

MEDICATION ADMINISTRATION

GENERAL CONSIDERATIONS

- A. Before administering any medication, the EMT should know:
1. What is the medication being used?
 2. Does the patient have an allergy to this medication?
 3. What is the safe and effective dose?
 4. What is the correct administration route?
 5. What are the indications? (Why are you using is?)
 6. What are the contraindications? (Why or when would you NOT use this medication?)
 7. What are the expected effects?
 8. What are the adverse effects / side effects?
 9. Is the medication expired?
- B. The “Six Rights” of medication administration:
1. Right patient – is the medication indicated for this patient; no contraindications; no allergies
 2. Right drug – the correct name (trade name vs. generic name); correct concentration
 3. Right dose
 4. Right route
 5. Right time – slow IVP vs. rapid IVP
 6. Right documentation
- C. Correct documentation of medications administered and/or IV/IO placement will include:
1. Time of medication administration; IV/IO placement
 2. Route of administration
 3. Size of catheter (IV/IO)
 4. Site location for IV/IO and SQ, IM medication (include unsuccessful IV/IO attempt locations)
 5. Dose or volume infused
 6. Time of infusion as indicated (e.g., rapid IVP, infused over 10 minutes, etc.)
 7. Name of EMT responsible
 8. Any complications and steps made to correct
 9. Patient’s response to treatment
- D. Use of a medication simply because it is in the protocol is not an acceptable standard of medical care. When there are questions about medication administration, consult medical control.

ORAL ADMINISTRATION

To administer an oral (PO) medication ensure that the patient has an intact gag reflex and place the patient in a seated or semi-seated position. Place the medication in the patient’s hand or mouth and ask them to swallow. If the patient needs a drink of water, it may be given to them if available.

Oral medications are absorbed through the gastrointestinal tract. The most common EMS medication given by this route is aspirin.



SUBLINGUAL ADMINISTRATION

To administer a sublingual (SL) medication, place the pill or direct the spray between the underside of the tongue and the floor of the oral cavity.

The medication is rapidly absorbed through the mucous membranes of the mouth and blood vessels of the tongue. The most common drug given by this route is nitroglycerin.



BUCCAL ADMINISTRATION

To administer a buccal medication place the medication between the patient's cheek and gum.

The drug is rapidly absorbed through the mucous membranes of the cheek. An example of a buccal medication is oral glucose.



INHALED MEDICATION ADMINISTRATION

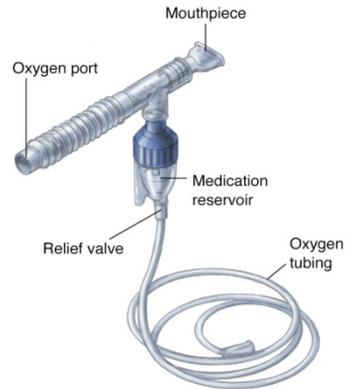
Oxygen administration – to administer oxygen, place the appropriate oxygen delivery device and set the flow accordingly. Appropriate flow rates are:

Device	Flow Rate in liters/min.	% Oxygen
Nasal Cannula	1-6	24-44%
Simple face mask	6-10	30-60%
Non-Rebreather Mask	10-15	60-95%
Venturi Mask	4-12 with appropriate adapter	40-60%

Metered-Dose Inhaler (MDI) – place the inhaler in the patient's mouth and press down on the inhaler. For the medication to be fully absorbed, have the patient breathe in slowly after the inhaler has been depressed. A spacer device may be used to increase the amount of medication to reach the bronchioles. Albuterol is a common medication delivered by MDI.



Nebulizer – to administer an aerosol medication with a nebulizer, place the medication in the assembled nebulizer. The drug is then administered with oxygen and absorbed in the alveoli and capillaries.



Nitronox Administration. Nitronox is a self-administered analgesic gas containing a mixture of 50% oxygen and 50% nitrous gas. Instruct the patient to hold the mask or mouthpiece to the mouth, breathe deeply and slowly. Allow the mask to fall away from the face spontaneously when effects are felt. Refer to Pain Management Protocol for specific indications and contraindications.



