

SHOSHONE COUNTY EMERGENCY MEDICAL SERVICES

Patient Care Guidelines and Protocols

Approved by: _____



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CCT Protocols

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CRITICAL CARE TRANSFER (CCT) Treatment Protocols

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CCT Program Policy

This Paramedic CCT program policy is designed to provide a higher level of care for interfacility patient transports than possible under the Shoshone County Prehospital Care Protocols. It applies to ground interfacility transports that originate at or end in the Shoshone County EMS Corporation Service area.

I Program Policy

- A. CCT medical director is appointed by the EMS Medical Director (see CCT Medical Director Roles/Responsibilities Protocol).
- B. CCT Supervisor
 - 1. The Agency will have a designated CCT Supervisor.
 - 2. CCT trained EMT-P with two years full time CCT experience
 - 3. Approval of CCT Medical Director
- C. CCT Paramedic
 - 1. Paramedic currently licensed by the Idaho EMS Bureau
 - 2. Employed by an approved ALS provider
 - 3. Successfully completed an approved CCT training program
 - 4. Participated in CCT continuing education and recertification as required by the CCT Medical Director.
 - 5. Cleared CCT Paramedic is known as Senior CCT Paramedic.

Agency Requirements

- A. CCT Supervisor, Medical Director, CCT Training, CCT equipment and personnel are to be provided for and maintained by the agency.
- B. Provide staffing as follows:
 - 1. CCT staffed with one Senior CCT and one paramedic or Ambulance Based Clinician.
- C. Maintain accurate records of personnel licensure, CCT training and clearance status including completion of an SCEMSC approved clinical orientation.
- D. Records must be available to the State EMS or other appropriate regulatory agencies upon request.
- E. Provide reports as deemed necessary by Sate EMS and/or the Medical Director, provide EPCR access to the Medical Director for all reports.
- F. All CCT personnel are expected to follow the procedures and protocols as stated in the policy. If the CCT Medical Director, EMS Medical Director or EMSPC determines that the provider is in violation of the policy, the provider's CCT credentials may be suspended or revoked.

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III Equipment

- A. See CCT Required Equipment List
- B. Narcotics will follow the Shoshone County Prehospital guidelines

IV CCT Training Requirement

- A. Program Faculty
 - 1. CCT Supervisor
 - a. Responsible for supervision of all aspects of the CCT program.
 - b. Participates in selection, training and certification process for CCT paramedics.
 - c. Supervises and assures that education and proficiency requirements are met.
 - d. In conjunction with the CCT provider agency, provides data to CCT medical director.
 - 2. CCT Course Instructor – responsible for coordination and instruction of the CCT training program.
- B. Student Qualifications
 - 1. Fully licensed paramedic and employed by SCEMSC.
 - 2. Two years of experience as a paramedic and approval of SCEMS.
- C. CCT Initial Training Course or approved course.
 - 1. Approved by CCT Medical Director
 - 2. See CCT Curriculum
- D. CCT Paramedic Approval
 - 1. Successful completion of CCT initial training course
 - 2. Successful completion of CCT paramedic test
- E. Senior CCT Paramedic Approval
 - 1. Complete CCT Orientation Checklist and CCT Critical Behaviors Checklist.
 - 2. Complete CCT clinical experience
 - 3. Approval of the CCT Medical Director and CCT Supervisor
 - 4. Completion of a SCEMSC approved PALS course or equivalent.
- F. Recertification
 - 1. In order to maintain clearance as a Senior CCT Paramedic, personnel must staff the CCT on a regular basis. If there has been a significant lapse in an individual's CCT experience they may be reclassified as a CCT Paramedic until approved for Senior CCT status by the CCT Supervisor and CCT Medical Director. Maintain SCEMS-required training competencies.

V CCT Reporting

- A. Each CCT transport will be clearly documented on the CCT EPCR.
- B. EPCR access will be provided for the CCT Supervisor and CCT Medical Director for review as requested.

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VI CCT Procedures

- A. See CCT Transport Capabilities for patients appropriate for CCT. Patients not meeting these capabilities should be transported with additional staff or by alternative transport mechanisms (air medical). Exceptions may be made by agreement between the CCT Paramedic and the CCT Medical Director or designee.
- B. Patient Treatment
 - 1. Transport treatment orders will be determined by the sending physician consistent with CCT transport capabilities.
 - 2. CCT personnel will use CCT treatment protocols for the standard treatment of CCT patients. Contact the CCT Medical Director, the sending or receiving physician or on-line medical direction for any problems.

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Critical Care Unit Transport Capabilities

The Critical Care Unit (CCT) has advanced capabilities to meet your transport needs. The CCT staff has been trained to transport critical but stable patients. Patient care and treatment are provided through State of Idaho approved protocols and 24- hour on call physician medical direction.

If the patient's stability and treatment fall within the following criteria as covered by the CCT's protocols, the CCT will be able to immediately accept your patient. If the patient is outside of these criteria, the CCT staff will contact our on-call physician and discuss whether the CCT is capable of transporting your patient. Usually the CCT is able to transport. However, if the CCT staff and physician decide the patient is outside our capabilities, we will work with you to explore other transport options, among which are having your hospital staff accompany the patient in the CCT, or utilizing helicopter transport.

<u>MEDICATIONS</u>
The following medications are covered by standard protocols, and are pre-approved for transport by the CCT:
<u>Vasoactive Medications</u> - Amiodarone, Dobutamine, Dopamine, Milrinone, Neosynephrine, Nicardipine, Nitroprusside, Nitroglycerin, Norepinephrine.
<u>Beta Blockers</u> - Esmolol, Labetolol
<u>Thrombolytics</u> - Retavase, Streptokinase, TNKase, tPA.
<u>Paralytics</u> - The CCT is able to maintain paralysis with non-depolarizing neuromuscular blockers initiated at the sending facility, with drugs provided by the sending facility.
<u>Other Medications</u> - Other medications covered by protocol – Acetylcysteine, Aggrastat, Amiodarone, Blood products, Cardizem, Heparin, Insulin, Integrilin, Lidocaine, Magnesium Sulfate, Mannitol, Midazolam, Morphine, Nesiritide, Octreotide, Oxytocin, Phenytoin, Procainamide, Propofol, ReoPro, Somatostatin, Valium, and Vasopressin. Other medications not listed above will be reviewed by the CCT on-call physician.

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VENTILATOR PATIENTS

The CCT is equipped with a transport ventilator with multiple capabilities including CPAP and BiPAP. Patients need to be stable on the ventilator or device with appropriate oxygenation. Patients with a PEEP greater than 10 will require review by the CCT on-call physician prior to transport.

ADDITIONAL CAPABILITIES

The CCT has additional capabilities to care for patients with special needs such as maintaining chest tubes, central lines, pacemakers and monitoring invasive line pressures.

PATIENT CONDITION AND STABILITY

The patient must be hemodynamically stable prior to transport.

Our goal is to provide the best and safest transport environment for our patients. While recognizing there is often urgency in transferring a patient to another facility, we see it as essential for safe treatment that a patient be as stable as possible before leaving a facility in a mobile unit.

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CCT Medical Director Role/Responsibilities

The CCT medical director (CCT-MD) will be a physician appointed by the Shoshone County EMS medical director. The CCT-MD will be a board-certified emergency physician actively practicing in Shoshone County. The CCT-MD will be responsible for oversight of the medical operations of the CCT and will provide:

1. 24 hour physician availability for CCT consultation. Both prospective triage evaluation and on-line medical direction are included in this function.
2. Review of all CCT runs providing feedback to the CCT personnel regarding appropriate triage and medical care during the CCT run.
3. Oversight of new CCT personnel training, curriculum, and credentialing of CCT personnel for CCT practice.
4. Oversight of CCT continuing education which will include didactic, practical, and run review formats.
5. Periodic CCT reports to the Medical Control Board.
6. Remediation of CCT personnel, if necessary.
7. Oversight of development of CCT treatment protocols.
8. Oversight of development of procedures for expanding CCT scope of practice.

