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| Performance Standard | | 7309 |
| Effective April 1, 2018 | Expires March 31, 2019 | |
| Category I Skill – Low Frequency/High Risk: Calculating and Preparing Medication Dosage | Approval: Medical Director Reza Vaezazizi, MD | Signed |
| Applies To: PSP, EMT, AEMT, PM, MICN, BHP, EMS System | Approval: REMSA Director Bruce Barton | Signed |

Terminal Performance Objective

To correctly calculate, prepare and administer medication(s) to a patient.

Before administering a medication, the PSP, EMT, AEMT, or paramedic must:

- a. Calculate the patient’s weight in kg
 - a. The patient may be able to verbalize his or her weight when awake, alert and oriented

- b. Review the six patient rights¹:
 - a. Right Medication
 - b. Right Patient
 - c. Right Dose
 - d. Right Time
 - e. Right Route
 - f. Right Documentation

- c. Some additional rights to consider:
 - a. Right to refuse
 - b. Right to be informed, including:
 - i. Name of medication
 - ii. Goal of administration
 - iii. Possible results, both positive and negative
 - c. Right indication

- d. Ascertain the patients allergies, including food, latex and medications

- e. Medication Calculations
 - a. Calculate patient’s weight in kg (1 kg = 2.2 pounds)

 - b. Ensure that all medications are in the same system of measurement (e.g., g, mg, µg, or mL)

a. Basic medication calculation:

$$\frac{\text{Desired}}{\text{Have}} \times \text{Quantity on hand} = \text{Dose}$$

b. IV medication calculation:

$$\text{Drip Rate} = \frac{\text{Total mL}}{\text{Total Minutes}} \times \text{Drip Factor (in drops/mL)}$$

¹ Paramedic Care Principles & Practice, Volume 1, Third Edition, Bledsoe, Porter, and Cherry

² Dosage Calculations made Incredibly Easy, 2nd Edition, Springhouse, 2002

- f. Check medication for right Drug, Dose, Integrity, Clarity, and Expiration date (DDICE)³ three times:
 - a. When you select the medication
 - b. As you are drawing it up
 - c. Just before administering medication

While administering a medication, the PSP, EMT, AEMT, or paramedic should:

1. Utilize appropriate body substance isolation
2. Maintain an aseptic environment
 - a. If administering a parenteral medication, cleanse the site with an antiseptic, such as alcohol wipes or betadine
 - b. Recap needles only as a last resort
 - i. Never use two hands to recap; lay the cap on a flat surface, and aim the syringe with the open needle attached into the cap
3. Use the appropriate route of medication administration:
 - a. Medication routes for the PSP: intranasal (as authorized by REMSA)
 - b. Medication routes for the EMT, AEMT, or paramedic:
 - i. Enteral
 1. Oral (PO)
 - ii. Parenteral
 1. Intramuscular (IM)
 1. Autoinjection(s) in vastus lateralis
 - c. Additional medication routes for the AEMT, or paramedic:
 - i. Enteral
 1. Oral (PO)
 2. Sublingual (SL)
 - ii. Parenteral
 1. Intravenous (IV)
 1. Push (IVP)*
 2. Intranasal (IN)
 1. Adult maximum volume: 1 ml per nostril
 2. Pediatric maximum volume: 0.5 ml per nostril
 3. Intramuscular (IM)
 1. 1 ml maximum in deltoid
 2. 2.5 ml maximum in gluteus
 3. 2 ml maximum in vastus lateralis
 4. Needle gauge and length:
 - a. 20 – 23 ga, 1 – 1.5 inch
 4. Subcutaneous (SQ)
 1. 1 ml maximum given SQ
 2. 23 – 25 gauge, 1/2 - 7/8 inch length
 5. Inhalation/Nebulized
 - d. Additional medication routes for the paramedic:
 - i. Enteral
 1. Buccal
 - ii. Parenteral
 1. Intravenous (IV)
 1. Intravenous piggyback (IVPB)*

³ Paramedic Care Principles & Practice, Volume 1, Third Edition, Bledsoe, Porter, and Cherry

2. Intraosseous (IO)
 1. Push (IOP)*
3. Intramuscular (IM)
 1. 5 ml maximum in gluteus or vastus lateralis in true emergencies such as when giving Magnesium Sulfate by the IM route for eclampsia
 2. Needle gauge and length:
 - a. 20 – 23 ga, 1 – 1.5 inch
4. Topical

* Always flush with at least 3 mL of Normal Saline after administering a medication IV/IO push and immediately following the infusion of an IVPB/IOPB medication

4. Reassess the patient after administration for response to medication
5. Documentation
 - a. Document all information concerning the patient and the medication including:
 - i. Indication for medication administration
 - ii. Dosage and route delivered
 - iii. Patient response to the medication; positive, negative, or none
 - iv. Patient's condition before and after medication administration
 - v. Vital signs before and after medication administration

Critical Success Factors

Appropriate dose and volume of the correct medication is administered.
 Desired effect of the medication is achieved.
 Adverse effects are identified immediately and addressed appropriately.