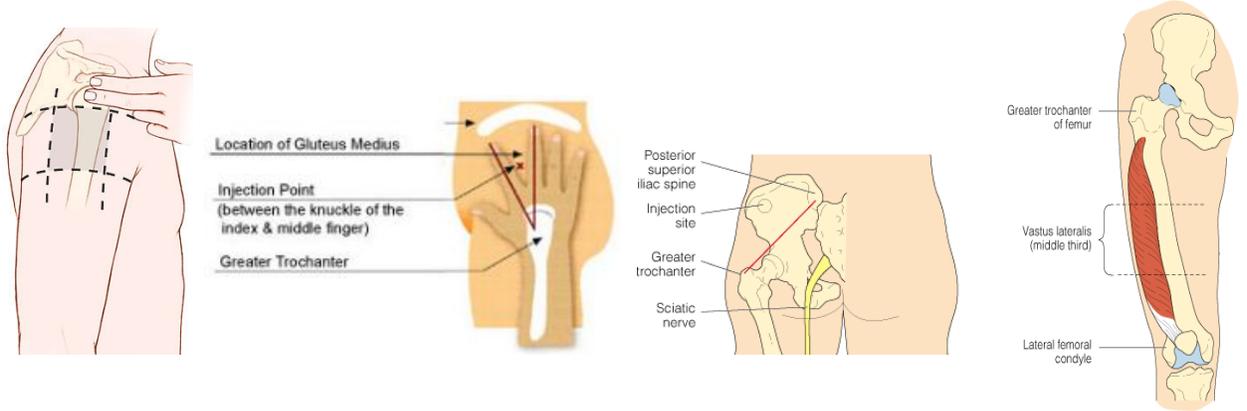
Tracheal Medications. The preferred route for medication administration during cardiac arrest is IV or IO, but, if unable to administer medications by that route, the tracheal route may be used for epinephrine, atropine, and lidocaine. Draw up the medication and dilute with 10 ml of normal saline for adults, 5ml for pediatric and 1 ml for infants. Instill the medication down the endotracheal tube using a needleless syringe and ventilate the patient with 5 rapid positive-pressure ventilations to disperse the medication.

Intranasal Administration (IN) - Draw up desired medication in a syringe. Attach a mucosal atomization device (MAD) to the syringe and insert the device into the nostril at a depth of 1.5 cm. The medication is then delivered as a fine mist that is absorbed through the nasal mucosa. Medication dose can be divided between nares with a maximum dose of 1 ml per nares. The onset of action for this route is rapid. Medications that can be delivered via the intranasal route are naloxone and midazolam.



INJECTABLE MEDICATION ADMINISTRATION

Intramuscular (IM) Injection - Draw up the desired medication in a syringe no larger than 5 ml. The appropriate needle size for an adult is 19-23 gauge and 1-2 inches long and 25 gauge 1/2-3/8" for children. Length of needle may vary based on the patient's size. The injection should be given at a 90° angle in one of the following locations: vastus lateralis, ventrogluteal, dorsogluteal, or deltoid. The ideal volume for a deltoid injection is 1 ml (2 ml max) and 3 ml (5ml max) for other sites. Avoid giving injections to patient exhibiting signs / symptoms of shock or edema / burns at injection site. Aspiration for blood should be performed with an IM injection to avoid giving the medication intravenously. In the event that blood is aspirated, dispose of needle and syringe and attempt again. Examples of IM medications include: epinephrine 1:1000, glucagon, diphenhydramine, haloperidol.



Deltoid

Ventrogluteal

Dorsogluteal

Vastus Lateralis

Subcutaneous (SQ) Injection – draw up the desired medication in a syringe no larger than 3 ml. The appropriate needle size for adult is 25-28 gauge and 1/2 - 5/8" and 25 gauge 1/2 - 3/8" for children. Length of the needle may vary based on the patient's subcutaneous tissue. The injection should be given at a 45-90° angle in one of the following locations: lateral aspect of the upper arm, the abdomen from the costal margins to the iliac crests, and the anterior thighs. Avoid giving injections to patient exhibiting signs / symptoms of shock or edema / burns at injection site. The maximum volume for SQ injection is 1 ml. Epinephrine 1:1000 is a common medication given by the SQ route.



