McLean County Area EMS System

Critical Care Transport Program

Revised July 2013
Purpose:

The McLean County Area EMS System recognizes the need to transport critically ill and injured patients from outlying hospitals to larger tertiary care centers. Some patients will require additional skills and procedures that paramedics do not normally perform for stabilization during or prior to transport. Some patients will require administration or maintenance of medications not normally carried by Advanced Life Support vehicles. This will outline the requirements for initial training, continuing education, approved additional skills, procedures, medications, quality assurance and improvement.

Right to Deny Transport:

A System approved Critical Care Transport Agency has the right to deny transport under the following conditions:

1. If providing the Critical Care transport will impede the ability for the Agency to provide emergency ALS response within their response area due to staffing or equipment.
2. If it is deemed the patient is not stable enough for ground transport after consultation with Medical Control.
3. If the safety of the patient and crew is at significant risk, i.e. weather, road conditions, violent patients.
Definitions

As defined by
Section 515.860 of the 77 Illinois Administrative Code 515

I) "Critical care transport" means the pre-hospital or inter-hospital transportation of a critically injured or ill patient by a vehicle service provider, including the provision of medically necessary supplies and services, at a level of service beyond the scope of the EMT-Paramedic. When medically indicated for a patient, as determined by a physician licensed to practice medicine in all of its branches, an advanced practice nurse, or a physician's assistant, in compliance with Section 3.155(b) and (c) of the EMS Act, critical care transport may be provided by:

   a. Illinois Department of Public Health approved critical care transport providers, not owned or operated by a hospital, utilizing EMT-Paramedics with additional training, nurses, or other qualified health professionals; or

   b. Hospitals, when utilizing any vehicle service provider or any hospital-owned or operated vehicle service provider. Nothing in the Act requires a hospital to use, or to be, an Illinois Department of Public Health approved critical care transport provider when transporting patients, including those critically injured or ill. Nothing in the EMS Act shall restrict or prohibit a hospital from providing, or arranging for, the medically appropriate transport of any patient, as determined by a physician licensed to practice medicine in all of its branches, an advanced practice nurse, or a physician's assistant. (Section 3.10(f-5) of the EMS Act)

II) “Expanded scope of practice” includes the accepted national curriculum plus additional training, education, experience, and equipment as approved by the Illinois Department of Public Health pursuant to Section 3.55 of the EMS Act. Tier I transports are considered “expanded scope of practice.”
Tier I:

Tier I provides a level of care for patients who require care beyond the National Paramedic scope of practice, up to but not including the requirements of Tiers II and III. Tier I transport includes the use of a ventilator, the use of infusion pumps with administration of medication drips, and maintenance of chest tubes.

A) Licensure:

1) Licensed Illinois Paramedic or Pre-Hospital Registered Nurse (PHRN)
2) Scope of practice more comprehensive than National Paramedic Scope of Practice, as approved by the Department in accordance with the EMS System Plan; and
3) Approved to practice by the Illinois Department of Public Health in accordance with the EMS System Plan.

B) Minimum Staffing:

1) EMT-Basic (alternately Emergency Medical Technician), Intermediate (alternatively Advanced Emergency Medical Technician) or Paramedic/PHRN as driver; and
2) Paramedic Expanded Scope of Practice credentialed individual or PHRN, who shall remain with the patient at all times.

C) Education, Certification, and Experience:

1) Initial Education: Documentation of initial education and demonstrated competencies of expanded scope of practice skills as required by Tier I Level of Care and approved by the Illinois Department of Public Health in accordance with the EMS System Plan.

D) Continuing Education Requirements:

1) Annual competencies of expanded scope of practice knowledge, equipment and procedures shall be completed; and
2) The EMS vehicle service provider shall maintain documentation of competencies and provide documentation to the EMS Resource Hospital upon request.

E) Certifications:

1) Tier I personnel shall maintain all renewable critical care certifications and credentials in active status:
   a. Advanced Cardiac Life Support (ACLS);
   b. Pediatric Education for Pre-Hospital Professionals (PEPP) or Pediatric Advanced Life Support (PALS); and
   c. International Trauma Life Support (ITLS) or Pre-Hospital Trauma Life Support (PHTLS).
F) Experience:

1) Minimum of one year of experience functioning in the field at an ALS level; and
2) Documentation of education and demonstrated competencies of expanded scope of practice skills required for Tier I Level of Care approved by the Illinois Department of Public Health and included in the EMS System Plan.

G) Medical Equipment and Supplies:

1) Ventilator; and
2) Infusion pumps.

H) Vehicle Standards:

1) Any vehicle used for providing expanded scope of practice care shall comply at a minimum with Section 515.830 (Ambulance Licensing Requirements) or Sections 515.900 (Licensure of SEMSV Programs –General) and 515.920 (SEMSV Program Licensure Requirements for All Vehicles) regarding licensure of SEMSV programs and SEMSV vehicle requirements, including additional medical equipment and ambulance equipment as defined in the above mention Sections.
2) Any vehicle used for expanded scope of practice transport shall be equipped with an onboard alternating current (AC) supply capable of operating and maintaining the AC current needs of the required medical devices used in providing care during the transport of a patient.

I) Quality Assurance Program:

1) The Tier I transport provider shall develop a written Quality Assurance (QA) Plan approved by the EMS System and the Department. The provider shall provide quarterly QA reports to the assigned EMS Resource Hospitals for the first 12 months of operation.
2) The EMS System shall establish the frequency of quality reports after the first year if the System has not identified any deficiencies or adverse outcomes.
3) The EMS Medical Director shall oversee the QA Program.
4) The QA Plan shall evaluate all expanded scope of practice activity for medical appropriateness and thoroughness of documentation. The review shall include:
   a. Review of transferring physician orders and evidence of compliance with those orders;
   b. Documentation of vital signs and frequency and evidence that abnormal vital signs or trends suggesting an unstable patient were appropriately detected and managed;
   c. Documentation of any side effects/complications, including hypotension, extreme bradycardia or tachycardia, increasing chest pain, dysrhythmias, altered mental status and/or changes in neurological examination, and evidence that interventions were appropriate for those events;
   d. Documentation of any unanticipated discontinuation of a catheter or rate adjustments of infusions, along with rationale and outcome;
Tier I
Treatment and Transport Protocols

Pain Control:

Attempts to control the patient’s pain will be made whenever possible as long as the patient’s condition is stable enough for the pain medication administration and there are no known allergies to the medications.

An assessment will be performed on all patients and treatment started per appropriate System protocol, if appropriate. Pain assessment scales, as shown below, will be used to evaluate the severity of pain. The appropriate pain control medication will be administered either by current System protocol or by Medical Control direction based on the origin of the pain.

Pain Scales:

English

Please point to the number that best describes your pain.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pain</td>
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<td></td>
<td></td>
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<td>Terrible pain</td>
</tr>
</tbody>
</table>

Treatment Protocol:

Isolated traumatic injuries:

1. Treat patient per “Routine Trauma Care- Stable Patient” or “Extremity Trauma” protocol.
2. Consider Toradol (Ketorolac) 30 mg IVP or 60 mg IM for patients less than 65 years of age.
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* Consider Toradol (Ketorolac) 15 mg IVP or 30 mg IM for patients 65 years of age or older.

**Caution:** Toradol is contraindicated in patients with active peptic ulcer disease and/or recent G1 bleeding, advanced renal failure, patients taking ASA or NSAIDS, or any patients at risk for bleeding.

Non-traumatic Pain:

1. Treat patient per appropriate System protocol.
2. Patients with ALOC or unstable vital signs should not receive pain medications.
3. * Consider Morphine Sulfate 2-4 mg IVP
   a. Repeat Morphine Sulfate in 2 mg increments to maximum 10 mg until patient indicates relief or tolerance of pain.
4. * Consider Toradol (Ketorolac) 15-30 mg IVP or 30-60 mg IM
   **Caution:** Toradol is contraindicated in patients with active peptic ulcer disease and/or recent G1 bleeding, advanced renal failure, patients taking ASA or NSAIDS, or any patients at risk for bleeding.
5. * Consider Hydromorphone (Dilaudid) 0.5 mg IVP
   a. Repeat Hydromorphone (Dilaudid) 0.5 mg IVP every 5 minutes to maximum 2 mg until patient indicates relief or tolerance of pain.
   b. Patients 65 years and older Hydromorphone (Dilaudid) 0.2 mg IVP every 5 minutes to maximum 2 mg until patient indicates relief or tolerance of pain.
6. * Consider Fentanyl 50 mcg IVP over 2 minutes
   a. Repeat Fentanyl 50 mcg IVP over 2 minutes to maximum 100 mcg

*Watch for ALOC and respiratory depression when administering narcotics. If ALOC and respirator depression occurs, administer Naloxone (Narcan) IVP.*

**Amiodarone:**

**Usage:**
Class III antiarrhythmic drug. Indicated for treatment and prophylaxis of frequently recurring ventricular fibrillation and hemodynamically unstable ventricular tachycardia it prolongs the duration of action potential and effective refractory period. Noncompetitive alpha and Beta adrenergic inhibition it increases PR and QT intervals and decreases sinus rate.

