vasopressin 0.01 – 0.04 units/min, although typical fixed dose 0.03 units/min, titration
 - Phenylephrine 0.4 – 5 mcg/kg/min
- **PEDIATRICS:** If hypotensive for age/delayed capillary refill initiate 20ml/kg IV fluid bolus up to 60ml/kg total
 - o *Hypotension (Systolic)*
 - <1 month: <60 mmHg
 - 1 month – 10 years: 70 mmHg + (2 x age in years)
 - >10 years: 90 mmHg
 - o If hypotension persists consider adding a vasopressor for support
 - Epinephrine is the preferred first line agent. 0.05 – 0.3 mcg/kg/min
 - Norepinephrine 0.05-0.3 mcg/kg/min can be utilized.
- If shock is refractory to both fluids and inotropic/pressor agents and/or if patient has suspected adrenal insufficiency, give bolus of methylprednisolone (Solu- Medrol) 125mg IV push.
- If shock continues to be refractory despite fluids, inotropic agents, and steroids, rule out and correct pericardial effusion, pneumothorax, and

increased intraabdominal pressure.

- Consider transportation to ECMO center if shock remains refractory to above measures.
- Monitor blood glucose due to the patient's metabolic demands and support as necessary Refer to **hypoglycemia protocol**
- Avoid hypocalcemia, as adequate calcium stores are essential for maintaining myocardial contractility.
 - o Patients with persistent shock and ionized calcium <1.1 mmol/L (4.8 mg/dL) should undergo correction with calcium gluconate 10% solution 50mg/kg.
- For infants in the first month of life, begin Prostaglandin E-1 (PGE-1) unless ductal- dependent cardiac lesion is ruled out by echocardiogram.
 - o Risk of apnea and hypotension/tachycardia with use of PGE-1. Some facilities may electively intubate and mechanically ventilate infants prior to transport if they are receiving PGE-1 due to risk of apnea.

Specialty Care Transport – ECMO, Impella, Implanted VAD

Care and Transport of Ventricular Assist Device (VAD) and Extracorporeal Membrane Oxygenation (ECMO) Patients

General Considerations:

***** ALWAYS communicate with the VAD service (1-866-844-8237)*****

- For Transport, VAD and ECMO patients will have the following:
 - o Obtain information on which VAD is implanted.
 - o Always transport patients extra batteries with patient if VAD is implanted
 - o Connect to power outlet whenever possible.
 - o Secure airway for transport with capnography if intubated.
 - o Supplemental oxygen to keep SpO₂ >92 % and pulse oximetry monitoring is mandatory.
 - o Cardiac monitor/defibrillator will be utilized for transport.
 - o Maintain transvenous/epicardial pacer settings from referring facility.
 - In the event of loss of capture set pacer to asynchronous at rate of 80.
 - o Maintain Vasopressors and Antiarrhythmics infusions as needed for perfusion and cardiac rhythm.
 - Antiarrhythmics: Per ACLS protocol.
 - Amiodarone: 150 mg over 10 minutes then drip at 1 mg/min.
 - Lidocaine: 1-1.5 mg/kg not to exceed 100 mg then drip at 1-4 mg/min.
 - If hemodynamic instability due to dysrhythmia and uncontrolled by Antiarrhythmic: Synchronized Cardioversion per ACLS protocols:
 - Narrow regular complex: 50-100 J biphasic, synchronized.
 - Narrow irregular complex: 120-200 J biphasic, synchronized.
 - Wide regular complex: 100 J biphasic, synchronized.
 - Wide irregular: Defibrillation, not synchronized.
 - o IV access will be established with IV fluids as these patients are typically preload dependent.
 - o Consider blood and/or blood products for volume replacement.
 - o Blood glucose should be obtained unless a recent blood glucose or blood chemistry has been completed within 2 hours of transport.
 - o Obtain pertinent lab values to include: ABG, CBC, PT/PTT/INR, ACT, Chemistry, Troponin, cardiac enzymes as available.
 - o Assess mean arterial blood pressure for patients on continuous flow ventricular assist devices.
 - o Transduce and monitor arterial, pulmonary arterial lines if present.
 - o Sedation: Continue all sedation established prior to transfer or refer to Aeromed Sedation protocol.
 - o Paralytic medication may be utilized for patient safety and transport safety.
 - o Treat pain per **pain management protocol** (IV fentanyl may require higher doses due to uptake in ECMO circuit).

Implanted VAD's:

- VAD patients generally have multiple medical problems. Assessment of VAD function is part of a more general assessment for cause of illness.
- Treat the patient, NOT the equipment. Regardless of the rhythm apparent on cardiac monitor, assess patient's perfusion prior to initiating any treatment for dysrhythmia.
 - o Perfusion assessment – mental status; skin color; capillary refill; urine output; mean arterial pressure.
 - o Listen for “Hmmm” of VAD over patient's chest wall. If NOT present, assess function of VAD.
 - o Mean Arterial Pressure can be estimated with a BP cuff and Doppler; MAP is the reading when flow returns (by Doppler) to the extremity as you deflate the cuff.
- If the patient's perfusion is adequate (MAP 65 to 90), move on to other causes of current illness.
- If perfusion is NOT adequate, assess for VAD function.
 - o Is the pump connected to the controller?
 - o Is the controller connected to power? Check for green power light, battery depletion, or plug connected to a functioning outlet.
 - o If the controller is alarming, treat for cardiogenic shock while contacting the VAD coordinator. Change controller if instructed to do so by VAD coordinator.
 - o Hypotension treatment:
 - Assess patient perfusion and LVAD flow.
 - MAP less 65 mmHg with low LVAD flow:
 - Infuse 500 ml bolus of normal saline. If flow remains lower than 4 L/min, give another 500 ml bolus of normal saline.
 - If no improvement in flows, and MAP greater than 65, start Dobutamine at 2.5-10 mcg/kg/min and titrate with goal of MAP 65-75 mmHg.
 - If no improvement on flow, and MAP higher than 65, start Milrinone at 0.250-0.75 mcg/kg/min and titrate to effect.
 - If flow higher than 4.0 L/min, and hypotension.
 - MAP less 65 mmHg post IV fluid bolus:
 - ◆ **Norepinephrine** at 0.05- 0.15 mcg/kg/min (max dose of 0.15 mcg/kg/min in these patients) and titrate with goal of MAP 65-75 mmHg.
 - MAP remains less than 65 with Norepinephrine maxed at 0.15mcg/kg/min:
 - ◆ **Epinephrine** 0.05-0.15 mcg/kg/min (max dose of 0.15 mcg/kg/min in these patients) and titrate with goal of MAP 65-75 mmHg.
 - MAP remains less 65 mmHg with Norepinephrine and Epinephrine maxed:
 - ◆ **Vasopressin** at 0.01-0.1 units/min and titrate with goal of MAP 65-75 mmHg.
 - o Hypertensive treatment.
 - MAP greater than 90, start
 - **Cardene** 5-15 mg/hr OR **Nitroglycerin** 0.25-1.0 mcg/kg/min and titrate with goal of MAP 65-75 mmHg.
 - o Arrhythmias causing hemodynamic instability.
 - Amiodarone: 150 mg over 10 minutes then drip at 1 mg/min.
OR
 - Lidocaine: 1-1.5 mg/kg not to exceed 100 mg then drip at 1-4 mg/min.
 - If hemodynamic instability due to dysrhythmia and uncontrolled by Antiarrhythmic:
 - Synchronized Cardioversion per ACLS protocols:
 - ◆ Narrow regular complex: 50-100 J biphasic, synchronized.
 - ◆ Narrow irregular complex: 120-200 J biphasic, synchronized.
 - ◆ Wide regular complex: 100 J biphasic, synchronized.

- ◆ Wide irregular: Defibrillation, not synchronized.
 - o If the equipment is functioning well, consider other causes of inadequate perfusion (shock protocol), paying particular attention to volume status and possible blood loss.
 - o If a VAD has been inactive for 2 minutes, administer patient provided Lovenox 1mg/kg.
- Complications of VAD include thromboembolic events, bleeding, infection, and mechanical failure.
- Once perfusion and pump function have been eliminated as causes for patient's presenting symptoms, rapidly move to the appropriate protocol for continued evaluation and care.
- Should ACLS intervention become necessary, start ACLS protocol without chest compressions till VAD coordinator spoken with.
- Keep the patient's primary caregiver with the patient if possible.
- Keep the patient's back up equipment and batteries with the patient.
- Documentation will be in accordance with the TGH Aeromed documentation policy and will include VAD flow rates with RPM settings.

Impella:

- Check status of Impella and placement signal
- Identify type and location of Impella placement
- Confirm evaluation of depth and placement location across the appropriate valve
 - o Ensure placement is correct – When was last ECHO/US done to confirm
- Ensure all connections are secured (Touhey Borst, luer connections, etc.)
- Confirm distal pulses, specifically distal to insertion sites.
- Ensure contents of purge fluid and remaining volume is adequate for the transfer timing
- Distal arterial line preferred for perfusion management
- Suction alarm management:
 - o Diastolic suction – (Diastolic < -30mmHg, but systolic function remains matched with LV waveform or adequate value)
 - Reduce the P level enough to break the suction
 - If CVP has been stable or trending down
 - 50-100mL **20-25% Albumin** bolus OR 250mL **5% Albumin**
 - 250mL normal saline bolus
 - If Cardiac Index is < 2, CVP trend is rising or no change seen with Albumin/Fluid, consider RV failure
 - **Dobutamine** 2.5-10 mg/kg/min
 - Once therapy given, or started, attempt to slowly bring P level back to original support level
 - o Continuous suction – (Complete separation of LV waveform and aortic placement signal)
 - Reduce P level to break suction, not below P2
 - Contact surgeon for verification of placement location
- Assess perfusion
 - o Hypotension present, MAP<65 mmHg
 - **Epinephrine** – 0.05-0.15 mcg/kg/min
 - **Norepinephrine** – 0.05-0.15 mcg/kg/min
 - If pulmonary hypertension, preferred medication is:
 - **Vasopressin** – 0.01-0.1 units/min, 0.03unit/min normal dosing, titrations are every 1 hour
 - If concern for RV failure with left sided support device
 - **Dobutamine** – 2.5-10 mcg/kg/min
 - o Hypertension – MAP> 90mmHg
 - **Cardene** 5-15 mg/hr
- Assess anticoagulation
 - o Goal ACT 160-180 seconds
 - o If just undergone cardiac cath, ACT likely will be >250 seconds
 - If ACT less than 160 or PTT less than 50 give **Heparin 2000 units IV bolus over 1 minute.**

ECMO

- ECMO patients generally have multiple medical problems.
- Assess type of ECMO (VV vs VA) and cannulation sites with catheter size if available.
 - o Distal pulses. Color/condition
 - o Mark depth if not already completed, ensuring to take marking to the skin
- Ensure all connections are secured with zip ties
- Regardless of the rhythm apparent on cardiac monitor, assess patient's perfusion prior to initiating any treatment for dysrhythmia.
 - o Perfusion assessment – mental status; skin color; capillary refill; urine output; mean arterial pressure.
 - o Mean Arterial Pressure will be measured from arterial line in upper extremity.
 - If no upper extremity arterial line present, insert or have one inserted prior to transport.
- Draw ABG from upper extremity and assess results with perfusion or accepting physician prior to transport.
- If the patient's perfusion is adequate (MAP 65-90 mmHg), move on to packaging and transport.
- If perfusion is NOT adequate assess fluid volume status. Look for line chugging or chattering.
 - o Hypotension treatment.
 - Assess patient perfusion and ECMO flow.
 - MAP less 65 mmHg with low ECMO flow:
 - **20-25% Albumin** 100mL OR 250mL **5% Albumin**
 - 500mL Normal Saline
 - Blood products may be indicated through evaluation of Hemoglobin and Hematocrit values
 - If flow higher than 4.0 L/min and hypotension:
 - MAP less 65 mmHg post IV bolus:
 - ♦ **Norepinephrine** at 0.05- 0.15 mcg/kg/min (max dose of 0.15 mcg/kg/min in these patients) and titrate with goal of MAP 65-75 mmHg.
 - MAP remains less than 65 with Norepinephrine maxed:
 - ♦ **Epinephrine** 0.05-0.15 mcg/kg/min (max dose of 0.15 mcg/kg/min in these patients) and titrate with goal of MAP 65-75 mmHg.
 - MAP remains less 65 mmHg with Norepinephrine and Epinephrine maxed:
 - ♦ **Vasopressin** at 0.01-0.1 units/min, 0.03unit/min normal dosing, titrations are every 1 hour with goal of MAP 65-75 mmHg and **Dobutamine** at 2.5-10 mcg/kg/min or **Milrinone** at 0.250-0.75 mcg/kg/min and titrate to effect (titration is every 2 hours).
 - o If the equipment is functioning well, consider other causes of inadequate perfusion (shock protocol), paying particular attention to volume status and possible blood loss.
- If hypertensive (MAP>90 mmHg):
 - o Titrate down/off vasopressors
 - o **Cardene** – 5-15mg/hr
- Complications of ECMO include thromboembolic events, bleeding, infection, and mechanical failure.
 - o Evaluate adequacy of anticoagulation with heparin and that ACT > 180 seconds or PTT > 60 seconds.
 - If ACT less than 180 or PTT less than 60 give **Heparin 2000 units IV bolus over 1 minute**.
- Should ACLS intervention become necessary, do NOT use chest compressions if centrally cannulated or open chest – pharmaceuticals and other standard ACLS care only.
- ALWAYS communicate with the accepting physician – (1-813-844-7979 TGH transfer center).

- Documentation will be in accordance with the TGH Aeromed documentation policy and will include ECMO flow rates, RPM's, sweep values, and cannulation sites and size.

Stroke

Known/Suspected Stroke

General Guidelines:

- ❖ Patient history is paramount for appropriate treatment of suspected stroke/TIA patients. Time of onset of symptoms is critical information and transport destination is critical to patient outcome. Obtain family and/or contact information (phone #) of any witnesses. Utilize the Cincinnati Pre Hospital Stroke Scale for rapid determination of neurological deficit and document results. Evaluate and document pain assessment; treat according to **Pain Management Protocol**.
- Upon recognition of any neurological deficit identified by the Cincinnati Pre Hospital Stroke Scale, determine onset time and time of the patient last seen normal or baseline. **Use the onset information and the following criteria to determine transport destination.**
 - o Patient's with an unknown or questionable onset time will be transported, **but not as a "stroke alert,"** to the nearest comprehensive center.
 - o Patients with onset of 24 hours or less or "wake-up" stroke will be transported as a "stroke alert" to the nearest comprehensive stroke center.
 - o Patients with suspected aneurysms OR when thrombolytics are potentially contraindicated, will be transported as a "stroke alert" to the closest comprehensive stroke center with known 24 hour IR coverage.
 - Exclusionary criteria for thrombolytics:
 - Current or history of intracranial hemorrhage
 - Neurosurgery, head trauma, or stroke in the past 3 months
 - Current use of anticoagulant (Warfarin, Eliquis, Xarelto, etc.)
 - Active internal bleeding
 - Possible exclusionary criteria for thrombolytics:
 - Major surgery or serious non-head trauma within 14 days
 - Recent GI or GU hemorrhage within 21 days
 - Seizures at onset
- Scene/inter-facility – time should be minimized.
- Administer supplemental oxygen to maintain oxygen saturations >94%. Supplemental oxygen should not be routinely administered to non-hypoxic patients.
- Initiate large bore IV access, preferably 2 sites, and give a 250 ml NS bolus. Antecubital site is preferred. Do not provide NS bolus if confirmed or suspected hemorrhagic stroke.
- **Perform a POC glucose. If less than 70 mg/dl, refer to Hypoglycemia Protocol.**
- **Place on cardiac monitor/defibrillator. Treat arrhythmias according to Cardiac Arrhythmias Protocol.**
 - o Obtain 12 lead EKG if not already complete
- Treat decreased LOC according to appropriate protocol.
- Protect and secure airway using appropriate method. Patient's with GCS <8 require definitive airway control (i.e. intubation), using RSI if necessary. Refer to **RSI protocol**.

Ischemic Stroke

- Transport suspected ischemic stroke alerts with HOB flat and head in midline position.
- If trauma is suspected or evident, (refer to **Trauma Protocol**). Immobilize cervical spine as necessary.
- Blood pressure management:
 - o In hypertensive patients with suspected or known ischemic stroke, do not treat blood pressure unless hypertension is extreme (SBP >220 mmHg or DBP >120 mmHg).
 - o If patient *is to receive tPA or going to IR*, treat to achieve SBP just below 185 mmHg and DBP just below 110 mmHg.
 - o If patient *has received tPA*, treat to achieve SBP 185 mmHg and DBP below 105 mmHg.
 - **Nicardipine:** 5-15mg/hr, titrate to goal BP

Hemorrhagic Stroke

- Suspect intracranial bleed if patient:
 - o Has SBP >240 mmHg
 - o Has GCS (Glasgow Coma Scale) 8 or less
 - o Has a seizure associated with this emergency.
- Transport known or suspected ICH patients with head of bed elevated at 30 degrees and head midline position unless hypotensive.
- If trauma is suspected or evident, (refer to **Trauma Protocol**). Immobilize cervical spine as necessary.
- Pretreat with ondansetron (Zofran) to prevent vomiting.
- Correct coagulopathies, but not at the expense of time.
- Blood pressure management:
 - o In hypertensive patients with known or suspected intracranial bleed/hemorrhagic stroke, treat to maintain SBP 130-150 mmHg. Initiate antihypertensive if SBP >150 mmHg. Do not allow SBP to drop <120 mmHg.
 - **Nicardipine:** 5-15 mg/hr, titrate to goal BP
 - o Initiate vasopressor to maintain MAP >65.
 - **Norepinephrine** is the preferred first line agent. Dose: 0.05 – 0.3 mcg/kg/min
- Seizure prophylaxis management:
 - o For confirmed intracranial bleed, administer **Levetiracetam (Keppra)**. Do not administer if this has already been provided by referring hospital.
 - Adult dose: 1000 mg IV
 - Pediatric dose: 20 mg/kg IV (max 1000mg)
- Signs of Increased ICP
 - o Unilateral sluggish, fixed, or dilated pupil OR bilateral fixed and dilated
 - o Posturing
 - o Cushing's triad (bradycardia, hypertension, irregular/decreased respirations)
- If signs of increased ICP or if the patient has imaging evidence of impending herniation or herniation:
 - o Controlled hyperventilation to EtCO2 goal of 25-30mmHg
 - o Prevent Hypoxia
 - Intubation and ventilatory support as necessary
 - o Prevention of hypotension
 - Goal MAP >65mmHg
 - Fluid bolus/vasopressor support
 - o Administer 3% hypertonic saline
 - Adult dose: 250 ml IV bolus over 10-20 minutes
 - Pediatric dose: 5ml/kg IV bolus (max 250ml) over 10-20 minutes

TPA Initiation, Implementation, Transport, and Documentation:

- Initiation: if assisting transferring staff
 - o Dose: 0.9 mg/kg total dose with 90 mg max
 - 10% of total dose over 1 minute
 - 90% of dose over 1 hour
 - o Reconstitution:
 - Use supplied diluent and follow package insert directions to mix a 1mg/ml solution.
- Implementation
 - o Withdraw and remove excess drug from vial and waste.
 - Puncture side of stopper to withdraw not previous punctured middle.
 - o Withdraw bolus dose (the 10%) with needle and administer over 1 minute.
 - Puncture side of stopper to withdraw not previous punctured middle.
 - o Hang the rest of dose (the 90%) over 1 hour.
 - Example: 90 kg total dose >>> 9 mg bolus >>> 81 mg infusion >>> at 81 mls/hr
 - o Near the end of the infusion a 50 mL bag of normal saline should be connected to the tubing infusing the tPA to ensure the residual medication in the tubing is infused accordingly in the 60 minute period.
- Transport
 - o Ensure accurate reporting from bedside RN of ordered tPA dose, ordered bolus dose, time bolus initiated, time drip initiated, and time drip completed. Ascertain if the vial contains more than the actual ordered dose, at which time the drip would be disconnected from the patient, or the exact amount which requires normal saline to complete the medication.
 - o **If the patient has an acute negative change in neurologic condition, immediately STOP the infusion**
- Documentation:
 - o Abbreviated run report AND in EMS Charts
 - Document total dose
 - Bolus dose with time started
 - Infusion dose and time started
 - Infusion dose time completed
 - Documentation of NIH before administration and physical exam findings upon completion/turnover of the patient

III. Traumatic Injuries

Abdominal Trauma

- Blunt Trauma - Suspect with appropriate history or mechanism of injury, presence of ecchymosis, hematuria, hypotension, decreased or absent bowel sounds and guarding or rebound tenderness.
 - o High flow oxygen.
 - o Large bore IV's of Ringer's Lactate/Normal Saline with trauma tubing.
 - o Pelvic fractures may result in significant blood loss. Apply T-Pod or equivalent in super pubical Pelvic Fx in hypotensive pt's.
- Penetrating Trauma
 - o Stabilize; leave foreign body in place for transport.
 - o Cover eviscerations with sterile saline soaked dressing then dry sterile dressing.
 - o Cover wounds with dry sterile dressing.
 - o Maintain oxygen >92%.
 - o Establish 2 large bore IV's and administer warm IV fluids.