Intravenous Push (IVP) / Intraosseous (IO) - delivery of medication directly into an infusion port on the IV tubing using a syringe. Use the port closest to the IV insertion site. This method of delivery has the fastest onset of action. Medications that are delivered slow IVP should be administered at a minimum of 5 minutes unless otherwise indicated. Medications given by the IO route and/or during cardiac arrest should be followed by a normal saline flush.



Peripheral Intravenous (IV) access

IVs may be started on patients of any age providing there are adequate veins and patient's condition warrants an IV. Generally, no more than two attempts or more than 5 minutes should be spent attempting IV access. IV placement must NOT delay transport of any critical patient. The initial attempt should be the dorsum of the hand. Further attempts should proceed to the forearm. Do NOT use the antecubital fossa unless the patient is unstable AND the IV is a life-saving procedure. External jugular veins are an option for critical adult patients. Veins in the feet and lower legs are an option, particularly for infants and young children; do not use these veins in patients with peripheral vascular disease due to risk of phlebitis. Do NOT use an arm used for hemodialysis. Avoid side of previous mastectomy.

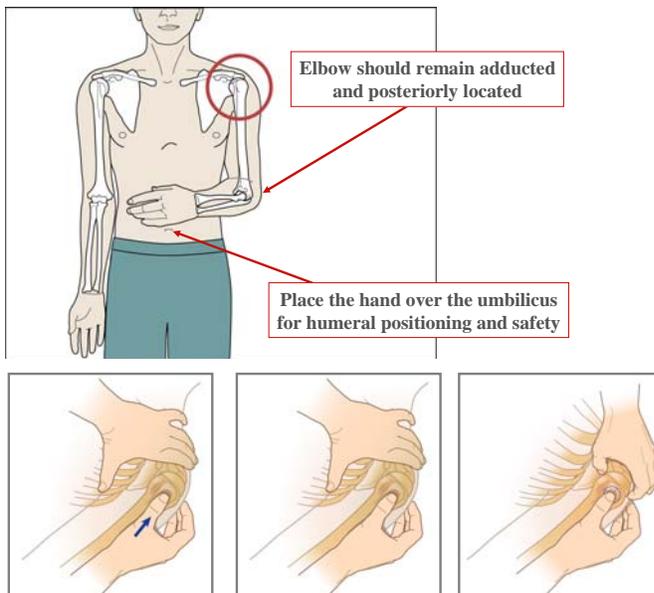
Gauge	Use	Approximate Flow Rate
14 (large bore)	Trauma, surgery, blood administration, administration of thick (viscous) medication in adolescents and adults	315 ml/min
16 (large bore)	Trauma, surgery, blood administration, administration of thick (viscous) medication in adolescents and adults	210 ml/min
18	Trauma, surgery, blood administration in adolescents and adults	110 ml/min
20	Suitable for most IV infusions in older children, adolescents and adults	65 ml/min
22	Children and elderly patients	38 ml/min
24	Neonates, infants, children and adults with fragile veins	24 ml/min



Intraosseous Infusion

"When IV access is unsuccessful or taking too long in a critically ill / injured patient, intraosseous access is an alternative method of gaining vascular access. Any medication or fluid that can be administered IV can be administered IO. IO access is indicated if vascular collapse is present and rapid access is essential, with mechanical access preferred over manual insertion. The preferred IO site is the proximal humeral head, though the medial aspect of the proximal tibia and distal tibia are also effective options. IO access should not be performed in an extremity with fractures proximal to the insertion site, orthopedic surgery, possible infection or other medical condition."

Humeral head



Distal Media



The insertion site is two finger-widths proximal to the medial malleolus and positioned midline on the medial shaft.