The CCT-MD will be appointed for a one year term to be renewed at the discretion of the Medical Director and the CCT ambulance provider. This appointment will be a calendar year term with reappointment to coincide with Medical Director contract renewal.

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CCT Required Equipment List

Equipment & Drugs - A cardiac monitor/defibrillator with external pacing is an ALS requirement. The CCT also carries or has access to the following additional equipment:

- 1) Pulse oximeter
- 2) Blood pressure/pulse monitor
- 3) IV infusion pumps
- 4) Portable ventilator
- 5) Two pressure infusion bags
- 6) Cellular telephone
- 7) Glucometer
- 8) Bag-Valve with PEEP attachments
- 9) One CCT Narcotic Medication Box

All anticipated non-narcotic medications needed for the transport are purchased from the sending facility and returned for credit if not used on patient. A standard ALS medication box is available on the ambulance.

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General Protocol for CCT Transports

Complete prior to transport:

1. Obtain a detailed history of patient's present illness prior to initial contact.
2. If available, obtain the most recent 12-lead ECG, ABG, labs and vital signs.
3. Obtain any orders from the sending facility along with any signed appropriate or expected orders (i.e., medications/drip rates; mechanical ventilator settings).
4. Proceed with initial patient contact and perform a physical examination which includes:
 - a) LOC
 - b) Breathing rate, rhythm, compliance and/or ventilator settings.
 - c) Complete vital signs
 - d) Cardiac monitoring
 - e) Oxygen saturation
 - f) IV site status; medication infusions labeled for accuracy; pump settings
5. Initiate CCT equipment interchanges and observe patient for adverse changes.
6. Ventilator patient will be monitored for continuous CO₂ exchange.
 - a) Maintain FI O₂ per sending facility orders.
7. Refer to specific ventilator protocol for additional information. Complete during transport:
8. Patient assessment and vital signs will be performed at 15-30 minute intervals, dependent on patient status. Any abnormality will be addressed immediately per established ALS protocols or by direct contact with medical control.

Examples, but not limited to:

Equipment failure:

 - Ventilators: address all warning tones per manufacturer recommendations. If unable to resolve, and patient shows signs of distress, ventilate patient via BVM with 100% O₂.
 - IV pumps: address alarms by checking IV site following up to the pump. Follow the manufacturer's recommendations.
9. Transfer patient care to the receiving facility. Give a verbal report along with the completed CCT MIR, any applicable paperwork and films from sending facility.

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CCT Chest Pain

Indications: CCT patients with active chest pain or anginal equivalent pain

Administration of Nitroglycerin: Mix nitroglycerin 50 mg in 250ml of normal saline. Begin infusion at 10-20 mcg/min and increase 5-10 mcg, q min, titrating for pain while maintaining systolic BP > 90. Maximum rate of 200 mcg/min.

**Do not use with PVC admin sets or bags.
Do not piggyback or administer any other fluids in same site.**

Dose Ordered (mcg/min)	Amount to infuse in ml/hr	
	50 mg/250 ml 100 mg/500 ml (200 mcg/ml)	100 mg/250 ml 200 mg/500 ml (400 mcg/ml)
10	3 ml/hr	1.5 ml/hr
20	6 ml/hr	3 ml/hr
30	9 ml/hr	5 ml/hr
40	12 ml/hr	6 ml/hr
50	15 ml/hr	8 ml/hr
60	18 ml/hr	9 ml/hr
70	21 ml/hr	10 ml/hr
80	24 ml/hr	12 ml/hr
90	27 ml/hr	14 ml/hr
100	30 ml/hr	15 ml/hr
110	33 ml/hr	17 ml/hr
120	36 ml/hr	18 ml/hr
130	39 ml/hr	19 ml/hr
140	42 ml/hr	21 ml/hr
150	45 ml/hr	23 ml/hr
160	48 ml/hr	24 ml/hr
170	51 ml/hr	26 ml/hr
180	54 ml/hr	27 ml/hr
190	57 ml/hr	29 ml/hr
200	60 ml/hr	30 ml/hr

Contraindications: Hypotension, hypersensitivity

Adverse Effects: Headache, flushing, hypotension, reflex tachycardia, bradycardia

Administration of Morphine: Initial dose 2-6mg IVP. Continue in 2mg increments, q 5 min as needed or until pain is relieved while maintaining systolic BP > 90.

Contraindications: Hypotension, hypersensitivity, suspected head or abdominal injury, non-vented patients with respiratory depression.

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Adverse effects: Respiratory depression, hypotension or bradycardia. **Have naloxone available to reverse effects if necessary.** The hypotensive effects of nitroglycerine are worsened in patients on VIAGRA or similar medications.

CCT Directives:

1. Follow generalized protocol for CCT patients.
2. Maintain vital signs within 5 minutes of administration every 15 minutes when stabilized or pain free.
3. Maintain delivery by IV infusion pump.
4. Continue to reassess patient for symptomatic improvement. Decrease or discontinue NTG if patient develops hypotension.
5. Suggest 325 mg of baby aspirin PO as indicated on all MI patients.

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Chest Tubes

*CCT paramedics will monitor and troubleshoot chest tubes.

Indications: Chest tubes are indicated for pneumothorax, hemothorax and pleural empyema.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Assure that the chest tube(s) is securely fastened to the patient.
3. Check chest tube(s) for patency and proper function prior to transport.
4. Assure that the long flexible tubing is securely fastened to the container that acts as a drainage device, water seal and suction control device. Assure that the tubing is free of kinks.
5. Make note of the fluid and blood levels in the drainage and water seal compartments.
6. Obtain orders as to the water seal level.
7. When suction is used, assure that there is bubbling in the suction control chamber. (If not, check the suction unit).
8. If the water seal fails to stop bubbling after the lung is reinflated or later begins to bubble:
 1. Momentarily clamp the flexible tubing near the chest. If the bubbles quit emanating from the tube while it is clamped, then the problem is either a persistent air leak in the patient's lung or the chest tube is not sealed at the chest wall.
 2. NEVER LEAVE THE CLAMP ON FOR MORE THAN A FEW SECONDS.
 3. Evaluate the insertion site.
 4. Apply occlusive dressings to the site.
 5. Evaluate the patient for distress.
 6. Consult physician immediately if needed.

If the bubbling does not cease during the clamping of the proximal end, then suspect a leak at a connection site in the tubing or the tubing itself.

1. Check all connections and secure with tape.
 2. Seal the leak with occlusive dressing and tape or replace the tubing. When replacing the tubing, remember to clamp the distal end of the chest tube to avoid the formation of a pneumothorax.
1. If water seal device becomes damaged, a temporary water seal can be accomplished by putting flexible tubing into a bottle of sterile saline. Keep this device and tubing below chest level.
 2. To clear clots from the tubing, squeeze the proximal end of the tubing with one hand and with the other below, squeeze the tube, stripping the material down the tube toward the drainage container.
 3. Consult with the physician/staff for the best patient positioning.
 4. If the chest tube is not functioning and a tension pneumothorax is suspected, perform a needle decompression of the affected side.

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Hypotension (Non-Hypovolemic)

Fluid treatment:

Reassure patient and control dysrhythmias. If systolic BP is < 90 mmHg and there is no sign of fluid overload administer a 250 cc NS fluid bolus and reassess. If systolic pressure remains < 90 mmHg and patient still shows no signs of fluid overload, give second fluid bolus of 250 cc of NS and assess again. May be repeated as indicated.

Additional Treatment:

Consider Vasopressors as indicated, Dopamine, Dobutamine, Norepinephrine or Epinephrine per CCT protocol or physician order.

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Ventilators

This protocol deals with considerations for the use of mechanical ventilators during interhospital transports. Typically, respiratory care settings will already have been established by physicians and administered by registered respiratory therapists.