Airway Management

The flight team should institute all measures deemed necessary for maintaining an adequate airway in the patient. Assess airway and ventilation utilizing C-spine precautions.

- All trauma patients should receive supplemental oxygen to maintain oxygenation >92%.
- Always suspect hypoxemia in the agitated or combative patient treating with high flow oxygen and consider intubation.
- Any patient demonstrating evidence of glottic obstruction should have the airway examined for foreign body. If respiratory difficulty persists the airway should be secured.
- Ventilation of the unconscious trauma victim should be accomplished by tracheal intubation.
- Intubation should be considered on patients with massive facial and/or neck injuries prior to liftoff.
- Any multiple trauma patient demonstrating cyanosis or respiratory distress should have an airway either by tracheal intubation or LMA or as a last resort cricothyrotomy. Re-assessment of underlying conditions should subsequently ensue.
- Rapid Sequence Induction may be necessary to secure airway in combative patients. Refer to RSI protocol.

Burns-Thermal/Chemical/Electrical/Lightning

- Prioritize ABC's.
- High flow oxygen. Thorough assessment of respiratory status in patients with facial, chest, neck burns.
- Early prophylactic intubation for severe burns of face and/or neck is indicated.
 - o Singed nasal hair or eyebrows.
 - o History of confinement in burning environment.
 - o Carbon deposits in oropharynx.
 - o Facial and neck edema - such injuries may require immediate airway support by intubation or cricothyrotomy.
- Quickly estimate percent of body surface area burned using rule of 9's (2nd and 3rd degree only).
- Start 2 large bore IV's
- Ringer's lactate 2-4 ml/kg X % of body surface burn/2nd degree or worse, 1/2 of this amount should be given in first 8 hours, or sufficient fluid to maintain blood pressure greater than 90 mmhg systolic in adult, or urine output > 30 ml/hour (see Special Pediatric Consideration).
- Insert NG/OG tube and foley if doing so does not delay transport.
- Consider bilateral midaxillary escharotomies for severe respiratory compromise due to restricted chest wall expansion.
- Provide pain control (see Pain Management protocol).
- Chemical burns should be copiously irrigated with water or sterile saline if possible. Prolonged irrigation at site may be preferable to transport if patient is stable. Remove all pt's clothing prior to transport. Contact poison control for any specific questions regarding exposure/care or cyano-kit 1-800-222-1222.
- Cover burned area with dry sterile dressings.

Electrical/Lightning Injury

- Safe extrication at the scene should be accomplished by experienced pre-hospital personnel.
- Evaluate and stabilize airway, breathing and circulation as necessary.
- Apply cardiac monitor and obtain 12 lead if able with defibrillator ASAP.
- Apply standard ACLS as needed. In multiple casualty electrical injuries, any victim with asystole or unstable cardiac status should be resuscitated first. Assess briefly for other injuries.
- Full spinal immobilization is necessary in all patients with a history of change in consciousness, pain or fall.
- Assume closed head injury in any unconscious but otherwise stable patient.
- Control pain (see **Pain Management protocol**).
- Monitor closely for life threatening Dysrhythmias.
- Suspect spinal injury secondary to tetanic muscle contractions and use standard spinal immobilization.
- Check for entrance and exit wounds.
- If time permits perform 12 lead EKG.
- Monitor urine output.

Chest Trauma

Objective: To provide rapid assessment and transportation of chest trauma victims with emphasis on life threatening interventions.

Remember the ABC's and observe for paradoxical chest movement, chest symmetry, open gurgling wounds, dyspnea, crepitus, and tracheal deviation, neck vein distention, decreased or absent breath sounds. Do not apply 4 sided occlusive dressing to any chest wound.

- Pneumothorax-Simple
 - o Signs and Symptoms – decreased or absent breath sounds hyper-resonance, Sub-
 - ◆ Q Emphysema, respiratory distress, asymmetrical chest wall movements.
Check chest x- ray if available; feel for rib fractures on affected side.
 - Treatment - High Flow Oxygen. Consider patient condition and ETA.
 - If symptomatic decompress with large bore angiocath.
 - Avoid PPV if possible. IF PPV is indicated watch very closely for development of Tension Pneumothorax.
- Tension Pneumothorax
 - o Signs and Symptoms - Deviated trachea to unaffected side, severe respiratory distress, distended neck veins, cyanosis, hypotension & PEA.
 - o Treatment –
 - High flow oxygen.
 - Remove occlusive dressing from sucking chest wound if present.
 - Needle thoracostomy in 2nd intercostal space, midclavicular line with a 3" as large as possible gauge needle.
 - Consider Simple Thoracostomy(see protocol).
 - May require intubation.
- Sucking Chest Wound
 - o Signs and Symptoms - Penetrating chest injury, gurgling or sucking sounds at chest wall and or respiratory distress.
 - o Treatment –
 - High flow oxygen.
 - If spontaneously breathing: Tape 4" X 4" Vaseline gauze on 3 sides of affected area creating flutter valve.
 - If mechanical ventilation leave open
 - Observe for signs and symptoms of tension pneumothorax.
- Flail Chest
 - o Signs and Symptoms - Paradoxical chest movement, splinting, movement of flail segment, crepitus and or respiratory distress.
 - o Treatment–
 - High flow oxygen.
 - Support respiratory function; may require intubation.
- Massive Hemothorax
 - o Signs and Symptoms - Absent breath sounds, dullness to percussion, hypoxia, severe respiratory distress and or chest x-ray shows white-out of lung field.
 - o Treatment - High flow oxygen.
 - Do not drain hemothorax (prior to transport) unless respiratory/ventilatory compromise occurs.

- Place largest possible chest tube in the 4th or 5th intercostal space midaxillary line of affected side.
- Massive quantities of blood may collect in the chest requiring large amounts of IV fluids, including blood transfusion.
- Cardiac Tamponade
 - o Signs and Symptoms – Narrowing pulse pressure, distended neck veins, hypotension, muffled heart sounds, pulses paradoxes, penetrating chest wound, electrical alternans positive chest x-ray if available and/ or PEA.
 - o Treatment - High flow oxygen.
 - Large volume crystalloids and prompt pericardiocentesis.
- Myocardial Contusion
 - o Signs and Symptoms - Chest pain, history of blunt chest trauma, rib or sternal fracture and or cardiac dysrhythmias.
 - o Treatment - High flow oxygen.
 - Monitor cardiac function. Treat symptomatic ventricular ectopy per ACLS guidelines
- Rib Fracture
 - o Signs and Symptoms - Localized pain, splinting, guarding, subcutaneous emphysema, decreased breath sounds on affected side, rib deformity and or crepitus.
 - o Treatment - High flow oxygen.
 - Observe for pneumothorax.
 - See **pain management protocol**

Head Trauma

Objective: Rapid assessment of the patient with a head injury, stabilization, and rapid transportation. Observation and institution of appropriate therapy:

- Assure adequate airway and ventilation. Intubate and oxygenate for unconscious GCS < 8 and signs of increased ICP or unequal pupils (not caused by direct trauma). Ventilate patient with a EtCO₂ goal of > 25. See **RSI protocol**.
- If patient has respiratory failure or needs intubation for airway protection, be mindful that **hypotension, hypoxia, and hyperventilation** are the leading causes of secondary brain injury and significantly impact mortality.
 - o Maintain EtCO₂ 35-45 with ventilations.
 - o Do not hyperventilate unless clear signs of active herniation (developing pupil asymmetry or bilateral dilatation, bradycardia in the setting of hypertension, posturing, irregular respirations).
 - In the setting of suspected **acute** herniation, a short period of hyperventilation with goal EtCO₂ 25-30 mmHg should be attempted.
- Severity classification of head trauma/traumatic brain injury (TBI):
 - o Mild – GCS 13-15
 - o Moderate – GCS 9-12
 - o Severe – GCS 8 or less
- Suspected or confirmed traumatic brain injury:
 - o Confirm the patient has clinical/physical signs and symptoms of a head injury.
 - o The patient must meet the following criteria for use of the traumatic brain injury medication management:
 - GCS < 8 **and** an advanced airway in place
 - **Plus any one of the following signs/symptoms:**
 - ♦ Unilateral fixed or dilated pupil OR bilateral fixed and dilated pupil
 - ♦ Unilateral paralysis
 - ♦ Posturing
 - ♦ Seizure after injury
 - ♦ Skull deformity
 - o Once confirmed that the patient meets the above criteria, administer the following medications. If the patient has imaging evidence of impending herniation or herniation, administer the following medications. Do not administer if this has already been provided by referring hospital or EMS agency.
 - **Levetiracetam (Keppra)**
 - Adult dose: 1000 mg IV
 - Pediatric dose: 20 mg/kg IV (max 1000mg)
 - **3% hypertonic saline**
 - Adult dose: 250 ml IV bolus over 10-20 minutes
 - Pediatric dose: 5ml/kg IV bolus (max 250ml) over 10-20 minutes
 - o Observe for seizure activity. For any additional seizures or if seizure activity continues, see **Seizure Protocol**.
 - o If the patient doesn't meet all of the criteria above, but has signs of moderate-severe head trauma or confirmed traumatic intracranial bleed, administer **Levetiracetam (Keppra)**. Do not administer if this has already been provided by referring hospital or EMS agency.
 - Adult dose: 1000 mg IV
 - Pediatric dose: 20 mg/kg IV (max 1000mg)
 - o In hypertensive patients with known intracranial bleed, treat to maintain SBP 130-150 mmHg. Initiate antihypertensive if SBP >150 mmHg. Do not allow SBP to drop <120 mmHg.
 - **Nicardipine:** 5-15 mg/hr, titrate to goal BP
 - o Initiate vasopressor to maintain MAP >65.

- Norepinephrine is the preferred first line agent. Dose: 0.05 – 0.3 mcg/kg/min
- o Be mindful for potential concomitant cervical spine trauma and refer to **Spinal Immobilization Protocol** as appropriate
- o Consider elevating the head of bed 30 degrees continuing to maintain spinal immobilization.
- o Observe for seizure activity. See **Seizure Protocol**.
- o For combativeness, refer to **Sedation Protocol**.

Multi System Trauma

Objective: To provide an initial organized approach to the victim of multiple trauma at the scene of an accident or at a referring emergency facility. To prepare for transport to a tertiary care facility:

- Airway maintenance and C-spine control
 - o Assess and secure a patent airway assuring protection of the cervical spine.
 - Breathing Control
 - o Assess respiratory status. Administer high flow oxygen. If assessment confirms tension pneumothorax refer to the chest trauma protocol. Secure the airway.
 - Assess circulatory status.
 - o Establish 2 large bore IV's of warm Normal Saline or Lactated Ringers. Peripheral IV's are preferable however intraosseous or central lines should be inserted as required. Generally avoid delaying transport for placement of IV lines.
 - o Control external bleeding with pressure, CAT tourniquet, or Quick Clot.
 - Neuro
 - o Transport suspected spinal cord injuries with full spinal immobilization regardless of x-ray results at referring institution unless C spine clearance can be safely assessed clinically. Consider the mechanism of injury as well as any complaints of neck pain. When in doubt immobilize.
 - o THE CERVICAL SPINE MAY BE CLEARED CLINICALLY IF THE PT MEETS CRITERIA. (SEE SPINAL CARE PROTOCOL)
- * Provided these preconditions are met the neck may then be examined.
- If there is no bruising or deformity no tenderness and a pain free range of active movements, the cervical spine can be cleared. Remember to maintain the C-Collar during transport.

Transport takes priority over secondary survey

Special Considerations in Pediatric Trauma

- The general principles of primary assessment and treatment for the pediatric patient (are basically the same as for adults. Fluid resuscitation and normal vital signs for age are discussed in the Medical Emergencies section Special Pediatric/Infant Considerations in Assessment and Resuscitation.
- Airway Guidelines
 - o ET-tube insertion size – (age/4) +3 cuffed, (age/4) +4-uncuffed.
 - o Needle cricothyrotomy is preferred to surgical cricothyrotomy up to age 8 years.
- Circulation
 - o Remember that pediatric patients maintain a normal pulse and blood pressure until markedly volume depleted.
 - o Standard fluid challenge is 20 ml/kg of normal saline. Repeat if necessary.
 - o Altered mental status, pallor or respiratory distress may be the first sign of shock in children.
 - o Central IV access is relatively contraindicated in children.
 - o Next to peripheral IV's, intraosseous infusions and femoral veins are the IV avenues of choice.
 - o See **Blood Admin Protocol**

Spinal Care

- Immobilize with a **Cervical Collar**-
 - o All patients with blunt traumatic injury
- Immobilize with a **Long Spine Board**-
 - o Spinal pain or tenderness
 - o Neurologic complaint (e.g., numbness, motor weakness)
 - o Anatomic deformity of the spine
 - o Altered level of consciousness
 - o Drug or alcohol intoxication
 - o Distracting injury present*
- Long Spine Board NOT needed (but **continue to apply Cervical Collars**)-
 - o Normal level of consciousness (Glasgow Coma Scale [GCS] 15)
 - o No spine pain or tenderness or anatomic deformity
 - o No neurologic findings or complaints
 - o No distracting injury present*
 - o No Intoxication
- Pediatrics
 - o Full immobilization for all blunt trauma patients ≤ 15
- *Distracting injury has been defined previously as:
 - o Long bone fracture
 - o Visceral injury requiring surgical consultation
 - o Large laceration, degloving injury or crush injury
 - o Large burn
 - o Any injury causing acute functional impairment

Orthopedic Injuries

Objective: To restore circulation, prevent further damage and alleviate pain in the affected limb.

- Assure airway, breathing, and circulation.
- Control hemorrhage with direct pressure.
- Splint all fx & evaluate the circulatory and neurological status distal to the site before and after splinting.
- If a limb is cyanotic and/or pulseless attempt to restore circulation by reducing fracture.
- If limb deformity inhibits transportation reduce fracture.
- Continue to monitor circulatory status during transport.
- Apply traction to femur fractures if not contraindicated
- See Pain Management protocol.
- For open fractures give Ancef,
 - o Adult dose 2 grams (if available), if not 1 gram IV.
 - o Pediatric dose 30 mg/kg IV (max dose 2 grams) as time permits.
- Splint pelvic fx with the T-Pod or equivalent.

Traumatic Amputations

Objective:

To preserve amputated part for possible re-implantation and prevent further damage to limb.

- Assure ABC's with special consideration to controlling hemorrhage and treatment of hypovolemia.
- Direct pressure with sterile dressing to control bleeding. Consider pressure dressing and elevation of limb if appropriate. Use tourniquets as a last resort.
- For partial amputation leave tissue intact. Apply moist sterile dressing.
- For complete amputations apply sterile dressing and control hemorrhage.
- Administer Ancef:
 - o Adult dose 2 grams (if available), if not 1 gram IV,
 - o Pediatric dose 30mg/kg IV, (Max dose 2 grams) as time permits.
- See **Pain Management protocol**
- Care of amputated part:
 - o Attempt to recover the severed part.
 - o Wrap in sterile gauze.
 - o Wet gauze with normal saline.
 - o Place in plastic bag.
 - o Place in cool container with ice.
 - o Never allow direct contact of tissue with ice.

IV. Environmental

Barotrauma

- The victims should be rescued from the water by experienced prehospital personnel and basic life support measures begun as needed. Basic ABC's are evaluated and stabilized as necessary. Standard ACLS is employed as necessary.
- Hypothermia should be considered an aggravating factor in every aquatic accident victim and rewarming should be started (See hypothermia protocols).
- Supplemental 100% oxygen should always be given as soon as possible being best administered by NRB mask at 10-12 liters/minute (adult) or appropriate to age.
- If air embolism is suspected the patient should be transported in the head down left lateral decubitus position to prevent additional gas emboli from traveling to the brain if not contraindicated by other injuries.
- Parenteral IV therapy should be initiated briskly unless contraindicated for other reasons with normal saline.
- The patient should be transported at 1000 feet or less as to subject him to the least possible pressure reduction and limit any further gas expansion.
- Obtain a detailed history if possible including: the type of diving engaged in, the number, depth, bottom time, surface interval between repetitive dives for the past 72 hours, in-water decompression, in-water recompression, site of diving and environmental conditions (temperature and amount of surge), primary diving activity, presence of pre-disposing factors, dive complications, pre-dive and post-dive activities and onset of symptoms.
- Transport to the nearest hyperbaric chamber for definitive care unless the patient needs emergency department stabilization first. Have dispatch contact the DAN network for the closest center 919-684-9111.

Emergencies Related to Marine Fauna

- Assess and stabilize airway, breathing and circulation.
- Assess need for decontamination and detoxification in cases of envenomation.
 - o Venomous bites include sea snake, certain species of octopus and blood worms.
 - o Venomous spine and fine punctures include crown of thorns star fish, cone shells, sea urchins, some catfish, scorpion fish, some sharks such as dogfish shark, stone fish and stingray.
 - Treat ABC priorities.
 - Heat treatment to affected area. Water 45-50 degree C (104 – 113 F) or hot packs.
 - Anti-venom if available.
 - o Coelenterate stings - jellyfish, Portuguese man-o-war, anemones, hydroids and stinging fire coral - treat with 1/2 strength vinegar with unseasoned meat tenderizer applied as paste or ammonia. DO NOT expose to fresh water.
- Consider associated complicating problems such as trauma, envenomation, foreign body, bacterial contamination, air embolism, decompression sickness, near drowning or underlying medical disorders.
- ***Contact Poison Control through dispatch or at 813-844-4444 or 1-800-222-1222 for aid in identification of toxin and specific recommendations.***

Heat Stroke

Characterized by hypotension, tachycardia, confusion/coma, seizures and absence of sweating.

- Cool patient immediately.
 - o Remove clothing and cover with wet sheet.
 - o Pack groin, armpits, and base of skull with cold packs if available
 - o Fan or direct air conditioning on patient.
- Protect airway. Intubation as needed. Supplemental oxygen.
- IV of normal saline 500 ml bolus for adults, 10 ml/kg for pediatric patients. Then IV at
 - 1.5 times maintenance rate appropriate to size of patient.
- Perform accu-check and treat less than 60 or symptomatic.
- Treat hypotension with normal saline.
- Observe for seizures. Treat according to seizure protocol.

Hypothermia

- Pre-hospital recognition and diagnosis:
 - o Mild hypothermia 35-34 degrees C (97-95 degrees F). Patient fully awake, shivering and very uncomfortable.
 - o Moderate hypothermia 34-30 degrees C (94-86 degrees F). Patient obtunded, shivering still present.
 - o Severe hypothermia - less than 30 degrees C (86 degrees F). Patient obtunded or unconscious. Shivering ceased or diminished. Respiration depressed or absent. Pulse and heart sounds may be depressed or absent. Extremities are rigid as in rigor mortis. The distinction between life and death may be difficult.
- Management of Hypothermia:
 - o Mild - remove from cold environment, provide warm fluids and warm blankets.
 - o Moderate/Severe - remove from cold environment, NPO and warm blankets
 - High flow oxygen warmed and humidified if possible.
 - Assist respirations if shallow.
 - Avoid excess stimulation.
 - Start IV with warm fluids.
 - EKG - shivering interference may be a problem.
 - Warm packs to groin, under arms and base of skull if possible.
 - Perform glucose check, treat per **Hypoglycemia Protocol**
- Start CPR if apnea/pulseless per ACLS protocols.
- Intubate gently as soon as possible.
- If asystole, continue CPR.
- Frostbite
 - o The treatment of choice is rapid rewarming with moist heat. If this cannot be accomplished nor sustained in the aircraft, rapid transport is mandatory.
- Elevate the affected extremity.
- Protect the injured area from further damage.
- See **Pain Management protocol**.

Nausea and Vomiting

- Continue general supportive care.
- Evaluate the severity of the patient's nausea and determine possible causes.
- Administer or increase oxygen delivery if patient's condition permits.
- Ondansetron (Zofran):
 - o Adult: 4-8 mg
 - o Pediatric: 0.1 – 0.2 mg/kg IV or IM.