**Adverse Reactions:**
CV: Hypotension most common, torsades de pointes, sinus arrest, bradycardia, CHF Pulmonary: Pulmonary toxicity, progressive dyspnea, fatigue, cough, pleuritic pain, fever.

**Contraindications:**
Known hypersensitivity. Cardiogenic shock, marked sinus bradycardia and 2nd or 3rd degree heart block, severe liver disease.

**Equipment Use:**
Amiodarone must be infused via MIP pump.

**Standing Orders:**

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1. Amiodarone infusion must be initiated at the transferring hospital.
2. Verify concentration and infusion rate prior to leaving transferring hospital.
3. Assess K+, Mg, liver function, if available.
4. Review medication administration record. If taking a beta blocker or calcium channel blocker, notify Medical Control at Resource Hospital. (Amiodarone may be used with caution with these medications.)
5. Assess input and output.
6. Monitor blood pressure, heart rate. Notify Medical Control at Resource Hospital if heart rate less than 60 or B/P less than 90.
7. Rate of infusion should not be changed unless ordered.
8. Amiodarone is incompatible with other drugs. Infuse through a central line if available.

Dosages:
1. Loading dose (to be given at the transferring hospital)
2. After loading dose 360 mg over the next 6 hours, 1 mg per minute.
3. Maintenance infusion: 540 mg over 18 hours (.05 mg/mm)

Cardizem (diltiazem):

Usage:
Atrial fibrillation with rapid ventricular response, atrial flutter; Paroxysmal Supraventricular Tachycardia (PSVT)

Complications\Adverse Reactions:
CNS: dizziness, paresthesia, headache, weakness, visual disturbance.
CV: hypotension, facial flushing, junctional or AV dissociation, chest pain, congestive heart failure, ventricular or atrial arrhythmias, edema
Demertalogic: injection site reaction (itching, burning), sweating
GI: constipation, nausea, vomiting, dry mouth

Equipment Maintenance:
All Cardizem drips must be administered via an infusion pump and will be initiated at transferring hospital.

Standing Orders for Administration by Transferring Facility:
1) Verify concentration, dosage and VS parameters on physicians order sheet from transferring hospital. (Usual dose is 125 mg/100 cc NS or D5W or D5 45 NS; this yields 1 mg/min delivered dose)
2) Monitor vital signs: B/P, pulse rate every 15 minutes with continuous EKG monitoring.
3) Notify Medical Control of the vital signs (heart rate < 110 / > 150, or Systolic BP <90) deviate from the predetermined parameters set forth by the transferring hospital.
4) Notify Medical Control of any AV block.
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**Dilaudid**
(Hydromorphone hydrochloride)

**Usage:**
For narcotic analgesic effects and as indicated for the relief of moderate to severe pain.

**Adverse Reactions:**
More common side effects may include anxiety, constipation, dizziness, drowsiness, fear, impairment of mental and physical performance, inability to urinate, mental clouding, mood changes, nausea, vomiting, restlessness, sedation, troubled and slowed breathing.

Less common side effects may include agitation, blurred vision, chills, cramps, diarrhea, and weakness.

**Contraindications:**
Known hypersensitivity to drug or narcotic painkillers, pregnant or nursing mothers. Caution should be used in patients who have taken other central nervous depressants, narcotic analgesics, sedative/hypnotics, or tricyclic antidepressants.

**Equipment Use:**
May be given IV push per physician order.

**Standing Orders:**
1. Verify drug, dose, and route of administration.
2. Dilaudid PCA must be run through a PCA pump. Refer to compatibility chart before pushing Dilaudid through an infusing IV. If no IV is established, begin NS at TKO rate.
3. Push IV dose over 1-2 minutes.
4. Monitor vital signs; if respiratory depression or hypotension occur, contact Medical Control physician and administer Narcan per protocol.
5. Monitor pain scale before and after treatment.

**Fentanyl**

**Usage:**
Acts at specific opioid receptors causing analgesic action of short duration during anesthesia, immediate postoperative periods, and as a general anesthesia agent.

**Adverse Reactions:**
**CNS:**
Sedation, clamminess, sweating, headache, vertigo, floating feeling, dizziness, lethargy, confusion, dreams, euphoria, seizures.
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CV: Palpitations, increased or decreased B/P, cardiac arrest, shock, arrhythmias.

Dermatologic: Rash, hives, flushing, warmth, sensitivity to cold.

GI: Nausea, vomiting.

Respiratory: Slow, shallow respirations, apnea, laryngospasm, bronchospasms, suppression of cough reflex.

Other: Physical tolerance and dependence, psychological dependence.

Contraindications:
Contraindicated with hypersensitivity to opioids, diarrhea caused by poisonings, acute bronchial asthma, upper airway obstruction, pregnancy.

Use cautiously with bradycardia, history of seizures, lactation, renal dysfunction, history of drug addiction.

Equipment Use:
May be administered via infusion pump or PCA pump.

Standing Orders:
1. Verify drug, dose, and route of administration.
2. Fentanyl PCA must be run through a PCA pump. Refer to compatibility chart before pushing Fentanyl through an infusing IV. If no IV is established, begin NS at TKO rate.
3. Push Fentanyl 50 mcg IV dose at rate of 1 minute per cc.
4. Monitor vital signs; if respiratory depression or hypotension occur, contact Medical Control physician and administer Narcan per protocol.
5. Monitor pain scale before and after treatment.

H2 Blockers
Zantac, (ranitidine), Pepcid, (fanotidine), Tagamet (cinetodine)

Usage:
Intractable duodenal ulcers, GI bleeding, prevention of ulcers in patients in a high stress state such as a critical illness, gastric ulcers, Zollinger-Ellison.

Complications:
Bradycardia with rapid administration
Adverse Reactions:
Malaise, vertigo, reversible confusion, tachycardia, bradycardia, constipation, nausea, vomiting, rash, muscle cramping.

Equipment Maintenance:
H2 Blockers need to be run through an infusion pump

Standing Orders for Administration by Transferring Facility:
1. Bolus infusions: initial dose must have been administered at transferring hospital
2. Continuous infusions will be started at the transferring hospital.
3. Verify dosage, concentration prior to leaving transferring hospital,

Usual dosages:
Zantac bolus: 50 mg to be run over 30 minutes every 6-8 hours.
Zantac Continual Infusion: 150 mg Zantac in 250 cc NS (typical rate 10 cc/hr)
Pepcid bolus: 20 mg every 12 hours
Tagamet: 300 mg bolus every 6 - 8 hours

Heparin

Action:
Inhibit reaction that lead to the clotting of blood and the formation of fibrin clots it acts at multiple sites in the normal coagulation system.

Usage:
Concurrent usage with administration of TPA in the acute MI patient. Treatment of pulmonary embolism, atrial fibrillation with embolization. Treatment of peripheral arterial embolism Treatment of venous thrombi and its extension.

Contraindications:
Severe thrombocytopenia Uncontrolled active bleeding (except when known to be from disseminated intravascular coagulation).

Complications/Adverse Reactions:
Hemorrhage, local site irritation, hypersensitivity, anaphylactic like reaction, adrenal hemorrhage

Equipment:
IV solution must be infused via an infusion pump
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Standing Orders:

1. Routine cardiac care
2. Verify initial dose concentration, and infusing rate as well as total time at transferring facility prior to departure.
3. Assess labs prior to transfer if available: H&H, platelets, PTI,
4. Heparin infusion must be initiated at the transferring hospital.
5. Rates of infusion should not be changed unless ordered.

Usual concentrations of heparin:

25,000 units in 500cc yields 50 units/cc  
25,000 units/250cc yields 100 units/cc  

Hyperalimentation (TPN, PPN)

Usage:

Hyperalimentation provides nutrition for patients unable to inject or tolerate oral or enteral feedings.

Complications:

Infection

Adverse Reactions:

Hyperglycemia, hyperosmolar syndrome, electrolyte disturbance and post infusion syndrome.

Equipment Maintenance and Use:

Hyperalimentation must be administered via an infusion pump.

Standing Orders:

1. Verify solution formula and rate with physician's orders prior to transport,
2. Hyperalimentation is to be considered incompatible with all other medications and IV solutions. Nothing is to be added to the Hyperalimentation bag or IV tubing
5. If a port of a central line is leaking or cracked, clamp off port, start peripheral IV and contact Medical Control for IV fluid orders

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IV Antibiotics

Usage:
To treat pre-existing infections or as a prophylactic measure in patients that are at high risk of developing an infection.

Complications:
Allergic reactions: rash, swelling, nausea, vomiting, diarrhea, chills, fever, laryngeal edema, anaphylaxis. Leukopenia, Ototoxicity, and nephrotoxicity (aminoglycocides)

Adverse Reactions:
Too rapid of administration

Equipment Maintenance:
Antibiotics administered by Tier I Paramedics must be infused through a pump.

