

# Solano County Health & Social Services Department

Mental Health Services  
Public Health Services  
Substance Abuse Services  
Older & Disabled Adult Services



Eligibility Services  
Employment Services  
Children's Services  
Administrative Services

**Gerald Huber, Director**

Aaron E. Bair, MD, MS  
EMS Agency Medical Director

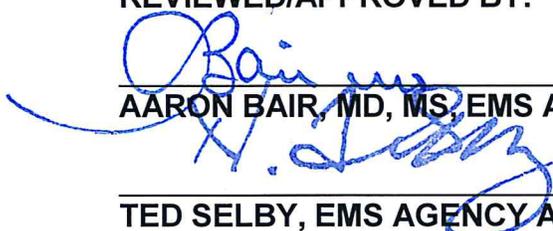
**EMERGENCY SERVICES BUREAU**  
275 Beck Avenue MS 5-240  
Fairfield, Ca. 94533  
(707) 784-8155 FAX (707) 421-6682  
www.solanocounty.com

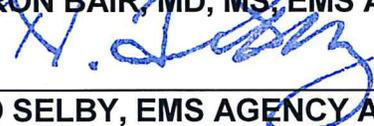
Ted Selby  
EMS Agency Administrator

## **POLICY MEMORANDUM 6603**

**EFFECTIVE DATE: December 28, 2015**

**REVIEWED/APPROVED BY:**

  
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**AARON BAIR, MD, MS, EMS AGENCY MEDICAL DIRECTOR**

  
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**TED SELBY, EMS AGENCY ADMINISTRATOR**

**SUBJECT: INTRAOSSEOUS CANNULATION – ADULT OR PEDIATRIC**

**AUTHORITY: CALIFORNIA HEALTH & SAFETY CODE, DIVISION 2.5, 1797.200.**

**I. PURPOSE/POLICY:**

To establish policy and procedure for the use of Intraosseous Infusion in adult and pediatric populations.

**II. DEFINITIONS**

- A. Intraosseous Cannulation (IO): The use of a manual or mechanical device to insert an appropriate needle through the bone into marrow cavity for medication administration or fluid resuscitation.
- B. EZ-IO: Mechanical device recommended for use in adult and pediatric populations for IO Cannulation.
- C. Bone Injection Gun or B.I.G.: Alternative mechanical device for use in adult and pediatric populations for IO Cannulation.
- D. Manual Intraosseous Infusion Needle: Only for use in pediatrics less than six years of age.

**III. CRITERIA FOR USE**

- A. Pediatrics:
  - 1. Patient critically ill or injured when IV fluids and/or medications must be administered to prevent death;
  - 2. Unresponsive;
  - 3. Venous access unavailable within 90 seconds.
- B. Adults:
  - 1. Patient critically ill or injured when IV fluids and/or medications should be immediately administered;
  - 2. May also be used after two unsuccessful IV attempts.

**IV. CONTRAINDICATIONS**

- A. Fracture proximal to placement site;
- B. Previous orthopedic procedures near insertion site;
- C. Inability to locate landmarks for insertion;
- D. Pre-existing medical condition of extremity;
- E. Infection at insertion site;
- F. Excessive pre-tibial or pre-humeral soft tissue or swelling;
- G. Previous IO within 24 hours;

**V. EQUIPMENT**

- A. Intraosseous infusion needle (Pediatric);
- B. EZ-IO DRIVER (Drill Device);
- C. EZ-IO Needle: 25 mm (adult and pediatric patients >3Kg) and 45 mm (adult humeral or >40 Kg with excessive tissue depth).
- D. Bone Injection Gun or B.I.G. (Adult and Pediatric sizes available);
- E. Appropriate county-recommended antiseptic cleanser;
- F. Sterile Gauze pads;
- G. 10 – 12 mL syringe filled with normal saline;
- H. Supplies to secure infusion.

**VI. PROCEDURE FOR INTRAOSSEOUS CANNULATION**

- A. Wear appropriate personal protective equipment;
- B. Note: Insertion sites are the same for the EZ-IO and Bone Injection Gun; See attachment A for Tibial placement and attachment B for Humeral placement.
- C. Using aseptic technique, cleanse the insertion site with appropriate county-recommended antiseptic cleanser;
- D. Stabilize the leg. For humeral insertion secure the arm in place across the abdomen.

- E. Locate the insertion site and Insert intraosseous needle. The proximal humerus is the preferred insertion site for adult patients.
1. Humeral-
    - a. Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)
    - b. Place your palm on the patient's shoulder anteriorly; the "ball" under your palm is the general target area
    - c. You should be able to feel this ball, even on obese patients, by pushing deeply
    - d. Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally
    - e. Place your thumbs together over the arm; this identifies the vertical line of insertion on the proximal humerus
    - f. Palpate deeply up the humerus to the surgical neck
    - g. This may feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck
    - h. The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle
  2. Tibia-
    - a. Aim the needle set at a 90-degree angle to the bone
    - b. Push the needle set tip through the skin until the tip rests against the bone
    - c. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
    - d. Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin
- F. Flush or bolus the IO catheter rapidly with 10 mL of normal saline using a 10 mL syringe; for pediatrics use 2-5 mL normal saline.
- G. Confirm proper placement in marrow cavity as evidenced by:
1. A decrease in resistance after needle passes through the bone cortex;
  2. The needle standing upright without support;
  3. The ability to aspirate bone marrow into syringe connected to the needle;
  4. Ability to push IV fluids through the IO needle without evidence of subcutaneous infiltration;
- H. Dress the site and secure the IO device in place;
- I. Lidocaine 2% administration for pain relief in conscious patients;
1. Prepare Lidocaine 2% -40 mg for adults and 0.5 mg/kg for pediatrics(max dose of 40mg)
  2. Prime extension set with Lidocaine

3. Note that the priming volume of the EZ-Connect® Extension Set is approximately 1.0 mL
  4. Slowly infuse lidocaine 40 mg IO over 120 seconds
  5. Allow Lidocaine to dwell in IO space 60 seconds
- J. Since there is relatively high pressure in the bone marrow cavity, fluids and medications **must** be administered under pressure when given using an intraosseous access device. This requires the use of either a pressure bag on the IV solution or the use of a syringe to inject fluids or medications under pressure.
- K. Continuous monitoring of soft tissues surrounding insertion site is required for early recognition of signs of infiltration.

**VII. CONTINUOUS QUALITY IMPROVEMENT (CQI)**

- A. Each agency's CQI Coordinator will evaluate the use of the IO on all patients (adult and pediatric) and report results at County CQI committee meetings;
- B. Each Agency using the IO device for adults will provide initial training for all paramedics to ensure competency in the procedure;
- C. To ensure skill competency each Advanced Life Support (ALS) Provider will provide annual "skills" practical update training for adult and pediatric IO;
- D. Annual training records for adult and pediatric IO will be submitted to the EMS Agency by the end of January each year for training accomplished the preceding calendar year.

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