Near Drowning

- Pre-hospital: Rapid cautious removal of victim from water maintaining spine motion restriction.
- Assess and stabilize airway, breathing and circulation. Intubate if necessary. In water CPR is not effective and should generally not be performed.
- Follow standard ACLS protocol.
- Consider precipitating medical or traumatic cause for the near drowning.
- Use dextrose and Naloxone as in unconscious patient protocol.
- Use supplemental oxygen on all patients. May require increased PEEP.

Toxic Gases and Chemicals

- Do not load patient into aircraft if there is obvious contamination. This could affect the quality of air in the aircraft or significantly contaminate medical crew or aircraft. Even unstable patients must be decontaminated to avoid risk to aircrew.
- Contact Poison Control through dispatch or at 813-844-4444 or 1-800-222-1222 for aid in identification of toxin and specific recommendations.
- Initial Survey (ABC's), remembering to limit further risk to the patient or to the flight crew. Essential protective gear includes hoods, gowns, face mask, double gloves and shoe covers.
- High flow oxygen for toxic gas inhalations.
- Avoid continued exposure by removing patients clothing. If possible, irrigate with a strong stream of rapidly flowing water unless a water reactant product is suspected prior to loading
 - o into transport vehicle. If dry or powdered agent is involved sweep off excessive contaminate prior to irrigation.
- Make every effort not to contaminate aircraft or your team.

V. Procedures

2. Chest Tube Management

- Prior to transport inspect the patient's chest wall to ensure that all connections are tight and that tubing is not kinked. Check the skin around the insertion site for subcutaneous emphysema. Be sure that the tube is properly secured to the patient.
- Note the color, consistency and amount of drainage. Note any air leak in the water chamber. Mark the current level of drainage on the pleur-evac with a pen. A sudden increase in the amount of drainage indicates hemorrhage or sudden patency of a previously obstructed tube.
- The chest tube can be clamped briefly during travel between suction devices but must be unclamped and re-connected to suction in the transport unit. Suction should be set at 20 cm Hg to create a gentle rolling of bubbles in the water seal chamber. Vigorous bubbling or excessive suction will result in water loss from the chamber.
- If patient condition permits the patient should be placed in semi-fowlers position.
- **NEVER** raise the chest tube above the chest or the drainage will back up into the chest. The chest tube and drainage system should hang below the patient or be placed on the floor and secured in an upright position.
- If the chest tube becomes dislodged or is partially pulled out do NOT attempt to re-insert the same tube in the same incision. Place a valve dressing over the insertion site if it is completely dislodged. Maintain the current (new) position if it is still in the pleural space. If patient's condition requires emergent decompression perform thoracostomy as needed.

Blood Administration

Purpose:

To identify the indications for, and approved procedures for emergent blood transfusion.

Objective:

To establish cardiovascular improvement evident by the improvement/correction of signs and symptoms of hemorrhagic shock related to traumatic injuries, aortic emergencies, gastrointestinal bleeding, and/or obstetrical emergencies. To achieve/maintain a MAP between 60-70 mmHg (adults), age-appropriate hemodynamics (pediatrics, see below criteria for Traumatic Injuries, section 2), to ensure adequate tissue perfusion while being mindful of the importance of permissive hypotension.

Criteria for Traumatic Injuries:

- Prior to the administration of blood products to an adult patient (>15 years old) at least one of the following criteria must be met:
 - o Blunt trauma patient with SBP <90mmHg x2 readings and sustained heart rate >120 (Shock Index 1.3) and/or other signs of hypoperfusion following 500 ml of crystalloid infusion (includes EMS/referring facility fluid administration).
 - o Penetrating trauma patient with SBP <90mmHg x2 readings and sustained heart rate >120 regardless of crystalloid infusion volume.
 - o Blood product administration should be performed in the setting of traumatic arrests with mechanisms of injury suggestive of significant blood volume loss.
 - o Blood product administration should be performed when supported by lab values (Hgb <7, Hct <21) if available.
- Prior to the administration of blood products to a pediatric patient ($\leq$ 15 years old) at least one of the following criteria must be met:
 - o Blunt trauma patient
 - For weight <50 kg: If SBP is **less** than $70 + (2 \times \text{age})$ x2 readings and sustained tachycardia and/or other signs of hypoperfusion following a crystalloid infusion of 10ml/kg x 1 (includes EMS/referring facility fluid administration). Examples of other signs of hypoperfusion: cold extremities, delayed capillary refill, altered mental status.
 - For weight $\geq$ 50 kg: SBP <90 mmHg x2 readings and sustained tachycardia and/or other signs of hypoperfusion following 500 ml of crystalloid infusion (includes EMS/referring facility fluid administration).
 - Age specific heart rates considered tachycardia: 1 month- 1year >190, 1 year- 2 years>150, 3 years- 5 years >130, 6 years- 15 years >120.
 - o Penetrating trauma patient:
 - Follow the above hemodynamic parameters based on weight. Blood products may be given regardless of crystalloid infusion volume.
 - o Blood product administration should be performed in the setting of traumatic arrests with mechanisms of injury suggestive of significant blood volume loss.
 - o Blood product administration should be performed when supported by lab values (Hgb <7, Hct <21) if available.

Criteria for Aortic Emergencies:

- Prior to the administration of blood products, at least one of the following criteria must be met:
 - o Suspected or known rupture with worsening hypotension, **SBP <90 mmHg following 750ml of crystalloid infusion (3 boluses of 250ml per Aortic Emergency Protocol).**
 - o Blood product administration should be performed when supported by lab values (Hgb <7, Hct <21) if available.

Criteria for Medical Emergencies (GI Bleed, OB, etc.):

- Prior to the administration of blood products, at least one of the following criteria must be met:
 - o Medical illness/condition suggestive of significant blood volume loss evident by clinical presentation and supported by lab values (Hgb <7, Hct <21) if available.
 - o SBP <90mmHg x2 readings and sustained heart rate >120 following and/or other signs of hypoperfusion following 500 ml or 10ml/kg for pediatric patients <50 kg of crystalloid infusion (includes EMS/referring facility fluid administration).

Tranexamic Acid (TXA)

- Rapid transport to an appropriate facility should not be delayed.
 - o All external hemorrhage control measures should be implemented as appropriate.
 - o TXA administration should follow the initiation of blood product resuscitation.

Indications:

- Known or suspected traumatic or OB hemorrhagic shock when initiation of blood products has begun, or when blood products are indicated, but not available
- Declined blood products due to religious, social, or other reasons.
- TXA should not be administered until first product set/ initial bolus (1 unit of LTOWB, or 1 PRBC & 1 Liquid Plasma) is completed. Refer to Blood Product Administration Protocol hemodynamic parameters.
- OB specific – cumulative ~1000mL blood loss (Maternal or post-partum hemorrhage)

Contraindications: Known hypersensitivity, known thromboembolic disease (DVT,PE).

Special Considerations:

- TXA must be initiated within 3 hours from time of injury, best efficacy if initiated within 1 hour from time of injury.
- Give consideration to time of injury to arrival to Trauma Center and additional treatments/interventions that may take priority during transport.

Adverse Reactions:

- Seizure, vision changes, renal impairment, and hypotension with rapid administration.
- **Dosing and Administration:**
 - o **Traumatic Dosing:**
 - **Adult Dosing:**
 - Mix bolus of 2-gram TXA in 100ml of 0.9%NS, administer IV/IO over 10 minutes.
 - **Pediatric Dosing (≤15 years of age):**
 - ≤65 kg: 15mg/kg IV (Max 1-gram), administer IV/IO over 10 minutes. Follow bolus with initiation of 2 mg/kg/hr (Max 1-gram) over 8 hours, if time permits.
 - ♦ >20kg: Mix in 100ml of 0.9%NS
 - ♦ <20kg: Mix in 50ml of 0.9%NS
 - >65kg: follow adult dosing protocol
 - o **OB Hemorrhage Dosing:**
 - 1 gram bolus IV/IO over 10 minutes. Follow Bolus with 1 gram drip over 8 hours
 - o TXA cannot be given in the same IV/IO line as blood products, or penicillin.
- **Communication:** All patients receiving TXA should have a TXA arm band applied. Upon arrival to the receiving facility verbal and written report MUST include TXA administration information (bolus with consideration of need for 8-hour infusion or need for continuation of 8-hour infusion). Recommend reporting estimated blood loss on scene.

- **Medical Control:** In the event that there is question if patient meets criteria for TXA administration, please contact online medical control physician.

Calcium Gluconate

- Calcium Gluconate is to be given to both Adult and Pediatric patients following either 2 units/ 2 boluses of LTOWB or 2 units/ 2 boluses of PRBCs. Dosing guidelines below.
- **Dosing & Administration**
 - o **Adult Dosing:**
 - 1 gram – administer over 5 minutes
 - o **Pediatric Dosing (≤ 15 years of age) – administer at rate of 100mg/minute:**
 - <10 kg – 250 mg – administer over 2.5 minutes
 - 10-20 kg – 500 mg – administer over 5 minutes
 - 20-30 kg – 750 mg – administer over 7.5 minutes
 - >30 kg – 1 gram – administer over 10 minutes

Admin considerations:

- Rapid IV calcium administration can cause vasodilation, leading to bradycardia, hypotension, arrhythmias, etc. – Monitor vital signs and cardiac monitoring during administration.

Policy/Process for Blood Product Administration:

- Upon notification of a **transport** request, the **flight or ground crew** will pack 2 units of Low Titer O Whole Blood (LTOWB), or 2 units of O-Positive Packed Red Blood Cells, and 2 units of Type A Liquid Plasma when LTOWB is not available, in the approved Blood Cooler according to manufacturer guidelines. If only 1 unit of LTOWB is available, then 1 unit of LTOWB, 1 unit of O-Positive PRBCs, and 1 unit of Type A Liquid Plasma will be packed. If only 1 unit of LTOWB or 1 unit of O-Positive PRBCs, and 1 unit of Type A Liquid Plasma is available, then that will be packed.
- The blood shall only be removed from the cooler immediately prior to transfusion or upon return to the base location following transport.
- Determine whether the patient meets the outlined criteria for blood product administration per the Aeromed Blood Product Administration Protocol.
- If the patient can provide consent, obtain their signature on the bottom of the OneBlood Form #1148. Patients may refuse blood transfusions for religious, social, and/or personal reasons. If the patient is unable to provide consent or refusal, then blood transfusions will be administered utilizing implied consent.
- All blood products will have the product crosschecked with the attached Transfusion Report for Product Type and RH, Unit number, and Expiration date by both the Flight Nurse and Flight Paramedic prior to transfusion. All blood product transfusions may be initiated by the Flight Nurse or Flight Paramedic. For Aeromed Ground services all blood products will have the product crosschecked with the attached Transfusion Report for Product Type and RH, Unit number, and Expiration date by both Ground **crew members** prior to transfusion and all blood products may be initiated by the Ground **crew members**.
- Ensure the patient has adequate IV access for blood product administration. Adults- 22 gauge or larger. Pediatrics- 20-24 gauge. IO access can be used to administer blood products.
- Adult patients (>15 years old): Initiate blood product administration using either LTOWB or a 1:1 ratio (1 unit of PRBCs: 1 unit of Liquid Plasma). O-Positive PRBCs will be administered to all patients regardless of age, sex, and Rh status in the emergency setting. A Rhlg Alert Band will be placed on all patients and the receiving MD notified upon arrival. All blood products will be transfused using the approved blood warmer device. A rapid infuser (preferred) or pressure bag will be used when condition warrants rapid infusion of blood products. The patient will be continuously monitored for development of signs of a transfusion reaction. Patient reassessment must be performed after completion of administration of each product set (1 unit of LTOWB or 1 PRBC & 1 Liquid Plasma) to determine whether the additional product set administration is indicated. LTOWB is the preferred blood product and should be transfused first if available.
- Pediatric patients (≤ 15 years old): Transfusion volumes for patients < 30kg is 20ml/kg if administering LTOWB and 10ml/kg if administering PRBCs/ Liquid Plasma, ≥ 30 kg is 1 unit. Initiate blood product administration using either LTOWB or a 1:1 ratio (1 unit of PRBCs: 1 unit of Liquid Plasma). O-Positive PRBCs will be administered to all patients regardless of age, sex, and Rh status in the emergency setting. A Rhlg Alert Band will be placed on all patients and the receiving MD notified upon arrival. All blood products will be transfused using the approved blood warmer device. A rapid infuser (preferred) or pressure bag will be used when condition warrants rapid infusion of blood products. The patient will be continuously monitored for development of signs of a transfusion reaction.
 - o Patient reassessment must be performed after completion of administration of each product set (1 unit of LTOWB, or 1 PRBC & 1 Liquid Plasma)/ initial bolus to determine whether the additional product set/ repeat bolus administration is indicated. LTOWB is the preferred blood product and should be transfused first if available.
- If a Transfusion Reaction is recognized:
 - o Stop the transfusion immediately but keep line open.
 - o Monitor vital signs every 5 minutes and urine output if able.
 - o For allergic reaction or anaphylaxis, refer to anaphylaxis protocol.
 - o Notify receiving Physician and Team immediately upon arrival.
 - o Return blood/component bag, administration set and any attached fluids, and copy of transfusion

report to the receiving blood bank.

- Upon arrival to the receiving hospital the flight or ground crew will remain with the patient until:
 - o The patient is identified with an arm band and patient labels are obtained to place on the Transfusion Report that is attached to the blood product transfused and One Blood Form #1148.
 - o Aeromed blood product transfusion has been completed and the Transfusion Report has been retrieved and completed. A copy of the Transfusion Report will be made and left at the receiving facility and the original maintained for Aeromed's patient record.
 - o One Blood Uncrossmatched Emergency Release Form #1148 has been completed and a copy left with the receiving facility and the original maintained for Aeromed's patient record.
 - o Blood segments have been recovered and are delivered by a flight or ground crew member to the receiving hospital's blood bank along with an additional copy of the Transfusion Report and One Blood Form #1148.
 - o If receiving hospital is a designated facility to restock blood product, this will be done prior to departure if time permits (Tampa General Hospital). Blood products must be placed directly into the approved blood cooler at time of receipt.
- If blood products are transfused during the transport and the receiving hospital is not a designated restocking facility, a flight or ground crew member will place an order in Blood Hub and notify the identified One Blood contact number as soon as possible to confirm receipt of order.
- If the blood products are not transfused during the transport, they will be returned to the base refrigerator immediately upon returning to base, following the appropriate Blood Service policy.
- Blood product administration documentation will include:
 - o Vital signs prior to transfusion and every 5 minutes during transfusion.
 - o All blood product information to include product type, unit number, expiration date, and volume.
 - o Names of crew members checking blood and initiating administration.
 - o Date and time of administration start and finish.
 - o Absence or presence of transfusion reaction and treatment provided.
 - o Volume transfused.
 - o Disposition of blood segments, Transfusion Report, and One Blood Form #1148.

Uncrossmatched Emergency Release Blood Release Form					
Patient's Name:		Date:		Time:	
Flight Number:		Crew: /			
Receiving Hospital & Room #			Attending Physician		
Blood Certified as Compatible for this patient cannot be supplied due to urgent need. Compatibility testing (ABO/Rh, Antibody detection and crossmatching) was not performed prior to transfusion. Patient received _____ units of Red Blood Cells ☐ O Positive ☐ O Negative Liquid Plasma _____ units Female of childbearing age or pediatric patient received _____ units of O Positive Red Cells and may need Rhlg The above units were infused in the interest of protecting this patient from exsanguination, we do not take responsibility for completion of compatibility of the blood with the patient. The unit number(s) transfused are:					
Unit #	Blood Type	Component	Start Time	End Time	Amt Infused
Vital Signs at Receiving Hospital	Time:	HR:	BP	RESP	TEMP
Patient exhibited signs/symptoms of transfusion reaction during transport ☐ YES ☐ NO (mark one)					
If Yes Signs and symptoms noted:				Time of reaction:	
				Date:	
Flight Crew 1 signature		Printed name			
				Date:	
Flight Crew 2 signature		Printed name			
I understand the information above regarding the emergency administration of uncrossmatched blood and am aware of the need to complete compatibility testing and the possible need for administration of Rhlg.					
Signed:			Date:		
Receiving Nurse					
The clinical condition for the above named patient is sufficiently urgent to necessitate this emergency transfusion before compatibility testing could be completed. The benefits of the transfusion outweigh the potential risk.					
Signed:			MD		
Per Aeromed Protocol/ Dr. Lefebvre			Date:		
Receiving Physician					
** Flight crew will provide a photo copy of this form, empty blood bag and appropriate paperwork to the receiving facility. The original will be maintained with the patient's flight records**					

***IF PATIENT IS ABLE TO CONSENT HAVE PATIENT SIGN HERE: _____ DATE: _____

EZ-IO

Indications for Use:

- Patients $\leq$ 3 kg requiring immediate volume, blood and/or medication administration in which adequate peripheral access attempts (including external jugular vein when accessible) have been unsuccessful and where further delay will likely result in further patient decompensation or demise.
 - o Adults: Proximal Humerus
Proximal/Distal Tibia
 - o Pediatrics: Proximal/Distal Tibia
 - *Proximal humerus can be used in patients when the landmarks can clearly be identified.

CONTRAINDICATIONS:

- Fracture of the tibia or femur (*consider contralateral tibia*)
- Previous orthopedic procedures (IO within 24 hours or knee replacement)
 - o (*Consider contralateral tibia*)
- Pre-Existing Medical Condition (*tumor near site or peripheral vascular disease*)
- Infection at insertion site (*consider contralateral site*)
- Inability to locate landmarks (*significant edema*)
- Excessive tissue at insertion site (*obesity*)

CONSIDERATIONS:

- Flowrates:
 - o Due to the anatomy of the IO space you will note flow rates to be slower than those achieved with peripheral catheters.
 - o Ensure 10 ml rapid bolus (flush)
 - o Use a pressure bag for continuous infusions
- Pain:
 - o Insertion of the EZ-IO™ in conscious patients causes mild to moderate discomfort and is usually no more painful than a large bore IV. Prior to IO flush on alert patients, SLOWLY administer 20 to 50 mg 2% IV Lidocaine through the EZ-IO™ hub for anesthetic purposes.

EQUIPMENT:

- EZ-IO™ Driver
- EZ-IO™ Needle Set
 - o *(Pink 15mm 3-39kg)
 - o *(Blue 25mm >40kg)
 - o *(Yellow 45mm >40kg & Excessive tissue over the insertion sites) Alcohol or Betadine® Swab
- Extension Set Bag
- IV tubing
- 10mL syringe
- Tape or Gauze
- Pressure Bag
- IV Lidocaine (Prefilled Cardiac version)

PLACEMENTPROCEDURE:

- Preparation
 - o Determine if placement is indicated
 - o Confirm that there are no contraindications
 - o Wear approved Body Substance Isolation or Personal Protective Equipment
- Placement
 - o Locate the insertion site.
 - o Cleanse the insertion site using aseptic technique
 - o Prepare the EZ-IO™ driver and needle set
 - o Stabilize leg and insert EZ-IO™ needle set
 - o Remove EZ-IO™ Driver from needle set while stabilizing catheter hub
 - o Remove stylet from needle set, place stylet in shuttle or sharps container
- Post Procedure
 - o Confirm correct placement
 - o Flush the device
 - o In conscious patients, slowly infuse 20 – 50 mg of 2% Lidocaine IO. You may also prime the extension set with Lidocaine to decrease any irritation.
 - o If unconscious, flush or bolus the EZ-IO™ catheter with 5-10 ml of normal saline.
 - o Connect the extension set or IV tubing
 - o Place a pressure bag on solution being infused where applicable
 - o Begin infusion
 - o Secure tubing
 - o Monitor EZ-IO™ site and patient condition

REMOVAL PROCEDURE

- Remove catheter by placing a syringe or cap-off IO open port, turn clockwise while pulling simultaneously with firm steady non-rocking movement. The device is not threaded but requires loosening from the bone. Pull while turning.
- Dispose of the catheter in a manner appropriate for contaminated sharps.
- Apply pressure to the site and then dress the wound using aseptic technique.

DOCUMENTATION:

1. Document assessment findings, interventions, and outcomes with special attention paid to any problems or complications.

Finger/Simple Thoracostomy

Indications (absolute)

- Traumatic cardiac arrest or peri-arrest state in a patient undergoing positive pressure ventilation.
- In the setting of blunt traumatic cardiac arrest bilateral thoracostomies should be considered.