Standing Orders:
1. Initial dose of the IV antibiotics must be administered at the transferring hospital prior to transfer. Transferring hospital may order and provide additional IV antibiotics to infuse during long distance interfacility transfers.
2. Known allergies must be assess prior to administering the antibiotics
3. Verify drug, dose, route and time of the administration from the transfer order sheet.
4. Infuse IV antibiotics as specified on the physician's order or hospital pharmacy directions.
5. Monitor for signs and symptoms of an allergic response. If any symptoms are noted, stop infusion and contact base station physician.
6. If IV antibiotics have finished infusing enroute, keep line open with NS KVO or LR KVO.
7. Review drug compatibility chart.

IV KCL

Usage:
To replace serum potassium that may be depleted from a disease state or from fluid resuscitation Maintains neuromuscular excitability of cardiac, smooth and skeletal muscles.

Complications:
Local irritation, burning along the vein of infusion, Nausea, vomiting, abdominal pain. Weakness in legs

In high concentrations: flushing, agitation, hypotension and diaphoresis Peripheral vascular collapse EKG changes associated with potassium intoxication:

1. Tall tented T waves
2. Depressed S-T segments
3. Prolonged P-R interval, loss of P-wave
4. Heart block, v-fib, cardiac arrest

**Adverse Reactions:**

Too rapid of IV infusion of an IV solution containing potassium

**Equipment Use:**

IV solutions should be infused via an MIP infusion pump.

**Standing Orders:**

1. IV potassium infusion must be initiated at the transferring hospital and may be run through either central or peripheral line.
2. KCL concentrations may not exceed 44meq KCL in 1 liter of 1V solution. **No KCL will be initiated in the field**
3. Refer to compatibility chart before administering any IV medications through an IV containing potassium.
4. Monitor for any signs and symptoms of potassium intoxication Stop infusion and notify base station physician of symptoms
5. Monitor urinary output. Notify base station physician if urinary output is less than 30 cc per hour for 2 consecutive hours.
6. Assess IV insertion site for any redness, swelling, or tenderness. If any of the above occurs, stop infusion and discontinue IV site. Restart infusion after a new IV site has been established. Notify receiving hospital of the area of the previous IV site.

**Lasix (Furosemide) Infusions**

**Usage:**

Congestive heart failure and acute renal failure that is unresponsive to bolus treatments.

**Complications:**

Digitalis toxicity, hypokalemia, ventricular ectopy, ototoxicity, electrolyte imbalance, esp. potassium and magnesium

**Adverse Reactions:**

Hypotension, vertigo, tinnitus, hearing loss, rash, weakness, muscle spasm, photosensitivity, ventricular ectopy.

Revised July 2013
Equipment Maintenance:

Lasix infusions must be run through an infusion pump.

Standing orders:

1. Infusion must be started at the transferring hospital.
2. Verify concentration, infusion rate and VS parameters prior to leaving transferring hospital.
3. Assess serum potassium levels prior to transfer if available
4. Monitor and document VS at least every 15 minutes while in transit.
5. Notify Base Command if B/P drops below 15% of initial baseline.
6. Monitor EKG. Notify Base Station of any new onset or increase of ventricular ectopy or tachycardia or signs and symptoms of adverse reaction (see above).
7. Common dosage: 250 mg of Lasix in 250 cc of NS yielding 1 mg/cc, Maintenance dose: 1- .4 mg/kg/hr not to exceed 4 mg/min.
8. Do not give IV bolus medications through the Lasix infusion.

Normal value: Serum K+ = 3.5 – 5.0

Morphine Sulfate

Usage:

Relief of severe pain.

Complications/Adverse Reactions:

Sedation, somnolence, euphoria, hypotension, bradycardia, respiratory depression

Equipment Maintenance:

May be given IV push per protocol. Morphine Sulfate drips must be administered through an infusion pump. MS PCA through a PCA pump.

Standing Orders:

1. Morphine Sulfate drip will be initiated at transferring hospital.
2. Monitor vital signs every 5 minutes; if respiratory depression, somnolence or hypotension occur; contact base station physician
3. Refer to compatibility chart before infusing any drug through the morphine drip.

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4. Consult with base station physician for dose adjustment if morphine drip is not effective in managing pain.

5. Monitor pain scale before and after treatment.

**Multi-Vitamin IV Additive (MVI)**

**Usage:**

To replace vitamin deficiency in those patients suffering from a chronic disease state this route is utilized when oral administration is not possible.

**Complications:**

WARNING: This product contains aluminum that may be toxic. Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Premature neonates are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum.

Research indicates that patients with impaired kidney function, including premature neonates, who receive parenteral levels of aluminum at greater than 4 to 5 mcg/kg/day, accumulate aluminum at levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration.

Studies have shown that vitamin A may adhere to plastic, resulting in inadequate vitamin A administration in the doses recommended with M.V.I.–12®.

**Allergic Reactions:**

Thiamine and folic acid cause irritation at IV site.

**Adverse Reactions:**

Fainting and dizziness with undiluted drug administration, Hepatotoxicity (Vitamin A toxicity), and Tissue calcification (Vitamin D toxicity)

**Standing Orders:**

1) Infusion containing multi-vitamin is to be initiated at the transferring hospital. Rate of infusion will be documented before transfer

2) Refer to compatibility chart before administering any IV medication through the IV infusion containing the multi-vitamin additive

3) The multi-vitamin dose must be diluted in a solution of 500-1000cc of LR, NS or D5/2.

4) May be administered in same IV as KCL.

5) Assess IV insertion site for any redness, swelling or tenderness.
6) If above occurs; STOP infusion and discontinue W. Restart infusion a new IV site has been 
established. Notify receiving hospital of the area of the previous IV site.

_Nitroglycerin Infusion_

**Usage:**

1. The principal pharmacological action of nitroglycerin is relaxation of vascular smooth 
muscle and consequent dilatation of peripheral arteries and veins, (especially the latter). Dilation of the veins promotes peripheral pooling of blood and increases venous return to the heart, thereby reducing left ventricular end-diastolic pressure and pulmonary capillary wedge pressure (preload). Arteriolar relaxation reduces systemic vascular resistance, systolic arterial pressure, and mean arterial pressure (after load). Dilatation of the coronary arteries also occurs.

2. Unstable angina, hemodynamically stable

3. Congested heart failure in settings of acute myocardial infarction that is 
hemodynamically stable

4. Systemic hypertension

**Adverse Reactions:**

Headaches, dizziness, weakness, nausea, vomiting, hypotension, tachycardia and palpitations.

**Equipment Use:**

All nitroglycerin infusion must be administered via an infusion pump.

**Standing Orders:**

1. Verify concentration and dosage and VS parameters on physicians order sheet from
   the transferring hospital.

2. Nitroglycerin infusions must be in a glass bottle and polyethylene tubing.

3. Monitor vital signs: B/P, heart rate at least every 15 minutes when transporting a
   patient with a nitro drip.

4. Notify Medical Control if the vital signs deviate from the predetermined parameters
   set forth by transferring MD.

5. Notify Medical Control if chest pain reoccurs while transporting to facility (usually if
   systolic <90).

6. Nitroglycerin infusion must have its separate IV site. No IV push drugs can be
   administered through this line.
Tier II

Tier II provides a level of care for patients who require care beyond the USDOT Curriculum and expanded scope of practice ALS (paramedic) transport program, and who require formal advanced education for ALS paramedic staff. Tier II transport includes the use of a ventilator, infusion pumps with administration of medication drips, maintenance of chest tubes, and other equipment and treatment, such as, but not limited to: arterial lines; accessing central lines; medication-assisted intubation; patient assessment and titration of IV pump medications, including additional active interventions necessary in providing care to the patient receiving treatment with advanced equipment and medications.

A) Licensure:

1. Licensed Illinois Paramedic or PHRN:
   i) Expanded scope of practice more comprehensive than USDOT Curriculum and expanded scope Tier I level; and
   ii) Approved to practice by the EMS System and the Department in accordance with the EMS System Plan.

B) Minimum Staffing:

1) Paramedic/PHRN; and
2) Paramedic or PHRN who is critical care prepared, who shall remain with the patient at all times.

C) Education, Certification and Experience:

1) Initial Advanced Formal Education:
   i) 80 hours established higher collegiate education or equivalent critical care education based on existing university program models, this program must meet or exceed the University of Maryland Baltimore County (UMBC) Critical Care Paramedic guidelines/curriculum; and
   ii) Demonstrated competencies, as documented by the EMS System.

D) Continuing Education Requirements:

1) The EMS System shall document and maintain annual competencies of expanded scope of practice knowledge, equipment and procedures;
   i) The following current credentials, as a minimum, shall be maintained: ACLS, PEPP or PALS, ITLS or PHTLS;
   ii) Twelve hours of critical care level education shall be completed annually;
   iii) The EMS provider shall maintain documentation of compliance with the above CEU requirements and shall provide documentation to the EMS Resource Hospital upon request; and
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iv) Critical care certification (from formal education) shall be maintained when criteria are available for renewal status of certification.

