Protocols, Medications & Devices (PMD)
Standing Committee

Date: March 15, 2018 - Time: 12:00 hrs

Location: 150 N. 18th Ave., Conference Rooms 215 A&B, Phoenix, AZ 85007
Via computer with call back: azgov.webex.com, meeting code 805 301 683, password PMD2018
Via telephone: dial 240-454-0879, meeting code 805 301 683 #

AGENDA

I. Call to Order – Toni Gross, MD

II. Roll Call – Shelley Bissell (13 Members, 7 required for quorum)

III. Chairman’s Report – Toni Gross, MD
   a. Attendance report (Attachment III.a.)
   b. New member: Alicia Mangram, MD
   c. Ventricular Assist Device (VAD) Workgroup update

IV. Bureau Report – Taylor George, DrPH
   a. Drug Profile compilation effort
   b. EMS Personnel TB resource to be distributed to stakeholders

V. Stakeholder Presentation - Ron Sattelmaier, Water Wheel Fire & Medical District
   a. Administration of intramuscular Epinephrine 1:1,000 by EMTs (Attachments V.a.1 and V.a.2)

VI. Discussion and Action Items
   a. Discuss, amend, approve addition of Epinephrine HCL, 1:1,000 as an authorized agent for EMT to Table 5.2
   b. Discuss, amend, approve addition of intramuscular medication administration as an STR for EMT to Table 5.1
   c. Discuss, amend, approve the removal of Tuberculin PPD from Table 5.2
   d. Discuss, amend, approve TTTG for LVAD (Attachment VI.d.)
   e. Discuss, amend, approve addition of IV acetaminophen, non-opioid analgesia to Table 5.1
   f. Discuss, amend, approve new drug profile for IV acetaminophen, non-opioid analgesia (Attachment VI.f.)
   g. Discuss, amend, approve addition of IV ketorolac, non-opioid analgesia to Table 5.1
   h. Discuss, amend, approve new drug profile for IV/IM ketorolac, non-opioid analgesia (Attachment VI.h.)
   i. Discuss, amend, approve update to drug profile for IV ketamine, non-opioid analgesia (Attachment VI.i)
   j. Discuss, amend, approve PMD minutes of November 16, 2017 (Attachment VI.j.)

“Health and Wellness for all Arizonans”
k. Discuss, amend, approve changes to TTTGs (Attachment VI.k.):
   1. TTTG 6 – Bradycardia
   2. TTTG 11 – Anaphylaxis and Allergic Reaction
   3. TTTG 17 – Shock
   4. TTTG 35 – External Hemorrhage Management
l. Discuss NASEMSO (National Association of State EMS Officials) Model EMS Clinical Guidelines

VII. Agenda items to be considered for the next meeting

VIII. Call to the Public

A public body may make an open call to the public during a public meeting, subject to reasonable time, place and manner restrictions, to allow individuals to address the public body on any issue within the jurisdiction of the public body. The Committee may ask staff to review a matter or may ask that a matter be put on a future agenda. Members of the public body shall not discuss or take legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. A.R.S. § 38-431.01(G)

Persons with disabilities may request a reasonable accommodation such as a sign language interpreter, by contacting Angie McNamara, Administrative Specialist, at 602-364-3156; State TDD Number 1-800-367-8939; or Voice Relay Number 711. Request should be made as early as possible to allow time to arrange accommodations.

IX. Summary of Current Events
   a. April 6, 2018 - EMS 1/2 Day Conference - Drowning Resuscitation - Tucson Medical Center
   b. April 10, 2018 – 1st EMS 4 Kids Conference – Phoenix Children’s Hospital
   c. April 24 - 25, 2018 - National Rural EMS & Care Conference - Tucson
   d. May 9, 2018 - AEMS Odyssey Pre-Conference, Desert Willow Conference Center, Phoenix
   e. May 10 - 11, 2018 - 18th Annual EMS Odyssey Conference - Desert Willow Conference Center, Phoenix

X. Next Meeting
   July 19, 2018 @ 12:00 hrs, Arizona Department of Health Services, 150 N. 18th Ave, Rooms 215A & B, Phoenix, AZ 85007

XI. Adjournment
## Protocols, Medications & Devices Committee

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Scope of Practice Change

IM delivery of epinephrine by basic EMCTs for the treatment of anaphylaxis
Scope of Practice Change

- Many Fire/EMS agencies in Arizona do not carry epi-pens.
- Our Fire District, as many other rural Fire/EMS agencies in Arizona rely on basic EMTs and not paramedics for service delivery.
- Remote and rural areas of the State may have ALS response times of greater than 60 minutes, where BLS first responders may be on scene in less than 15 minutes.
Scope of Practice Change

• The Scope of Practice for EMCTs in Arizona currently allows EMTs to perform no fewer than any or all of the 12 advanced skills listed below after successfully completing an STR for each and with authorization from their base hospital Medical Director.

Esophageal Airways    Supraglottic Airways    Peripheral IV’s
Automated transport ventilator    Orotracheal intubation
12-lead acquisition (no interpretation)    Mechanical CPR device
Aerosolized/nebulized (beta Agonist)    Auto Injector
    Buccal    Intranasal    SVN
Scope of Practice Change

Regional States that currently have provisions in their Scope of Practice for basic EMTs, which allows IM Epinephrine administration for treatment of anaphylaxis:

- New Mexico
- Utah
- Washington
- Oregon
- Colorado
- Montana
Scope of Practice Change

Project Goal:
Enable basic EMCTs in the State of Arizona to administer IM Epinephrine 1:1000, using a 1cc syringe and vial of epi (1mg/1ml) for the treatment of anaphylaxis.

Changes needed:
Revise scope of practice for basic EMCTs to include administering IM Epinephrine 1:1000 for the field treatment of anaphylaxis.
Create an STR to train and qualify basic EMCTs in this procedure.
Scope of Practice Change

Benefits:

Implementation of this plan would enable any EMS response agency in the State of Arizona to add this potentially life saving intervention to their “toolbox” even if they only have BLS certified personnel on their staff.