Indications (relative)

- Tension pneumothorax with hypoxia, hypotension, absent breath sounds

Contraindications

- Chest trauma without invasive positive pressure ventilation, hypotension or hypoxia
- Confirmed or suspected simple pneumothorax

Equipment

- Sterile gloves
- Eye protection/ face shield
- Chlorhexidine prep
- Scalpel
- Hemostats / blunt instrument
- Skin marking pen

Procedure

- Utilize universal precautions especially face and eye protection.
- Place the patient in a supine position, immobilize if necessary.
- The patient's arm is abducted and the 5th intercostal space is identified just anterior to the mid- axillary line.
 - o The site should be higher where landmarks are difficult (i.e., obese patients) or for pregnant patients who have a raised diaphragm. The practitioner should also confirm that the defined site is well within the "safe triangle" (bordered by the anterior border of the latissimus dorsi, the lateral border of the pectoralis major muscle, and a line superior to the horizontal level of the nipple).



- Clean the chest with chlorhexidine (or equivalent).
- Make a 3-4 cm incision into the subcutaneous fat. Dispose of scalpel.
- Bluntly dissect through the intercostal muscles and puncture the pleura. A tract capable of having a finger inserted should be achieved. Remove the forceps.
- Insert gloved finger into chest cavity and perform finger sweep to assess for adhesions and to feel lung inflation and deflation.
- Bony crepitus of procedural region is a contraindication for pleural cavity sweeps and palpation.
- Remove finger and leave thoracostomy site open.
- Reassess hemodynamics post procedure.
- Circle the incision and label "EMS" with skin marking pen.
- Administer Cefazolin (Ancef) 2gm if available, if not 1 gm IV if time permits.

REMEMBER TO NOTIFY THE MEDICAL DIRECTOR IF THIS PROCEDURE WAS PERFORMED

Nasogastric / Orogastric Tube

Purpose

Nasogastric / orogastric tube placement is used primarily to evacuate gastric contents and decompress gastric distention.

Indications

- To relieve gastric distention severe enough that it impairs effective ventilation of an adult or pediatric patient, as a result of prolonged CPR or rescue breathing.
- To relieve gastric distention severe enough that it impairs effective ventilation or poses an aspiration hazard in a pediatric patient, following submersion or near drowning.
- To facilitate removal of gastric contents prior to removal of an LMA, in order to prevent possible aspiration.
- Any time an on-line medical control physician orders its use.

Contraindications

- In the above situations there are no absolute contraindications.
- Maxillofacial trauma is a relative contraindication for use of the nasal route.

Precautions

- Insertion of the orogastric / nasogastric tube may cause or exacerbate bleeding. Use caution in patients with known hepatic cirrhosis, esophageal or gastric. bleeding disorders or disease.
- Insertion is likely to cause gagging and vomiting in the semi-conscious patient who has an intact gag reflex, which may result in aspiration, if the airway is not secured.

Adverse Reactions

- aspiration
- significant and possibly exsanguinating hemorrhage
- nasal sinus injury
- inadvertent intubation of the trachea
- inadvertent intubation of the cranium (through the cribriform plate)

Equipment

- appropriate PPE
- double lumen silicone tube with Salem Sump® vent, of appropriate size
- water soluble lubricant
- aspirating or bulb syringe
- suction equipment (i.e. yankauer tip)
- adhesive tape

Procedure

- Gather equipment.
- Don appropriate PPE.
- Position patient (if possible, flexion of the head is desirable).
- Measure the tube from the tip of the nose, around the ear, to the approximate vicinity of the epigastrium, and note length to be inserted.
- Apply water soluble lubricant to the distal 5 cm of the tube.
- Insert slowly, until the noted length has been inserted. If resistance is met, remove and attempt insertion into the other nare. Be aware of possible regurgitation and aspiration.
- Place a stethoscope over the epigastrium, while injecting air into the tube with an aspirating or bulb syringe, and listen for loud bubbling sounds. If no sound is heard, retract the tube 5 cm and inject air again. If there is still no evidence of air being introduced into the stomach then remove the tube and attempt reinsertion.
- After confirmation of placement, secure the tube in place with tape.
- Connect tube to low suction (80 cm/H₂O or less) and document results.
- Vent the tube as necessary, to prevent occlusion.

Needle Cricothyrotomy

Indications:

The only indication for needle cricothyrotomy is the inability to ventilate or adequately ventilate via non-invasive means for a pediatric <8 years of age.

Contraindications:

- Acute laryngeal disorders which cause distortion of landmarks
- Tracheal Injury or obstruction below the level of the cricothyroid membrane

Equipment:

- Flush (half full)
- 14 ga Angio catheter
- Skin disinfectant
- Pediatric BVM with ability to close pop off valve
- 3mm ETT hub
- Securement – adult nasal cannula, ETT holder fabric strap

Procedure:

- Remove end cap from Angio catheter and connect half full flush
- Utilize universal precautions especially face and eye protection.
- Place the patient in a supine position, immobilize if necessary.
- Attempt ventilation with BVM while preparing for procedure.
- Disinfect the entire anterior neck with antiseptic swabs, utilizing sterile procedures when possible.
- Locate the thyroid notch, cricothyroid membrane and the sternal notch. Stabilize the thyroid cartilage with the left (or non-dominant) hand
- At 45-90 degrees to the neck, puncture through the cricothyroid membrane while aspirating the syringe. Once through, bubbles will be withdrawn into the syringe – **This is our primary confirmation method for the placement.**
- If at a steep angle tilt the entire syringe and angio catheter setup to aim towards the feet – be careful not to advance the needle.
- Once aimed towards the feet advance the catheter over the needle to the hub
- Remove the needle
- Attach the 3mm ETT hub into the catheter and attach the BVM (with the popoff disable/off)
- Do not attach EtCO2 device to the ETT hub. This is not a reliable verification tool in this particular scenario.
- Ventilate using bag
- Do not target a RR, as soon as the bag reinflates, squeeze the bag again
- Secure the device in place

REMEMBER TO NOTIFY THE MEDICAL DIRECTOR IF THIS PROCEDURE WAS PERFORMED

Pain Management

Pain management is authorized in patients in whom significant discomfort is present and where the intervention is not specifically contraindicated due to unstable patient condition.

- Continue general supportive care appropriate to patient condition.
- Evaluate and request the patient's pain severity score using the appropriate measuring tool as applicable with "10" being extreme and "0" indicated pain free. Document the pre-treatment pain severity score on the run report and begin pain management. For pediatric patients, visual aids can be provided to assess pain severity (Reference current TGH policyTX-172).
- Pain can be controlled with Morphine, Fentanyl or Ketamine. Fentanyl is preferred for instances where potent but short acting pain control is desired.
 - o **Morphine:**
 - **Adult:** 0.025-0.1 mg/kg IV every 10 minutes until pain resolves. Preferred dosing range of 2-8 mg.
 - **Pediatric:** 0.025-0.1 mg/kg IV; give ½ of calculated dose slowly over 2 minutes; if pain is not controlled after 3 minutes continue giving morphine. This total dose can be repeated in 10 minutes if sufficient pain control has not been obtained.
 - o Consider administering Zofran per protocol if nausea is present or anticipated.
 - o **Fentanyl:**
 - **Adult:** 0.25-1 mcg/kg IV; repeat until pain is controlled or until a total of 250mcg has been given. May repeat total dosing in 30 minutes if necessary.
 - **Pediatric:** 0.25-1 mcg/kg, given slowly. May repeat at 0.5-1.0 mcg/kg in 5 to 10 minutes once. Total dosing may be repeated in 30 minutes if necessary.
 - o **Ketamine (Adult Only):**
 - 0.1 mg/kg IV if opiate fail to control pain, repeat until pain is controlled
- Monitor and record vital signs before and after administration of any pain medication and document pain scale number.

FLACC scale

The **Face, Legs, Activity, Cry, Consolability scale** or **FLACC scale** is a measurement used to assess pain for children between the ages of 2 months and 7 years or individuals that are unable to communicate their pain. The scale is scored in a range of 0–10 with 0 representing no pain. The scale has five criteria, which are each assigned a score of 0, 1 or 2.

Criteria ¹	Score 0	Score 1	Score 2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, uninterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting, back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

The FLACC scale has also been found to be accurate for use with adults in intensive-care units (ICU) who are unable to speak due to intubation. The FLACC scale offered the same evaluation of pain as did the Checklist of Nonverbal Pain Indicators (CNPI) scale which is used in ICUs.

Paralytics (Long Acting)

General Guidelines:

- **Use of long acting paralytic medication by Aeromed personal is only indicated for:**
 - o Need for ventilator compliance after optimal attempts at sedation is ineffective.
 - o Safety due to combative patients after optimal attempts at sedation ineffective.
 - o Safety of medical devices in which pt movement and medical device dislodgement may increase morbidity/mortality.
- Medications
 - o Vecuronium: 0.1 mg/kg IV repeat PRN
 - o Rocuronium: 1mg/kg IV repeat PRN
- When providing long-acting paralytics, you MUST provide adequate dosing of sedation AT THE SAME TIME as providing long-acting paralytics
- NEVER give a long-acting paralytic without providing sedation (see sedation protocol)
- Recommend higher dosing for sedation, provided that the patient has stable blood pressure. If higher doses of sedation are not feasible due to hemodynamics, more frequent lower doses should be used.
- In the event of borderline to low blood pressure, provide ketamine for sedation
- Recommend Train of Four monitoring before departure from sending
- **Continuous sedative drip is REQUIRED for patients on continuous paralytic infusions.**
- Must notify medical director via QA flag when long-acting paralytics are used

Patient Sedation

General Guidelines:

- Sedation may be appropriate where the patient is combative, restless, anxious, or delirious, especially regarding safety in flight.
- Use lower dose range for those that are mildly anxious/agitated or those that are lower in weight.
- Be very cautious with use of multiple sedating or analgesic medications or with repeat dosing, as this may cause respiratory depression and hemodynamic instability.
- Patients on ventilatory support may require sedation to improve ventilatory compliance and tolerance.
- Continue general supportive measures appropriate to patient condition. Careful monitoring of vital signs is necessary when sedatives are used. **End tidal CO₂ monitoring is required when administering sedating medications.** Exceptions include patient's whom are severely agitated and if there is risk of harm to patient or crew members.
- Current hospital sedation scale should be used to document the patient's level of sedation before and after administration of sedatives.
- Attempt to communicate with the patient to alleviate anxiety or restlessness. If verbal de-escalation is not successful, consider the administration of a sedative.
- If the sending physician has orders available for choice of sedation and dosage and these are not in conflict with the general care guidelines of TGH, utilize these orders.

Anxiety / Agitation

- For anxiety or agitation (agitation causing acute deterioration or safety hazard):
 - o Lorazepam (Ativan) – longer acting, give slowly
 - Adult: 0.5-2 mg IV/IM, q15 min
 - Pediatric: 0.05 mg/kg IV/IM (Max 2mg/dose), q15 min
 - o Midazolam (Versed) – shorter acting, give slowly
 - Adult: 1-5 mg IV/IM, q5 min
 - Pediatric: 0.05 mg/kg IV/IM (Max 5mg/dose), q5 min
- For anxiety or agitation unrelieved by benzodiazepines or hemodynamic instability:
 - o Haloperidol (Haldol) – give over 2 minutes – ADULTS ONLY
 - Adult: 5mg IV/IM, q15 min x 2 doses max
 - May be of benefit in patients with history of psychosis
 - Contraindicated if patient has long QT
 - Use with caution in patients older than 50
 - Limited data available for pediatrics, so to be used in adults only
 - o Ketamine – give over 2 minutes
 - Adult: 1mg/kg IV
 - Pediatric: 1mg/kg IV
 - Ketamine is only to be used in ≥ 3 months of age due to risk of airway obstruction, laryngospasm, and apnea.
 - Be aware of emergence phenomenon and consider use of midazolam (Versed)

Procedural Sedation (including manipulation of injured extremities in order to place in aircraft)

- Ketamine – give over 3-5 minutes
 - o 1 mg/kg IV
 - o 2-4 mg/kg IM

Post-intubation:

- o Lorazepam (Ativan) – longer acting
 - Adult: 1-2 mg/kg IV, q15 min
 - Pediatric: 0.05 mg/kg IV, q15 min
- o Midazolam (Versed) – shorter acting
 - Adult: 1-5 mg IV, q5 min
 - Pediatric: 0.05-0.2 mg/kg IV, q5 min
- o Propofol (Diprivan)
 - Usual starting dose 5 mcg/kg/min (Max 75 mcg/kg/min)
 - If boluses are needed, provide 0.25-0.5 mg/kg IV
 - Recommend increasing infusion dose rather than giving boluses, although boluses may be needed prior to beginning infusion
- o Ketamine
 - 1-2mg/kg IV
- o Fentanyl
 - 1-3 mcg/kg IV (Max 200 mcg/dose)
 - 0.7-10 mcg/kg/hr IV

COVID patients:

- o Continue using sedation infusion from sending facility
- o May add additional push dose sedation to ensure adequate sedation, but this is not meant to be used instead of an infusion

Long acting paralytics

- o When providing long acting paralytics, you MUST provide adequate dosing of sedation AT THE SAME TIME as providing long acting paralytics
- o NEVER give a long acting paralytic without providing sedation
- o Recommend higher dosing for sedation, provided that the patient has stable blood pressure. If higher doses of sedation are not feasible due to hemodynamics, more frequent lower doses should be used.

Richmond Agitation-Sedation Scale (RASS)

Richmond Agitation-Sedation Scale is a medical scale used to measure the agitation or sedation level of a patient. It was developed with efforts of different practitioners, represented by physicians, nurses and pharmacists.

The RASS can be used in all hospitalized patients to describe their level of alertness or agitation. It is however mostly used in mechanically ventilated patients in order to avoid over and under-sedation. Obtaining a RASS score is the first step in administering the Confusion Assessment Method in the ICU (CAM-ICU), a tool to detect delirium in intensive care unit patients.

The RASS is one of many sedation scales used in medicine. Other scales include the Ramsay scale, the Sedation-Agitation-Scale, and the COMFORT scale for pediatric patients.

Score

Score	Classification	(RASS)
4	Combative	Overtly combative or violent; immediate danger to staff
3	Very agitated	Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff
2	Agitated	Frequent non purposeful movement or patient-ventilator dyssynchrony
1	Restless	Anxious or apprehensive but movements not aggressive or vigorous
0	Alert and calm	
-1	Drowsy	Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice
-2	Light sedation	Briefly (less than 10 seconds) awakens with eye contact to voice
-3	Moderate sedation	Any movement (but no eye contact) to voice
-4	Deep sedation	No response to voice, but any movement to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Push-Dose Pressors

General Guidelines:

- ❖ Rapid transport to an appropriate facility. Measures to control blood pressure **without** delaying transport should be instituted.
 - o Goal: Main a Mean Arterial Pressure (MAP) greater than 65 mmHg if hypotension is not due to traumatic volume loss or loss of vessel lumen integrity.
- ❖ Transferring facility's prior medication for heart rate and blood pressure shall be continued if appropriate and within Aeromed's treatment protocols or online medical control direction. Goal is rapid transport.
- ❖ ***Push dose pressors are NOT TO BE USED AS A SUBSTITUTE FOR AN INFUSION, rather a transitional or temporary measure to overcome transient hypotension (i.e. – medication induced).***
- ❖ Blood pressure is to be monitored continuously. Maintain Mean Arterial Pressure (MAP) greater than 65 mmHg, with the goal MAP of around 75 mmHg.

The following are current options for push dose pressor administration:

- Phenylephrine (Neosynephrine):
 - o Concentration: 1000mcg/10mL prefilled syringe
 - o MOA: Alpha agonist (pure vasopressor)
 - o Onset: ~60 seconds
 - o Duration: 10-20 minutes
 - o Dosing range: 50-200 mcg
 - o Dosing intervals: 2-5 minutes
 - o Indications:
 - Hypotension *without bradycardia*
 - Hypotension during rapid sequence intubation
 - Quick administration enabling the initiation or addition of vasopressor infusion
 - Transferring vasoactive medications at referring facilities
 - Sepsis
 - Neurogenic shock
 - Hemorrhagic shock while preparing initiation of blood products
 - Tachyarrhythmia and hypotension
 - Hypotension in aortic emergencies (unless profoundly bradycardic)
 - o Contraindications:
 - Bradycardia
 - Hypersensitivity
 - o Adverse events:
 - Bradycardia
 - Rebound hypertension
- Epinephrine:
 - o Concentration: 100mcg/10mL prefilled syringe
 - o MOA: Alpha & Beta 1/Beta 2 Agonist (inotrope and vasopressor)
 - o Onset: ~60 seconds
 - o Duration: 5-10 minutes
 - o Dosing:
 - Adult: 5-20 mcg
 - Pediatric: 1 mcg/kg (max dose 20 mcg)
 - o Dosing intervals: 2-5 minutes
 - o Indications:
 - Hypotension without severe tachycardia

- Hypotension during rapid sequence intubation
- Quick administration enabling the initiation or addition of vasopressor infusion
- Transferring vasoactive medications at referring facilities
- Sepsis
- Neurogenic shock
- Hemorrhagic shock while preparing initiation of blood products
- Anaphylaxis
- Cardiogenic shock / bradycardic
- S/p cardiac arrest with pulse
- o Contraindications:
 - Severe tachycardia or tachyarrhythmia
 - Hypersensitivity
 - Aortic emergencies (due to increased pulsatile load) unless profoundly bradycardic
- o Adverse events:
 - Tachycardia
 - Rebound hypertension
- Consider epinephrine in low cardiac output states or when needing beta agonistic properties to support hemodynamics
- In **cardiogenic shock**, push-doses of epinephrine are preferred over phenylephrine due to epinephrine's benefits of improved inotropy & chronotropy when the cardiac function is compromised. Phenylephrine is not recommended in cardiogenic shock because it may decrease cardiac output in these patients due to its potential for reflex bradycardia.
- Consider phenylephrine when significant tachycardia (HR>120bpm) is present.

Presumption of Death in the Field

- Medical patients who display advanced signs of death may be presumed dead. body cold to touch in an otherwise warm environment with dependent morbid
- Trauma patients must meet 3 criteria to be presumed dead:
 - o Have sustained a mechanism that suggests significant trauma.
 - o Be pulseless and apneic or succumb to that condition while in the presence of the flight crew- Blunt trauma only
 - o Show asystole or a Bradycardia PEA in two leads
- Once the above criteria are met, the police or emergency medical personnel should be advised to summon the local coroner to the scene. The flight team is not required to remain on the scene to await the coroner's arrival but they do need to leave the following information in writing with the police officer:
 - o Time of arrival at the patient's side if resuscitation is not initiated or the time CPR is terminated on the physician's order.
 - o Names of the flight nurse, paramedic and on line medical control
 - o Name of our organization (Tampa General Hospital - Aeromedical Services).
 - o Our phone number for additional information (813-844-7400).
- Though every effort must be made to cooperate with law enforcement agencies and the coroner's/medical examiner's office regarding disturbing crime scenes when transporting victims in potential/probable homicides the first priority must remain patient salvage.
- When employing presumption of death certain extenuating circumstances particularly hypothermia and submersion must be taken into account and potential for salvage should be assumed. In these instances full resuscitative efforts should be initiated without delay.
- In the event that there is any question as to whether to initiate or terminate resuscitative efforts the following guidelines should be employed:
 - o When in doubt resuscitate.
 - o Almost all pediatric arrest should have the benefit of full resuscitative efforts including transport.
 - o On scene runs with trauma patients where access to provide adequate CPR to the patient in cardiac arrest is not available (i.e. - prolonged extrication), the possibility of tension pneumothoracies must be considered and bilateral needle or finger thoracostomy be performed before resuscitative efforts are discontinued.
- No patients are to be transported after pronouncement of death. It is illegal to transport dead bodies.

Radial Art Line Insertion

General Guidelines:

- Radial Art Line insertion is an important aspect of caring for patient's with labile or need for continuous blood pressure monitoring
- Essential tool when managing VAD and ECMO patients due to low pulsatility as well as patients who require vasopressor support and titration
- Must have an Allen's test completed and documented to verify adequate collateral ulnar circulation
- Review pertinent labwork to include coagulation studies and platelet count

Equipment:

- 22-18 G Arrow Radial Artery Catheterization Set,
- sterile gloves,
- chlorhexidine or betadine swabs,
- oblite/togaderm,
- pressure transducer line,
- 500 ml NS bag, pressure bag,
- Zoll pressure cable.
- POCUS (optional)

Procedure:

- Ensure pressure transducer is set up or being set up and opens catheter packaging maintain sterility.
- Position patient in comfortable position for patient and practitioner for optimal success (wrist from flat to hyper extended to maximize radial pulse palpation).
- Cleans from thumb pad to ½ way up forearm (chlorhexidine or betadine).
- Don sterile gloves.
- Trial advance and retract spring-wire guide through needle via actuating lever to ensure proper feeding.
- Stabilizes artery by pulling skin taut.
- Puncture skin/vessel at 45-60 degree angle being careful to not puncture both vessel walls.
- Achieves blood flashback and advances guide wire as far into vessel as allows.
 - o Caution: If difficult advancing guidewire do not force feed wire.
- Advances catheter over guidewire.
 - o If difficulty in advancing catheter, slight rotating motion of catheter hub may be helpful.
- Holds light pressure at catheter tip and removes needle and guidewire.
- Attaches pressure tubing and observes monitor for arterial pressure waveform.
- Cleans excess blood and secures line with wing clip and togaderm if able.
- Splints wrist to maintain line integrity if necessary.