C) Experience

1) Minimum of two years experience functioning in the field at an ALS level for paramedic or PHRN.

D) Medical Equipment and Supplies:

1) Ventilator; and  
2) Infusion pumps.

E) Vehicle Standards:

1) Any vehicle used for providing critical care transport shall comply at a minimum with Section 515.830 (Ambulance Licensing Requirements) or Sections 515.900 (Licensure of SEMSV Programs – General) and 515.920 (SEMSV Program Licensure Requirements for All Vehicles) regarding licensure of SEMSV programs and SEMSV vehicle requirements, including additional medical equipment and ambulance equipment as defined in this Section. Any vehicle used for critical care transport shall be equipped with an onboard AC supply capable of operating and maintaining the AC current needs of the required medical devices used in providing care during the transport of a patient.

F) Quality Assurance Program:

1) The Tier II transport provider shall develop a written QA Plan approved by the EMS System and the Department. The participating provider shall provide quarterly reports to the assigned EMS Resource Hospitals for the first 12 months of operation.  
2) The EMS System shall establish the frequency of quality reports after the first year if the System has not identified any deficiencies or adverse outcomes.  
3) The EMS Medical Director shall oversee the QA Program.  
4) The QA Plan shall evaluate all expanded scope of practice activity for medical appropriateness and thoroughness of documentation. The review shall include:  
   a. Review of transferring physician orders and evidence of compliance with those orders;  
   b. Documentation of vital signs and frequency, and evidence that abnormal vital signs or trends suggesting an unstable patient were appropriately detected and managed;  
   c. Documentation of any side effects/complications, including hypotension, extreme bradycardia or tachycardia, increasing chest pain, dysrhythmia, altered mental status and/or changes in neurological examination, and evidence that interventions were appropriate for those events;  
   d. Documentation of any unanticipated discontinuation of a catheter or rate adjustments of infusions, along with rationale and outcome;  
   e. Review of any Medical Control contact for further direction;
Tier II
Treatment and Transport Protocols

Rapid Sequence Intubation (RSI):

Indications:
1. Trauma patients with a Glasgow Coma Scale (GCS) of 9 or less with a gag reflex.
2. Trauma patients with significant facial trauma and poor airway control.
3. Closed head injury or major stroke with unconsciousness.
4. Burn patients with airway involvement and inevitable airway loss.
5. Respiratory exhaustion such as severe asthma, CHF, or COPD with hypoxia.
6. Overdose with altered mental status where loss of airway is inevitable.
7. Patients with an altered level of consciousness and the potential for airway compromise that cannot be controlled by any other means.

Preparation:
1. Assess and treat patient per appropriate protocol.
2. Apply oxygen. Have BVM, BIAD, PerTrach/transtracheal jet equipment, and suction ready.
3. If not performed prior, establish IV access, apply cardiac monitor, and pulse oximeter.
4. Prepare and check all ET equipment for endotracheal intubation.
5. Estimate patient’s weight, calculate drug doses and draw up into syringes.

Procedure:
1. Pre-oxygenate with 100% oxygen by non-rebreather mask for 3-5 minutes. If ventilation is required, bag gently with cricoid pressure applied for 3-5 minutes if situation allows.
2. Administer Atropine to patients 8 years old and under.
   a. Pediatric dose – 0.02 mg/kg, minimum dose 0.1 mg, maximum single dose 1 mg
3. Consider administration of Atropine for adult patients with bradycardia.
   a. Adult dose – 1 mg
4. Administer Lidocaine 1-1.5 mg/kg IV push two minutes prior to paralysis for patients with head trauma or stroke.
   a. Caution: Do not administer Lidocaine to patients with bradycardia, high degree heart blocks, or ventricular escape rhythms.
5. Administer Amidate (Etomidate) 0.3 mg/kg IV push two minutes prior to paralysis or Midazolam (Versed) 2 mg IV push every 1-2 minutes for the first five minutes. Further orders by Medical Control or transferring physician.
6. Administer Fentanyl 50 mcg IV Push over 2 minutes. May repeat one time up to a total dose of 2-10mcg/kg. Further orders by Medical Control or transferring physician.

7. Administer Succinylcholine 1.5 mg/kg up to 150 mg IV push and wait for paralysis.
   a. Caution: Use extreme caution and/or contact Medical Control for patients with hyperkalemia, (i.e. renal failure), increased intracranial pressure, and eye injury with increased intraocular pressure.

8. Perform endotracheal intubation using Selick’s maneuver. Discontinue attempt and ventilate with 100% O2 if:
   a. Thirty seconds has elapsed and SaO2 falls below 91%, or
   b. Heart rate falls below 60 BPM

9. When successfully intubated, confirm placement by
   a. Bilateral breath sounds
   b. Silent epigastrum
   c. Chest rise and fall
   d. Esophageal detection device (EDD), capnography, or end tidal CO2 monitoring

10. Secure the ETT using a commercial tube holder

11. Administer Vecuronium (Norcuron) 0.1 mg/kg IV push.

12. If the intubation is unsuccessful, maintain cricoid pressure and provide ventilations by BVM. Consider the use of a Blind Insertion Airway Device.

13. If the intubated patient becomes agitated, administer Midazolam (Versed) 1 mg IV push every 1-2 minutes until the patient is calm or a total of 10 mg has been administered. Further medication orders may be given by Medical Control.

McLean County Area EMS System
Critical Care Agency
Rapid Sequence Intubation

Date: __________________    EMS Run Number: __________
Agency: _________________________   Unit: ________
Crew: _________________________

Indications for RSI
(Before Intubation)

GCS: ____________  Pupil Status: ____________  Respiratory Rate: ____________
SaO2: ____________  Heart Rate: ____________  B/P: ____________ / ____________

Post Intubation

GCS: ____________  Pupil Status: ____________  Respiratory Rate: ____________

Revised July 2013
McLean County Area EMS System
Critical Care Transport Program

SaO₂: ___________ Heart Rate: ___________ B/P: ___________/___________
Number of Attempts: _______ Successful: Yes No
ETT Size: ________________ ETT Depth: ________________
Confirmation by: ___ Cord visualization ___ Chest expansion
                     ___ Silent epigastrum ___ Bilateral Breath Sounds
                     ___ EDD ___ End tidal CO₂
                     ___ Capnography

To Be Filled Out by Critical Care Paramedic Performing RSI:
Physical Findings or Justification for Need:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Estimated Patient Weight: _____________________ kg
Patient Transported to: _________________________
Receiving RN or MD Signature ______________________
Paramedic Signature _____________________________

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Time</th>
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<tr>
<td>Fentanyl</td>
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Amidate
(Etomidate)

Usage:
A hypnotic agent with no analgesic effect used for the induction of general anesthesia. Commonly used in the emergency setting as part of a rapid sequence induction to induce anesthesia.

Adverse Reactions:

Skeletal muscle: Myoclonic skeletal muscle movements, tonic movements.
Respiratory: Apnea of short duration, hyperventilation or hypoventilation, laryngospasm.
CV: Hypertension or hypotension, tachycardia or bradycardia, arrhythmias.
GI: Nausea, vomiting.
Miscellaneous: Eye movements, hiccoughs, snoring.

Contraindications:
Patients with a known hypersensitivity to the drug.

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McLean County Area EMS System
Critical Care Transport Program

**Equipment Use:**

Administer via patent intravenous line.

**Standing Orders:**

Use as indicated in the Rapid Sequence Intubation protocol.

---

**Blood Administration:**

**Usage:**

To replace blood loss while maintaining adequate circulating volume and oxygen during transport.

**Complications:**

Transfusion reactions. Severe reactions are usually manifested during the initial 50cc or less of infusion.

**Adverse Reactions:**

Too rapid an infusion producing a volume overloaded state. Incompatible AB0 blood administration.

**Equipment Use:**

Infusion pumps may be helpful but not required unless delivery is through a central venous catheter or pediatrics.

**Standing Orders:**

1. Initial blood administration will be instituted at the transferring hospital.

2. Verify the physician order for blood product, blood type, rate of infusion, and use of micro aggregate or leukocyte removal filter.

3. Assess patient for religious or cultural objections to transfusion, history of previous reaction to a blood product and for pre-transfusion symptoms that could be mistaken for a transfusion reaction.

4. Assess baseline TPR and BP prior to starting transfusion and at least every 15 minutes x 2 after the transfusion is initiated; then hourly while blood is infusing and again when transfusion is completed (except albumin and plasma protein fraction). Vital signs must be documented.

5. Assess TPR and BP every 15 minutes x 4 during intravenous gamma globulin administration.

6. Replace blood tubing after every 2 units or after 4 hours of use. Discard tubing.

Revised July 2013
McLean County Area EMS System
Critical Care Transport Program

immediately following completion of transfusion.