1. Always keep a bag-valve mask (BVM) resuscitator close by in case of ventilator failure.
2. Patient lung sounds should be checked, and tube placement verified via X-ray/CO2 detector.
3. Respiratory status should be established via ABG in newly intubated patients when available. Continuous CO2 detection and monitoring with the pulse oximeter will be used on all patients. If no pulse ox is attainable due to poor circulation, an ABG will be necessary to insure adequate ventilations.
4. Ventilator and circuit must be set up according to manufacturer's recommendations.
5. Patient should be placed on the ventilator approximately 5 minutes prior to departure (to make sure patient tolerates our ventilator well). Adjustments should be made prior to departure. Recommended vent settings: 6-10 cc/kg of ideal body weight. Assist Control (AC), Synchronized Intermittent Mandatory Ventilations (SIMV), and the Non Invasive Positive Pressure Ventilation (NIPPV) techniques - Continuous Positive Airway Pressure (CPAP) and Bilevel Positive Airway Pressure (BiPap) are acceptable modes of operation. Set Positive End Expiratory Pressure (PEEP) and SBP as established by sending facility.
6. Patients not tolerating the ventilator should have airway adequacy rechecked. If okay, patient may be transported using BVM ventilation. If the problem is with the patient and not the ventilator, consider sedation/paralysis prior to departure. For sedation of ventilator patients, administer Versed (Midazolam) 1-2 mg every 5-10 minutes. Discontinue administration of sedative agent when desired sedation is achieved or when SBP is equal to or less than 90 mm Hg.
7. Once the patient is on the ventilator, expiratory volumes must be checked and documented. The values should not exceed 100 cc of air difference, unless the patient has an uncuffed tube.
8. Patient's high and low-pressure alarms can be set by taking the peak inspiratory pressure and adding 15 mmHg for the high value and subtracting 10 mmHg for the low value.
9. If the patient's respiratory status is unstable, contact medical control physician for approval to transport patient (i.e., hospital vent settings with PEEP greater than 20 mmHg).

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Acetylcysteine (Mucomyst)

Indications: Acetaminophen (Tylenol) poisoning

Actions: Antidote for acetaminophen (Tylenol) poisoning

Contra-indications: Hypersensitivity, caution if upper GI bleed risk.

Adverse Effects: Bronchospasm, nausea, vomiting, rash, tachycardia, flushing pruritus.

Administration: Start 150 mg/kg IV x 1 over 60 minutes, then 50 mg/kg IV x 1 over 4 hrs, then 100 mg/kg IV x 1 over 16 hours.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Continue at drip rate determined by the sending facility.
3. Frequently assess for undesirable effects, discontinue drip if adverse reactions occur.

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Amiodarone (Cordarone)

Indicators: Sustained severe ventricular tachycardia, supraventricular tachycardia, atrial fibrillations, ventricular fibrillation not controlled by first-line agents.

Contra-indications: Second or third-degree AV block, bradycardia.

Adverse Effects: Flushing, edema, sinus arrest, hypotension, bradycardia, CHF, dysrhythmias, SA node dysfunction, nausea and vomiting, headache, dizziness, tremors, abdominal pain.

Administration: IV bolus 150 mg over 10 minutes (15 mg/min), then 360 mg over 6 hours (1 mg/min), then 540 mg over the remaining 18 hours (0.5 mg/min).

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain drip per sending facility orders.
3. Discontinue if significant adverse effects occur.

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Blood Administration

Blood administration may be continued by CCT paramedic. If additional units are indicated they may be initiated as ordered by the sending facility.

Indications:

Type and cross for donor units for the following conditions:

1. Obvious large amount of blood loss
2. Active or recent GI bleeding
3. TAA or AAA
4. Hgb < 8 mg/dl or Hct < 25%

Administration of blood (universal donor indicated) may be performed if delay for type and cross is determined to be potentially detrimental to the patient.

Adverse Effects: Consider termination if:

1. Signs of anaphylaxis
2. CP, DIB, decreased BP and bleeding (may suggest hemolytic reaction).
3. Monitor fluid output and color (dark may suggest hemoglobinuria).

Contact sending facility physician, on-call CCT physician or medical control if:

1. Patient becomes febrile, i.e., one or two degrees Fahrenheit above baseline (document temperature at least twice during treatment, once at the sending facility and once before arrival at receiving facility).

Administration

Typically, wide-open for management of shock or hemorrhage, otherwise as per medical direction.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Use large bore tubing (blood Y tube) and catheters in large veins.
3. Warm crystalloid prior to administrations.
4. Use isotonic solution only.
5. Pressure bag may be indicated.

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Cardizem (Diltiazem)

Indications: Control of rapid ventricular response with A-fib/A-flutter or PSVT.

Contra-indications: Allergy, hypotension, second and third-degree heart block or V-tach.

Administration: Initial dose 20 mg (0.25 mg/kg) slow IV push over 2 minutes. Second dose at 25 mg (0.35 mg/kg) slow IV push 15 minutes after first dose, if indicated. DRIP: Start continuous infusion at 5-15 mg/hr.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Give repeat IV boluses of 10 – 20 mg and increase the drip rate in 5 mg increments (up to 15 mg/hr total) as necessary to control heart rate.
3. Discontinue if patient develops hypersensitivity (rash).
4. Consider discontinuation or provide alternative appropriate treatment for hemodynamic instability.

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Dilantin (Phenytoin)

Indications: Seizure disorders, head trauma

Contra-indications: Hypersensitivity, pregnancy, bradycardia

Adverse Effects: Nystagmus and ataxia are early signs of toxicity. May also see cardiac depressant effects including hypotension.

Administration: May be delivered in 0.9% NaCl (Sodium Chloride) ONLY. Adult loading dose is 15-20 mg/kg at a maximum infusion rate of 25 – 50 mg/min.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. May administer as piggy-back in main IV access if fluid is 0.9% NaCl. If not, a second IV must be started in order to deliver medication.
3. Continued seizure activity may require supplemental benzodiazepine.
4. Discontinue if patient develops hypersensitivity (rash) or hemodynamic instability.

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Dobutamine (Dobutrex)

Indications: Patients with non-hypovolemic hypotension or low cardiac output along with pulmonary congestion.

Administration: Mix 250 mg Dobutamine in 250 cc of 0.9% NS or 5% Dextrose in water. Begin administering at 2 mcg/kg/min, titrate to systolic BC > 90 mmHg at lowest possible dose. Maximum dose 20 mcg/kg/min.

Patient Weight

<i>mcg/kg/ min</i>	<i>2.5 kg</i>	<i>5 kg</i>	<i>10 kg</i>	<i>20 kg</i>	<i>30 kg</i>	<i>40 kg</i>	<i>50 kg</i>	<i>60 kg</i>	<i>70 kg</i>	<i>80 kg</i>	<i>90 kg</i>	<i>100 kg</i>
<i>2 mcg</i>			<u>1</u>	<u>2</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>10</u>	<u>11</u>	<u>12</u>
<i>5 mcg</i>		<u>1.5</u>	<u>3</u>	<u>6</u>	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>27</u>	<u>30</u>
<i>10 mcg</i>	<u>1.5</u>	<u>2</u>	<u>6</u>	<u>12</u>	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>
<i>15 mcg</i>	<u>2</u>	<u>5</u>	<u>9</u>	<u>18</u>	<u>27</u>	<u>36</u>	<u>45</u>	<u>54</u>	<u>63</u>	<u>72</u>	<u>81</u>	<u>90</u>
<i>20 mcg</i>	<u>3</u>	<u>6</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>

ml/hr

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Monitor vital signs every 5-10 minutes.
3. Avoid increases in heart rate greater than 10%.
4. If tachyarrhythmia or ventricular ectopy occur, consider decreasing dose.
5. Caution in use in patients with MI, as may increase infarct.
6. If an invasive arterial line monitoring device is present and compatible with CCT equipment, continue monitoring during transport.