System Benchmark

1. Appropriate dose and volume of the correct medication is administered 100% of the time
2. Adverse effects of medication are identified and addressed appropriately 100% of the time

Core Competency Requirements

1. Differentiate among the chemical, generic, official, and trade names of a medication
2. Six patient "rights" of medication administration
3. Special considerations: pediatric patients, pregnant patients, geriatric patients
4. Medication routes (IVP, IVPB, IM, SQ, IO, topical, nebulized or inhaled, nasal atomizer device)
5. Appropriate volumes for each route
6. Standard Precautions
7. Calculating IV drip rates
8. Complications of peripheral IV access
9. Conversion to metric system & metric equivalents
10. Calculating dosages for medications

Equipment Requirements

1. PPE
2. Needles, syringes, (exact sizes), nebulizers, Nasal Atomizer Device (NAD), measurement paper (for Nitroglycerin paste)

Instructor Resource Materials

Paramedic Care Principles & Practice, Volume 1, Third Edition, Bledsoe, Porter, and Cherry

Calculating and Preparing Medication Dosage Validation

PERFORMANCE CRITERIA: 100% accuracy required on all items marked with an *

Before administering a medication the PSP, EMT, AEMT, or paramedic must:

| Points | Score | Performance Steps | Additional Information |
|--------|-------|--|--|
| 1 | | Calculate the patient's weight in kilograms (kg) * | <ul style="list-style-type: none"> The patient may be able to verbalize his or her weight when awake, alert and oriented Divide the patient's weight in pounds by 2.2 to arrive at kg |
| 1 | | Review the six patient rights * | <ol style="list-style-type: none"> Right medication Right patient Right Dose Right Time Right Route Right Documentation <p>Additional "rights" to consider:</p> <ul style="list-style-type: none"> Right to refuse Right to be informed of medication <ul style="list-style-type: none"> Name of medication Goal of medication administration What patient can expect from medication, positive and negative Right indication |
| 1 | | Ascertain the patient's allergies, including food, latex and medications * | |
| 1 | | Calculate dosage * | <ol style="list-style-type: none"> Calculate patient's weight in kg (1 kg = 2.2 pounds) Ensure that all medications are in the same system of measurement (e.g., g, mg, µg, or mL) Basic medication calculation as in Performance Standard above IV medication calculation as in Performance Standard above |
| 1 | | Check medication for Drug, Dose, Integrity, Clarity, and Expiration date (DDICE) 3 times * | <ol style="list-style-type: none"> When you select the medication As you are drawing it up Just before administering medication |

While administering a medication the PSP, EMT, AEMT, or paramedic must:

| Points | Score | Performance Steps | Additional Information |
|--------|-------|--|--|
| 1 | | Take or verbalize body substance isolation * | Selection: gloves, goggles, mask, gown, booties, P100 PRN |
| 1 | | Maintain an aseptic environment * | <ol style="list-style-type: none"> If administering a parenteral medication, cleanse the site with an antiseptic, such as alcohol wipes or betadine Recap needles only as a last resort <ol style="list-style-type: none"> Never use two hands to recap; lay the cap on a flat surface, and aim the syringe with the open needle attached into the cap |

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| 1 | | Use the appropriate route of medication administration * | <p>Medication routes for the EMT, AEMT, or paramedic:</p> <ul style="list-style-type: none"> a. Enteral <ul style="list-style-type: none"> i. Oral (PO) b. Parenteral <ul style="list-style-type: none"> i. Intramuscular (IM) <ul style="list-style-type: none"> 1. Autoinjection(s) in vastus lateralis <p>Additional medication routes for the AEMT, or paramedic:</p> <ul style="list-style-type: none"> c. Enteral <ul style="list-style-type: none"> i. Oral (PO) ii. Sublingual (SL) d. Parenteral <ul style="list-style-type: none"> i. Intravenous (IV) <ul style="list-style-type: none"> 1. Push (IVP) ii. Intranasal (IN) <ul style="list-style-type: none"> 1. Adult maximum volume: 1 ml per nostril 2. Pediatric maximum volume: 0.5 ml per nostril iii. Intramuscular (IM) <ul style="list-style-type: none"> 1. 1 ml maximum in deltoid 2. 2.5 ml maximum in gluteus 3. 2 ml maximum in vastus lateralis 4. Needle gauge and length: <ul style="list-style-type: none"> 1. 20 – 23 ga, 1 – 1.5 inch iv. Subcutaneous (SQ) <ul style="list-style-type: none"> 1. 1 ml maximum given SQ 2. 23 – 25 gauge, 1/2 - 7/8 inch length v. Inhalation/Nebulized <p>Additional medication routes for the paramedic:</p> <ul style="list-style-type: none"> e. Enteral <ul style="list-style-type: none"> i. Buccal f. Parenteral <ul style="list-style-type: none"> i. Intravenous (IV) <ul style="list-style-type: none"> 1. Intravenous piggyback (IVPB) ii. Intraosseous (IO) iii. Intramuscular (IM) <ul style="list-style-type: none"> 1.5 ml maximum in gluteus or vastus lateralis in true emergencies such as when giving Magnesium Sulfate by the IM route for eclampsia iv. Topical <p>Always flush with at least 3 mL of Normal Saline after administering a medication IV/IO push and immediately following the infusion of an IVPB/IOPB medication</p> |
| 1 | | Reassess the patient after administration for response to medication * | |

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| 1 | | Perform documentation * | Document all information concerning the patient and the medication including: <ol style="list-style-type: none"> 1. Indication for medication administration 2. Dosage and route delivered 3. Patient response to the medication; positive, negative, or none 4. Patient's condition before and after medication administration 5. Vital signs before and after medication administration |
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Critical Failure Criteria

- ___ Failure to calculate the patient's weight in kilograms (kg).
- ___ Failure to review the six patient rights.
- ___ Failure to ascertain the patient's allergies.
- ___ Failure to calculate dosage.
- ___ Failure to check medication (DDICE) three times.
- ___ Failure to take or verbalize BSI appropriate to the skill prior to performing the skill.
- ___ Failure to maintain an aseptic environment.
- ___ Failure to use the appropriate route of medication administration.
- ___ Failure to reassess the patient after administration for response to medication.
- ___ Failure to perform documentation.
- ___ Any procedure that would have harmed the patient.