*Monitor peripheral site and infusion system at least every hour during blood product administration.*

**For any suspected reaction:**

- Stop transfusion, do not clear tubing
- Recheck labels
- Notify base station physician
- Remove bag and tubing; start isotonic saline
- Monitor and treat symptoms
  - Collect a urine specimen for receiving hospital
  - Save blood bag - deliver to receiving hospital along with urine specimen for further testing

---

**Dobutamine**

**Only Usage:**

When parenteral therapy is necessary for inotropic support in the short-term treatment of adults with cardiac decompensation due to depressed contractility in patients with atrial fibr and rapid ventricular response, a digitalis preparation should be used prior to Dobutamine.

**Complications:**

Increase HR, BP, may develop rapid ventricular response in atrial fib

Ectopic - may precipitate or exacerbate. Rarely causes VT

Hypersensitivity - rash, fever, eosinophilia, and bronchospasm.
Sodium bisulfate may cause allergic reaction, anaphylaxis, and asthmatic

**Adverse Reactions:**

In patients who have shown previous manifestations of hypersensitivity to Dobutamine May be ineffective if received beta blockers; may have increased peripheral vascular resistance

**Equipment Use:**

IV should be infused via infusion pump.

**Standing Orders:**

1. IV Dobutamine must be initiated at the transferring hospital.
2. Verify infusion rate, infusion dosage, patients weight prior to transfer
3. Monitor BP and heart rate continuously. If heart rate increases more than 15% of baseline or hypotension occurs, notify base station physician.
4. Refer to compatibility chart before infusing any medication through the Dobutamine line No IV push drugs can be given through a Dobutamine infusion.
5. If any redness, swelling, tenderness, warmth appears at IV site, discontinue IV after reestablishing a new IV site.

**Insulin**

**Usage:**

Insulin is a naturally-occurring hormone in the body that causes the uptake of glucose by the cells, decreases blood glucose, and promotes glucose storage. Used in the treatment of Type 1 diabetes, Type 2 diabetes that cannot be controlled by diet or oral agents, and several diabetic ketoacidosis.

**Adverse Reactions:**

*Metabolic:* Hypoglycemia.

**Contraindications:**

Avoid overcompensation of blood glucose level.

**Equipment Use:**

Insulin must be infused via an infusion pump.

**Standing Orders:**

1. Insulin infusion must be initiated at the transferring hospital.
2. Verify concentration and infusion rate prior to leaving transferring hospital.
3. Assess level of consciousness, vital signs, and blood glucose level.
4. If level of consciousness decreases or blood glucose levels drops below 70 mg/dl, contact Medical Control.
5. Rate of infusion should not be changed unless ordered.

**Integrilin**

**Usage:**

Antiplatelet Agent used with acute coronary syndrome including percutaneous coronary intervention. Prevents fibrinogen, von Willebrand’s factor from binding to the glycoprotein lib/IIa receptor, fighting platelet aggregation.

**Adverse Reactions:**

CV stroke, hypotension, systemic bleeding

**Equipment Maintenance:**

Integrilin must be infused via MTP pump.
McLean County Area EMS System
Critical Care Transport Program

Standing Orders for; Administration by Transferring Facility:

1) Integrin Infusion must be initiated at the transferring hospital.
2) Verify concentration and infusion rate prior to leaving transferring hospital.
3) Assess Hb, HCT, Platelets, PTT, and serum creatinine, if available
4) Monitor for signs and symptoms of bleeding.
5) Rates of infusion should not be changed unless ordered

<table>
<thead>
<tr>
<th>Patient kg</th>
<th>Infusion ml/hr</th>
<th>Patient kg</th>
<th>Infusion ml/hr</th>
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Usual Dosage for Serum Creatinine ~2
Renal Impairment Dosage Serum Creatinine 2.-4
McLean County Area EMS System
Critical Care Transport Program

**IV Antibiotics**

**Usage:**
To treat pre-existing infections or as a prophylactic measure in patients that are at high risk of developing an infection.

**Complications:**
Allergic reactions: rash, swelling, nausea, vomiting, diarrhea, chills, fever, laryngeal edema, anaphylaxis. Leukopenia, Ototoxicity, and nephrotoxicity (aminoglycocides)

**Adverse Reactions:**
Too rapid of administration

**Equipment Maintenance:**
IV antibiotics should be run through an infusion pump whenever possible. Antibiotics must be infused through a pump if run through a central venous catheter

**Standing Orders:**

1. Initial dose of the IV antibiotics must be administered at the transferring hospital prior to transfer. Transferring hospital may order and provide additional IV antibiotics to infuse during long distance interfacility transfers.
2. Known allergies must be assess prior to administering the antibiotics
3. Verify drug, dose, route and time of the administration from the transfer order sheet.
4. Infuse IV antibiotics over 30-60 minutes. Aminoglycocides over 60 minutes unless otherwise specified on the physician's order or hospital pharmacy directions.
5. Monitor for signs and symptoms of an allergic response. If any symptoms are noted, stop infusion and contact base station physician.
6. If IV antibiotics have finished infusing enroute, keep line open with NS KVO or LR KVO.
7. Review drug compatibility chart.

**Levophed**
(Norepinephrine bitartrate)

**Usage:**
For blood pressure control in acute hypotensive states and as an adjunct in the treatment of cardiac arrest.

**Adverse Reactions:**
Dizziness, weakness, headache, mood changes, bradycardia, tachycardia, chest pain, shortness of breath, diaphoresis

**Contraindications:**

Revised July 2013
Hypotensive states due to hypovolemia.

**Equipment Use:**

Levophed must be infused via an infusion pump.

**Standing Orders:**

1. Levophed must be initiated at the transferring hospital.
2. Verify infusion rate, infusion dosage, patients weight prior to transfer
4. Refer to compatibility chart before infusing any medication through the Levophed line. No IV push drugs can be given through a Levophed infusion.
5. If any redness, swelling, tenderness, warmth appears at IV site, discontinue IV after re-establishing a new IV site.

---

**Magnesium Sulfate**

**Usage:**

Control seizures in toxemia of pregnancy, epilepsy, acute nephritis, hypomagnesemia, hypothyroidism, acute magnesium deficiency, and cardiac dysrhythmias

**Complications/Adverse Reactions:**

CNS: Sweating, weak or absent reflexes, drowsiness muscle weakness
CV: Hypotension, flushing, circulatory collapse, heart block, depressed cardiac function
Other: Respiratory paralysis and hypocalcemia

**Equipment:**

Magnesium Sulfate must be infused via an infusion pump.

**Standing Orders:**

1. For monitoring of second and third degree heart block patients receiving MgSO₄ during interfacility transfer. Not to be initiated in the field.
2. Monitor vital signs every 15 minutes while drug is infusing. Monitor for weakness in extremities (by movement) Watch for signs of respiratory depression and second and third degree heart block Monitor I & O. Urinary output should be 100 ml or more in 4 hour period before each dose given or during infusion. This will be measured every 4 hours and documented on flow sheet. Report any changes to base station physician and document. Paramedics will monitor urinary output during interfacility transfer.
3. Early indicators of toxicity include: profound thirst, feeling of warmth, sedation, confusion, muscle weakness.

4. Maximum infusion rate is 150mg/minute. Dose/concentration will be determined by transferring hospital. Recommended 2 grams in 100 cc on MTP pump. The drip will infuse over at least 90 minutes. Rapid drip will induce uncomfortable feeling of heat Constant infusion (MT1~) pump.
   a. Note: Hypomagnesemia is usually accompanied by other electrolyte deficiencies, especially calcium and potassium.

5. IV Bolus cannot be given in field unless direct order given by base station physician in life threatening situation. IV bolus in seizing pregnant patient, 1 -• 2 grams over 2 minutes may be given on direct order from base station physician Action is immediate following injection; duration approximately 30 minutes

**Mannitol**

**Usage:**
Treatment of oligmia, edema, increased intracranial pressure, and intraocular pressure.

**Complications\Adverse Reactions:**
Tachycardia, blurred vision, fluid and electrolyte imbalance hypotension.

**Equipment Maintenance:**
IV push per protocol, not IV drip.

**Standing Orders for Administration by Transferring Facility:**

1. Routine medical care.

2. Verify orders for administration of Mannitol. It will be administered on a scheduled dose time as begun at referring hospital.

3. Push 25% Mannitol (50 ml) slow over 5 minutes.

4. Document vitals every 5 minutes.

5. Flush with sterile water before and after administration.

**Natrecor**

**Usage:**
Natrecor is indicated for the intravenous treatment of patients with acutely decompensated congestive heart failure who have dyspnea at rest or with minimal activity. Reduces pulmonary capillary wedge pressure and improving dyspnea.
McLean County Area EMS System
Critical Care Transport Program

Adverse Reactions:

CV: Hypotension, ventricular tachycardia, bradycardia, angina

GI: Nausea, vomiting

CNS: Insomnia, dizziness, anxiety

Other: Headache, abdominal pain, back pain

Contraindications:

Administration is contraindicated in patients who are hypersensitive to any of the drug components. Should not be used as primary therapy for patients with cardiogenic shock or in patients with a systolic blood pressure less than 90 mmHg. Use should be avoided in patients suspected or having, or known to have, low cardiac filling pressures.

Equipment Use:

Natrecor must be infused via infusion pump.