Currently there are EMS response agencies in Arizona that do not carry epi-pens simply due to the exorbitant costs, and thus are not able to provide this emergent medical intervention for patients with anaphylaxis.

A significant benefit to IM administration of epinephrine by syringe from a vial is that you potentially have multiple doses of medication available per 1ml vial as opposed to a single dose from an epi-pen auto injector.
EMTs prepare to administer IM epinephrine to an anaphylaxis patient.

Photos courtesy Redmond Fire Department
ECONOMICS

King County (Wash.) EMS saves $334,000 annually by switching to IM delivery of epi by EMTs

By Sofia Husain, MPH; Jonathan Nolan, EMT-P; Andrew Latimer, MD & Mickey Eisenberg, MD, PhD

Anaphylaxis is a severe allergic reaction to an allergen, which can become life-threatening if not treated immediately with epinephrine. Epinephrine acts as a bronchodilator and vasconstrictor to reduce the symptoms of anaphylaxis and maintain blood pressure.

Patients with known anaphylaxis are typically prescribed epinephrine auto-injectors (EAIAs) for personal use in the case of an anaphylactic reaction. Due to the need for rapid treatment, and because of the ease of administration, virtually all states authorize administration of epinephrine via auto-injections as part of emergency medical technician (EMT) scope of practice.

In 1999, the Washington state legislature passed the Christine Castner Act requiring that all EMTs be trained and equipped to administer epinephrine with EAIAs.

In 2004, King County EMS published the results of their initial three-year experience with EMT administration of EAIAs.

In 2009, partly in response to rising medication cost, the Washington state legislature allowed county medical directors to decide whether to use EAIAs or to draw up 1:1000 epinephrine to administer intramuscularly (IM).

In early 2014, King County began a program authorizing EMTs to draw the correct dose from a vial of epinephrine with a needle and syringe and administer the drug IM. The program was called “Check and Inject.” In this article, we describe the training program and economic impact of substituting IM epinephrine for EAIAs.

**KING COUNTY’S EMS SYSTEM**

Excluding the city of Seattle, King County has a population of 1.4 million people who are served by a two-tiered EMS system.

The first tier consists of firefighter/EMTs trained in BLS procedures, including administration of aspirin and epinephrine, CPR and defibrillation using AEDs.

The second tier consists of paramedics trained in ALS procedures, including endotracheal intubation and the administration of medications after obtaining vascular access.

All EMS care is provided by 28 fire departments and five paramedic agencies and all adhere to King County EMS protocols. The fire departments provide EMT-level care as first-in-EMS response in the county and three private ambulance companies assist with BLS transport. Paramedic-level care and transportation is provided by five ALS agencies (four are based in fire departments and one in the health department).

The 9-1-1 dispatch centers in King County adhere to the King County Criteria-Based Dispatch Guidelines, which indicate that BLS units must be dispatched for all potential allergic reactions.

ALS units are also dispatched if the patient presents with the following characteristics: unconscious, non-responsive to voice or touch, respiratory distress (e.g., unable to speak normally or sit, stand and lean forward to breathe); audible wheezing or stridor; swelling in throat, tongue or difficulty swallowing and unable to speak normally; sign of shock (e.g., syncope when sitting/standing).

If BLS units administer epinephrine IM, ALS units are also dispatched to the scene.

**TRAINING & IMPLEMENTATION**

Training for the Check and Inject program began in January 2014, and it took six months for agencies to train all EMTs in the county.

We utilized a train-the-trainer approach.

There are approximately 2,500 fire department EMTs and 1,000 private ambulance EMTs in King County. Training typically required two hours and EMTs were trained in small groups of 5-15.

The first hour was lecture-based and focused on recognizing the signs and symptoms of an anaphylactic reaction and the proper administration of epinephrine IM via a syringe and needle.

There was also instruction in the need for proper documentation, including patient signs and symptoms, suspected triggers, any epinephrine that was administered prior to their arrival (e.g., from an EAI), vital signs pre- and post-epinephrine administration, ALS evaluation and transportation details.

The second hour of each training program provided an opportunity for EMTs to practice with the Check and Inject materials and administer the drug on manikins and/or oranges. All training was carefully monitored by instructors approved by the King County EMS system.

When all EMTs within a fire department completed training, that agency was authorized to allow their EMTs to administer the medication for anaphylaxis. By July 1, 2014, all agencies in the King County EMS area were participating.
After the initial training, an online training course was developed by the King County EMS training section. EMTs were required to review the content quarterly with an opportunity for additional practice with the needle and syringe.

All agencies were provided a Check and Inject kit for each EMS vehicle. The kit was made up of a plastic box (1" x 4" x 6") that was sealed and contained the following items:

- Epinephrine Check and Inject form (used to determine patient eligibility and indications for administration);
- 1:1000 1 mL vial epinephrine (with expiration date listed clearly);
- 2 syringes (1cc 25-gauge safety needles); and
- Bandages and alcohol wipes.

For the first 12 months of the program, EMTs were required to call King County EMS after each incident in which IM epinephrine was used. A representative from King County EMS then retrieved the used Check and Inject kit and the run report from the involved station to review the proper use and documentation of epinephrine IM administration. A new kit was provided to replace the used kit.

The run reports of all cases were abstracted by senior paramedic Jonathan Nolan and the medical director at the time, Mickey Eisenberg, MD, PhD, as well as Andrew Latimer, MD, an EMS fellow at the University of Washington.

Feedback and/or additional training was provided to individual EMS personnel or agencies in some instances and periodic training updates were provided to all EMS agencies in the county.

**ECONOMIC CONSIDERATIONS**

The economic cost of EAI kits focused on the direct annual cost to equip each EMT vehicle with either EAI or epi kits.

In 2017, there were 565 EMT-staffed vehicles—391 fire department EMT-staffed responding vehicles and 174 EMT-staffed private ambulances. Though only fire department vehicles provide emergency 9-1-1 responses, all EMT-staffed vehicles, including private ambulances, are required by state law to have EAI or IM epinephrine.

Annual costs for all supplies were determined for 2017. It does not include the cost of replacements for use or breakage, nor does it include inventory, storage, or administrative costs.