Rapid Sequence Intubation (RSI)

The Flight Paramedic and/or Registered Nurse may perform RSI/oral intubation on patients with potential or actual airway compromise.

- Indications:

- o Failure of oxygenation not treatable with less aggressive airway intervention (e.g., nasal cannula, non-rebreather mask, CPAP)
- o Failure of ventilation (rising end-tidal CO₂) that is not successfully treated with CPAP (or in cases where CPAP is contraindicated)
- o Patients with potential or actual airway compromise due to depressed sensorium (GCS of 8 or less) or whose combativeness threatens the airway, spinal cord stability, or transport safety.
- o Patients who demonstrate a high probability of airway compromise during transport (i.e. smoke inhalation, severe facial trauma with bleeding, angioedema, or a decreased ability to protect the airway).
- o Patients who may require ventilatory assistance or airway protection.

- Contraindications:

- o Given the need, there are no absolute contraindications.

- Procedure:

- o Preparation:
 - Prepare all equipment for use, including LMA and Glidescope Go for backup (when indicated), and emergency cricothyroidotomy should intubation/LMA/Glidescope attempts fail.
 - Ensure the patient is being monitored for cardiac rhythm, pulse oximetry, and NIBP. Pulse oximetry reading and NIBP must be performed and documented before and after intubation.
 - Place patient in correct positioning.
 - If trauma is known or suspected, initial attempt for intubation should be utilizing Glidescope Go while maintaining C-collar. If unable to intubate using Glidescope Go, may remove C-collar front to allow for adequate mandible manipulation. Once C-collar is removed, ensure in-line manual cervical spine stabilization. DO NOT hyperextend or distract the neck.
 - In setting of potential difficulty airway, Glidescope Go should be utilized as the initial attempt for intubation.
- o Pre-oxygenation:
 - If patient is spontaneously breathing and maintaining oxygen saturations above 90%, place non-rebreather mask at 15 LPM and nasal cannula at 15 LPM (apneic oxygenation) for pre-oxygenation. Leave apneic oxygenation nasal cannula in place until successful airway control.
 - If saturations are below 90%, utilize non-rebreather mask or assisted ventilation with BVM with PEEP valve along with nasal cannula to bring oxygen saturation >90% if possible.
- o Induction with paralysis
 - Induction options:
 - Etomidate (Amidate)
 - ♦ Adult – 0.3 mg/kg
 - ♦ Peds – 0.2-0.3 mg/kg
 - Try to avoid if sepsis is suspected or known
 - Propofol
 - ♦ Adult/Peds – 2mg/kg
 - Caution for hypotension

- Ketamine
 - ◆ Adult/Peds – 2mg/kg
 - Preferred in reactive airway disease due to beta2 effects
- Paralysis options:
 - Succinylcholine
 - ◆ Adult – 1.5mg/kg
 - ◆ Peds – 2mg/kg
 - ◆ Succinylcholine contraindications
 - Risk for hyperkalemia (e.g. renal failure patients, crush injury).
 - Denervation injury (paralysis, burns, muscular dystrophy).
 - Penetrating eye injury or glaucoma
 - History of malignant hyperthermia
 - ◆ Repeat dosing is highly discouraged in young children as cardiac arrest can ensue due to immature sympathetic nervous system.
 - Rocuronium
 - ◆ Adult/Peds – 1 mg/kg
 - Can be used in patients with contraindications to succinylcholine.
- o Intubation
 - Assess the patient to ensure paralysis – lack of spontaneous respirations, loose jaw, and flaccid extremities.
 - Insert laryngoscope blade into the oropharynx to facilitate visualization of the vocal cords. Remove any obstructions secretions or foreign bodies with suction and/or Magill forceps.
 - Visualize the vocal cords while inserting the endotracheal tube. Insert approximately 1-2 cm past vocal cords and inflate the distal cuff. If a stylet is used, it is removed after the tube has passed the chords.
 - Cricoid pressure and/or BURP maneuver can be utilized to facilitate intubation and prevent passive regurgitation.
 - If bradycardia persists, atropine can be given.
 - Adult – 0.5 mg IV
 - Peds – 0.02 mg/kg IV
 - Must confirm proper tube placement with continuous end tidal capnography. In addition, may also utilize auscultation, misting in tube, negative epigastric sounds.
 - If intubation is unsuccessful and additional attempts are intended, one must change some portion of approach (i.e. blade, patient position, tube size, bougie, Glidescope, etc.).
 - If intubation fails (either direct or with Glidescope), place LMA.
 - If LMA fails and unable to ventilate and oxygenate patient, surgical cricothyroidotomy should be considered.
- o Post-intubation
 - Patients who are on a ventilator must be maintained on a ventilator throughout the transport.
 - Maintain capnography to ensure that tube has not become dislodged.
 - Maintain ventilation at rate such that EtCO₂ is 35-45mmHg if possible.
 - Measure ETT cuff pressure with AG Cuffill ETT manometer. Pressure should be maintained at 20-30 cmH₂O. *Need to measure cuff pressure once during flight.*
- Complications:
 - o Succinylcholine
 - May cause vomiting during fasciculations, dysrhythmias (bradycardia, PVCs, V-fib), increased intraocular pressure, and/or transient ICP rise.
 - Malignant hyperthermia is a rare metabolic process of the skeletal muscles that may be triggered by succinylcholine. *See malignant hyperthermia crisis info below*

- Repeat dosing can lead to phase II block, prolonged paralysis.
 - Should be avoided in burns >24 hours, crush injuries, and in renal failure patients due to potassium release.
- o Etomidate
 - May result in adrenal suppression. Try to avoid in sepsis.
 - May cause vomiting, respiratory depression, myoclonus, and/or hypotension during use.
 - May cause emergence psychosis.
- o Midazolam (Versed)
 - May cause hypotension, amnesia, respiratory depression, and/or nausea/vomiting.
- o Propofol
 - May cause apnea, vomiting, and cardiac arrest in severe cases.
 - May require dose adjustment in geriatric and pediatric cases.
- o Ketamine
 - May cause respiratory depression, apnea, vomiting, arrhythmias, hypertension, and/or tachycardia
 - May cause emergency delirium
- **Documentation:**
 - o Indications for intubation.
 - o Tube size.
 - o Oxygenation prior to and during intubation attempts, including use of apneic oxygenation.
 - o Classification and condition of airway.
 - o Number of attempts and any difficulty with intubation.
 - o Confirmation of placement by 5 ways: auscultation, visualization, FEF device, capnography (wave form and numerical #), oxygen saturations, chest rise, ventilatory compliance, and how the patient looks.
 - o Depth of insertion and how the tube is secured.
 - o Crew member that performed procedure.
 - o Manual in line spinal immobilization, cricoid pressure.
 - o Mode of ventilation after intubation (BVM, ventilator).
 - o Cardiac rhythm, pulse oximetry, ETCO₂, NIBP when available.
 - o Status of ETT after movement (loading/unloading). Waveform capnography strip during patient transfer should be printed and attached to patient care record.
 - o Status of ETT at the receiving facility, clinical improvements at the receiving facility. If available, include initial ABG's.
 - o SPO₂% before the apneic oxygenation, during intubation, and after intubation.
 - o NIBP before and after intubation.

Malignant hyperthermia crisis

- o Recognition
 - Unexplained increase in ETCO₂
 - Unexplained tachycardia
 - Unexplained increase in oxygen requirement
 - Muscle rigidity and marked temperature elevation
 - Previous uneventful anesthesia does not rule out MH
- o Management
 - Hyperventilate with 100% oxygen
- o Treatment
 - Dantrolene Sodium (Ryanodex)
 - Add 5ml of sterile water for injection to each 250mg vial
 - Shake the vial to mix the medication up (no more than 10 seconds)
 - Suspension should be a uniform orange color
 - Give IVP with a normal saline flush
- o Dosage

- Loading dose of 2.5 mg/kg IV
- If the physiologic and metabolic abnormalities of MH continue, administer additional boluses up to the max dosage of 10mg/kg (max dosage can be exceeded)
- If the abnormalities reappear, repeat Dantrolene dosing by IVP starting at 1mg/kg.

Surgical Cricothyrotomy

Indications

The only indication for surgical cricothyrotomy is the inability to ventilate or adequately ventilate via non-invasive means.

Contraindications:

- Acute laryngeal disorders which cause distortion of landmarks
- Children under age 8
- Tracheal injury or obstruction below the level of the cricothyroid membrane

Complications:

- hemorrhage
- infection, cellulitis, tracheitis
- pneumonia
- false passage resulting in pneumo-mediastinum or pneumothorax
- sub-glottic stenosis
- tracheal or esophageal injury
- tube dislodgment
- mucous plug (common when using non humidified oxygen)
- apnea or cardiac arrest

Equipment:

- Sterile gloves
- Eye protection/ face shield
- Suction equipment
- Antiseptic swabs
- Scalpel
- Sterile 4x4 gauze pads
- Two curved hemostats
- 6.0 mm endotracheal tube - shortened in length, to include pilot balloon for cuff
- 10cc syringe
- BVM
- Oxygen
- Adhesive tape
- Bougie
- Tube holder

Procedure

- Utilize universal precautions especially face and eye protection.
- Place the patient in a supine position, immobilize if necessary.
- Attempt ventilation with BVM while preparing for procedure.
- Disinfect the entire anterior neck with antiseptic swabs, utilizing sterile procedures when possible.
- Locate the thyroid notch, cricothyroid membrane and the sternal notch.
- Stabilize the thyroid cartilage with the left (or non-dominant) hand.
- This is the most important step.
 - o If you lose the midline, the anatomy will be distorted and you may find yourself in the musculature and or vasculature on either side.
- Make a vertical skin incision, at least 2 cm long, over the lower half of the cricothyroid membrane.
- Try to cut through the skin and the subcutaneous tissue in one clean stroke.
- There is potential for severe bleeding from the incision.
- Locate the cricothyroid membrane with your index finger.
- Carefully make a transverse incision over the lower part of the membrane.
- Insert the closed tips of the curved hemostat into the incision and open the hemostat to enlarge the opening.
 - o If the patient is breathing spontaneously, secretions, blood and air will spray out of the opening.
 - o PROTECT YOUR FACE.
- Insert the shortened ET tube into the opening ensuring that the cuff passes into the trachea.
- Inflate the distal cuff and ventilate the patient.
- Insure proper tube placement utilizing the "5 Point" auscultation method and observe for chest wall movement. Attach ETCO₂ detector and monitor for appropriate color change or wave form.
- Secure tube with tape or tube holder.



REMEMBER TO NOTIFY THE MEDICAL DIRECTOR IF THIS PROCEDURE WAS PERFORMED

Trauma Tourniquet

Indications:

To stop bleeding when life-threatening limb hemorrhage is not controlled with direct pressure or other simple measures. This may occur with a mangled extremity, amputation or penetrating injury to a large extremity artery.

Contraindications:

None given the need. This is used in an extreme situation when other efforts to control hemorrhage have failed and especially in the multi-trauma patient when medical personnel must attend to other resuscitation needs.

Procedure:

- Expose the extremity by removing clothing in proximity to the injury.
- Route the band around the extremity, directly over exposed skin, at least 5 cm proximal to the injury.
- Pass the band through the buckle pulling the band tight.
- Twist the rod (windlass) until bright red bleeding stops.
- Tighten the screw on the buckle to prevent loosening during movement.
- Lock the rod in place with the triangular clip.
- Record the date and time of application on the tourniquet.
- The tourniquet is effectively applied when there is cessation of bleeding from the injured extremity indicating total occlusion of arterial blood flow. Any pre-existing distal pulse should be absent at that time as well.

Tourniquet time and removal:

- Tourniquets should be removed as soon as possible, under conditions where the hemorrhage can be directly controlled.
- Tourniquet placement must be communicated in patient reports for all pre-hospital to hospital and inter-hospital transfers.

NOTE Tourniquet time > 6 hours is associated with distal tissue loss.

Ventilator Management

Initial ventilator settings and appropriate changes for the management of ventilated pt's.

- Modes available:
 - o CMV+
 - Used for full control/support of the intubated patient's ventilations
 - o SIMV+ (synchronized intermittent mandatory ventilation):
 - Used to supplement/assist intubated spontaneous effort of the patient's own respiratory drive
 - o ASV (Adaptive Support Ventilation)
 - Adapts based on the patient's interaction
 - Traditional controls are different, ensure practitioner awareness of ventilator controls before using
 - o CPAP+PS (continuous positive pressure ventilation + pressure support):
 - Used to supplement/assist non intubated patient's own respiratory drive.
- Regulation
 - o Volume:
 - Used to deliver constant tidal volume and ensuring minimum minute ventilation
 - o Pressure:
 - Used to control inspiratory pressure levels while optimizing peak airway pressures
 - o PRVC (Pressure regulated volume control):
 - Used to deliver a target tidal volume and set rates with the lowest possible (minimize) inspiratory pressure and setting upper pressure limit to stop the ventilator
- Settings (Standard ranges):
 - o Tidal Volume:
 - Adults: 5-8 ml/kg (Ideal Body Weight)
 - Pediatric: 6-8 ml/kg (Ideal Body Weight)
 - Smaller pediatrics may require higher tidal volumes/kg (up to 10ml/kg)
 - *****CONSIDER STARTING AT THE LOWER RANGE AND ADJUST AS NEEDED*****
 - o Respiratory Rate:
 - -Adult: 8-20
 - -Child: 12-20
 - -Infant/small child: 20-30
 - o FIO2:
 - -Initially set to 100% with goal to decrease to 30-60% to maintain SPO2 greater than 90% and /or PaO2 75-110 mmHg.
 - ***** Used TGH Range and Unit reference range*****
 - *****FIO2 can be turned down 10% every 5 minutes while observing SPO2. *****
 - o PEEP:
 - -Adult/child normal healthy lungs: 3-5 cm H2O
 - -To increase oxygenation 5-15 cm H2O
 - o Pressure Support:
 - cm H2O titrated to achieve age-appropriate tidal volumes on assisted breaths

Diffuse Lung Disease:

Acute Respiratory Distress Syndrome (ARDS), Acute Lung Injury (ALI)
ARDSnet Protocol

- Start with 5-8ml/kg (IBW) VT(prefer the highest that maintains Pplat<30cmH2O).
- Any breath mode can be utilized.
- Set initial rate to the patient's baseline minute ventilation (max RR of 35).

- **Overall Goals:**
 - o Improve oxygenation through alveolar recruitment.
 - o Prevent alveolar collapse.
 - o Minimize baro/volu trauma

- **Oxygenation Goal: PO₂ 55-80 or SpO₂ 88-95%**
 - o Use a minimum PEEP of 5 cmH₂O.
 - o To improve oxygenation increase PEEP incrementally.
 - Elevated PEEP (20 cmH₂O) may be necessary.
 - o Maintain awareness of BP as vasopressor support may be necessary.

- **Plateau Pressure Goal: <30cmH₂O**
 - o **If Pplat > 30 cm H₂O:** *ensure adequate sedation; consider long term paralytics; decrease VT by 1ml/ kg steps (minimum =4ml/kg).*
 - o **If Pplat < 25 cm H₂O and VT< 6 ml/kg,** increase VT by 1 ml/kg until Pplat > 25 cm H₂O or VT =6ml/kg.
 - o **If Pplat < 30 and breath stacking or dys-synchrony occurs:** *ensure adequate sedation; may increase VT in 1ml/kg increments to 7 or 8 ml/kg if Pplat remains ≤ 30 cm H₂O.*

- **Reminder:** *As tidal volume is adjusted, minute volume changes and the ventilatory rate may need to be inversely adjusted.*
 - o **pH Goal: 7.30-7.45** (Note: PCO₂ and PetCO₂ will likely not correlate in these patients therefore use caution when managing low PetCO₂ levels).

- **Acidosis Management: (pH <7.30)**
 - o **If pH 7.15-7.30:** Increase RR until pH > 7.30 or PaCO₂ < 25 (Maximum set RR =35).
 - o **If pH < 7.15:** Increase RR to 35.
 - o If pH remains < 7.15, VT may be increased in 1 ml/kg steps until pH > 7.15 (Pplat target of 30 may be exceeded). May give Sodium Bicarbonate, 1 mEq/kg (Dilute 1:1 if patient is <1 year old)

- **Alkalosis Management: (pH > 7.45)**
 - o Decrease overall minute volume, if possible.

Obstructive Lung Disease: COPD/Asthma

- Start ventilation with 5-8 ml/kg (IBW).
 - PIPs will likely be high, but plateau may be normal due to high airway resistance in these patients
- Any breath mode can be utilized.
- Awareness of VT when using pressure regulated modes as poor compliance limits the volume the patient will receive.
- Initial Rate needs to be lower:
 - Intentional hypoventilation protects from hyperinflation/breath stacking/barotrauma.
- **Overall Goals:**
 - **LET THESE PATIENTS EXHALE.**
 - Maintain oxygenation and ventilation. Stop the decline
 - Reduce/prevent hyperinflation.
- **Oxygenation Goals:**
 - Maintain $PO_2 > 60$ and SpO_2 88-95%.
 - **If PIPs are elevated $> 30 \text{ cmH}_2\text{O}$.**
 - Check Plateau pressure and ensure $< 30 \text{ cmH}_2\text{O}$
 - Treat the disease - Consider beta agonists.
 - Increase exhalation time through decreasing RR or I-time.
 - Decrease VT.
 - Special attention COPD: keep FiO_2 down to preserve internal shunt and to maintain SpO_2 below 92%
- **PEEP**
 - Zero or Low levels of PEEP to support open airways, but do not prevent exhalation.

****THESE ARE BASIC GUIDELINES AND SHOULD BE USED IN CONJUNCTION WITH PT CLINICAL CONDITION, VITALS SIGNS AND LAB RESULTS WHEN AVAILABLE
--

VII Reference's

DNR Status

Transport of patients with DNR status

It is advised that personnel have a documented conversation with the patient / medical proxy on the individual's DNR status and whether it is to be rescinded while transporting. Along with that conversation, another documented conversation with the receiving provider and sending provider must also take place, should the patient expire en route. The conversation with the receiving / sending providers will establish the facility which would receive the body if the patient were to expire (see "Transfer Arrangements" below).

State of Florida Do Not Resuscitate Order (DNRO)

If it is determined that a patient has a Florida Do Not Resuscitate Order (DNRO):

The presentation of a valid Florida DNRO provides objective criteria for withholding cardiopulmonary resuscitation, which includes: cardiac compressions, endotracheal intubation and/or other advanced airway management, artificial ventilation, defibrillation and related procedures, in the event of cardiac or respiratory arrest. A DNRO may apply to patients with any type of electrocardiographic rhythm and not just those in asystole. The presentation of a valid DNRO does not relieve EMS of the responsibility to provide interventions in the non-arrested patient for comfort care or to alleviate pain. Pain relieving measures may be particularly appropriate in the prehospital care of such patients.