Standing Orders:

1. Natrecor infusion must be initiated at the transferring hospital.

2. Verify concentration and infusion rate prior to leaving transferring hospital.

3. Monitor vital signs. Notify Medical Control if blood pressure is less than 90 mm/Hg or heart rate is less than 60 beats per minute.

4. Rate of infusion should not be changed unless ordered.

Nitroglycerin Infusion

Usage:

1. The principal pharmacological action of nitroglycerin is relaxation of vascular smooth muscle and consequent dilatation of peripheral arteries and veins, (especially the latter). Dilation of the veins promotes peripheral pooling of blood and increases venous return to the heart, thereby reducing left ventricular end-diastolic pressure and pulmonary capillary wedge pressure (preload). Arteriolar relaxation reduces systemic vascular resistance, systolic arterial pressure, and mean arterial pressure (after load). Dilatation of the coronary arteries also occurs.

2. Unstable angina, hemodynamically stable

3. Congested heart failure in settings of acute myocardial infarction that is hemodynamically stable

4. Systemic hypertension

Revised July 2013
Adverse Reactions:

Headaches, dizziness, weakness, nausea, vomiting, hypotension, tachycardia and palpitations.

Equipment Use:

All nitroglycerin infusion must be administered via an MTP infusion pump

Standing Orders:

1. Verify concentration and dosage and VS parameters on physicians order sheet from the transferring hospital.
2. Nitroglycerin infusions must be in a glass bottle and polyethylene tubing.
3. Monitor vital signs: B/P, heart rate at least every 15 minutes when transporting a patient with a nitro drip.
4. Notify Medical Control if the vital signs deviate from the predetermined parameters set forth by transferring MD.
5. Notify Medical Control if chest pain reoccurs while transporting to facility (usually if systolic <90).
6. Titrate Nitro drip by 10mcg (3cc) if concentration is 50mg/250cc every 3-5 minutes to achieve relief of chest discomfort or until blood pressure systolic ≥ or = 90.
7. Monitor B/P, heart rate pain control 3-5 minutes after an increase in dose.
8. Infusion rates should not be greater than 100mcgs/minute unless ordered by Medical Control.
9. Nitroglycerin infusion must have its separate IV site. No IV push drugs can be administered through this line.

Norcuron
(Vecuronium)

Usage:

Neuromuscular blocking agent (non-depolarizing) that paralyzes skeletal muscles, including respiratory muscles, used to achieve paralysis to facilitate endotracheal intubations.

Adverse Reactions:

Prolonged paralysis, hypotension, and bradycardia.

Contraindications:

Patients with a known hypersensitivity to the drug.
McLean County Area EMS System
Critical Care Transport Program

Equipment Use:
Administered IV push via patent intravenous line.

Standing Orders:
1. Use as indicated in the Rapid Sequence Intubation protocol.

Patient Controlled Analgesia (PCA) Pumps

Usage:
Patient Control Analgesia (PCA) has been shown to provide highly effective pain management by allowing patients to titrate analgesia within pre established parameters.

Complications:
Sedation, somnolence, clouded sensory, euphoria convulsions with large doses, hypotension, bradycardia, respiratory depression, nausea, vomiting, diarrhea, constipation, urinary retention.

Adverse Reactions:
Drugs may interfere with the evaluation of CNS by masking symptoms. May decrease the effects of diuretics in CHF. MS may worsen gallbladder pain. Physical and psychological dependence Respiratory depression.

Equipment Maintenance and Use:
PCA pumps must be kept plugged in at all times during transport.

Standing Orders:
1. PCA pump will be initiated at transporting hospital.
2. Verify medication and PCA pump settings prior to transporting and initiation should the pump become unplugged.
3. Verify the following items:
   a. Medication
   b. Lockout period
   c. Interval dose
   d. Maximum dose
   e. Infusion rate (continuous)
   f. Loading dose
   g. Dose booster

Revised July 2013
4. There will be no purging of system during interfacility transport.

5. Monitor BP, HR and respiratory rate continuously. Notify Medical Control physician of hypotension, respiratory rate <10 for Narcan order.

6. Assess total amount of PCA medication administered; doses may be changed (decreased/increased) according to PCA standings order sheet.

7. Discontinue orders for all other narcotics unless approved for use with PCA and documented by transferring institution.

8. Lock pump security door with key after cartridge insertion or following changes in pump settings.

9. Close slide clamp on tubing prior to opening door or changing cartridge to prevent accidental bolus.

10. Maintain PCA tubing as the primary line, connecting fluid or medication infusion into PCA tubing.

11. Validate compatibility of medications additives with PCA narcotic prior to connecting into PCA tubing.

12. Flush the PCA narcotic line with normal saline before and after administration of known incompatible or questionable medications.

13. Consult with Medical Control physician for dose adjustment if PCA is not effective in managing pain.

**Phenobarbital**

**Usage:**

For the treatment of generalized tonic-clonic, cortical focal seizures, and the emergency control of acute seizures (tetanus, eclampsia, epilepticus). Also used as a sedative to relieve anxiety.

**Adverse Reactions:**

Agitation, confusion, ataxia, vertigo, respiratory depression, bradycardia, hypotension, syncope, nausea, vomiting, and constipation.

**Contraindications:**

Patients with a known hypersensitivity to barbiturates.

**Equipment Use:**

Administer slowly via patent IV line.

**Standing Orders:**

1. Verify orders, dose, and route of administration.

Revised July 2013
2. For IV administration: do not give more than 60 mg/minute.
3. Monitor for respiratory depression.

**Primacor**
(Milrinone)

**Usage:**
Short-term management of congestive heart failure in patients who have not responded adequately to digitalis, diuretics or vasodilators

Positive inotropic action with vasodilator activity. Reduces after load and preload by direct relaxant effect on vascular smooth muscle. Produces slight enhancement of AV conduction.

Increases myocardial contractility, improves diastolic function.
Effects are dose-related and plasma drug concentration related.
In presence of depressed myocardial function, produces increase CO, decreased PCWP, and decrease vascular resistance without significant increase in heart rate and myocardial oxygen demand.

**Complications/Adverse Reactions:**
Headache, tremor, hypokalemia, increased ectopic activity, PVCs, Supraventricular arrhythmias, ventricular tachycardia, ventricular fibrillation. Hypotension: possible increase in angina symptoms.

**Equipment Maintenance:**
All Primacor drips must be administered via an infusion pump.

**Standing Orders for Administration by Transferring Facility:**
1. Primacor drips will be initiated at the transferring hospital.
2. Verify concentration, dosage rate and VS parameter on physician's order sheet prior to transfer (usual maintenance dose is .375 to .75 mcg/kg/min).
3. Monitor vital signs: B/P, heart rate at least every 15 minutes.
4. Notify Medical Control if the vital signs deviate from the predetermined parameters set forth by the transferring hospital.
5. Measure PR every 30 minutes. Notify Medical Control if PR begins to shorten.

**Propofol**
(Diprivan)

**Usage:**
When sedation is necessary for patients after intubation or patients requiring ventilatory assistance via ET tube or Tracheostomy tube to maintain a sedated level of consciousness during transport.

Revised July 2013
Complications:
Tachycardia or bradycardia
Hypotension
Hypersensitivity

Contraindications:
Patients with a known hypersensitivity to the drug, egg products, or soy products.

Adverse Reactions:
Most adverse reactions are mild and transient with more severe reactions associated with prolonged and high dose use.

Equipment Use:
IV should be infused via infusion pump.

Standing Orders:
1. IV Propofol must be initiated with a written order by the transferring hospital physician.
2. Verify infusion rate, infusion dosage, patient’s weight prior to transfer. Follow orders from transferring physician for dosage. Propofol may be titrated from 5mcg/kg/min to 50 mcg/kg/min for desired sedation.
3. Monitor BP and heart rate continuously. If hypotension occurs, decrease the dose and contact transferring facility or Medical Control as needed.
4. Refer to compatibility chart before infusing any medication through the Propofol line No IV push drugs can be given through a Propofol infusion.
5. If any redness, swelling, tenderness, warmth appears at IV site, discontinue IV after reestablishing a new IV site.

Reopro

Usage:
Adjunct therapy to PTCA for significantly decrease ischemic complications for patients at high risk for closure of treated coronary vessel; used in conjunction with ASA and heparin. Inhibits platelet aggregation and platelet mediation thrombus by preventing the binding of fibrinogen to the glycoprotein II/IIA receptor; the final common pathway for platelet aggregation.

Adverse Reactions:
CV: hemorrhagic stroke Systematic bleeding


McLean County Area EMS System
Critical Care Transport Program

Equipment Use:
Reopro must be infused via infusion pump.

Standing Orders:
1. Reopro infusion must be started at the transferring hospital.
2. Assess H&H, HCB, platelet count, PTT, APTT and ACT if available.
3. Monitor for bleeding.
4. Administer other medications through a separate line.
5. Notify Medical Control if blood pressure is below 90.
6. Dosage should not be changed unless ordered.
7. Monitor B/P, EKG every 15 minutes.