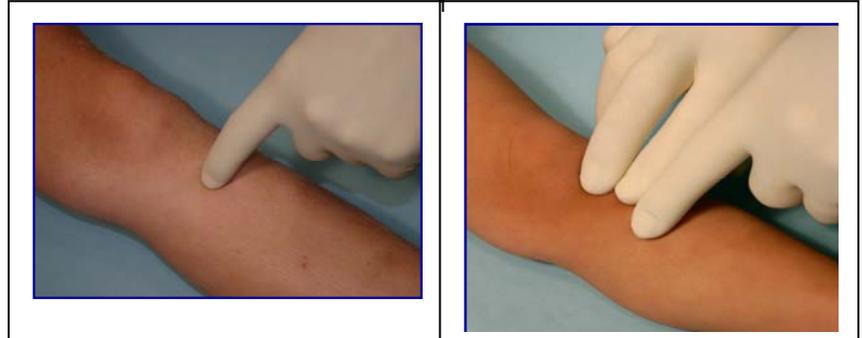
NOTE: For pediatric patients, insertion is one finger-width proximal to the medial malleolus, along the flat aspect of the medial distal tibia. As the patient's size approaches 39 kilograms, the practitioner should accommodate for the larger bone and joint space.

Proximal Medial Tibia

Adult patients



Pediatric Patients



If the tibial tuberosity CAN be palpated the insertion site is one finger-width below the tuberosity and then medial along the flat aspect of the tibia.

It is often difficult to palpate the tibial tuberosity on very young patients. If the tibial tuberosity CANNOT be palpated the insertion site is two finger-widths below the patella and then medial along the flat aspect of the tibia.

IO Lidocaine Infusion Protocol

Indication: Pain from an IO in an awake patient

Precautions & contraindications: Refer to Drug Index

Adult Protocol

1. Use only 2% lidocaine, preservative-free and epinephrine-free, a.k.a. cardiac or ACLS lidocaine.
2. Prime extension set with lidocaine (approximately 1 mL).
3. Slowly infuse lidocaine 40 mg IO over 120 seconds.
4. Allow lidocaine to dwell in IO space 60 seconds.
5. Flush with 5 to 10 mL of normal saline.
6. Slowly administer an additional 20mg of lidocaine IO over 60 seconds, repeat PRN.

Infant/Child Protocol

1. Use only 2% lidocaine, preservative-free and epinephrine-free, a.k.a. cardiac or ACLS lidocaine.
2. Prime extension set with lidocaine (approximately 1 mL).
Note: If the child requires less than 1 mL of lidocaine, consider administering by syringe directly into the needle hub (prime extension tubing with normal saline)
3. Slowly infuse lidocaine 0.5 mg/kg (not to exceed 40 mg) over 120 seconds.
4. Allow lidocaine to dwell in IO space 60 seconds.
5. Flush with 5 to 10 mL of normal saline.
6. Slowly administer an additional half the initial dose lidocaine IO over 60 seconds, repeat PRN.

Infant/Child IO Lidocaine Analgesia Dosage Reference

Note: Dose in mL is for 2% lidocaine solution

Weight kg (lbs)	1st Dose (mL)	2nd Dose (mL)	Weight kg (lbs)	1st Dose (mL)	2nd Dose (mL)
4 (8.8)	0.1	0.05	44 (96.8)	22	11
8 (17.6)	0.2	0.1	48 (105.6)	24	12
12 (26.4)	0.3	0.15	52 (114.4)	26	13
16 (35.2)	0.4	0.2	56 (123.2)	28	14
20 (44)	0.5	0.25	60 (132)	30	15
24 (52.8)	0.6	0.3	64 (140.8)	32	16
28 (61.6)	0.7	0.35	68 (149.6)	34	17
32 (70.4)	0.8	0.4	72 (158.4)	36	18
36 (79.2)	0.9	0.45	76 (167.2)	38	19
40 (88)	1	0.5	80 (176)	40	20