A prehospital DNRO may be considered valid by any of the following methods:

- **Method #1:** Florida Prehospital Do Not Resuscitate Order (Form #1896)
 - o Information on the original State of Florida Do Not Resuscitate Order (Form #1896) or it is a copy on yellow paper of an original Form # 1896
 - This provides the patient and/or family the ability to generate their own supply of DNROs
 - o Has signatures from the attending physician and the patient, or if the patient is incompetent, their health care surrogate (HCS), proxy or guardian
 - o The DNRO has not been orally withdrawn by the patient, court appointed guardian, patient's health care surrogate or healthcare proxy. Next-of-kin, other family and friends do not have the right to withdraw a valid DNRO unless they are the patient's health care surrogate or healthcare proxy or guardian.
 - o Patient identity is verified with a legal photo ID other someone on scene attests to the patient's identity
- **Method #2:** DNRO documentation from a licensed health care facility, licensed hospice provider or from another state:
 - o An effective date is documented that predates the date the assistance is requested
 - o The patient's full legal name is documented (typed or printed)
 - o Is signed and dated by the patient, patient's HCS or proxy, or legal guardian if one is appointed
 - o Is signed and dated by at least two witnesses

Honoring a DNRO

- The following steps must be completed:
 - o Determine the identity of the patient with the DNRO through a driver's license, other photo identification or from a witness in the presence of the patient
 - o Determine that the DNRO form is fully and properly executed in that it has the required signatures, has been witnessed and has an effective date which predates the date the assistance is requested

- o Documentation is made of the following items in the narrative portion of the EMS patient care report anytime a DNRO is honored:
 - Effective date of the DNRO
 - Information pertaining to witness (name, address, telephone number and relationship to the patient) if one was used to establish patient identification
 - Name of the attending physician who signed the DNRO
 - Name of the patient or other person (HCS or proxy) who signed the DNRO
 - Whether the patient dies at home or during transportation

Transfer arrangements

When arrangements are being made to transfer a patient with a DNRO between facilities or from their primary residence to a healthcare facility, the receiving facility shall be contacted and informed of the patient's DNRO prior to transport. The sending physician and the accepting physician should discuss which facility will agree to accept the patient if during transport the patient expires and the DNRO is honored. When possible, coordination of the proposed transportation should be made on a recorded line, documenting the facility's acceptance and the name of the facility's representative agreeing to the above conditions. During such transport, the following guidelines should be followed:

- Ensure that the original or a copy (valid copy on yellow paper) of the prehospital DNRO accompanies the patient. Every attempt should be made to transport a copy of the prehospital DNRO with the patient. The original should remain at the patient's residence or nursing facility where they reside. The EMS provider shall relinquish the DNRO form along with the patient to the receiving facility
- If the EMS provider receives a request to transport the patient home or to another health care facility for further treatment, the EMS provider shall obtain a valid copy of the DNRO from the sending facility prior to transport.
- Before transport may occur, on-line medical control must be consulted in situation where the clinician finds the family or healthcare facility requesting transport of a patient who has either, lost or misplaced the DNRO or verbally requested that the patient not be resuscitated, has no valid DNRO or in which a "copy" of the DNRO is unable to be validated

Special considerations

In situations where it is impossible to copy the document, the original should accompany the patient and be delivered to the receiving facility. In these situations, it may be beneficial to document in the patient care records where the original DNRO was left and who took custody of it.

- If the original DNRO is transported with the patient, inform either the receiving facility or family member of the importance of obtaining the original and in making additional copies
 - o Patient Identification Device – State of Florida Do Not Resuscitate Order Form #1986
- The patient identification device is a miniature version of the – State of Florida Do Not Resuscitate Order Form #1986 and is incorporated by reference as part of the DNRO form.
- Use of the patient identification device is voluntary and is intended to provide convenient and portable DNRO which travels with the patient. The device is perforated so that it can be separated from the DNRO form. It can also be hole punched, attached to a chain in some fashion and visibly displayed on the patient. To protect this device from hazardous conditions, it should be laminated after completing it. Failure to laminate the device shall NOT be grounds for not honoring a patient's DNRO order if the device is otherwise properly completed.
- To not inconvenience patients or waste the supply of DNRO forms, all previous version of DH Form 1896 are considered valid.

Living Will

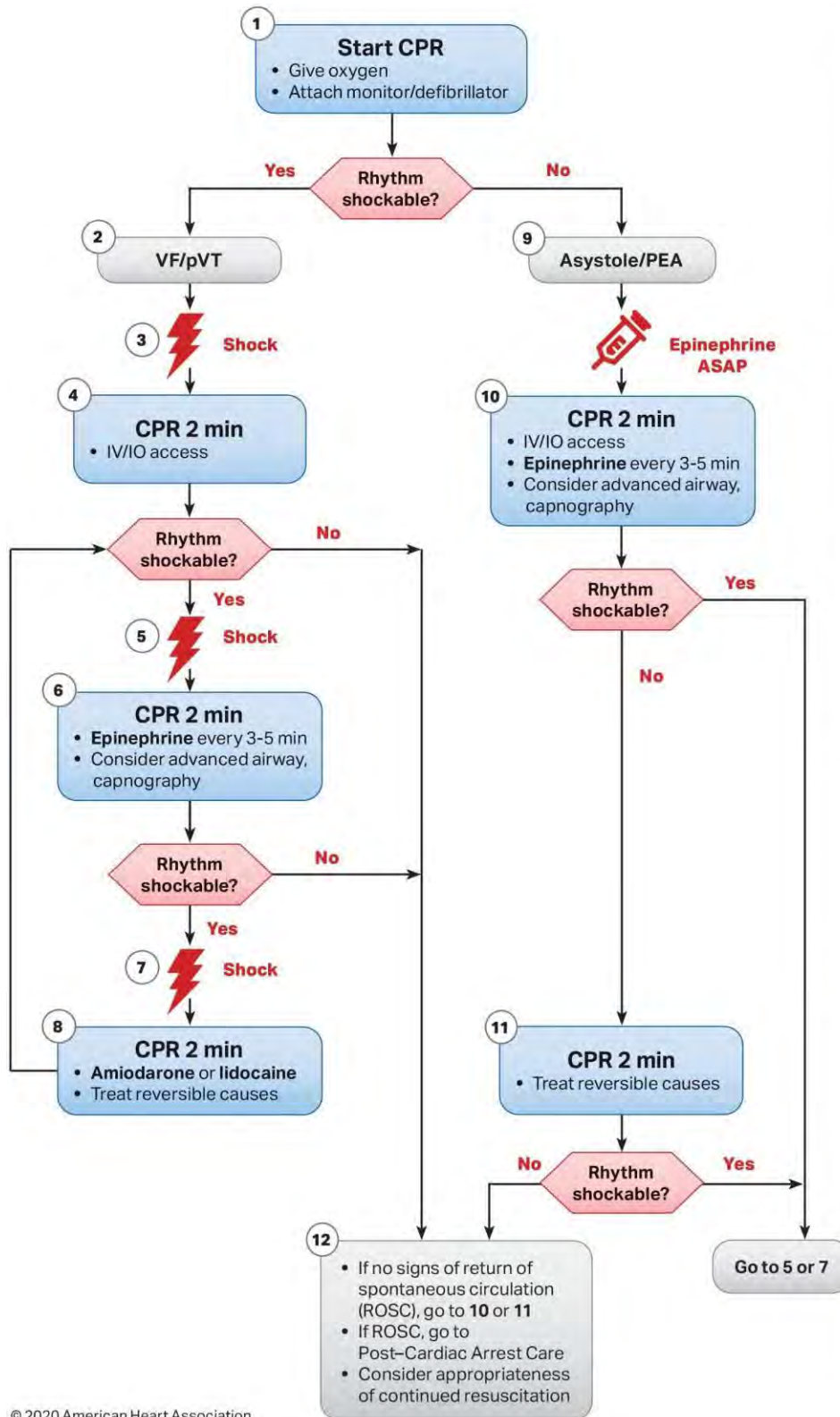
DO NOT confuse a DNRO and a Living Will. A Living Will serves an entirely different purpose and should not influence the acute application of resuscitation.

- For example, a patient may have a valid living will, however EMS should still render appropriate care in the event of a trauma, medical emergency or cardiac arrest.
- However, if this patient is later declared brain dead, the Living Will would direct ventilators, other life support to be disconnected and the patient is allowed to die naturally, with comfort measures only.

Medical Orders for Life Sustaining Treatment (MOLST) and Physician Orders for Life Sustaining Treatment (POLST)

A Medical Orders for Life Sustaining Treatment (MOLST) or Physician Orders for Life Sustaining Treatment (POLST) is a physician order that helps provide health care treatment instructions for seriously ill adults nearing death. These documents are for patients who are both seriously ill and have a life expectancy of less than one year. Although not yet officially recognized in Florida, if you see one, contact medical control for permission to follow patient/family wishes.

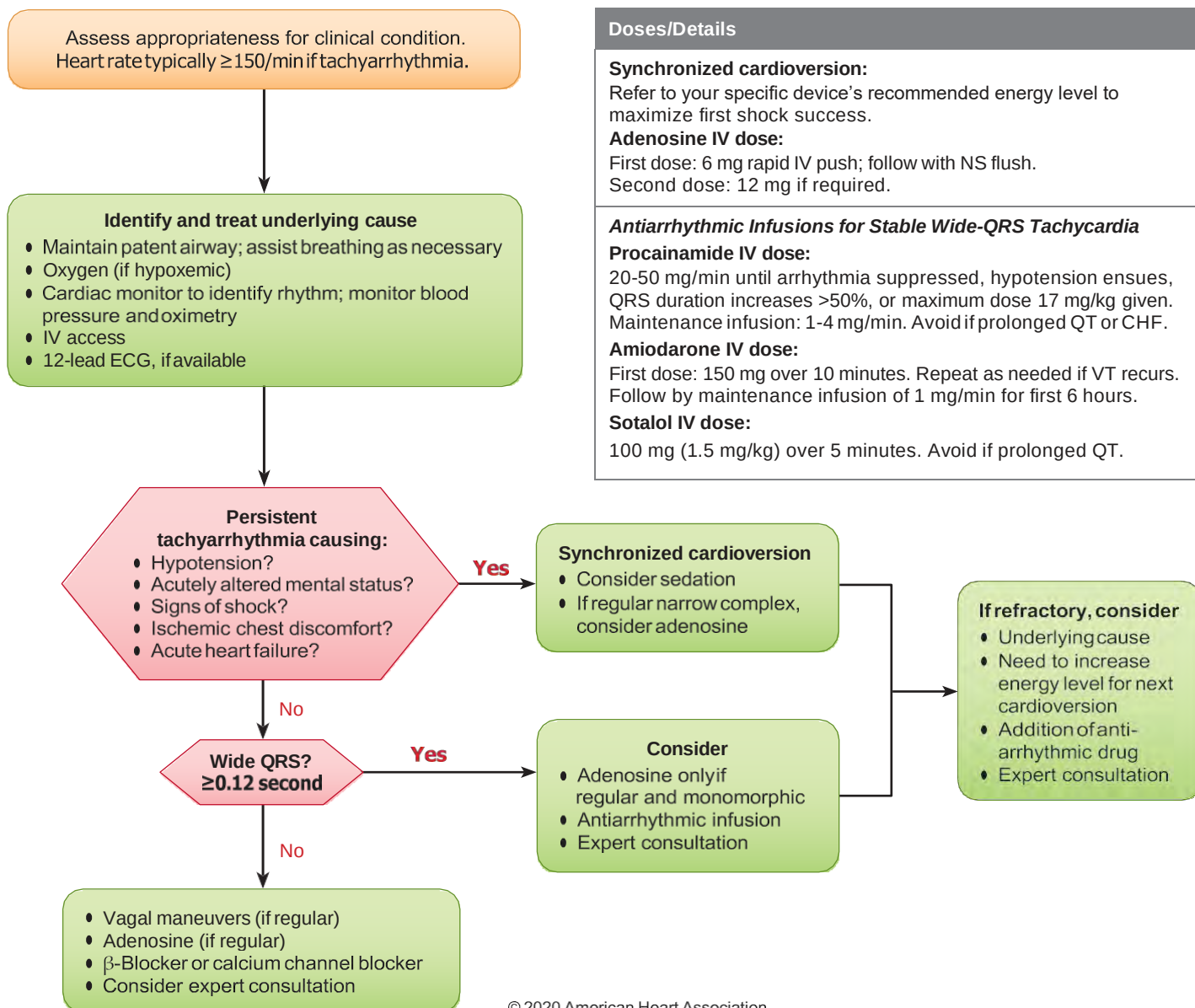
Figure 4. Adult Cardiac Arrest Algorithm.



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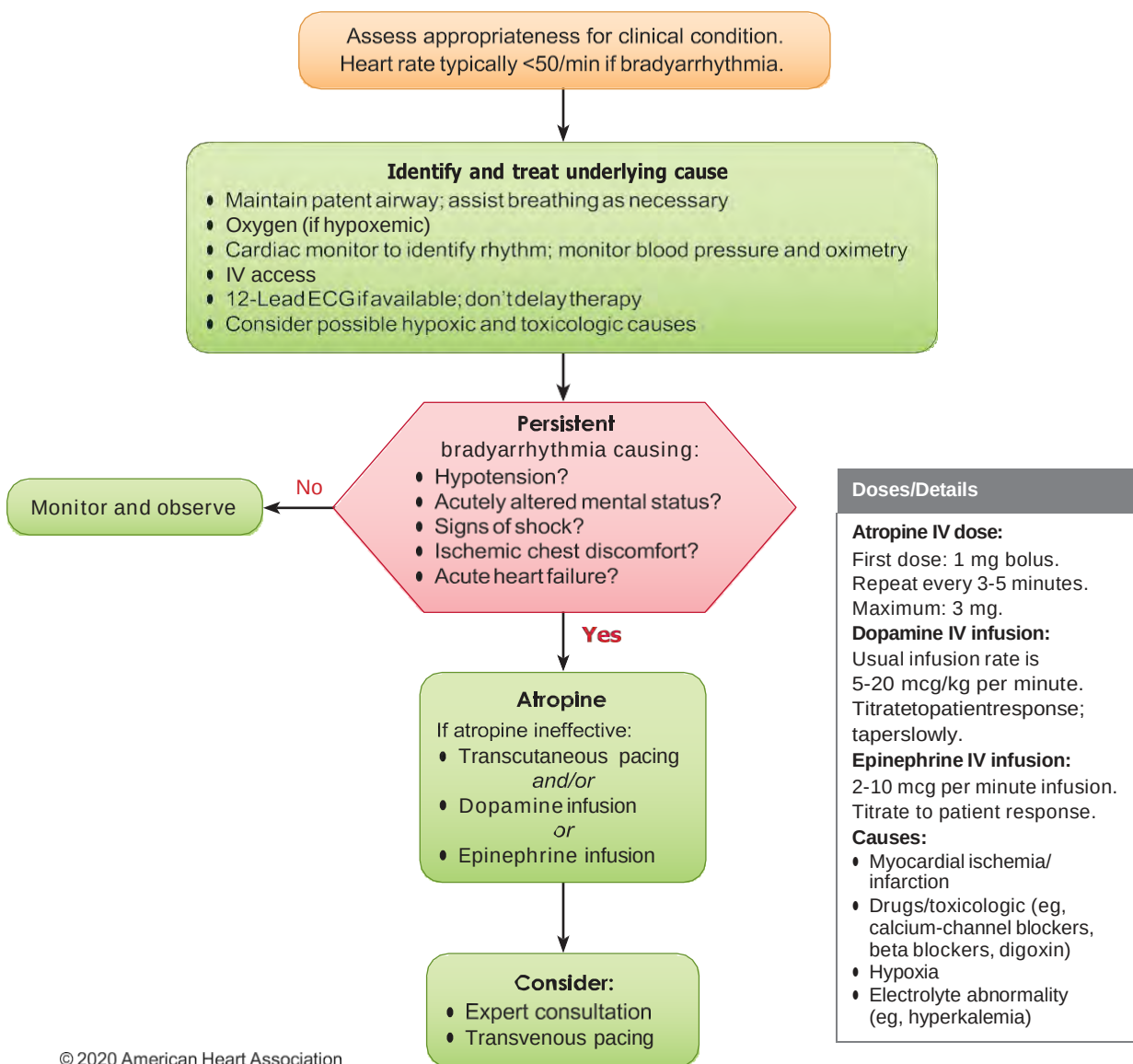
CPR Quality
• Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil. • Minimize interruptions in compressions. • Avoid excessive ventilation. • Change compressor every 2 minutes, or sooner if fatigued. • If no advanced airway, 30:2 compression-ventilation ratio. • Quantitative waveform capnography – If PETCO₂ is low or decreasing, reassess CPR quality.
Shock Energy for Defibrillation
• Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. • Monophasic: 360 J
Drug Therapy
• Epinephrine IV/IO dose: 1 mg every 3-5 minutes • Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg. - or • Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
Advanced Airway
• Endotracheal intubation or supraglottic advanced airway • Waveform capnography or capnometry to confirm and monitor ET tube placement • Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions
Return of Spontaneous Circulation (ROSC)
• Pulse and blood pressure • Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg) • Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
• Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypo-/hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary

Adult Tachycardia With a Pulse Algorithm



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Adult Bradycardia Algorithm



AHA ACLS Acute Coronary Syndrome Algorithm



Symptoms Indicate possible Ischemia or infarction

EMS and Prehospital Care

- ✓ Monitor support ABC's. Readiness for CPR and/or defibrillation
- ✓ Obtain 12-Lead ECG; (STEMI) ST elevation should be reported to the receiving facility
- ✓ Medications to give: Aspirin, Oxygen, SL Nitroglycerine and Morphine
 - ✓ Hospital should prepare to respond to STEMI

● Must be performed immediately

● Must be performed in less than 10 minutes

Immediate ED Assessment & Treatment:

- 12 Lead ECG (if not done pre-hospital) Obtain vital signs; O2 sat
- Oxygen if O2 sat < 94%; 4L then titrate
- Provide Aspirin 160-325 mg
- Provide nitroglycerine sublingual or spray
- Establish IV & give Morphine if needed
- Provide nitroglycerine sublingual or spray
- Perform brief, targeted hx. & physical exam
- obtain Review fibrinolytic checklist. Check contraindications
- Obtain cardiac marker levels, electrolyte, and coagulation tests.
- Portable chest x-ray (<30 min.)

Read ECG

ST Elevation (STEMI)

ST depression (NSTEMI)

Normal ST segment

- Start appropriate therapies: Heparin, NTG, β -blockers
- Reperfusion Therapy STAT

Symptoms $\leq$ 12 hrs

NO

YES

Elevated Troponin or high-risk patient

Signs for invasive therapy:

Continued chest discomfort
Continued ST deviation
Unstable hemodynamics
Heart Failure
Ventricular Tachycardia

Adjunctive Therapies

Nitroglycerine (IV/PO)
Heparin (IM/IV)
Possibly: β -blockers
Possibly: Clopidogrel
Possibly: Glycoprotein IIb/IIIa inhibitor

- Admit to monitored bed
- Continue ASA, heparin, and other indicated therapies.
- ACE Inhibitors/ARB
- Statin Therapy
- Expert consultation to assess cardiac risk factors

- ☐ Goal for stent placement or balloon inflation should be within 90 minutes
- ☐ Goal for fibrinolysis should be 30 minutes

- Possible admission: monitor serial ECG and cardiac markers.
- Consider non-invasive testing like treadmill or thallium stress test.

YES

- Develops 1 or more:
 - ECG changes (ST elevation/depression)
 - Troponin Elevated
 - Worsening chest discomfort or arrhythmias

NO

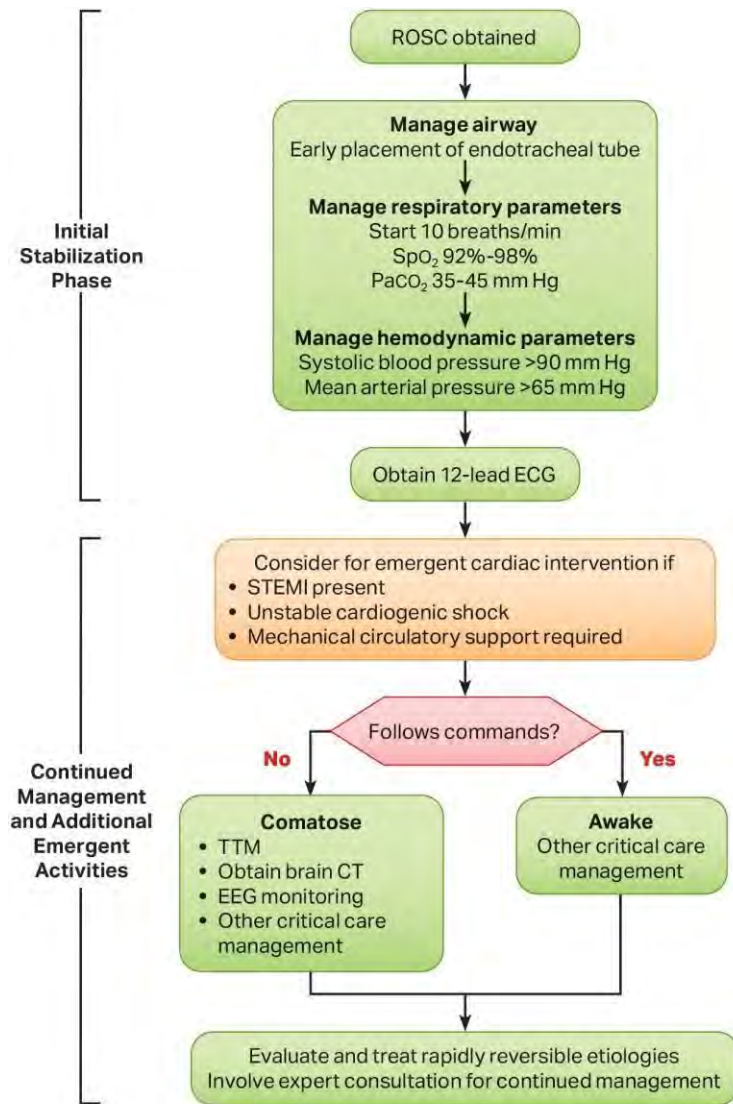
- Abnormal results from non-invasive diagnostic tests mentioned above
- Abnormal results from ECG or troponin

YES

NO

Discharge and schedule Follow-up

Figure 7. Adult Post-Cardiac Arrest Care Algorithm.