Dosages:

Infusion of 10 mcg/min post initial bolus.
McLean County Area EMS System
Critical Care Transport Program

**Succinylcholine**

**Usage:**
For skeletal muscle relaxant, including respiratory muscles, to facilitate rapid sequence intubation.

**Adverse Reactions:**
Prolonged paralysis, hypotension, and bradycardia.

**Contraindications:**
Patients with a known hypersensitivity to the drug.

**Equipment Use:**
Administered via patent intravenous line.

**Standing Orders:**
Use as indicated in the Rapid Sequence Intubation protocol.

**Thrombolitics**

**Type Utilized:**
- TPA
- TNK
- Retavase

**Usage:**
Acute myocardial infarction or confirmed thrombosis CVA. To dissolve the clot to reduce infarct size thus reducing myocardial muscle damage or significant brain tissue necrosis.

**Complications:**
Bleeding, reperfusion arrhythmias, hypotension, and elevated temperature.

**Adverse Reactions:**
Anaphylactic reaction and hypotension.

**Equipment Use:**
Thrombolytics must be administered via infusion pump.

Revised June 2013
McLean County Area EMS System
Critical Care Transport Program

Standing Orders:

1. Apply EKG monitor
2. Administer oxygen
   a. 4L/min by cannula or
   b. 10-12L/min by mask for marked dyspnea if patient tolerates mask.
3. Thrombolytics must be initiated at the transferring hospital. Dosage regimen and times shall be clearly documented on all patients. (See below)

**TPA**

1. Protocol for infusion (front loaded dosing/mix TPA according to recommendations (100 mg in 100 cc D5W or NS yields 1 mg/cc).
   a. **Weight > 65 kg**
      1) Infuse 15 mg over 1-2 minutes
      2) Then 50 mg over 30 minutes
      3) Then 35 mg over 60 minutes
   b. **Weight < 65 kg**
      1) Infuse 15 mg over 1-2 minutes
      2) Then .75mg/kg over 30 minutes
      3) Then .50 mg/kg over 60 minutes
   c. At the end of the infusion; add 20cc saline chaser to the bag to flush tubing of TPA.

**TNK**

TNK is administered as a single dose at the transferring hospital but its terminal half-life is 41-132 minutes after the initial infusion.

**Retavase**

1. Retavase is administered by two intravenous injections 30-minutes apart. Each of the injections should be administered by the transferring hospital. The half life of this medication is 13 - 16 minutes with normal hepatic and renal clearance.
2. Monitor for any signs/symptoms of bleeding internally or externally. Notify Medical Control physician of any signs of bleeding. Note: A nasogastric tube is contraindicated in patients receiving TPA.
3. Monitor VS including B/P, heart rate, respiratory and neuro status, and document every 15 minutes.
4. Treat re-perfusion arrhythmias per protocols and notify Medical Control physician.
5. Notify Medical Control of any reoccurrence of chest pain.

Revised June 2013
Tier III

Tier III provides the highest level of ground transport care for patients who require nursing level treatment modalities and interventions.

A. Licensure:
   a. Licensed Illinois Paramedic or PHRN:
      i. Expanded scope of practice more comprehensive than USDOT Curriculum and expanded scope Tier I level; and
      ii. Approved to practice by the EMS System and the Department in accordance with the EMS System Plan.

B. Minimum staffing:
   a. EMT-B/I/P (as driver); and
   b. Two critical care prepared providers, who shall remain with the patient at all times:
      i. Paramedic or PHRN; and
      ii. RN

C. Education, Certification, and Experience:
   a. Paramedic or PHRN
      i. Initial Advanced Formal Education;
      ii. Approval to practice by EMS System and the Department in accordance with the EMS Program Plan;
      iii. 80 hours established higher collegiate education or equivalent critical care education based on existing university program models, this program must meet or exceed the University of Maryland Baltimore County (UMBC) Critical Care Paramedic guidelines/curriculum; and
      iv. Approved scope of practice more comprehensive than USDOT Curriculum and expanded scope of practice of Tier II Level.

D. Continuing Education Requirements:
   a. Current certifications shall be maintained;
   b. 12 hours of critical care level education shall be completed annually; and
   c. Shall provide documentation to the EMS Resource Hospital upon request.

E. Certifications – Paramedic or PHRN:
   a. Tier III personnel shall maintain the following renewable critical care certifications and credentials in active status:
      i. ACLS;
      ii. PEPP or PALS; and
      iii. ITLS or PHTLS.

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F. Advanced Certifications (Preferred but not Required):
   a. Certified Emergency Nurse (CEN);
   b. Critical Care Registered Nurse (CCRN);
   c. Critical Care Emergency Medical Technician-Paramedic (CCEMT-P);
   d. Certified Registered Flight Nurse (CFRN); and
   e. Certified Transport Registered Nurse (CTRN).

G. Experience – Paramedic or PHRN:
   a. Minimum of three years experience functioning in the field at an ALS Level;
   b. Documented demonstrated competencies; and
   c. Completion of annual competencies of expanded scope knowledge, equipment and procedures.

H. Education, Certification and Experience – Nurse:
   a. Continuing Education Requirements:
      i. 12 hours of critical care level education shall be completed annually;
      ii. Annual competencies of expanded scope of practice knowledge, equipment and procedures shall be completed; and
      iii. Shall provide documentation to the EMS Resource Hospital upon request.

I. Certifications – Nurse:
   a. Tier III personnel shall maintain the following renewable critical care certifications and credentials in active status:
      i. ACLS;
      ii. PALS, PEPP or ENPC;
      iii. ITLS, PHTLS, TNCC or TNS; and
      iv. ECRN or equivalent.

J. Advanced Certifications (Preferred but not Required):
   a. Certified Emergency Nurse (CEN);
   b. Critical Care Registered Nurse (CCRN);
   c. Critical Care Emergency Medical Technician-Paramedic (CCEMT-P);
   d. Certified Registered Flight Nurse (CFRN); and
   e. Certified Transport Registered Nurse (CTRN).

K. Experience – Nurse:
   a. Two years of experience with demonstrated competency in a critical care setting; and
   b. Documented demonstrated competencies.

L. Medical Equipment and Supplies:

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a. Tier III transport requires nursing level treatment modalities and interventions as agreed upon by the sending physician and the accepting physician at the receiving facility. If either physician is not available for consult, the provider's Medical Director or designee shall direct care.

M. Vehicular Standards:

a. Any vehicle used for providing critical care transport shall comply, at a minimum, with Section 515.830 (Ambulance Licensing Requirements) or Sections 515.900 (Licensure of SEMSV Programs – General) and 515.920 (SEMSV Program Licensure Requirements for All Vehicles) regarding licensure of SEMSV programs and SEMSV vehicle requirements, including additional medical equipment and ambulance equipment as defined in this Section. Any vehicle used for critical care transport shall be equipped with an onboard AC supply capable of operating and maintaining the AC current needs of the required medical devices used in providing care during the transport of a patient.

N. Treatment and Transport Protocols shall address the following:

a. Paramedic or PHRN: EMS Medical Director or designee present at established Medical Control communication points and written Critical Care Standard Operating procedure signed by the EMS MD and approved for use by the Department in accordance with the System Plan;
b. Registered Nurse: The provider's Critical Care Medical Director may establish standing medical orders for nursing personnel, or the RN may be approved to accept orders from the sending physician and/or receiving physician.

O. Quality Assurance Program:

a. The Tier III transport provider shall have a written QA Plan approved by the EMS System and the Department. The provider shall provide quarterly reports to the assigned EMS Resource Hospitals for the first 12 months of operation;
b. The EMS System shall establish the frequency of quality reports after the first year if the System has not identified any deficiencies or adverse outcomes;
c. The EMS System Medical Director shall oversee the QA Program;
d. The QA Plan shall evaluate all expanded scope of practice activity for medical appropriateness and thoroughness of documentation. The review shall include:
   i. Review of transferring physician orders and evidence of compliance with those orders;
   ii. Documentation of vital signs and frequency and evidence that abnormal vital signs or trends suggesting an unstable patient were appropriately detected and managed;
   iii. Documentation of any side effects/complications, including hypotension, extreme bradycardia or tachycardia, increasing chest pain, dysrhythmias, altered mental status and/or changes in neurological examination, and evidence that interventions were appropriate for those events;
   iv. Documentation of any unanticipated discontinuation of a catheter or rate adjustments of infusions, along with rationale and outcome;
   v. Review of any medical control contact for further direction;

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vi. Prompt communication of unusual occurrences to the EMS System; and  

vii. An analysis of any event or care inconsistent with standards. The EMS System educator shall assess and carry out a corrective action plan.  