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Dopamine (Inotropin)

Indications: Non-hypovolemic hypotension unresolved by fluid challenge.

Administration: Mix 400 mg Dopamine in 250 cc of 0.9% NS or 5% Dextrose in water. Start administering at 5 mcg/kg/min. Increase in 5 mcg/kg/min increments. Titrate until patient's systolic BP is > 90 mmHg or maximum dose of 20 mcg/kg/min is reached (Dopamine is contraindicated in hypovolemia).

Patient Weight

<i>mcg/kg /min</i>	<u>2.5 kg</u>	<u>5 kg</u>	<u>10 kg</u>	<u>20 kg</u>	<u>30 kg</u>	<u>40 kg</u>	<u>50 kg</u>	<u>60 kg</u>	<u>70 kg</u>	<u>80 kg</u>	<u>90 kg</u>	<u>100 kg</u>
<i>2 mcg</i>				<u>1.5</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
<i>5 mcg</i>		<u>1</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>17</u>	<u>19</u>
<i>10 mcg</i>	<u>1</u>	<u>2</u>	<u>4</u>	<u>8</u>	<u>11</u>	<u>15</u>	<u>19</u>	<u>23</u>	<u>26</u>	<u>30</u>	<u>34</u>	<u>38</u>
<i>15 mcg</i>	<u>1.4</u>	<u>3</u>	<u>6</u>	<u>11</u>	<u>17</u>	<u>23</u>	<u>28</u>	<u>34</u>	<u>39</u>	<u>45</u>	<u>51</u>	<u>56</u>
<i>20 mcg</i>	<u>2</u>	<u>4</u>	<u>8</u>	<u>15</u>	<u>23</u>	<u>30</u>	<u>38</u>	<u>45</u>	<u>53</u>	<u>60</u>	<u>68</u>	<u>75</u>

ml/hr

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. If possible, administer through large vein (i.e., antecubital), central line is preferred.
3. Monitor blood pressure every 5-10 minutes.
4. Frequently assess for undesirable effects of increased preload and afterload.
5. Caution in use in patients with MI, as may increase infarct.
6. If an invasive arterial line monitoring device is present and compatible with CCT equipment, continue monitoring during transport.

**Shoshone County EMS Corp
CCT Protocols**

Drug Name: Epinephrine

Trade Name: Adrenalin, Epi

Class:

- Adrenergic Catecholamine
- Sympathomimetic

Indications:

- Hypotension
- Asystole, VF, pulseless VT, PEA

Contraindications:

- None in cardiac arrest, severe anaphylaxis
- Hypersensitivity

Precautions:

- HTN
- Ischemic heart disease
- Cerebrovascular insufficiency
- Deactivated/Precipitates with alkaline solutions (NaHCO₃)
- Will increase myocardial oxygen demand
- Pulmonary edema
- Pregnancy (C)
- Geriatrics
- Protect from light

PEARLS:

- Sodium bicarbonate & Furosemide will inactivate epinephrine, flush line well between administration.
- ET administration should be utilized only until IV access can be established.

Epinephrine Infusion Matrix

Recommended Infusion Rate for Epinephrine		
DOSE mcg/min	1 mg/250 cc with microdrip 4 mcg/ml concentration	1 mg/100 cc Bunitrol 10 mcg/ml concentration
2	30 gtt/min (ml/hr)	12 gtt/min (ml/hr)
3	45 gtt/min (ml/hr)	18 gtt/min (ml/hr)
4	60 gtt/min (ml/hr)	24 gtt/min (ml/hr)
5	75 gtt/min (ml/hr)	30 gtt/min (ml/hr)
6	90 gtt/min (ml/hr)	36 gtt/min (ml/hr)
7	105 gtt/min (ml/hr)	42 gtt/min (ml/hr)
8	120 gtt/min (ml/hr)	48 gtt/min (ml/hr)
9	135 gtt/min (ml/hr)	54 gtt/min (ml/hr)
10	150 gtt/min (ml/hr)	60 gtt/min (ml/hr)

Shoshone County EMS Corp
CCT Protocols

To calculate a **pediatric** epinephrine drip, a simple formula for children uses **0.6** multiplied by the child's weight in kg. This amount (in mg) is then added to enough IV solution to equal a total of 100 ml.

When the resulting solution is infused at a rate of 1ml/hr, it will deliver a dosage of 0.1 mcg/kg/min. 2mcg/kg/min. is 2 ml/hr.

Rule of 6 quick reference

KG	1	2	4	6	8	10	12	14	16	18	20
Pounds	2.2	4.4	6.6	8.8	17.6	22	26.4	30.8	35.2	39.6	44
Epi added to buritrol	0.6	1.2	1.8	2.4	4.8	6.0	7.2	8.2	9.6	10.8	12.0

KG	22	24	26	28	30	32	34	36	38	40
Pounds	48.4	52.8	57.2	61.6	66	70.4	74.8	79.2	83.6	88
Epi added to buritrol	13.2	14.4	15.6	16.8	18.0	19.2	20.4	21.6	22.8	24.0

KG	42	44	46	48	50	52	54	56	58	60
Pounds	92.4	96.8	101.2	105.6	110	114.4	118.8	123.2	127.6	132
Epi added to buritrol	25.2	26.4	27.6	28.8	30.0	31.2	32.4	33.6	34.8	36.0

**Shoshone County EMS Corp
CCT Protocols**

Esmolol (Brevibloc)

Indications: Rapid control of SVT, atrial fibrillation or flutter.

Contra-indications: Should not be given to patients with COPD or cardiac conduction abnormalities (second or third degree heart block) or in the presence of hypotension, shock or bronchospasm.

Adverse Effects: Hypotension, bradycardia, bronchospasm

Administration: Mixing instructions: 5 grams in 500ml, 5% dextrose or 0.9% normal saline.
Loading dose of 500 mcg/kg over 1 minute followed by infusion of 50 mcg/kg/min. If no therapeutic effect after 5 minutes, may repeat loading dose and increase infusion to 100 mcg/kg/min. This sequence may be repeated every 5 minutes to a maximum infusion of 200 mcg/kg/min.

Patient Weight

<i>mg/kg/min</i>	<u>40 kg</u>	<u>50 kg</u>	<u>60 kg</u>	<u>70 kg</u>	<u>80 kg</u>	<u>90 kg</u>	<u>100 kg</u>	<u>110 kg</u>	<u>120 kg</u>
<u>50 mcg</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>27</u>	<u>30</u>	<u>33</u>	<u>36</u>
<u>100 mcg</u>	<u>24</u>	<u>30</u>	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>	<u>66</u>	<u>72</u>
<u>150 mcg</u>	<u>36</u>	<u>45</u>	<u>54</u>	<u>63</u>	<u>72</u>	<u>81</u>	<u>90</u>	<u>99</u>	<u>108</u>
<u>200 mcg</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>	<u>132</u>	<u>144</u>

ml/kg

CCT Directives:

1. Follow protocol for generalized CCT transports.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor vital signs every 5 minutes.
4. Discontinue if patient develops hypotension, bradycardia, bronchospasm.

Shoshone County EMS Corp
CCT Protocols

***Glycoprotein IIb/IIIa Receptor Antagonist for Acute
Coronary Syndromes***

Indications: In combination with Heparin for the treatment of acute coronary syndromes, including unstable angina and non Q-wave AMI and for those patients who are to be managed medically and those undergoing PTCA or atherectomy.

Contra-indications:

1. Known hypersensitivity.
2. Active internal bleeding or a history of significant bleeding within the previous 30 days.
3. History of intracranial hemorrhage, intracranial neoplasm, arteriovenous malformation or aneurysm.
4. History of thrombocytopenia following prior exposure to Aggrastat, Integrilin or ReoPro.
5. History of CVA within 30 days or any history of hemorrhagic stroke.
6. Major surgical procedure or severe physical trauma within previous month.
7. History, symptoms or findings suggestive of aortic dissection.
8. Severe HTN (systolic BP > 180 mmHg and/or diastolic BP > 110 mmHg).
9. Concomitant use of another parenteral IIb/IIIa inhibitor.