A web-based search in May 2017 for EAI two-packs for adults and children (available through EMS pharmaceutical supply sites) revealed costs ranging from $600 to $900 per two-pack.

The expiration dates for EAI kits and Check and Inject epinephrine vials were both approximately 18 months. Though the manufacturers of EAI kits and vials claim expirations of 24 months, our experience is that actual medications have average expiration dates of only 18 months upon receipt from the manufacturers. For this cost analysis, we assumed the maximum expiration date of 24 months.

The current annual cost to equip all responding vehicles and transport ambulances with EAI kits would be $339,000. This calculation uses the low end of the EAI two-pack range, $600 per two-pack, and assumed a two-year expiration. The annual cost of equipping a similar number of vehicles with Check and Inject epi kits was $5,085.

The large difference in cost is due to two factors: 1) cost of the EAI kits compared to the epi kits; and 2) the number of EAI kits compared to epi kits.
**Figure 1: Check and inject epinephrine job aid**

**CHECK & INJECT**
EMT Epinephrine Injection Process

**1 MEETS CRITERIA**

- **TRIGGER**
  - food allergy
  - insect sting
  - drug allergy

- **SYMPTOMS**
  - respiratory distress
  - hypotension
  - hives
  - facial swelling

**2 VERIFY DRUG**

- Confirm medication & check the expiration date.
- 1 mg/ml 1:1,000 Epinephrine
- valid expiration date
- clear, not cloudy

**3 VERIFY DOSAGE**

- Adult = 0.3 cc
- Peds < 66 lbs = 0.15 cc

**4 PREP & INJECT**

- Prep the patient's skin with an alcohol wipe. Note the location.

**5**

- Draw air into the syringe to the desired dose.

  Note: This step is required to properly pressurize the vial.

**6**

- Insert the needle into the vial at a 90 degree angle. The tip of the syringe should be in the liquid.
- Fully depress the syringe and watch for air bubbles.

**7**

- Draw up the desired dose.
  
  It's best to draw more medication than required, leaving enough in the vial for a second dose.

**8**

- Flick the syringe several times to bring the air bubbles to the surface.

**9**

- Depress the syringe to the desired dose.
  
  You should see the medication squirt from the syringe. This confirms you've removed the air and have medication in the syringe.

**10**

- Squeeze the patient's anterior lateral mid-thigh.
- Insert the needle at a 90 degree angle.

**11**

- Support the syringe with your thumb and index finger.
- Retract the plunger to check for blood.
- Continue if there is no blood in the syringe.

**12**

- Inject medication and remove the syringe.

**13**

- Engage the safety device.
- Place the needle in sharps container.

**14 MONITOR & DOCUMENT**

- Massage the site for 30 seconds.
- Monitor the patient and document treatment, patient, response and side effects.
Table 1: Cost calculations of equipping King County EMS vehicles with EAs vs. Check and Inject kits

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<td>Private ambulance responding vehicles</td>
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<td><strong>Total number of EMS vehicles</strong></td>
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<td><strong>Annualized cost to fully supply all EMS vehicles with EAs</strong></td>
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<tr>
<td>Number of EAI two-packs needed (adult and pediatric EAI two-pack for each vehicle)</td>
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<td>Cost of EAI devices</td>
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<td><strong>Annual cost of EAs</strong></td>
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<td><strong>Annualized cost to fully supply all EMS vehicles with epinephrine Check and Inject kits</strong></td>
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<td>Number of Check and Inject kits needed</td>
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<td>Cost of epinephrine vial (1:1000 1 mL)</td>
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<td>Cost of needles, syringes, swabs, container</td>
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<td><strong>Total cost of Check and Inject kit</strong></td>
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Table 1 shows the cost calculations for equipping all EMS vehicles in King County with EAs and Check and Inject kits.

The net annual cost-savings is approximately $334,000. The estimate does not take into account replacement costs of the epinephrine administered; however, including this would magnify the cost savings.

The analysis also assumes the needle and administration cost, including the container, last for two years when, in fact, it’s likely longer until expiration. As mentioned above, we experienced expiration dates of 18 months for the medication instead of 24 months. Had we used the 18-months figure instead of 24 months the cost-savings would have been an additional $100,000.

This analysis also doesn’t take into account the training costs for either EAI or Check and Inject. We believe differences in training costs would be minimal as all training (for either EAI or Check and Inject) was conducted while EMS personnel were on duty.

**CONCLUSION**

King County EMS changed the method of epinephrine administration for anaphylaxis from automatic injectors to IM injections for EMTs. Conservatively, we estimate an annual cost-savings of $334,000.

**Sofia Husain, MPH, is an epidemiologist with King County, Wash., EMS.**

**Jonathan Nolan, EMT-P, is a Medical Services Officer with King County, Wash., Medic One.**

**Andrew Latimer, MD, is an EMS Fellow in the Division of Emergency Medicine at the University of Washington.**

**Mickey Eisenberg, MD, PhD, is director of medical quality improvement, with King County, Wash., EMS.**

**Acknowledgment:** The authors thank the EMTs and paramedics of King County for their professionalism in the delivery of emergency care. Special thanks to Megan Zdanovic and David Sanchez for assistance in data collection and to Jim Duren for helping establish the Check and Inject program.