Initial Stabilization Phase

Resuscitation is ongoing during the post-ROSC phase, and many of these activities can occur concurrently. However, if prioritization is necessary, follow these steps:

- Airway management: Waveform capnography or capnometry to confirm and monitor endotracheal tube placement
- Manage respiratory parameters: Titrate FiO_2 for SpO_2 92%-98%; start at 10 breaths/min; titrate to PaCO_2 of 35-45 mm Hg
- Manage hemodynamic parameters: Administer crystalloid and/or vasopressor or inotrope for goal systolic blood pressure >90 mm Hg or mean arterial pressure >65 mm Hg

Continued Management and Additional Emergent Activities

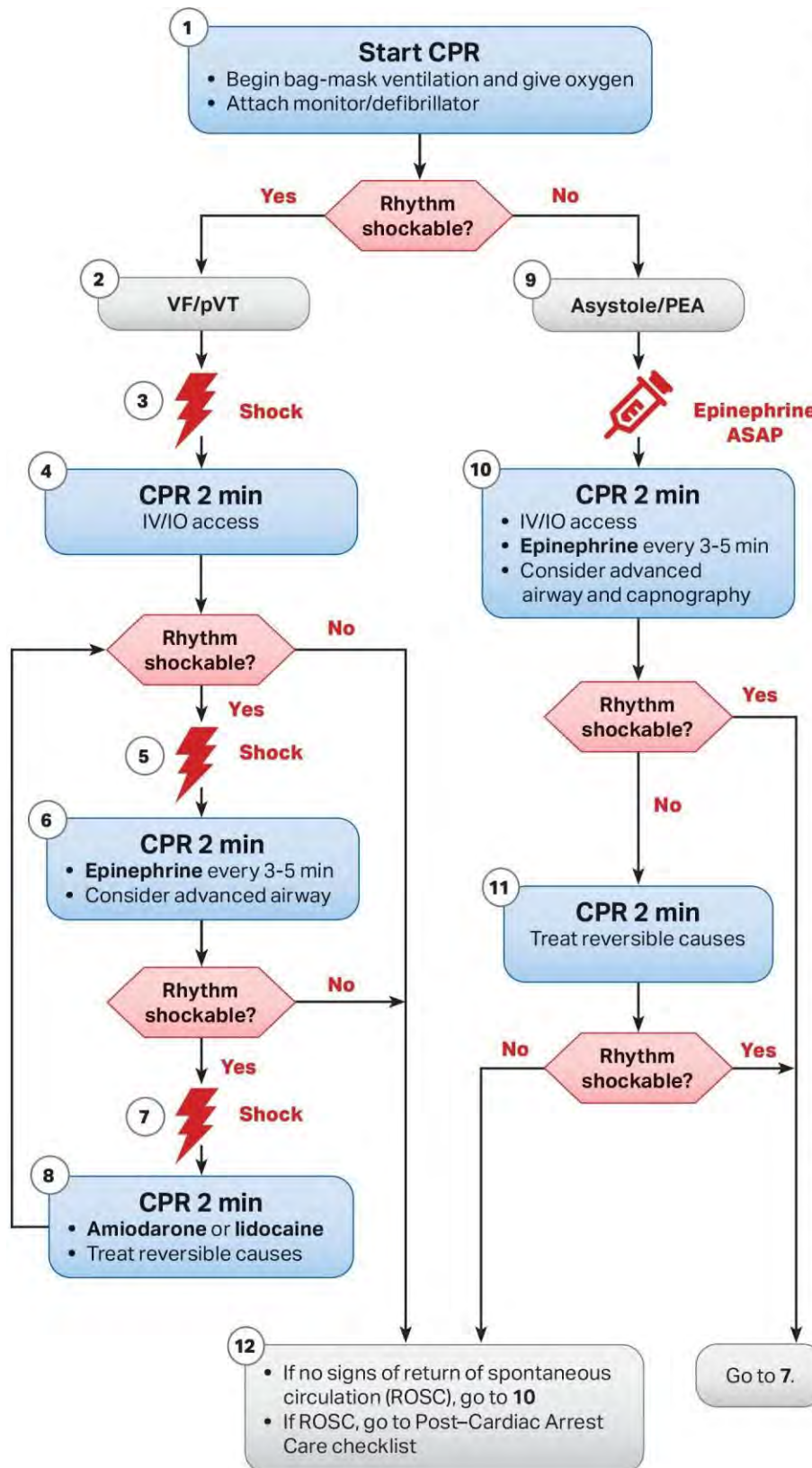
These evaluations should be done concurrently so that decisions on targeted temperature management (TTM) receive high priority as cardiac interventions.

- Emergent cardiac intervention: Early evaluation of 12-lead electrocardiogram (ECG); consider hemodynamics for decision on cardiac intervention
- TTM: If patient is not following commands, start TTM as soon as possible; begin at 32-36°C for 24 hours by using a cooling device with feedback loop
- Other critical care management
 - Continuously monitor core temperature (esophageal, rectal, bladder)
 - Maintain normoxia, normocapnia, euglycemia
 - Provide continuous or intermittent electroencephalogram (EEG) monitoring
 - Provide lung-protective ventilation

H's and T's

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypokalemia/hyperkalemia
Hypothermia
Tension pneumothorax
Tamponade, cardiac
Toxins
Thrombosis, pulmonary
Thrombosis, coronary

Figure 11. Pediatric Cardiac Arrest Algorithm.



CPR Quality

- Push hard ($\geq \frac{1}{3}$ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks ≥ 4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT or
- **Lidocaine IV/IO dose:** Initial: 1 mg/kg loading dose

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Figure 12. Pediatric Bradycardia With a Pulse Algorithm.

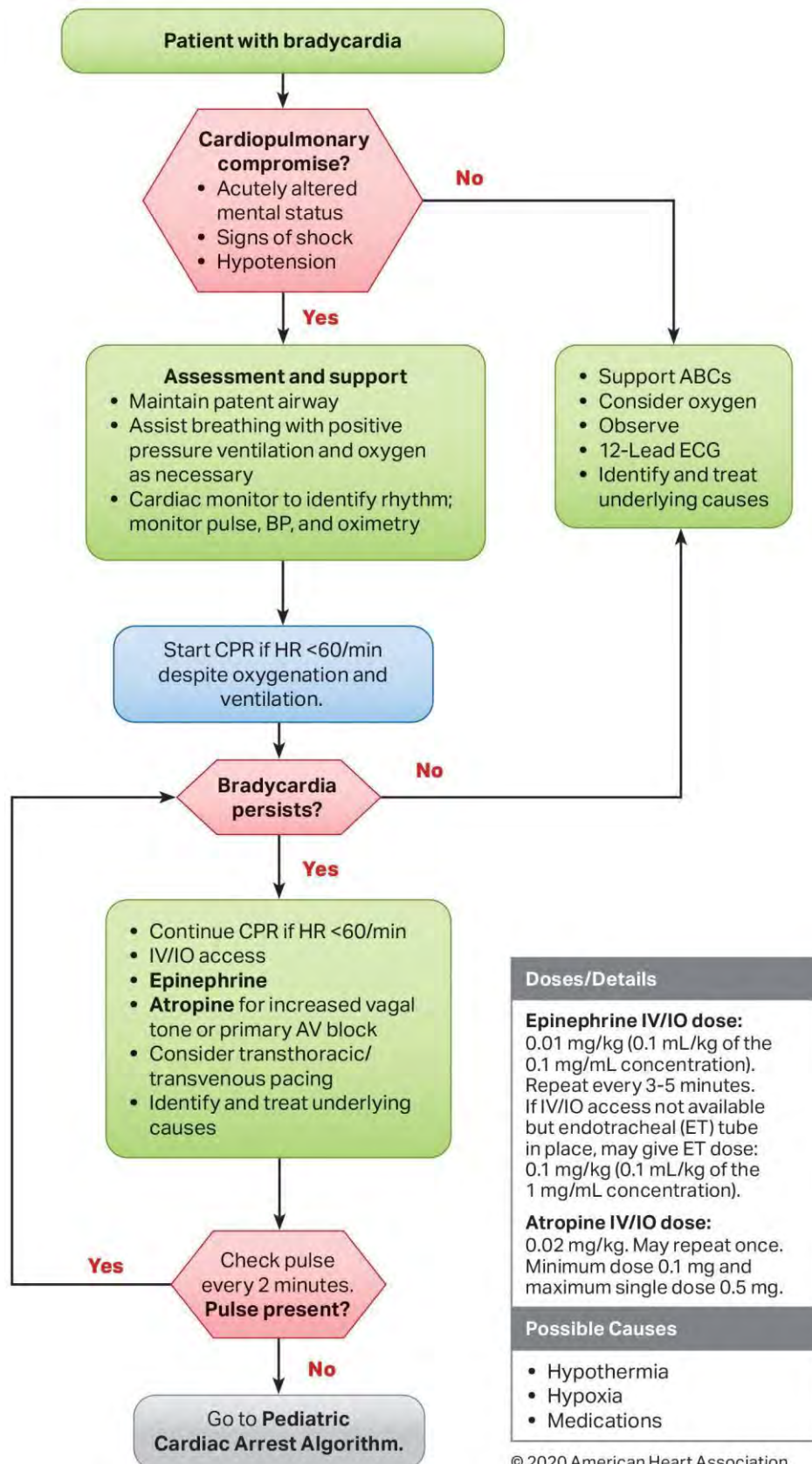
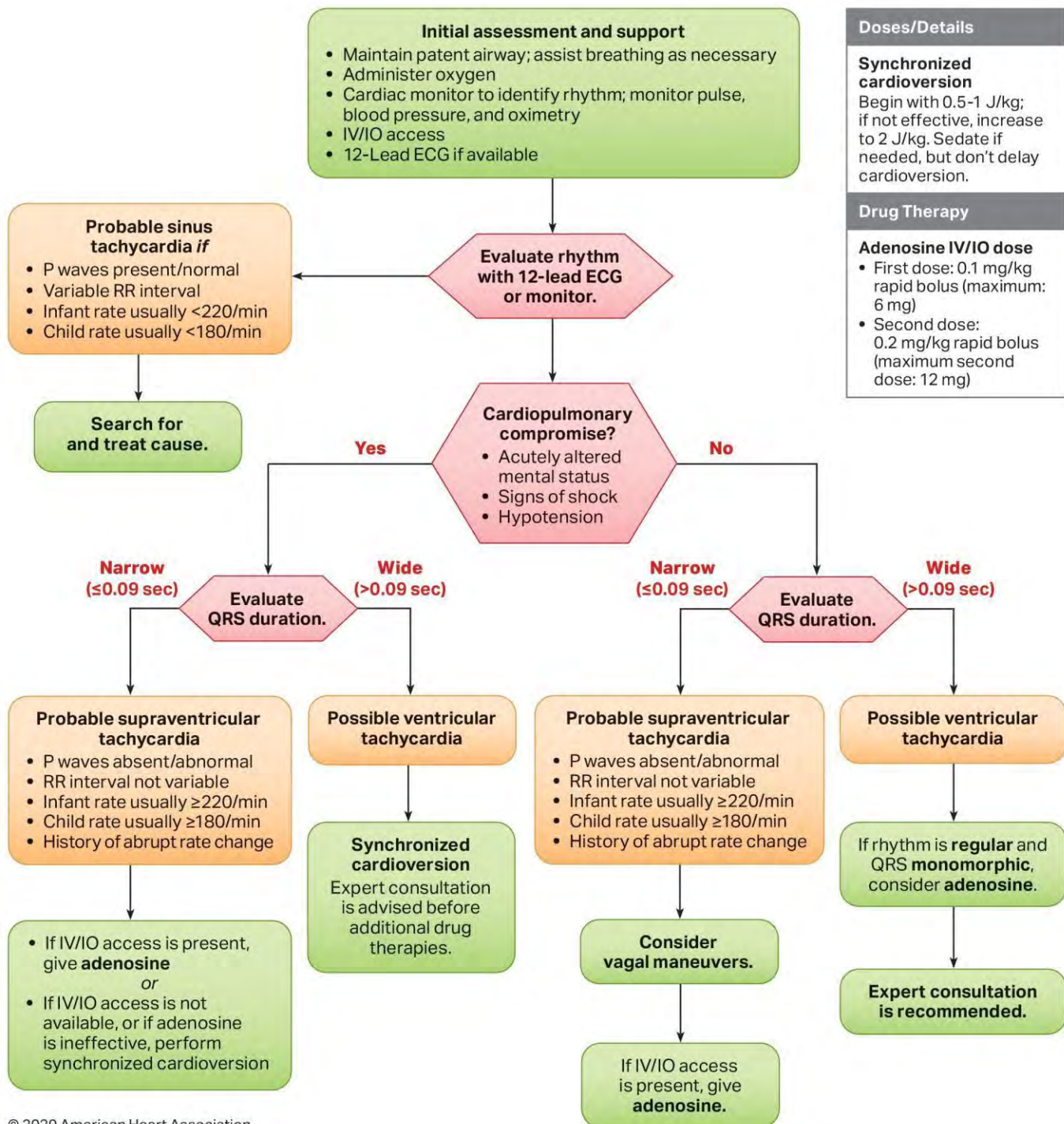
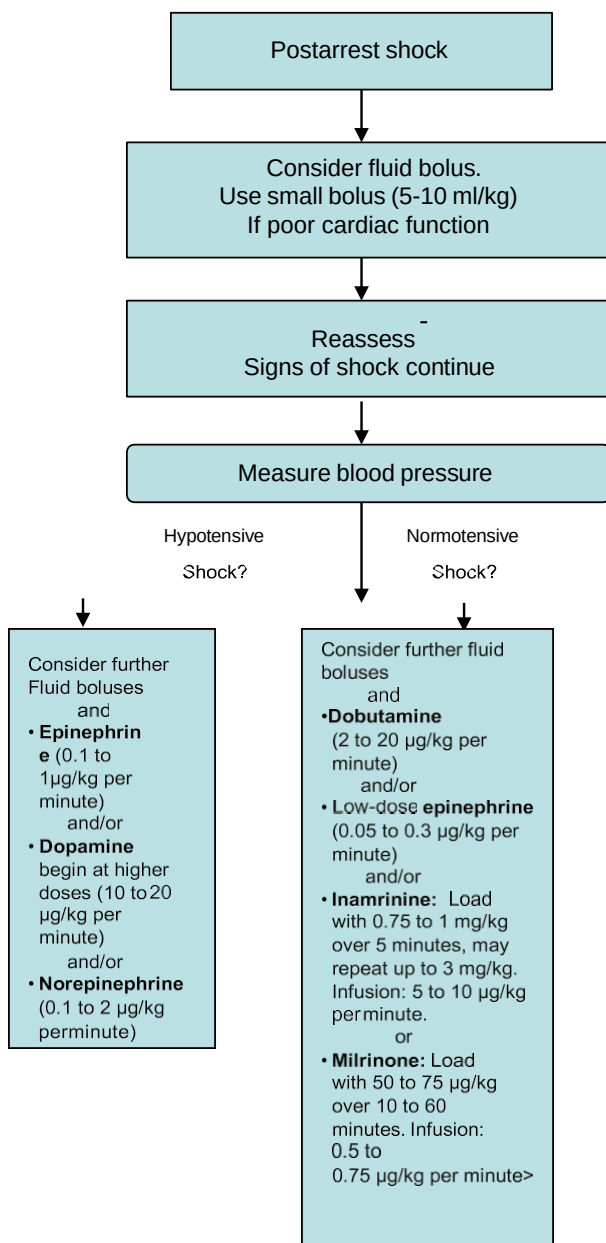


Figure 13. Pediatric Tachycardia With a Pulse Algorithm.



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Pediatric Postresuscitation Treatment of Shock and Maintenance Fluid Replacement



Estimation of Maintenance fluid Requirements

- **Infants <10 kg:** Infusion of D5/normal saline after initial Stabilization at a rate of 4 ml/kg per hour. For example, the maintenance rate for an 8kg baby is as follows

$$4 \text{ ml/kg per hour} \times 8 \text{ kg} = 32 \text{ ml/hr}$$

- **Children 10 to 20kg:** Infusion of 0.9% sodium chloride (normal saline) after initial stabilization at a rate of 40 ml/hr plus 2 ml/kg per hour for each kg between 10 and 20kg. For example the maintenance rate for a 15 kg child is as follows:

$$40 \text{ ml/hr} + (2 \text{ ml/kg per hour} \times 5 \text{ kg}) = 50 \text{ ml/hr}$$

- **Children > 20kg:** Infusion of 0.9% sodium chloride (normal saline) after initial stabilization at a rate of 60 ml/hr plus 1 ml/kg per hour for each kg above 20kg. For example the maintenance rate for a 30kg child is as follows:

$$60 \text{ ml/h} + (1 \text{ ml/kg per hour} \times 10 \text{ kg}) = 70 \text{ ml/hr}$$

- **Shortcut for pts weighing > 20kg:**
weight in kg + 40 ml/hr

Adjust rate and composition of fluids to child's clinical condition (eg, pulse, blood pressure, systemic perfusion) and level of hydration)

Trauma Alert Criteria

 ADULT TRAUMA ALERT HILLSBOROUGH COUNTY TRAUMA AGENCY	
EITHER 1 A score of 2 or greater for ADULT (> 15 y.o.) according to trauma scorecard methodology below:	
1 point	2 points
Airway • Sustained RR ≥ 30	• Active assistance (<i>not just oxygen</i>)
Circulation • Sustained HR > 120	• Lack of radial pulse with sustained HR > 120, or • BP < 90
Best Motor Response • BMR = 5	• BMR of ≤ 4, or • Paralysis, or • Suspected spinal cord injury, or • Loss of sensation
Cutaneous • Tissue loss (degloving injuries, major flap avulsions > 5 inches) • GSW to extremities	• Amputation proximal to the wrist or ankle, or • 2nd or 3rd degree burns ≥ 15% TBSA, or • Any high voltage electrical or lightning injury, or • Penetrating injury to head, neck or torso (<i>excluding superficial wounds in which the depth of the wound can be easily determined</i>)
Long Bone Fracture • Single fracture site due to MVA, or • Single fracture site due to a fall ≥ 10 feet	• Multiple fracture sites
Age • ≥ 55	
Mechanism of Injury • Ejection from vehicle (<i>excluding any motorcycle, moped, ATV, bicycle or open truck bed, or</i> • Deformed steering wheel (<i>driver</i>)	
OR 2 • A GCS score less than or equal to 12 (<i>excluding those whose baseline is 12 or less</i>) [SEE SCALE BELOW]	
OR 3 • A neck laceration with swelling, sustained bleeding, escape of air from wound or stridor • Any other neck laceration: Transport to the nearest trauma center, but do not trauma alert	
OR 4 • EMS PROVIDER HIGH INDEX OF SUSPICION	
GLASGOW COMA SCALE	
Opens Eyes	Spontaneously 4 To voice 3 To pain 2 No response 1
Best Verbal Response	Oriented 5 Confused 4 Inappropriate words 3 Incomprehensible words 2 No response 1
Best Motor Response	Obeyes command 6 Localizes to pain 5 Withdraws to pain 4 Flexion (pain) [decorticate] 3 Extension (pain) [decerebrate] 2 No response 1
THE FOLLOWING PATIENT ASSESSMENT INFORMATION SHOULD BE COMMUNICATED TO THE TRAUMA CENTER OR INITIAL RECEIVING HOSPITAL WHEN EN ROUTE WITH A TRAUMA ALERT: • Age • Sex • Mechanism of injury • Body area involved • GCS • Airway and ventilation status • Vital signs • Circulation (pupils, skin, peripheral pulses)	
Printed 2011	

 PEDIATRIC TRAUMA ALERT HILLSBOROUGH COUNTY TRAUMA AGENCY		
EITHER 1 A score of 2 or greater for CHILD (≤ 15 y.o.) according to trauma scorecard methodology below:		
Normal/0 points	1 point	2 points
Size • Weighs > 11 Kg (24 lbs)	• Weighs (11 Kg (24 lbs) or length is ≤ 33 inches	
Airway • Normal, or • O2		• Assisted (<i>includes measures such as manual jaw thrust, continuous suctioning, or other adjuncts</i>), or • Intubated
Consciousness • Awake, alert and oriented for age	• Amnesia, or • Reliable Hx of LOC	• Altered mental status, or • Coma, or • Paralysis, or • Suspected spinal cord injury (sensory or motor findings of weakness, decreased strength or sensation), or • Loss of sensation
Circulation • Good peripheral pulses, or • SBP ≥ 90	• The carotid or femoral pulse is palpable but neither the radial or pedal pulses are palpable, or • SBP < 90	• Weak or nonpalpable carotid or femoral pulse, or • SBP < 50
Fracture • None seen nor suspected	• Suspected single closed long bone fracture (<i>proximal to the wrist or ankle</i>)	• Any open long bone fracture, or • Multiple fx / dislocation sites (<i>proximal to the wrist or ankle</i>)
Cutaneous • No visible injury, or • Contusion, abrasion, minor laceration		• Major tissue disruption (<i>major degloving injuries, major flap avulsions, or major soft tissue disruption</i>), or • Amputation (<i>proximal to the wrist or ankle</i>), or • 2nd or 3rd degree burns to ≥ 10% TBSA, or • Any high voltage electrical or lightning injury, or • Penetrating injury to head, neck, or torso
OR 2 • A neck laceration with swelling, sustained bleeding, escape of air from wound or stridor • Any other neck laceration: Transport to the nearest pediatric trauma center, but do not trauma alert.		
OR 3 • EMS PROVIDER HIGH INDEX OF SUSPICION		
PEDIATRIC COMA SCALE (< 2 yrs)		
Opens Eyes	Spontaneously 4 To speech 3 To pain 2 No response 1	
Best Verbal Response	Coos, babbles 5 Consolable 4 Cries to pain 3 Moans to pain 2 No response 1	
Best Motor Response	Normal spontaneous 6 Withdraws to touch 5 Withdraws to pain 4 Abnormal flexion 3 Abnormal extension 2 No response 1	
THE FOLLOWING PATIENT ASSESSMENT INFORMATION SHOULD BE COMMUNICATED TO THE PEDIATRIC TRAUMA CENTER OR INITIAL RECEIVING HOSPITAL WHEN EN ROUTE WITH A TRAUMA ALERT: • Age • Sex • Mechanism of injury • Body area involved • GCS • Airway and ventilation status • Vital signs • Circulation (pupils, skin, peripheral pulses)		
Printed 2011		

TRAUMA TRANSPORT PROTOCOLS



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Purpose: Florida law requires emergency medical services (EMS) providers to develop, obtain department approval of, and implement protocols governing assessment and transportation of trauma victims.