Tier III  
Treatment and Transport Protocols  

Intra-Aortic Balloon Pump  
(IABP)  

The Intra-aortic balloon pump (IABP) is a mechanical device that increases myocardial oxygen perfusion while at the same time increasing cardiac output. Increasing cardiac output increases coronary blood flow and therefore myocardial oxygen delivery. It consists of a cylindrical polyethylene balloon that sits in the aorta, approximately 2 centimeters (0.79 in) from the left subclavian artery and counter pulsates. That is, it actively deflates in systole, increasing forward blood flow by reducing after load. It actively inflates in diastole, increasing blood flow to the coronary arteries. These actions combine to decrease myocardial oxygen demand and increase myocardial oxygen supply.  

Indications:  
A. Left ventricular failure or cardiogenic shock.  
B. Mechanical complications of Acute MI.  
C. Post MI ventricular irritability.  
D. Unstable angina refractory to medical therapy.  
E. Support for high risk PTCA patients.  
F. Failed PTCA.  
G. Thrombolytic therapy of acute MI.  
H. Failure to wean from cardiopulmonary bypass.  
I. Low-output syndrome.  
J. Stabilization of high risk patients undergoing general anesthesia.  
K. Bridge to heart transplant.  
L. Stunned myocardium.  

Contraindications:  
A. Severe aortic valvular insufficiency.  
B. Aortic dissection.  
C. Severe peripheral vascular disease.  
D. Irreversible brain damage.  

Complications:  
A. Vascular:  
   a. Arterial injury (perforation or dissection).  
   b. Femoral artery thrombosis.  
   c. Peripheral embolization.  

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d. Femoral vein cannulation.

e. Limb ischemia.

f. Visceral ischemia.

B. Balloon:
   a. Perforation.
   b. Tear.
   c. Rupture.
   d. Incorrect positioning.
   e. Gas embolization.

C. Miscellaneous:
   a. Hemorrhage.
   b. Infection.
   c. Entrapment.

**Standing Orders:**

A. Follow written orders of transferring physician.

B. Contact Medical Control of any complications during transport.

**Extracorporeal Membrane Oxygenation**  
*(Ecmo)*

**Indications:**

A. Patients with the following 2 major neonatal diagnoses require the use of ECMO:

1) Primary diagnoses associated with primary pulmonary hypertension of the newborn (PPHN), including idiopathic PPHN, meconium aspiration syndrome, respiratory distress syndrome, group B streptococcal sepsis, and asphyxia.

2) Congenital diaphragmatic hernia (CDH)

**Contraindications:**

A. The failure to meet selection criteria discussed in Indications for Extracorporeal Membrane Oxygenation, above, is a relative contraindication for ECMO.

B. Unlike the situation in neonates, when ECMO is considered in a pediatric patient, no clear set of inclusion or exclusion criteria exists. Evaluation of a pediatric patient for ECMO support is largely based on an assessment of the patient's condition and the institutional experience with pediatric ECMO.

**Complications:**

A. Mechanical:

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1) Clots in the circuit are the most common mechanical complication (19%). Major clots can cause oxygenator failure, consumption coagulopathy, and pulmonary or systemic emboli. More recently, heparin-coated extracorporeal membrane oxygenation (ECMO) systems have been used to decrease the frequency of this complication.

2) Cannula placement can cause damage to the internal jugular vein, which causes massive mediastinal bleeding. Dissection of the carotid arterial intima can lead to lethal aortic dissection.

3) Air in the circuit can range from a few bubbles to a complete venous air lock. This air can originate in the dislodgement of the venous cannula, a small tear in the membrane, or high partial pressure of oxygen in the blood. A large bolus of air can be fatal.

4) Oxygenator failure is defined either as decreased oxygen or carbon dioxide transfer or as the presence of consumptive coagulopathy. A failing membrane should be replaced immediately.

5) Cracks in the connectors and tube rupture have become less serious problems since the introduction of tubing.

6) Pump malfunction may be a manifestation of inadequate venous return to the pump; heat exchanger malfunction can cause severe hypothermia.

7) Failure of the entire circuit, including the oxygen source and oxygen blenders, may occur, as may failure of circuit-monitoring equipment. In cases of circuit failure, immediately clamp the venous line, open the bridge, and clamp the arterial line to remove the patient from the ECMO. Because the patient is ventilator dependent, immediately bag the patient with 100% oxygen (FiO$_2$ =1) or shift the patient back to pre-ECMO ventilator settings.

B. Medical:

1) Neurologic complications include seizures. Intracranial bleeds and infarction may be due to ligation of the carotid artery and internal jugular vein, systemic heparinization, thrombocytopenia, coagulopathies, or systolic hypertension.

2) Hemorrhagic complications include hemorrhages and a decreased platelet count. Hemolysis and consumption coagulopathy may occur. Hemorrhage at the surgical site, at the cannula site, or into the site of a previous invasive procedure is a frequent complication because of systemic heparinization. Intrathoracic, abdominal, or retroperitoneal hemorrhage may also occur. Decreases in the platelet count occur because of decreased production, increased consumption, sequestration, or dilution.

3) Cardiac complications include myocardial stun, which is defined as a decrease in the left ventricular shortening fraction by more than 25% with initiation of ECMO that returns to normal after 48 hours of ECMO. In addition, hypertension is a dangerous complication because of the risk of hemorrhage and stroke. Arrhythmia may occur as a result of hypoxia and electrolyte imbalance. Symptomatic patent ductus arteriosus may occur, as well as pericardial tamponade may occur.

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4) Pneumothorax is a potential pulmonary complication, along with pulmonary hemorrhage.

5) Oliguria is a commonly observed renal complication during the early part of ECMO; acute tubular necrosis is observed in some patients and may require hemofiltration and dialysis.

6) GI tract complications include hemorrhage, which may occur as a result of stress, ischemia, or bleeding tendencies. Direct hyperbilirubinemia and biliary calculi may occur secondary to prolonged fasting and total parenteral nutrition (TPN), hemolysis, and diuretics.

7) Complications may also result from infection and sepsis, because the ECMO circuit represents a large intravascular foreign body, and frequent manipulation increases the risk of sepsis.

8) Metabolic complications include the following:
   a. Acidosis or alkalosis
   b. Hyperkalemia or hypokalemia
   c. Hypernatremia or hyponatremia
   d. Hypercalcemia or hypocalcemia
   e. Hyperglycemia or hypoglycemia
   f. ECMO may alter serum concentration of drugs due to increased volume of distribution. Caution is warranted when narrow therapeutic drugs are administered, and dose alterations may be necessary.

9) Acute cardiorespiratory decompensation may result because of the following:
   a. Pericardial tamponade (from blood or air)
   b. Tension pneumothorax or hemothorax
   c. Respiratory failure
   d. Myocardial ischemia
   e. Electrolyte imbalance
   f. Massive hemorrhage (especially intracranial hemorrhage)
   g. Drug effects
   h. Overwhelming sepsis

**Standing Orders:**

A. Patients on ECMO require close monitoring of fluids and electrolytes. The high-energy requirements should be met using hyperalimentation techniques. The patient's weight increases in the first 1-3 days on ECMO because of fluid retention.

B. Follow written orders of transferring physician.

C. Contact Medical Control of any complications during transport.

*Any medications or procedures not included in this document, Medical Control should be contacted to direct the Tier level of transport.*

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Quality Assurance and Improvement  

To maintain adequate medical oversight and assure quality patient care, treatment provided by Critical Care personnel will be reviewed by the EMS Medical Director through the McLean County Area EMS System office. Critical Care calls will be reviewed for appropriateness of medical care provided, proper use of medications, and success rates for skills, i.e. ET, IV, etc. The calls will also be reviewed to assure the patients were transported by the most effective method.

Quality review plan

For new agencies, year 1 and 2 – review all calls and provide timely feedback when indicated. The EMS Office will provide the agency with an annual quality report.

For established agencies – review all calls with critical skills performed (i.e. RSI) and random audits as deemed necessary by the EMS Medical Director. Timely feedback will be provided as indicated.

RSI QA/QI – All calls in which patients receive rapid sequence induction for endotracheal intubation will be reviewed. The System QA/QI form will be completed by the Critical Care personnel after the call which will document an assessment before and after intubation, justification of the procedure, medication doses, and confirmation method of the ET. The form will be signed by the Critical Care personnel and the RN or MD receiving the patient and submitted with the run report to the EMS Office for review.

All incident reports will be reviewed by the EMS Office and appropriate actions taken as needed.

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## McLean County Area EMS System
### Critical Care Transport Program

<table>
<thead>
<tr>
<th>Medication Name</th>
<th>Tier I</th>
<th>Tier II</th>
<th>Tier III</th>
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<tbody>
<tr>
<td>Fentanyl</td>
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<tr>
<td>Amiodarone</td>
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# McLean County Area EMS System
## Critical Care Transport Program

### Required Medications to be maintained on Critical Care Vehicles

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<th>Medication</th>
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<td>Dilaudid</td>
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<tr>
<td>Etomidate</td>
<td>80 mg</td>
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<tr>
<td>Fentanyl</td>
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<td>40 mg</td>
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<tr>
<td>Succinylcholine</td>
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<tr>
<td>Toradol</td>
<td>120 mg</td>
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<tr>
<td>Propofol (Diprivan)</td>
<td>2 bottles</td>
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</tbody>
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