**REFERENCES**


For more information on this program contact Jonathan Nolan, EMT-P, at jonathan.nolan@kingcounty.gov.
# Implantable Ventricular Assist Devices: Adult

Use this guideline for:

1. Adult patients that have had an implantable ventricular assist device (VAD), including a left ventricular assist device (LVAD), right ventricular assist device (RVAD), or biventricular assist device (BiVAD), and have symptoms of cardiovascular compromise
2. Patients with VADs that are in cardiac arrest
3. Patients with VADs that are experiencing a medical or injury-related event not involving the cardiovascular system or VAD malfunction

**EMS role is to:**

- Rapidly identify cardiovascular compromise in patients with VAD and provide interventions
- Rapidly identify VAD-related malfunctions or complications (including stroke, infection) and provide interventions
- **Contact patient’s VAD program on-call provider, using the phone number on the device**

## EMT

- Manage airway as indicated
- Assess for possible pump malfunction
  - Assess for alarms
  - Auscultate for pump sound “hum”
  - Signs of hypoperfusion including pallor, diaphoresis, altered mental status (blood pressure reading is unreliable)
- If the VAD pump has malfunctioned
  - Contact the patient’s VAD-trained companion, if available
  - Contact the patient’s VAD coordinator, using the phone number on the device
  - Check all the connections to system controller
  - Change VAD batteries, and/or change system controller if indicated
  - Have patient stop all activity and assess for patient tolerance
  - Follow appropriate cardiovascular condition-specific protocol(s) as indicated
  - If patient is experiencing VAD-related complications or cardiovascular problems, expedite means of transport that will get patient to the facility where VAD was placed if patient’s clinical condition and time allows

## AEMT

- If patient is in full cardiac arrest, CPR should not be performed if there is evidence that the pump is still functioning
- Decision to perform CPR should be made in consultation with patient’s VAD-trained companion and VAD coordinator. CPR may be initiated only where
  - Confirmation that the pump has stopped and troubleshooting efforts have failed, and
  - Patient is unresponsive and has no detectable signs of life

- If patient has a functioning VAD and is experiencing a non-cardiovascular-related problem, transport to a facility that is appropriate for the patient’s main presenting problem without manipulating the device

## EMT-I/Paramedic

- Establish PIV
  - If patient has a functioning VAD and is hypoperfusing, administer IV fluids: 30 mL/kg, maximum 1 L, over < 15 minutes, using push-pull method.
  - May repeat up to 3 times based on patient’s condition and clinical impression
- Cardiac monitoring
- Acquire 12-lead EKG; patient’s baseline may be arrhythmia
Drug Profile for ACETAMINOPHEN INJECTION

GENERIC NAME: ACETAMINOPHEN

CLASS: Analgesic, Antipyretic

Mechanism of Action:

Unknown

Pharmacologic Effects:

Analgesic and antipyretic activity

Metabolized:

- Primarily by the liver, including CYP2E1

Indications for Field Use:

- Management of mild to moderate pain in adult and pediatric patients 2 years and older
- Management of moderate to severe pain with adjunctive opioid analgesics in adult and pediatric patients 2 years and older

Contraindications:

- Known hypersensitivity to acetaminophen or to any of the excipients in the intravenous formulation
- Severe hepatic impairment or severe active liver disease

Adverse Reactions:

- Serious adverse reactions may include hepatic injury, serious skin reactions, allergy, and hypersensitivity
- The most common adverse reactions in patients treated with Acetaminophen IV were nausea, vomiting, headache, and insomnia in adult patients and nausea, vomiting, constipation, and pruritus in pediatric patients

Cautions:

- Administration of acetaminophen in doses higher than recommended may result in hepatic injury, including the risk of liver failure and death. Do not exceed the maximum recommended daily dose of acetaminophen. The maximum recommended daily dose of acetaminophen includes all routes of acetaminophen administration and all acetaminophen-containing products administered, including combination products. Dosing errors could result in accidental overdose and death
- Use caution when administering acetaminophen in patients with the following conditions: hepatic impairment or active hepatic disease, alcoholism, chronic malnutrition, severe hypovolemia, or severe renal impairment (creatinine clearance ≤ 30 mL/min
- Rarely, acetaminophen may cause serious skin reactions such as acute generalized exanthematous pustulosis (AGEP), Stevens-Johnson Syndrome (SJS), and toxic epidermal necrolysis (TEN), which can be fatal. Discontinue Acetaminophen IV immediately at the first sign of skin rash
- The antipyretic effects of Acetaminophen IV may mask fever
Drugs and Dosages

Drug Profile for ACETAMINOPHEN INJECTION

Notes of Administration:

IV infusion over 15 minutes

Incompatibilities/Drug Interactions:

Warfarin (Coumadin), alcohol, barbiturates, carbamazepine (Tegretol), phenytoin (Dilantin), and known CYP2E1 inducers/inhibitors

Adult Dosage:

Adults ≥ 50 kg 650 mg IV infusion, administer over 15 minutes,
Adults < 50 kg utilize pediatric dosage

Pediatric Dosage:

12.5 mg/kg IV infusion, administer over 15 minutes, if patient weighs < 50 kg

Routes of Administration:

IV

Onset of Action:

IV: 15 minutes

Peak Effects:

IV: 1 hour

Duration of Action:

IV: 4-6 hours

Arizona Drug Box Minimum Supply:

Optional: 1000 mg

Special Notes:

- Pregnancy: Category C
- Lactation: Undetermined, if any, effects
Drug Profile for KETOROLAC

GENERIC NAME: Ketorolac Tromethamine
CLASS: Anti-inflammatory, (NSAID)

Mechanism of Action:

Non selective COX inhibitor. Achieves the antipyretic, analgesic, and anti inflammatory properties through the inhibition of prostaglandin synthesis by the competitive blocking of the enzyme cyclooxgenase (COX).

Indications and Field Use:

- Short term management of moderate to severe pain
- Non opioid alternative for pain management.

Contraindications:

- Not to be used in peri-operative pain treatment of (CABG) coronary artery bypass graft
- Not to be used in patients with advanced renal impairment and those at risk for renal failure, such as severe volume depletion
- Not to be used in patients with active or history of peptic ulcer disease, GI bleeding and/or perforation
- Not to be used in patients with cerebrovascular bleeding, those with active bleeding and those at risk of bleeding
- Not to be used in pregnancy or with nursing mothers
- Not to be used in patients taking aspirin or other NSAIDs

Adverse Reactions:

May cause indigestion, headache, nausea, vomiting, diarrhea, abdominal pain, dizziness, ringing in the ears, or drowsiness. Increased risk of GI bleeding.

NOTES ON ADMINISTRATION

Incompatibilities/Drug Interactions:

Probenecid, NSAIDs, oral steroids, blood thinners such as warfarin, lithium, diuretics, ACE inhibitors, carbamazepine, phenytoin, methotrexate, alcohol, and sedatives.