Adverse Effects: Bleeding, edema/swelling, hypotension, bradycardia, pain, dizziness, sweating, nausea.

Administration: All may be used with ASA and Heparin

Integrilin (Eptifibatide): IV bolus 180 mcg/kg, then continuous IV infusion of 2 mcg/kg/min, up to 72 hours.

Aggrastat (Tirofiban): IV 0.4 mcg/kg/min for 30 minutes then 0.1 mcg/kg/min; give 2 dose in renal disease.

ReoPro (Abciximab): IV 250 mcg (0.25 mg) /kg bolus, then continuous IV infusion of 10 mcg/min for up to 12 hours. CCT Directives:

1. Follow generalized protocol for CCT transport.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor V/S every 5-10 min.
4. Discontinue after notifying appropriate medical facility if patient develops severe hypotension, active bleeding or hypersensitivity.

**Shoshone County EMS Corp
CCT Protocols**

Heparin

Indications: Acute myocardial infarction, pulmonary embolism, deep vein thrombosis (DVT), disseminated intravascular coagulation (DIC).

Contra-indications: Active bleeding, known or suspected intracranial hemorrhage, chronic renal failure, recent surgery or other significant risk for bleeding such as thrombocytopenia or hemophilia. Patients who have already received Lovenox (1.5 mg/kg wait 24 hours. 1 mg/kg or less wait 12 hours).

Administration: Recommended mixing instructions are 25,000 units mixed into 250 cc of NS. For suspected cardiac patients: Initial bolus is 60 units/kg IVP followed by an infusion of 12 units/kg/hr. For all other patients: Initial bolus is 70 units/kg IVP followed by an infusion of 16 units/kg/hr. CCT Directives:

1. Following generalized protocol for CCT transports.
2. Consider stopping infusion if patient develops signs of bleeding such as petechiae or bruising, hematemesis, bleeding from the gums, epistaxis, sudden tachycardia or hypotension.
3. Concurrent use of oral anticoagulant, thrombolytic and salicylates or IIb/IIIa antagonist can increase risks of bleeding.
 - a. Suggest a heparin drip on all post-thrombolytic patients.
 - b. Suggest 325 mg of baby aspirin PO as indicated on all MI patients.
 - c. Suggest running all heparin drips at 12 U/kg/hr when indicated.
 - d. Suggest a heparin drip on all cardiac patients when indicated.

HEPARIN DOSING CHART		
STRENGTH:	25,000 units in 250 mL of NS	25,000 units in 500 mL of NS
DOSE ORDERED:	INFUSION RATE	
500 units	5 mL/hr	10 mL/hr
600 units	6 mL/hr	12 mL/hr
700 units	7 mL/hr	14 mL/hr
800 units	8 mL/hr	16 mL/hr
900 units	9 mL/hr	18 mL/hr
1000 units	10 mL/hr	20 mL/hr
1100 units	11 mL/hr	22 mL/hr
1200 units	12 mL/hr	24 mL/hr
1300 units	13 mL/hr	26 mL/hr
1400 units	14 mL/hr	28 mL/hr
1500 units	15 mL/hr	30 mL/hr
1600 units	16 mL/hr	32 mL/hr
1700 units	17 mL/hr	34 mL/hr
1800 units	18 mL/hr	36 mL/hr
1900 units	19 mL/hr	38 mL/hr
2000 units	20 mL/hr	40 mL/hr

Shoshone County EMS Corp
CCT Protocols

Insulin

<u>Indications</u>	Hyperglycemia, ketoacidosis
<u>Contra-indications:</u>	Hypersensitivity to particular insulin formulation.
<u>Adverse Effects:</u>	Hypoglycemia
<u>Administration:</u>	As per physician orders; typically initial bolus of 0.1 units/kg bolus IV push (6 – 10 units) followed by infusion of 0.05 – 0.1 units/kg/hr (2-10 units/hr).

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Check glucose every 15 – 30 minutes.
3. As blood glucose level moves below 250 mg/dl, change IV fluid to D5 0.9 NS at 5 ml per kg per hour not to exceed 200 ml per hour.
4. If blood glucose level moves below 150 mg/dl, despite the treatment in # 3, decrease the insulin drip to one half of the previous rate.
5. If developing signs of hypoglycemia (glucose < 60 mg/dl), administer Dextrose 50%, 25 g (50 ml) IV and recheck glucose in 5 minutes.
6. Discontinue insulin drip if unable to maintain glucose > 60 mg/dl or if patient develops signs of hypersensitivity.
7. Initiate a second IV line when using an insulin drip due to its incompatibility with many drugs.

Shoshone County EMS Corp
CCT Protocols

Labetolol (Normodyne, Trandate)

Indications: Hypertension

Contra-indications: Bronchial asthma, overt cardiac failure, greater than first-degree heart block, cardiogenic shock, severe bradycardia, hypotension, hypersensitivity.

Adverse Effects: Bradycardia, hypotension, dizziness, ventricular arrhythmias, bronchospasm.

Administration: Initial infusion, 20 mg IV over 2 minutes. Repeat injections of 40 to 80 mg every 10 minutes until maximum dosage of 300 mg is reached.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor vital signs every 5-10 minutes.
4. Discontinue and notify appropriate medical direction facility if patient develops severe hypotension, bradycardia, bronchospasm or hypersensitivity occurs.

Shoshone County EMS Corp
CCT Protocols

Magnesium Sulfate

Indications: Seizure prevention or control in severe pre-eclampsia or eclampsia.

Contra-indications: Do not give in toxemia of pregnancy during the 2 hours preceding delivery.

Adverse Effects: Flushing, sweating, hypotension, depressed reflexes, respiratory paralysis, increased PR interval, heart block.

Administration: Initial dose 2-4 gms IV, infusion 1-4 gms/hr. CCT

Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain drip per sending facility orders.
3. Discontinue if significant adverse effects occur.

Shoshone County EMS Corp
CCT Protocols

Mannitol (Osmitol)

Indications: Adjunct in the treatment of acute oliguric renal failure. Adjunct in the treatment of cerebral edema. Reduction in intracranial or intraocular pressure.

Contra-indications: Hypersensitivity, anuria, dehydration, active intracranial bleeding.

Administration: **Cerebral edema, oliguric renal failure:** 50-100 g IV as a 5-25% solution. May precede with a test dose of 0.2 g/kg over 3-5 minutes.
Reduction of intracranial or intraocular pressure: IV, 0.25-2 g/kg as a 15-25% solution over 30-60 minutes.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Administer as ordered unless significant adverse effects occur.

**Shoshone County EMS Corp
CCT Protocols**

Milrinone (Corotrope, Primacor)

Indications: Short-term management of congestive heart failure. Contra-

indications: Hypersensitivity.

Adverse Effects: Headache, ventricular arrhythmias

Administration: Initial IV loading dose of 50 mcg/kg over 10 minutes followed by an infusion of 0.375 - 0.75 mcg/kg/min. (mix 20mg Milrinone in 80 ml/D5W). Maximum dose 1.13 mg/kg/day.

Patient Weight						
<i>mcg/kg/min</i>	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
<i>0.375 mcg</i>	<u>5.6</u>	<u>6.8</u>	<u>7.9</u>	<u>9</u>	<u>10.1</u>	<u>11.3</u>
<i>0.5 mcg</i>	<u>7.5</u>	<u>9</u>	<u>10.5</u>	<u>12</u>	<u>13.5</u>	<u>15</u>
<i>0.625 mcg</i>	<u>9.4</u>	<u>11.3</u>	<u>13.1</u>	<u>15</u>	<u>16.9</u>	<u>18.8</u>
<i>0.75 mcg</i>	<u>11.3</u>	<u>13.5</u>	<u>15.8</u>	<u>18</u>	<u>20.3</u>	<u>22.5</u>

ml/hr

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor vital signs every 5-10 minutes.
4. Discontinue and notify appropriate medical direction facility if patient develops severe hypotension or hypersensitivity occurs.
5. If an invasive arterial line monitoring device is present and compatible with CCT equipment, continue monitoring during transport.