Additionally, Medical Direction 64J-1.004 (section 4, paragraph a) states “The medical director shall issue standing orders and protocols to the provider to ensure that the provider transports patients to facilities that offer a type and level of care appropriate to the patient’s medical condition, if available within the service region.”

Additionally, 64J-2.002 (section 2) also states “Each EMS provider shall transport, or cause to be transported, every trauma alert patient to a trauma center nearest to the location of the incident, unless the distance is not relevant to the length of time for transport due to the use of air ambulance... if a trauma center further from the location of the incident has a special resource(s) that the nearest trauma center does not have...the EMS provider may transport to the trauma center having that special resource(s) even if the trauma center is not nearest to the incident. These exceptions to transporting to the nearest trauma center or other exceptions the EMS provider wishes to request, shall be addressed in the EMS provider’s TTPs which shall be submitted to the department for approval, in accordance with Section 395.4045, F.S., and Rule 64J-2.003, F.A.C.”

Additionally, per DOH Trauma Transport Manual (December 2004, Section 5, #3), “If there are situations where the EMS provider’s medical director has determined it would be in the best medical interest of the trauma alert patient to be transported to a hospital other than those specified above, a list of such situations must be identified in the TTPs.”

Additional consideration for destination criteria will depend on: weather, geography, Federal Aviation Administration rules and regulations, disaster, trauma center status (bypass status), and most importantly patient condition.

Whereas, Aeromed is operated by Tampa General Hospital.

Whereas, Tampa General Hospital is a Level One Adult and Pediatric Trauma Center and has met all State designated requirements to operate trauma and specialty services such as Pediatrics, Trauma, Brain and Spinal Cord Injury, designated State and American College of Surgeons Burn Center, Re-implantation Center, Primary and Comprehensive Stroke Center, and Hillsborough County STEMI center.

Whereas, the service area of Aeromed is determined by the location of its four (4) helicopter base sites:

- a) Aeromed 1 – Tampa, Florida (Hillsborough County)
- b) Aeromed 2 – Sebring, Florida (Highlands County)
- c) Aeromed 4 – Winter Haven, Florida (Polk County)
- d) Aeromed 5 – Punta Gorda, Florida (Charlotte County)

TRAUMA TRANSPORT PROTOCOLS

I. DISPATCH PROCEDURES

Any recognized medical or emergency authority can request Aeromed for on-scene trauma. Requesting agencies should communicate directly with the Aeromed Communications Center at Tampa General Hospital. This includes public agencies such as law enforcement agencies, fire departments, paramedics and ambulance services, and safety officials of commercial and industrial concerns. We request that industrial safety officials identify in advance, in writing, those personnel that are authorized to act for the firm in requesting our services.

A. The following information should be provided to the Communication Specialist in the Aeromed Communications Center when requesting the Aeromed helicopter for on-scene trauma emergencies:

1. Requesting County/Agency
2. A call-back phone number for the requesting county/agency
3. City of incident
4. Address/ major intersection
5. Mechanism of injury/illness to include verification of adult or pediatric
6. The number of aircraft needed
7. Landing zone information if different than incident location
8. Ground contact/ radio frequency for active requests

B. The Aeromed Communications Center is responsible for dispatching the helicopters in priority sequence, tracking activated helicopters, and coordinating any additional resources as needed.

1. The closest, most appropriate, and available helicopter will be dispatched to a requested scene location, to include other local and regional air medical programs.
2. The Communications Specialist is responsible for flight following to maintain current helicopter location and status.
3. Assistance required for on-scene safety may be dispatched by Aeromed Communications Center or by the EMS Dispatch ground crew, depending on the need.
4. The Aeromed Communications Center will coordinate all flight activity with the Metro Aviation Operational Control Center located in Shreveport Louisiana per the FAA rules and regulations.

TRAUMA TRANSPORT PROTOCOLS

II. TRAUMA PATIENT ASSESSMENT

Medical Protocols and Standing Orders, approved by the Tampa General Hospital Medical Advisory Committee, have been forwarded to the Department of Health, and are on file in the Aeromed Services Business Office. These will be followed unless other instructions are given by direct communication with the Attending Physician at the Trauma Center.

- A. The Flight Paramedic and Nurse will assess the patient using trauma scorecard methodology, as outlined in Florida Administrative Code (FAC) 64J-2. The criteria for adults are:

ADULT TRAUMA SCORECARD METHODOLOGY*

COMPONENT	Item = 1 point	Item = 2 point
AIRWAY	Sustained RR of 30 or greater	Active airway assistance ²
CIRCULATION	Sustained HR greater than 120	Lack of radial pulse with sustained heart rate greater than 120, or BP less than 90 mm Hg
BEST MOTOR RESPONSE	BMR = 5	BMR = 4 or less, or Paralysis, or Suspected spinal cord injury, or Loss of sensation
CUTANEOUS	Soft tissue loss ³ GSW to extremities	Amputation ⁴ , or 2nd or 3rd degree burns $\geq$ 15% TBSA, or Any high voltage electrical or lightening injury that meets trauma alert criteria, or Penetrating injury to head, neck or torso ⁵
LONG BONE FRACTURE	Single fracture site due to MVA, or Single fracture site due to a fall of	Multiple fracture sites
AGE	55 years or older	

MECHANISM OF INJURY Ejection from vehicle, Deformed steering wheel⁶, and ⁷

PARAMEDIC DISCRETION ⁸

¹ Airway evaluation is designed to reflect the intervention required for effective care

² Not just oxygen

³ Degloving injuries, major flap avulsions (> 5 inches)

⁴ Amputations proximal to the wrist or ankle

⁵ Excluding superficial wounds in which the depth of the wound can be easily determined

⁶ Excluding any motorcycle, moped, all-terrain vehicle, bicycle or the open body of a pick-up truck

⁷ Only applies to driver of vehicle

⁸ If none of the above criteria are met, the provider can call a trauma alert if, in their judgment, the patient's condition warrants

* NOTE: A SCORE OF 2 OR GREATER DETERMINES AN ADULT TRAUMA ALERT, AND WILL BE TRANSPORTED TO A STATE APPROVED TRAUMA CENTER

TRAUMA TRANSPORT PROTOCOLS

- B.** The Flight Paramedic and Nurse will assess the patient using trauma scorecard methodology, as outlined in Florida Administrative Code (FAC) 64J-2. Pediatric trauma patients are defined as those with physical and anatomical characteristics of a person 15 years old or less. The criteria for pediatrics are:

PEDIATRIC TRAUMA SCORECARD METHODOLOGY*

COMPONENT	Item= 1 point	Item= 2 points
SIZE	Weights 11 Kg or less (actual or per length based tape)	
AIRWAY		Assisted ¹ , or Intubated
CONSCIOUSNESS	Amnesia, or reliable history of loss of consciousness	Altered mental status, or unresponsive/coma, or there is presence of paralysis; or suspicion of spinal cord injury; or loss of sensation
CIRCULATION	The carotid or femoral pulse is palpable, but the the radial and pedal pulses are not, or the SBP is less than 90mmHg	Weak or nonpalpable carotid or femoral pulse, or the SBP is less than 50 mmHg
FRACTURE	Suspected single closed long bone fractures ³	Any open long bone fracture, or multiple fracture / dislocation sites ³
CUTANEOUS		Major tissue disruption ⁴ , or amputation at/or ³ , or 2nd or 3rd degree burns to 10% or more of total body surface area, or any high voltage electrical or lightening injury, or penetrating injury to head, neck or torso

PARAMEDIC DISCRETION⁵

¹ Includes measures such as manual jaw thrust, continuous suctioning, or other adjuncts

² As evidenced by sensory or motor findings of weakness, decreased strength or sensation

³ Proximal to the wrist or ankle

⁴ Major degloving injuries, major flap avulsions, or major soft tissue disruption

⁵ If none of the above criteria are met, the provider can call a trauma alert if, in their judgment, the patient's condition warrants

*** NOTE: A SCORE OF 2 OR GREATER DETERMINES A PEDIATRIC TRAUMA ALERT AND WILL BE TRANSPORTED TO A STATE APPROVED PEDIATRIC TRAUMA CENTER.**

TRAUMA TRANSPORT PROTOCOLS

III. TRAUMA DESTINATION REQUIREMENTS

- A. Adult trauma alert patients will be taken to the SATC nearest to the scene of the incident
- B. Pediatric trauma alert patients will be taken to the Pediatric SAPTC nearest to the scene of the incident
- C. Burn patients will be taken to a designated state Burn Center
- D. Other specialty considerations:
 - a. Hand injuries suspected to require specialty hand services to include microvascular surgery (Tampa General Hospital)
- E. Exceptions for transporting a trauma alert patient to a hospital other than a SATC or a SAPTC, or nearest SATC or SAPTC to the scene of the incident would be:
 - 1. A mass casualty in which the trauma centers, or nearest trauma centers are overwhelmed
 - 2. Critical condition of a patient, such as a cardiac arrest, in which the patient would benefit from stabilization at a closer initial receiving hospital
 - 3. Distance to the nearest trauma center is so great that extended time in the field is detrimental to the patient's outcome
 - 4. Weather or other aviation influences/limitations

IV. TRANSFER OF PATIENT CARE INFORMATION

An abbreviated run report will be left with the patient at the receiving hospital along with a complete verbal report of the patient's condition in accordance with 64J-1.014.

A full EPCR will be initiated by the Aeromed Flight Team after returning to the helicopter base. After the report is completed, it will be faxed to the receiving hospital to be added to the patient's medical chart in accordance with 64J-1.004.

TRAUMA TRANSPORT PROTOCOLS

V. TRAUMA ALERT PROCEDURES

A Trauma Alert will be communicated by using the words "trauma alert".

1. The pre-hospital EMS agency requesting Aeromed may call a "trauma alert" to the Trauma Center nearest the location of the incident via radio or telephone, per agency protocol. The requesting agency will communicate the "trauma alert" to the Aeromed Flight Team during the patient report to include trauma alert criteria.
2. If the condition of a non-trauma alert patient changes during a flight and this patient then meets trauma alert criteria, the Aeromed Flight Team will declare the patient a "trauma alert" and notify the receiving trauma center.

VI. EMERGENCY INTER-FACILITY TRANSFERS

1. Emergency trauma transfer requests are made by the requesting physician directly to the Tampa General Hospital Transfer Center, who will arrange a conference call directly to the TGH specialty on-call physician. The requesting physician speaks directly to the accepting physician through the transfer center on a recorded line.
2. Those hospitals that are not a designated trauma center, with a trauma alert patient in the Emergency Department, who are medically in need of a Level I Trauma Center, will be accepted into Tampa General Hospital, pending trauma center capabilities and capacity at that time.
3. Any hospital Emergency Department requesting transfer of a trauma alert patient to Tampa General Hospital must stabilize the patient prior to transport. The physician on duty at Tampa General Hospital can refuse transfer of the patient which is deemed hazardous when stabilization has not been adequately accomplished at the referring institution, when facilities for this stabilization are available, and when such transfer would jeopardize the life of the patient. This is in compliance with Florida Statute #395.0142, "Access to Emergency Services and Care".
4. Any request for transfer of a patient at a requesting/sending hospital to Tampa General Hospital is handled through the Tampa General Hospital Transfer Center. Patients being transferred from another hospital to Tampa General Hospital in need of emergency helicopter transport should be transported by Aeromed flight services familiar with TGH protocols. TGH Transfer Center will notify the requesting hospital of such, as well as Aeromed Dispatch Center, who will dispatch the most appropriate, available aircraft.

TRAUMA TRANSPORT PROTOCOLS

VII. LIST OF HOSPITALS

The following hospitals are Trauma Centers within Aeromed's service area. A copy of these Trauma Transport Protocols will be forwarded to each of them.

TRAUMA CENTER	LEVEL	COUNTY
Ascension Sacred Heart Bay	Level II	Bay
Ascension Sacred Heart Pensacola	Provisional Level I	Escambia
Baptist Hospital Pensacola	Level II	Escambia
Broward Health Medical Center	Level I	Broward
Broward Health North	Level II	Broward
Delray Medical Center	Level I	Palm Beach
Gulf Coast Medical Center (Lee Health System)	Level II	Lee
Halifax Hospital Medical Center	Level II	Volusia
HCA Florida Aventura Hospital	Level II	Miami-Dade
HCA Florida Bayonet Point	Level II	Pasco
HCA Florida Blake Hospital	Level II	Manatee
HCA Florida Ft. Walton Beach- Destin Hospital	Level II	Okaloosa
HCA Florida Kendall Hospital	Level II	Miami-Dade
HCA Florida Lake Monroe Hospital	Level II	Seminole
HCA Florida Lawnwood Hospital	Level II	St. Lucie
HCA Florida Memorial Hospital (Jacksonville)	Level II	Duval
HCA Florida Ocala Hospital	Level II	Marion
HCA Orange Park Hospital	Level II	Clay
HCA Florida Osceola Hospital	Level II	Osceola
Health First's Holmes Regional Medical Center	Level II	Brevard
Jackson Memorial Hospital/ Ryder Trauma Center	Level I	Miami-Dade
Jackson South Medical Center	Level II	Miami-Dade
John Hopkins All Children's Hospital	Pediatric	Pinellas
Lakeland Regional Medical Center	Provisional Level I	Polk
Memorial Regional Hospital (Hollywood)	Level I	Broward
Nicklaus Children's Hospital	Pediatric	Miami-Dade
Orlando Health Bayfront Hospital	Level II	Pinellas
Orlando Health Orlando Regional Medical Center	Level I	Orange
Sarasota Memorial Hospital	Level II	Sarasota
St. Joseph's Hospital	Level II/ Pediatric	Hillsborough
St. Mary's Medical Center	Level I	Palm Beach
Tallahassee Memorial Healthcare	Level II	Leon
Tampa General Hospital Center	Level I	Hillsborough
UF Health Jacksonville	Level I	Duval
UF Health Shands Hospital	Level I	Alachua
Wolfson Children's Hospital	Pediatric	Duval

TRAUMA TRANSPORT PROTOCOLS

VIII. MEDICAL DIRECTOR ATTESTATION:

I have written and approved these Trauma Transport Protocols.



10/21/2025

Juliana Lefebre, DO
Medical Director, Aeromed

Date

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN, pursuant Section 401.25, Fla. Stat. and Section 2-13-55 of the Manatee County Code of Ordinances, that the Manatee County Board of County Commissioners will hold a Public Hearing on **April 21st 2026, at 9:00 a.m.** (or as soon thereafter as may be heard), located on the first floor of the Manatee County Administrative Center, 1112 Manatee Avenue West, Bradenton, Florida, to consider and act upon the following matter:

Tampa General Aeromed Renewal Application for a Certificate of Public Convenience to provide Advanced Life Support Air Ambulance Service (rotor and fixed) in Manatee County

All interested parties are invited to appear at this hearing and be heard, subject to the proper rules of conduct. Additionally, any public comments submitted will be considered by the Board of County Commissioners and entered in the record. Link to: [Public Comment](#)

Copies of the application and supporting documents and the Public Safety Director's report and recommendation are available for public inspection from 8:00 a.m. to 5:00 p.m. Monday through Friday at the Manatee County Public Safety Center, 2101 47th Terrace East, Bradenton, Florida. These documents are also available on the County's website. Link to: [Agendas](#)

Interested parties may obtain assistance regarding this matter by calling (941) 749-3070 or emailing at planning.agenda@mymanatee.org during normal business hours.

In accordance with Section 286.0105, Florida Statutes, if any person decides to appeal any decision made with respect to any matters considered at such meeting or hearing, that person will need a record of the proceedings, and for such purpose, that person may need to assure that a verbatim record of the proceedings is made, which record would include any testimony or evidence upon which the appeal is to be based.

Americans With Disabilities: The Board of County Commissioners does not discriminate upon the basis of any individual's disability. Manatee County is committed to providing full access to facilities, programs, and services to all, as well as supporting the employment of qualified individuals with disabilities in its workforce in accordance with federal and state laws and regulations, including the Americans with Disabilities Acts of 1990 (ADA) and as amended ("ADAA), and 503 and 504 of the Rehabilitation Act of 1973. Anyone requiring reasonable accommodation for this meeting as provided for in the ADA, or assistance with accessing any of these documents, should contact Carmine DeMilio, ADA Compliance Coordinator, at 941-792-4501 ext. 6016 or carmine.demilio@mymanatee.org, at least 3 business days prior to the scheduled meeting. If you are deaf/hard of hearing and require the services of an interpreter, please contact the Florida Relay Service at 711.

SAID HEARING MAY BE CONTINUED FROM TIME TO TIME PENDING ADJOURNMENTS.

MANATEE COUNTY BOARD OF COUNTY COMMISSIONERS
Manatee County Public Safety Department

Manatee County, Florida
Date Published:

MANATEE COUNTY GOVERNMENT

STATE OF FLORIDA

COUNTY OF MANATEE

Before the undersigned authority personally appeared Quantana Acevedo, who on oath says that she is a County Employee of Manatee County Government, Manatee County, Florida; that the attached copy of advertisement, being a public notice in the matters of Notice of Hearing for Tampa General Hospital Aeromed Certificate of Public Convenience for the Manatee County Board of County Commissioners Regular Meeting on April 21, 2026, in Manatee County Florida, was published on the publicly accessible website of Manatee County Government, Manatee County, Florida, of www.mymanatee.org on April 9, 2026.

Affiant further says that the website complies with all legal requirements for publication in Chapter 50, Florida Statutes.

By: 
Quantana Acevedo
Planning and Zoning Tech III

Sworn to and subscribed before me this 9th day of April 2026, by Quantana Acevedo, who is personally known to me or who has produced (type of identification) as identification.




(Signature of Notary Public)
Abigail Bonds
(Print Name of Notary Public)
Notary Public
(Title)

My Commission Expires: July 26, 2026
Commission Number: HH 293466

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MANATEE COUNTY BOARD OF COUNTY COMMISSIONERS
Manatee County Public Safety Department
Manatee County, Florida
Date Published: 4/8/26