Adult dosage by weight (age 17 and older):

- 50 kg or more = 60 mg IM or 30 mg IV
- Less than 50 kg = 30 mg IM or 15 mg IV

Geriatric dosage = 30 mg IM or 15 mg IV

Pediatric dosage by weight:

Age greater than two years.

- IV = 0.5 mg/kg up to a maximum dose of 15 mg
- IM = 1 mg/kg up to a maximum dose of 30 mg
Routes of Administration:
IV, IM

Onset of Action:
About 30 minutes in both IV and IM dosing

Peak Effects:
1 to 2 hours

Duration of Action:
4 to 6 hours

Arizona Drug Box Minimum Supply:
None

Special Notes:
- May be used for up to five days in adults
- May increase the risk of stroke or myocardial infarction
- Dosing not to be repeated in the prehospital setting
Drug Profile for KETAMINE HYDROCHLORIC INJECTION

GENERIC NAME: KETAMINE HYDROCHLORIDE C INJECTION

CLASS: Anesthetic; Dissociative Anesthetic

Mechanism of Action:

Non-competitive antagonist of NMDA receptors causing a prolonged tonic blockade of the receptor contributing to long lasting analgesic effects. Directly affects the delta opioid receptor and acts to augment opioid mu-receptor function. Blocks the release of excitatory neurotransmitter glutamate and provides anesthesia, amnesia, and analgesia by virtue of decreasing central sensitization.

Pharmacologic Effects:

- Ketamine is a Class III Phencyclidine (PCP) derivative that is rapid acting in producing a “dissociative” anesthesia in which the patient’s consciousness is detached from their nervous system, due to its “dissociative” properties, Ketamine is a potent analgesic.
- Minimal cardiac depression occasionally reported with rapid-high doses. May transiently (within 30-60 seconds) increase heart rate and blood pressure by central sympathetic stimulation. Return to normal values begins almost immediately, and is complete within 15 minutes.
- Ketamine is a bronchodilator and has minimal to no respiratory depression, with respiratory stimulation frequently seen.

Metabolized:

- The liver microsomal enzyme system metabolizes Ketamine.

Indications for Field Use (15 years and older):

- Analgesia (15 years and older)
  - Pre-anesthetic (Induction agent) for Rapid Sequence Intubation.
  - Pre-anesthetic for critical asthma patients needing aggressive bronchodilation and possible intubation.

Contraindications:

- Angina
- CHF
- Symptomatic Hyperthyroidism
- Pregnancy-Relative (Category B)

Adverse Reactions:

Emergence reaction with dissociative dose (in approximately 12% of patients) may occur near end of medication half-life, when patient is awakening, dizziness, nausea, light-headedness, nystagmus, visual disturbances, drowsiness, numbness, increased skeletal tone, hallucinations, dysphoria or confusion, agitation, disorientation, mood changes, tachycardia, hypertension, feeling of unreality.
Drug Profile for KETAMINE HYDROCHLORIC INJECTION

Cautions:
- Hypertension
- Tachycardia
- Known Cerebral or Aortic Aneurism
- Psychotic Disorders

Notes of Administration:
- IV/IO: May re-medicate with half-dose after 10 minutes.
  Very slow administration for pain management reduces adverse reactions

Incompatibilities/Drug Interactions:
- **Diazepam**
  Sympathomimetic drugs, concurrent use with a Benzodiazepene may cause increased sedation

Adult Dosage (15 years and older):
- IV/IO 0.5-2 mg/kg over 1 minute. Half-life 5-10 minutes.
- IM 2-4 mg/kg. Half-life 12-25 minutes.

  Sub-dissociative dose pain management:
  - IV/IO 0.1 – 0.3 mg/kg very slow IV push
  - IM 0.3 – 0.5 mg/kg

Pediatric Dosage:
- Not currently recommended for field use in patients less than 15 years old for Rapid Sequence Intubation

  Sub-dissociative dose pain management:
  - IV/IO Same as adult dose
  - IM Same as adult dose

Routes of Administration:
- IV/IO/IM/IN

Onset of Action:
- IV/IO: 30 seconds
- IM: 3-4 minutes

Peak Effects:
- IV/IO: 30 seconds to 5 minutes
- IM: 3-12 minutes
Drug Profile for KETAMINE HYDROCHLORIC INJECTION

Duration of Action:

IV/IO: 10-45 minutes  
IM: 25-60 minutes

Arizona Drug Box Minimum Supply:

Optional: 200 mg

Special Notes:

- If significant emergence reaction occurs consider Midazolam 1-5 mg IV/IM/IO to calm patient  
- Pregnancy: Category B  
- Lactation: Undetermined, if any, effects  
- Elderly: Use with caution, start at low end of dosing range  
- Alcohol: Use with caution in the acutely alcohol-intoxicated patient
Protocols, Medications & Devices (PMD)
Standing Committee

Date: November 16, 2017 - Time: 12:00 hrs

Location: 150 N. 18th Ave., Conference Rooms 215 A&B, Phoenix, AZ 85007

Minutes

I. Call to Order – Toni Gross, MD, Chair
   • The meeting was called to order at 12:05 hrs.

II. Roll Call – Shelley Bissell (13 Members, 7 required for quorum)
   • Quorum is present.

Members Present
   Toni Gross, MD
   Brian Smith
   Franco Castro-Marin, MD*
   Gail Bradley, MD
   Josh Gaither, MD*
   Neil Gago*
   Terence Mason, RN
   Jason Johnson, MD

Members Absent
   Robert Jarvis
   Jeffrey Salomone, MD
   Heather Miller, RN
   Chester Key
   Garth Gemar, MD

   *indicates telephonically

III. Chairman’s Report – Toni Gross, MD
   a. Attendance report (Attachment III. a.)
      • As presented for members. A letter has been sent to Dr. Salomone with no response, so the role “Trauma Surgeon” is vacant.
   b. 2018 Meeting Schedule (Attachment III.b.)
      • As presented for members.
   c. National Clinical Guidelines update
      • The link is for the new version of the National Model. This was used as the basis of our last revision of TTTGs (Trauma Triage Treatment Guidelines). We will need to be cognizant of these updates as we review our TTTGs.