Shoshone County EMS Corp
CCT Protocols

Morphine Sulfate

Indications: Severe pain, chest pain, analgesic in patients receiving paralytics.

Contra-indications: Hypersensitivity history, suspected head or abdominal injury, non-vented patients with respiratory depression, hypotension.

Adverse Effects: Respiratory depression, hypotension or bradycardia. **Have naloxone available to reverse effects if necessary.**

Administration: Initial dose of 2-5 mg IVP. Continue in 2 mg increments PRN until pain is relieved or until signs of respiratory depression occur.
DRIP: 250 mg/250 ml or 500 mg/250 ml concentration, titrate to effect.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Reassess vital signs within 5 minutes of administration.
3. Have naloxone (Narcan) available to reverse effects if necessary.

**Shoshone County EMS Corp
CCT Protocols**

Nesiritide (Natreacor)

Indications: Acutely decompensated congestive heart failure patients who have dyspnea at rest or with minimal activity.

Contra-indications: Hypersensitivity to any of its components and it should be avoided in patients suspected of having, or known to have, low cardiac filling pressure. **Nesiritide should not be used as primary therapy for patients with known cardiogenic shock or patients with SBP less than 90mmHg.**

Adverse Effects: Prolonged hypotension (mean duration of greater than 2 hours in length).

Administration: Initial bolus of 2 mcg/kg (over 60 seconds) followed by an infusion of 0.01mcg/kg/min. ***Nesiritide should not be titrated. If hypotension is observed discontinue infusion*** (mix 1.5mg of reconstituted Nesiritide in 250ml D5W or 0.9%NS. this will give you a concentration of 6 mcg/ml).

Patient Weight						
	60kg	70kg	80kg	90kg	100kg	110kg
<i>Bolus (ml/60sec)</i>	20	23.3	26.7	30	33.3	36.7
	60kg	70kg	80kg	90kg	100kg	110kg
<i>inf. rate (ml/hr)</i>	6	7	8	9	10	11

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor vital signs every 5-10 minutes.
4. Discontinue and notify appropriate medical direction facility if patient develops severe hypotension or hypersensitivity occurs.
5. If an invasive arterial line monitoring device is present and compatible with CCT equipment, continue monitoring during transport.

Shoshone County EMS Corp
CCT Protocols

Nicardipine (Cardene)

Indications: Acute hypertension resulting in medical emergencies such as subarachnoid hemorrhage, aortic dissection or other medical indication requiring acute blood pressure control. Nicardipine hydrochloride (Cardene® IV) is indicated for the short-term treatment of hypertension.

Contra-indications:

Allergy to Nicardipine (Cardene® IV). Nicardipine hydrochloride (Cardene® IV) is contraindicated in patients with advanced aortic stenosis because part of the effect of Cardene IV premixed injection is secondary to reduced afterload. Reduction of diastolic pressure in these patients may worsen rather than improve myocardial oxygen balance.

Administration:

Nicardipine (Cardene) 50 mg in 250 ml NS (0.2 mg/ml) starting at 5mg/hr (25 ml/hr) IV infusion. Titrate to effect by increasing the rate of administration by 2.5 mg/hr every 5 minutes to a maximum of 15 mg/hr until desired blood pressure reduction is achieved.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Increased by 2.5 mg/hr every 5 minutes (for rapid titration) to 15 minutes (for gradual titration) up to a maximum of 15.0 mg/hr, until desired blood pressure reduction is achieved.
3. Reduce infusion rate by 2.5 mg/hr every 5 minutes if blood pressure is reduced by more than 20 mmHg systolic below the target blood pressure until return of control to near target level is obtained.
4. Discontinue if patient develops hypersensitivity (rash) or hemodynamic instability.

**Shoshone County EMS Corp
CCT Protocols**

Nitroglycerin (Nitro-Bid IV, Nitrostat IV, Tridil)

Indications: Angina, acute MI, CHF with pulmonary edema

Contra-indications: Hypotension, hypersensitivity, recent Viagra or similar medication use

Adverse Effects: Headache, flushing, hypotension, reflex tachycardia, bradycardia

Administration: **ORAL:** 0.4 mg tab sublingual, may repeat every 5 minutes to a maximum of 3 doses. **DRIP: Mix 50 mg Nitroglycerin in 250 ml of NS.** Start infusion at 10-20 mcg/min and increase by 5-10 mcg/min every 5 minutes, titrating for pain and symptomatic relief while maintaining systolic BP > 90. Maximum rate of 200 mcg/min.

Dose Ordered (mcg/min)	Amount to infuse in ml/hr	
	50 mg/250 ml 100 mg/500 ml (200 mcg/ml)	100 mg/250 ml 200 mg/500 ml (400 mcg/ml)
10	3	1.5
20	6	3
30	9	5
40	12	6
50	15	8
60	18	9
70	21	10
80	24	12
90	27	14
100	30	15
110	33	17
120	36	18
130	39	19
140	42	21
150	45	23
160	48	24
170	51	26
180	54	27
190	57	29
200	60	30

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Monitor vital signs every 5 minutes during titration, every 15 minutes when held at a stable dose.
3. Maintain appropriate delivery by IV infusion pump.
4. Continue to reassess patient for symptomatic improvement. Decrease or discontinue infusion if patient develops severe adverse effects.

**Shoshone County EMS Corp
CCT Protocols**

Nitroprusside (Nitropress)

Indications: Hypertensive emergencies including stroke, aortic dissection, acute MI, CHF.

Contra-indications: Compensatory hypertension. Extreme caution indicated in use with patients with renal or hepatic insufficiency.

Adverse Effects: Hypotension, tachycardia, thiocyanate and cyanide toxicity found especially in patients with renal or hepatic insufficiency: Thiocyanate toxicity may be seen by tinnitus, blurred vision and delirium.

Administration: Infusion of 0.5 to 10 mcg/kg/min. (mix 50 mg Nitroprusside in 250 ml/D5W) titrated carefully to desired effect.

Patient Weight								
<u>mcg/min</u>	<u>30 kg</u>	<u>40 kg</u>	<u>50 kg</u>	<u>60 kg</u>	<u>70 kg</u>	<u>80 kg</u>	<u>90 kg</u>	<u>100kg</u>
<u>0.5 mcg</u>	<u>4.5</u>	<u>6</u>	<u>7.5</u>	<u>9</u>	<u>10</u>	<u>12</u>	<u>14</u>	<u>15</u>
<u>1 mcg</u>	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>27</u>	<u>30</u>
<u>2 mcg</u>	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>
<u>4 mcg</u>	<u>26</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
<u>8 mcg</u>	<u>72</u>	<u>96</u>	<u>120</u>	<u>144</u>	<u>166</u>	<u>192</u>	<u>216</u>	<u>240</u>
<u>10 mcg</u>	<u>90</u>	<u>120</u>	<u>150</u>	<u>180</u>	<u>210</u>	<u>240</u>	<u>270</u>	<u>300</u>

ml/hr

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain appropriate delivery by IV infusion pump.
3. Monitor vital signs every 5 minutes.
4. Solution bag should be wrapped in foil due to light sensitivity.
5. If an invasive arterial line monitoring device is present and compatible with CCT equipment, continue monitoring during transport.

Shoshone County EMS Corp
CCT Protocols

Norepinephrine (Levophed)

Indications: Acute hypotension, shock

Contra-indications: Hypersensitivity, ventricular fibrillation, tachy-dysrhythmias.

Adverse Effects: Dizziness, palpitations, tachycardia, HTN, PVC=s, angina, nausea, vomiting, necrosis, tissue sloughing with extravasation, dyspnea, decreased urine output.

Administration: 2 - 30 mcg/min IV infusion. Titrate until patient=s systolic BP is > 90 mmHg. (Norepinephrine is contra-indicated in hypovolemia).

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. If possible, administer through large vein (i.e., antecubital), central line is preferred. A second peripheral line of NS or LR is also preferred.
3. Monitor blood pressure every 5-10 minutes.
4. Frequently assess for undesirable effects of increased preload and afterload.
5. Caution in use with patients with MI, as may increase infarct.

Shoshone County EMS Corp
CCT Protocols

Oxytocin (Pitocin) and Related Medications

These drugs act to cause smooth muscle contraction and are used as drips to control bleeding. Vasopressin, Octreotide Acetate, and Somatostatin are related medications.

Indications: Control of postpartum hemorrhage or bleeding from esophageal varices. Adverse

Effects: Hypertension. May see tachycardia, hypotension in patient with heart disease.

Administration: As per medical direction, usually 10-40 U/min for Pitocin. CCT

Directives:

1. Follow generalized protocol for CCT transports.
2. Monitor vital signs every 10 minutes.
3. Be aware of shock in the presence of ongoing hemorrhage.
4. Titrate as indicated for worsening hemorrhage or development of adverse effects such as severe hypertension.

Shoshone County EMS Corp
CCT Protocols

Paralytics: Non-Depolarizing Neuromuscular Blockers (NDMB)

Patients who are on non-depolarizing neuromuscular blockers (NDMB-s) initiated at the sending facility may be transported by CCT paramedics. Recurrent bolus or drip administration as ordered by the sending facility may be continued during transport.

Indications: Muscular paralysis, either for pre-intubation induction or continued paralysis of intubated patients.

Adverse Effects: Duration of action of pancuronium and vecuronium will be extended in patients with hepatic or renal disease. NDMB effects will also be potentiated with hypothermia, dehydration, respiratory acidosis, hypokalemia. Effects of NDMB-s will be decreased in the presence of respiratory alkalosis and decreased peripheral perfusion.

Administration:

	<u>Adult</u>	<u>Pediatric</u>
Vecuronium:	0.1-0.15 mg/kg IV	same
Pancuronium:	0.1 mg/kg IV	same
Atracurium:	0.5 mg/kg IV (age > 2)	0.3-0.4 mg/kg IV (age < 2)
Rocuronium:	0.6-1.2 mg/kg IV	N/A

CCT Directives:

1. NDMB-s will be used only on intubated patients.
2. Assess frequently for correct tube position and adequate ventilation. Continuous pulse oximetry and CO2 detection is mandatory.
3. Monitor vital signs every 10 minutes.
4. Assess need for additional sedation or re-dosage of NDMB frequently.
5. Re-dose as indicated.

RSI cleared CCT paramedics may use the RSI procedure as outlined in Shoshone County EMS Field Care Protocols.

Shoshone County EMS Corp
CCT Protocols

Phenylephrine (Neosynephrine)

Indications: Shock, Spinal shock, spinal anesthesia

Actions: Stimulates smooth muscle alpha adrenergic receptors

Contra-indications: Hypersensitivity, severe hypertension, ventricular tachycardia (Phenylephrine is generally contraindicated in hypovolemia).

Adverse Effects: Arrhythmia, AMI, Asthma exacerbation.
Hypertension, tachycardia, palpitations, headache, PVC-s, arrhythmias, tissue necrosis, excitability.

Administration: 100 – 180 mcg/min IV infusion. Titrate until patient's systolic BP is > 90 mmHg or meets treatment goals. Maintenance IV drip is 40 – 60 mcg/min. CCT

Directives:

1. Follow generalized protocol for CCT transports.
2. If possible, administer through large vein (i.e., antecubital), central line is preferred. A second peripheral line of NS is also preferred.
3. Titrate drip to meet treatment goals.
4. Monitor blood pressure every 5-10 minutes.
5. Frequently assess for undesirable effects, decrease or discontinue drip if adverse reactions occur.
6. Caution in use with patients with MI, as may increase infarct.

Shoshone County EMS Corp
CCT Protocols

Procainamide Hydrochloride (Pronestyl)

- Indications:** VT, SVT, V-Fib, Ventricular Arrhythmia
- Contra-indications:** Hypotension, known hypersensitivity to procainamide or any other local anesthetic of the amide type, second or third degree AV block unless an electrical pacemaker is operative, torsades de pointes, myasthenia gravis, systemic lupus erythematosus.
- Adverse Effects:** Hypotension, QT prolongation, QRS widening, confusion, tachycardia, torsade de pointes, and systemic lupus erythematosus.
- Administration:** **LOAD:** 17mg/kg (or 1g) administered no faster than 20-30 mg/min. Discontinue if QRS interval increases by 50%, hypotension occurs, arrhythmia ceases or total of 1g is given.
MAINTENANCE: Mix 1g Procainamide in 250 ml of NS or D5W. 1-6 mg/min or 1-2.7 mg/kg/hr.

dose (mg/min)	rate ml/hr	Dose (mg/min)	rate ml/hr	dose (mg/min)	Rate ml/hr
1 mg/min	16 ml/hr	3 mg/min	46 ml/hr	5 mg/min	76 ml/hr
1.5 mg/min	22 ml/hr	3.5 mg/min	52 ml/hr	5.5 mg/min	82 ml/hr
2 mg/min	30 ml/hr	4 mg/min	81 ml	6 mg/min	90 ml/hr
2.5 mg/min	38 ml/hr	4.5 mg/min	84 ml		

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Monitor vital signs every 5 minutes during titration, every 15 minutes when held at a stable dose.
3. Maintain appropriate delivery by IV infusion pump.
4. Continue to reassess patient for symptomatic improvement. Decrease or discontinue infusion if patient develops severe adverse effects.

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Propofol (Diprivan)

Indications: IV sedative-hypnotic agent

Contra-indications: Hypersensitivity (including egg lecithin, soybean oil and glycerol).

Adverse Effects: Bradycardia, hypotension, hypertension, decreased cardiac output.

Administration: For sedation: Initial infusion, (mix 1gm Propofol in 100 ml NS or 500mg in 50 ml NS), 5 mcg/kg/min for 5 minutes. Increase rate in increments of 5 to 10 mcg/kg/min until desired level of sedation is achieved. Rates of 5 to 50 mcg/kg/min or higher may be required. An initial bolus of 0.5 mg/kg may be given over one minute if rapid initial sedation is desired.

Patient Weight

<i>mcg/kg/min</i>	35 kg	40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	90 kg	100 kg
<i>5 mcg</i>	1.05	1.2	1.35	1.5	1.65	1.8	1.95	2.1	2.25	2.4	2.7	3
<i>10 mcg</i>	2.1	2.4	2.7	3	3.3	3.6	3.9	4.2	4.5	4.8	5.4	6
<i>20 mcg</i>	4.2	4.8	5.4	6	6.6	7.2	7.8	8.4	9	9.6	10.8	12
<i>30 mcg</i>	6.3	7.2	8.1	9	9.9	10.8	11.7	12.6	13.5	14.4	16.2	18
<i>40 mcg</i>	8.4	9.6	10.8	12	13.2	14.4	15.6	16.8	18	19.2	21.6	24
<i>50 mcg</i>	10.5	12	13.5	15	16.5	18	19.5	21	22.5	24	27	30
<i>60 mcg</i>	12.6	14.4	16.2	18	19.8	21.6	23.4	25.2	27	28.8	32.4	36
<i>70 mcg</i>	14.7	16.8	18.9	21	23.1	25.2	27.3	29.4	31.5	33.6	37.8	42
<i>80 mcg</i>	16.8	19.2	21.6	24	26.4	28.8	31.2	33.6	36	38.4	43.2	48
<i>90 mcg</i>	18.9	21.6	24.3	27	29.7	32.4	35.1	37.8	40.5	43.2	48.6	54
<i>100 mcg</i>	21	24	27	30	33	36	39	42	45	48	54	60

ml/hr

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Maintain appropriate delivery rate by IV infusion pump.
3. Monitor vital signs every 5-10 minutes.
4. Discontinue and notify appropriate medical direction facility if patient develops severe hypotension, bradycardia or hypersensitivity occurs.