IV. Bureau Report – Taylor George, DrPH, Bureau Liaison
   a. ASENa = 2016 Arizona Statewide Emergency Medical Services Needs Assessment (Attachment IV.a.)
      • Now available for distribution. Please contact Shelley Bissell for a copy.
   b. Pediatric ketamine review
      • Alyson Welch, NREMT-P, presented the review of data of 23 pediatric cases from 2016 with a PowerPoint slide. After narrowing the cases down to six that had both EMS and hospital outcome records in the State databases, all six patients were discharged alive that received ketamine from EMS. There were no noted complications (in the medical records from the State bridge) directly attributed to the use of ketamine.
        Dr. Gross asked about whether the patients that were discharged from the Emergency Department or after being admitted. Ms. Welch indicated the discharges to home were after hospital admission and stay of three days or more. Dr. Bradley asked about the percentage of patients that were intubated. Ms. Welch indicated all six were intubated successfully with ETCO2 monitoring. Dr. Gross added that in the ketamine drug profile, that one of the indications is for intubation.
   c. Pediatric Traumatic Cardiac Arrest
In the fall issue of AzHEAT (Arizona Health, EMS, and Trauma), there is a table to show the data from the EMS records and the hospital records for the issue of whether there is a difference in outcomes of a patient that is transported to a pediatric ACS-verified (American College of Surgeons) trauma center versus the closest facility. The findings are that we can’t make any conclusions from the data. The sample size is very small. We are missing 48% of the outcome records from non ACS-verified trauma centers.

d. DHS Bureau of Epidemiology & Disease Control Services to present TB test background and information

Currently EMCTs can place a tuberculin skin test (TST) purified protein derivative (PPD) but it is not within the scope of practice to interpret the PPD test. The Bureau asked State DHS personnel to provide information on this issue: Lisa Villarroel, MD, the Medical Director for the Division of Preparedness at the Arizona Department of Health Services, and Cherie Stafford, MSN, TB Nurse Coordinator. The TST (Tuberculin Skin Test) does not differentiate between latent TB and active TB. The newer, preferred test is the IGRA (Interferon Gamma Release Assay).

After giving some background information, Dr. Villarroel presented her findings for the three areas of concern:

1. Do EMCTs in Arizona have the authority and training to both administer and read a TST? The CDC (Centers for Disease Control and Prevention) does not define who can place a TST. They do suggest training. As for who can read a test, they indicate a “designated, trained healthcare worker” and that you should not read your own test. In Arizona, there is no rule or certification for who can place or read. As for the authority and training of EMCTs, there is nothing written to say if you can or cannot. The important part for testing is, if it is positive, that you have the next steps for referral to treatment. The goal is to treat positive cases.

2. Are EMCTs at greater risk for TB infection and should these workers be tested more frequently? The CDC considers EMS a non-traditional facility-based setting and the overall risk is low. EMS personnel should have a baseline screening and follow up screening depending on where they work. Arizona data agrees with that.

In Arizona, 2009-2014 we had 1,359 confirmed TB cases, 37 were healthcare workers. Of those 37, only 7 were US-born, 3 were Native American, and 4 were part of an ongoing active-TB investigation. We don’t track positive skin tests. 10% of latent TB becomes active later on. Most of the healthcare workers that were positive cases had other risk factors that we know about, such as being foreign-born. EMCTs themselves, by their work, are not considered to be at higher risk for getting TB.

3. Would the EMCTs’ ability to administer and read a TB test be a beneficial service to offer the community? Not really. The evidence-based data has directed a move away from testing low-risk individuals. The general community is considered low risk. Mass testing generates many false positives. Modern standards recommend strongly against testing low-risk populations.

As far as corrections, immigration, and border patrol personnel, there is a facility screening tool from the CDC that asks questions to determine what risk your facility has, and that sets the baseline for how often you should be doing follow-up screening. If you are performing patient care in non-traditional settings, you will be part of the contact investigation should a positive TB case be confirmed. The public health department would know how many cases they have in their community.

Dr. Villarroel emphasized that testing low-risk people every year is not recommended anymore; it is recommended to ascertain risk stratification of the facility where you work, get a baseline test and then screen for symptoms annually after that.

V. Discussion and Action Items

a. Discuss, amend, approve addition of adding Mantoux tuberculin test interpretation to the EMCT scope of practice (Attachment Table 5.1) – Dr. Gross and Dr. Zeidler (Dr. Zeidler was not present.)

- Motion to discuss made by Gail Bradley, second by Jason Johnson. The group discussed what the rationale was to get this adjusted on Table 5.1.
Mark Olieman with River Medical and Jill McAdoo with AMR/Life Line Ambulance shared with the board that this was brought up due to low compliance rates for personnel getting tested and read in a timely manner as per company policy. AMR has a standard practice to evaluate risk and safety annually. With the test administration as an STR, the obvious challenge is a lack of resources to read the test in a timely manner for all personnel and hinders the ability help smaller agencies in western Arizona with their TST. A change to allow reading TSTs would alleviate that.

Brian Bowling with the Maricopa County Sheriff’s Office is also in support of adding test reading to the scope of practice. MCSO has around 2-3,000 personnel to TB test annually per their policy, so with many EMCTs to administer the test and only one occupational health nurse to read those, a huge backlog occurs. It would streamline the process tremendously for our organization if the EMCTs could read it as well as administer it.

Dr. Bradley indicated that we may be overtesting certain populations, given what Dr. Villarroel and Ms. Stafford just presented.

Ms. Stafford shared that each facility would need to do a risk assessment to determine risk level, and she could not give guidance on circumstances that use EMS to supplement occupational health workers.

Dr. Bradley thought this would be an opportunity to take the data in Arizona and have facilities reevaluate their risk level and their need to do regular testing. She has experience with routine retesting for a positive result and unnecessary x-ray exposure annually, and she questions continuing that for someone who is really not at higher risk.

Dr. Johnson thought that personnel will continue to get tested and retested due to lack of timely readings because their work policy will demand it regardless of what this board decides.

The group discussed possibly deleting the test administration from Table 5.1, while recognizing that they could not influence companies’ policies regarding TB testing.

Dr. Gross thought a change to Table 5.1 would not lead to internal policy changes and the facility screenings encouraged by DHS staff, so then the need would now be to have both (administer and read) or none. Members discussed pros and cons and included asking what training material would be available.

Dr. Villarroel clarified that you have to be a healthcare worker, that there is data that shows many mistakes are made when placing and reading a TST, and that quality control is important to maintain.

Mr. Olieman said the last time he presented this to the Committee, he did bring the CDC-based training material for the members to review. His employer, outside of Arizona, does infection control practices, and they do re-competency for it annually.

Motion to approve the Mantoux test interpretation as an STR for paramedic scope of practice made by Brian Smith, second by Terence Mason. (Roll call vote: Smith, aye; Castro-Marin, aye; Bradley, abstain; Johnson, aye; Gaither, aye; Gago, aye; Mason, aye; Gross, aye.) They ayes have it, motion approved. (This approved motion and topic will be addressed at the next Medical Direction Commission meeting January 18.)

Dr. Bradley would like to get the education out to agencies for appropriate facility screening. The screening tool for facilities and symptom screening would be beneficial as there is too much testing. Dr. Gross agreed and added that the test alone is not a screening program.

b. Discuss, amend, approve PMD minutes of July 20, 2017 (Attachment V.b.) – Dr. Gross
   • A motion to approve the minutes as they stand made by Terence Mason, second by Jason Johnson. Ayes have it. Minutes approved.

c. Discuss, amend, approve Bylaws (Attachment V.c.) – Dr. Gross and Dr. George
   • The members discussed the role of the trauma surgeon representative. A motion to approve the bylaws as they stand made by Gail Bradley, second by Jason Johnson. The Ayes have it. Bylaws approved.

d. Discuss and approve creation of a workgroup for TTTG for LVAD patients (Attachment V.d.) – Dr. Gross
National Association of State EMS Officials (NASEMSO) Model EMS Clinical Guidelines has guidelines for LVAD patients. We want to form a workgroup that consists of representatives from the three hospitals that treat LVAD patients and work in conjunction with the Education Committee. Motion to approve forming a workgroup by Jason Johnson, second by Terence Mason. **Motion approved.** (Dr. Gross collected names of volunteers.)

e. Discuss Non-Opioid Intravenous Pain/Analgesic Medications- Dr. Gross and Dr. George
- Due to the current opioid epidemic nationally, Dr. Gross discussed potentially adding some drugs to the drug table that are non-opioid pain medications. Not to vote on today, but the meds that could be considered: iv/im ketorolac; iv acetaminophen, oral acetaminophen, nitrous oxide. If there is support for this, the next step is to write the drug profiles and, at the next meeting, discuss/amend/approve changes to Table 5.2.

Dr. Bobrow added that several states are starting to look at this, so it might be a good time for our state to look at options also. Medical Direction Commission (MDC) would be supportive. (Dr. Gross took names of volunteers to write drug profiles.)

f. Discuss Wound Packing STR (Attachment V.f.) – Dr. Bradley
- Dr. Bradley explained that this was approved by MDC as an STR and it has not yet been published in rule. The feeling from the Education Committee is to take it back to MDC on their agenda to make wound packing not require STR training. In the interim, the Education Committee will post on the DHS website wound packing training resources from Stop The Bleed and TCCC resources.

Mr. Mullins added that there has been some suggestion that the national scope of practice is changing to make wound packing available to all EMCTs.

Dr. Gross would like to acknowledge that the PMD Committee is in support of the Education Committee letting MDC know at their January meeting that the national scope of practice may be changing and asking to possibly remove the STR requirement but have some type of training available. (The group discussed how to deal with changes to the table when changes are made at the national level.)

Dr. Bradley wants the Education Committee to make those trainings available so people don’t create their own. Dr. Gross thought maybe this committee would be required to look at the TTTG for hemorrhage control and possibly update that.

g. Discuss, amend, approve addition of application of end tidal CO2 monitor to the EMT scope of practice (Attachment Table 5.1) – Dr. Gaither
- A motion to discuss addition of noninterpretation and application of ETCO2 monitoring for EMT and AEMT scope of practice made by Josh Gaither, second by Terence Mason. Dr. Gaither shared that different quality improvement initiatives in his region have shown that, when paramedics are managing critically ill patients, the application of an ETCO2 monitor gets deprioritized. By allowing EMTs to apply the ETCO2 monitor, we believe that patient care will improve as that device can indicate hyperventilation and hypoventilation, which does increase mortality. Dr. Gross added that wording for this on Table 5.1 would consist of adding a row for “End Tidal CO2 Acquisition (noninterpretive)” and the checkboxes would indicate “EMT” and “AEMT.” We would leave the row in there that says “End Tidal CO2 monitoring/capnography” with checks in the boxes for “EMT-I” and “Paramedic.”

A further clarification was made to explain that the ask was for the EMT to quantitatively capture the number displayed on the monitor and write that down on paper and not to have the EMT qualitatively interpreting the capnography. Mr. Smith indicated that most people today are using capnography, but knowing if the wave form was appropriate for the number indicated would require some training in recognizing wave forms. The group discussed monitors, pros and cons of capnography vs capnometry, and clarification regarding the proposed wording and intent. Dr. Gaither added that, for example, in his experience of working at two different hospitals, one has a wave form capnography monitor and the other has a number-only capnography monitor, and that he would like a number captured as opposed to no number captured. The group discussed the role of the highest level provider on scene. Dr. Gaither added that the collection of an
ETCO2 measurement is very important and can influence proper ventilation and low readings can increase mortality, so anything we can do to improve the ability of our paramedics to identify hyperventilation has the potential to improve patient outcomes. Dr. Bradley shared that the training they did statewide with the EPIC Project was to the EMT-level provider.