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Thrombolytics

Indications: Evolving acute MI, ideally within 6 hours of onset, with diagnostic ECG changes. For stroke, tPA may be indicated for certain patients. tPA must be given within 3 – 4.5 hours of the onset of CVA symptoms. Treatment decision will be made by the sending facility.

Contra-indications:

1. Allergy to agents
2. Any predisposition to or active bleeding, including recent surgery or stroke, trauma.
3. Severe hypertension
4. Pregnancy
5. Additional contraindications may be facility specific. Treatment decision will be made by the sending facility.

Precautions:

Complications may develop in patients with internal (occult) hemorrhage, multiple needle puncture sites, severe hepatic or renal insufficiency. Be aware of the potential for reperfusion dysrhythmias in AMI patients treated with thrombolytics.

Administration for AMI:

1. Streptokinase: 1.5 million units in 50 ml 0.9% NaCl IV over 30-60 minutes as BP tolerates.
2. tPA: Initial 15 mg is given as bolus, then 0.75 mg/kg (not to exceed 50 mg) is given over 30 minutes followed by 0.5 mg/kg (not to exceed 35 mg) is given over 30 minutes. A total dose not to exceed 100 mg.
3. Retavase: Double bolus injection of 10 units over 2 minutes followed by a second 10-unit bolus over 2 minutes, 30 minutes after the start of the first bolus.
4. TNKase (Tenecteplase): Single bolus injection over 5 seconds. If patient is **<60kg administer 30 mg**, >60kg to <70kg administer 35 mg, **>70kg to < 80kg administer 40 mg**, > 80kg to <90kg administer 45 mg, **>90kg administer 50 mg**.
5. These are recent dosing recommendations. As these may change or the dosing used may differ at various sending facilities, when continuing thrombolytic drips for transport, use dosing regimes prescribed by the sending facility.

Administration for Stroke:

1. tPA: (0.9 mg/kg is the total dose, max 90 mg). 10% is given as a bolus over 1 minute. 90% is given as an infusion over 1 hour.

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CCT Directives for AMI:

1. Follow generalized protocol for CCT transports.
2. Maintain at least 2 open IV lines during administration.
3. Administer repeat bolus of Retavase if ordered at 30 minutes following first bolus.
4. Avoid unnecessary punctures and minimize patient handling.
5. Heparin 60 U/kg bolus followed by 12 U/kg/hr infusion should be give ASAP in conjunction with thrombolytic administration.
6. Discontinue thrombolytic if patient develops hypotension or active bleeding (i.e., bleeding gums, spontaneous petechiae or bruising, hematemesis, epistaxis).

CCT Directives for Stroke treated with tPA:

1. Follow generalized protocol for CCT transports.
2. Maintain at least 2 open IV lines during administration.
3. Perform neuro checks every 15 minutes. Assess LOC, facial movement, arm and leg function. Inform the receiving facility promptly of significant change.
4. Maintain systolic BP (SBP) less than 180 mmHg, diastolic BP (DBP) less than 105 mmHg. If SBP is greater than 180 mmHg or DBP is greater than 105 mmHg, control the BP with Labetolol, nicardipine or sodium nitroprusside as determined by the sending facility. Consider obtaining medication for BP control from the sending facility when indicated.
5. If using Labetolol, administer Labetolol 10 mg IV over 1 – 2 minutes. Repeat with increasing doses of 10 – 40 mg every 10 – 20 minutes as needed for BP control. Labetolol may also be used as an infusion of 2 – 6 mg/min.
6. If using nicardipine or sodium nitroprusside follow appropriate CCT protocol for treatment guidelines.
7. Avoid unnecessary punctures and minimize patient handling.
8. Discontinue thrombolytic if patient develops hypotension or active bleeding (i.e., bleeding gums, spontaneous petechiae or bruising, hematemesis, epistaxis).

Shoshone County EMS Corp
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Valium (Diazepam)

Indications: Seizures, status epilepticus, muscle spasms, acute ETOH withdrawal, anxiety, precardioversion.

Contra-indications: Know allergy, hypotension

Adverse Effects: Respiratory depression, apnea, hypotension

Administration: **Seizures:** 5-10 mg slow IVP up to 30 mg at 5 minute intervals.
Anxiety: 2-5 mg slow IVP, 5-10 mg slow IVP for severe anxiety.
Precardioversion: 2-5 mg IVP.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Hold dose if BP <90 mmHg systolic.

Shoshone County EMS Corp
CCT Protocols

Versed (Midazolam)

Indications: Sedation for patients on a ventilator, precardioversion sedation, adjunct with paralytics for rapid sequence intubation (RSI).

Contra-indications: Known allergy, hypotension

Adverse Effects: Respiratory depression, apnea, hypoxia, nausea and vomiting, allergic reaction.

Administration: **Sedation:** 1-2 mg initial dose slow IVP over 30 seconds to a minute. 0.5-2 mg incremental doses as indicated. Sedation endpoint per sending orders or when BP is \leq 90 mmHg systolic.
IV Drip: Drip is prepared as 1 mg/ml. Bolus 2 – 5 mg IV. Titrate drip 1 – 2 mg/hr as needed. Every increase in the drip rate should be accompanied by a repeat bolus.
 Precardioversion: 2 – 5mg slow IVP.

Onset/Action:

1. Versed has a rapid onset of 45-90 seconds and it has a short duration of 15-60 minutes with a half life of approximately 2 hours.
2. Versed is 3-4 times as potent as Valium.

CCT Directives:

1. Follow generalized protocols for CCT transports.
2. Use for sedation and titrate as directed by the sending facility or per the above administration directions.
3. Hold dose if BP < 90 mmHg systolic.

Shoshone County EMS Corp
CCT Protocols

Precedex (Dexmedetomidine)

Indications: IV sedation

Contra-indications:

Allergy to Precedex. Caution for patients with advanced age, hepatic impairment, bradycardia, 2nd or 3rd degree heart block, hypotension or hypovolemia.

Administration:

Precedex (Dexmedetomidate) 0.2 – 1.4 mcg/kg/hr. Start at 0.5 mcg/kg/hr and titrate to effect. Consider lower doses in elderly patients.

CCT Directives:

1. Follow generalized protocol for CCT transports.
2. Obtain titration parameters from sending facility personnel
3. Reduce infusion rate and consider an IV fluid bolus if the patient develops hypotension.
4. Discontinue if patient develops hypersensitivity (rash) or hemodynamic instability.

Shoshone County EMS Corp
CCT Protocols

Ketamine

Indications: IV sedation

Contraindications: Allergy to Ketamine. Children under age 2. Intracranial injury or intraocular injury.

Administration: Initial dose 1.5 – 2 mg/kg slow IVP followed by Ketamine 0.5 - 2 mg/kg/hr IV drip, titrate to minimum effect. Start at 0.5 mg/kg/hr IV drip, titrate to minimum effect.

Ketamine is a dissociative anesthetic with bronchodilatory properties. It may also increase secretion production. Do not use with airway devices other than endotracheal tubes due to risk of laryngospasm. It increases both heart rate and blood pressure and has some analgesic effect.

CCT Directive:

1. Follow general protocol for CCT patients.
2. Obtain starting dose and titration parameters from sending facility physician.
3. Discontinue if patient develops signs of hypersensitivity or hemodynamic instability, severe tachycardia, hypertension.