Dr. Gross clarified that this was not requested to be added as an STR. There was further discussion regarding the EPIC trainings over the last five years. Dr. Bobrow indicated there is no current funding for continued EPIC training, and that ongoing training is needed especially for new providers. Dr. Bradley proposed amending the motion to add interpretation without the STR. Dr. Johnson added agreement and since they are already applying it, it would be helpful for them to help interpret it. Mr. Smith added that with the checkmark in the column, it has to be part of initial and refresher training also.

Dr. Bradley amended the motion to include interpretation and check marks all the way across, second by Jason Johnson. The amended motion is to include ETCO2 monitoring/capnography the way it is written currently in Table 5.1 with checks all the way across, so just to add two check marks. The Chair called for a vote. With one nay, the ayes have it. **Motion approved.** (This approved motion and topic will be addressed at the next Medical Direction Commission meeting January 18.)

h. Discuss, amend, approve Adult Stroke TTTG guidelines (Attachment V.h.) – Dr. Gross
   - Motion made to open discussion by Jason Johnson, second by Gail Bradley. In the packet there is a revised version with language that is different at the bottom. Dr. Gross reviewed the proposed amended wording on the document. The goal is to incorporate telemedicine resources into our revised guidelines.

   Dr. Gross proposed a vote to approve the guidelines as reflected on the attachment with three amendments: 1-add a pediatric destination box per local protocol (not on mock up); 2-add head of bed flat for pediatrics (not on mock up); 3-add a fourth destination option for the adults “or any healthcare institution participating in a recognized stroke telemedicine program” (not on mock up). The ayes have it. **Guidelines approved.**

VI. Agenda items to be considered for the next meeting
   - Dr. Gross would like to add the non-opioid drug profiles, add the workgroup for LVAD guidelines, add a review of the tracked changes for NASEMSO. Please contact Shelley Bissell and indicate which guidelines we should revise at the next meeting on March 15.

VII. Call to the Public
   - Jose Lizarraga from Quartzsite Fire Department and LaPaz Hospital presented information promoting epi kits as a more economical choice over epi pens for EMS use. The state of Washington has supported these kits for their BLS providers and has saved a considerable amount of money. He asked the Committee to please consider allowing the kits for use for our smaller agencies that cannot afford epi pens.

   Mr. Smith indicated the device already has FDA approval, but the State would need to change Table 5.1 for EMTs to include intramuscular injections and need to add to Table 5.2, for Epinephrine HCl 1:1,000/1 mg/1 ml, an “A” to the epi row. All we have now is autoinjector. Mandatory carrying is optional right now.

VIII. Summary of Current Events
   - As presented on the agenda.

IX. Next Meeting
   - March 15, 2018 @ 12:00 hrs, ADHS, 150 N. 18th Ave, 215A & B, Phoenix, AZ 85007

X. Adjournment
   - The meeting was adjourned at 13:35 hrs.
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<th>Name (PLEASE PRINT)</th>
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<td>Quartzsite FD &amp; Lopez Hospital</td>
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<td>Barb Bovee</td>
<td>MH HS</td>
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<td>Matt Shiv</td>
<td>Maricopa Medical Transport</td>
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<td>David Harder</td>
<td>ADHS</td>
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<td>Kris Ramos</td>
<td>PCH</td>
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<td>Alyssa Weber</td>
<td>ADHS</td>
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<td>Martin Ocierman</td>
<td>River Media 1</td>
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<td>Amber Riu</td>
<td>Banner Tucson</td>
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TTTG Proposed Changes: March 15, 2018

TTTG 6 – Bradycardia

- EMT level, Pediatric 2nd box:
  - For heart rate < 60 and signs of poor perfusion, initiate chest compressions
- Paramedic level, General 2nd box:
  - **Vasopressor** medications (in order of preference)
    - Epinephrine IV drip 0.02-0.2 mcg/kg/min titrated to a MAP greater than 65 mmHg
    - OR
      - Epinephrine by push dose (dilute boluses)
        - Prepare 10 mcg/mL by adding 1 mL 0.1mg/mL Epinephrine to 9 mL normal saline, then administer 10-20 mcg boluses (1-2mL) every 2 minutes titrated MAP greater than 65mmHg
    - OR
      - Norepinephrine 0.02-0.4 mcg/kg/minute IV titrated to a MAP greater than 65 mmHg

- Paramedic level, Pediatric 2nd box:
  - Epinephrine push dose (dilute boluses): 0.01 mg/kg (max single dose 0.01mg) every 3-5 minutes titrated to MAP > 65mmHg
  - Atropine min dose 0.1 mg, max initial dose 0.5mg, max total dose 3 mg

TTTG 11 – Anaphylaxis and Allergic Reaction

- Paramedic level, 1st box:
  - add PO route

TTTG 17 – Shock:

- Introductory box:
  - Signs of poor perfusion: ETCO₂ reading of < 25 mmHg
- AEMT level, Pediatric 1st box:
  - Correct blood glucose if < 60 mg/dl
- AEMT level, General 1st box:
  - IV/IO fluids 30 mL/kg, max 1 L over < 15 minutes, using push-pull method
- Paramedic level, 3rd box:
  - **Vasopressors (shock unresponsive to IV fluids)**
    - Cardiogenic shock, hypovolemic shock, obstructive shock:
      - Norepinephrine - there is recent evidence that supports the use of norepinephrine as the preferred intervention.
        - Although dopamine is often recommended for the treatment of symptomatic bradycardia, recent research indicates that patients in cardiogenic or septic shock treated with norepinephrine have a lower mortality rate compared to those treated with dopamine (initial
norepinephrine dose: 0.05 – 0.5 mcg/minute titrated to effect)

- Give epinephrine, 0.05-0.3 mcg/kg/minute
- **Give dopamine, 2-20 mcg/kg/minute**

- Distributive shock (with the exception of anaphylactic shock):
  - Give norepinephrine, 0.05-0.5 mcg/kg/minute
  - Norepinephrine is the first-line drug of choice for neurogenic shock

THTG 35 – External Hemorrhage Management:

- EMT level:
  - Apply wound packing/direct pressure/pressure dressing to injury