SASKATOON DISTRICT HEALTH

Department of Nursing Affairs

ADMINISTRATION OF INTRAVENOUS PUSH/DIRECT MEDICATIONS

SPECIAL NURSING PROCEDURE

LEARNING PACKAGE

This package provides the basic information necessary for the nurse to understand administration of intravenous push/direct medication theory and nursing care.

DATE: March 2011

ACKNOWLEDGMENTS:

Coordinated by:

Helen Sabadash — Clinical Nurse Educator, Royal University Hospital

Special thanks to:

Teresa Pidduck — Clinical Nurse Educator, Royal University Hospital
Carey Redekopp-Kroeger — Clinical Nurse Educator, Royal University Hospital

TABLE OF CONTENTS:

1.0 INTRODUCTION

1.1 Certification in Administration of IV Push/Direct Medications

Registered Nurses, Graduate Nurses and Registered Psychiatric Nurses (RN, GN,RPN) identified by the managers in designated practice settings will be certified in Administration of IV Push/Direct Medication. Successful completion of this module will complete the theory portion of the IV push/direct medication certification. Following completion of this module you will be required to demonstrate the skill to a Clinical Nurse Educator or certified RN/GN/RPN to complete the skill certification.

1.2 Criteria for Certification

1.2.1 Review of the learning package.

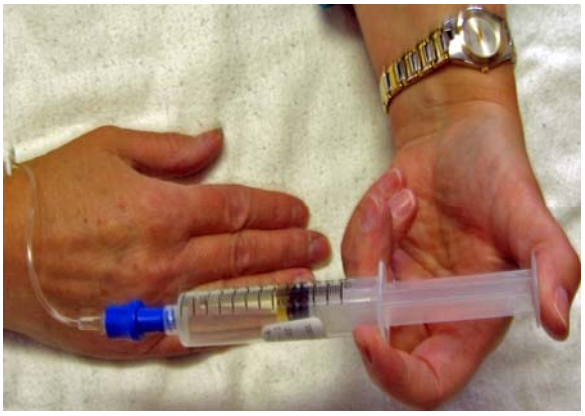
1.2.2 Completion of the Review Quiz (Section 5)

1.2.3 Demonstration of the skill.

1.3 Objectives

Upon completion of this learning package you should be able to:

- Define IV push/direct administration of medications
- Identify the steps in safely administering medication by the IV push/direct route
- Identify medication information resources
- Calculate the dosage of medications
- Identify complications of IV push/direct route



Medication given IV Push/Direct

2.0 THEORY

2.1 Definition

What is an IV push/direct medication?

- IV push/direct means the manual administration of a small volume of medication or concentrated solution directly into the venous system.
- It does **not** refer to a medication placed on a pump or is added to an IV bag.

Why give a medication by the IV push/direct route?

- Giving a medication IV push/direct means more immediate and predictable therapeutic effects.
- The health care team is able to quickly respond to a patient's needs.
- Some medications can only be absorbed intravenously.
- The IV route is often required if the patient is unable to take oral medications.
- Administration can be discontinued immediately if an adverse reaction occurs.

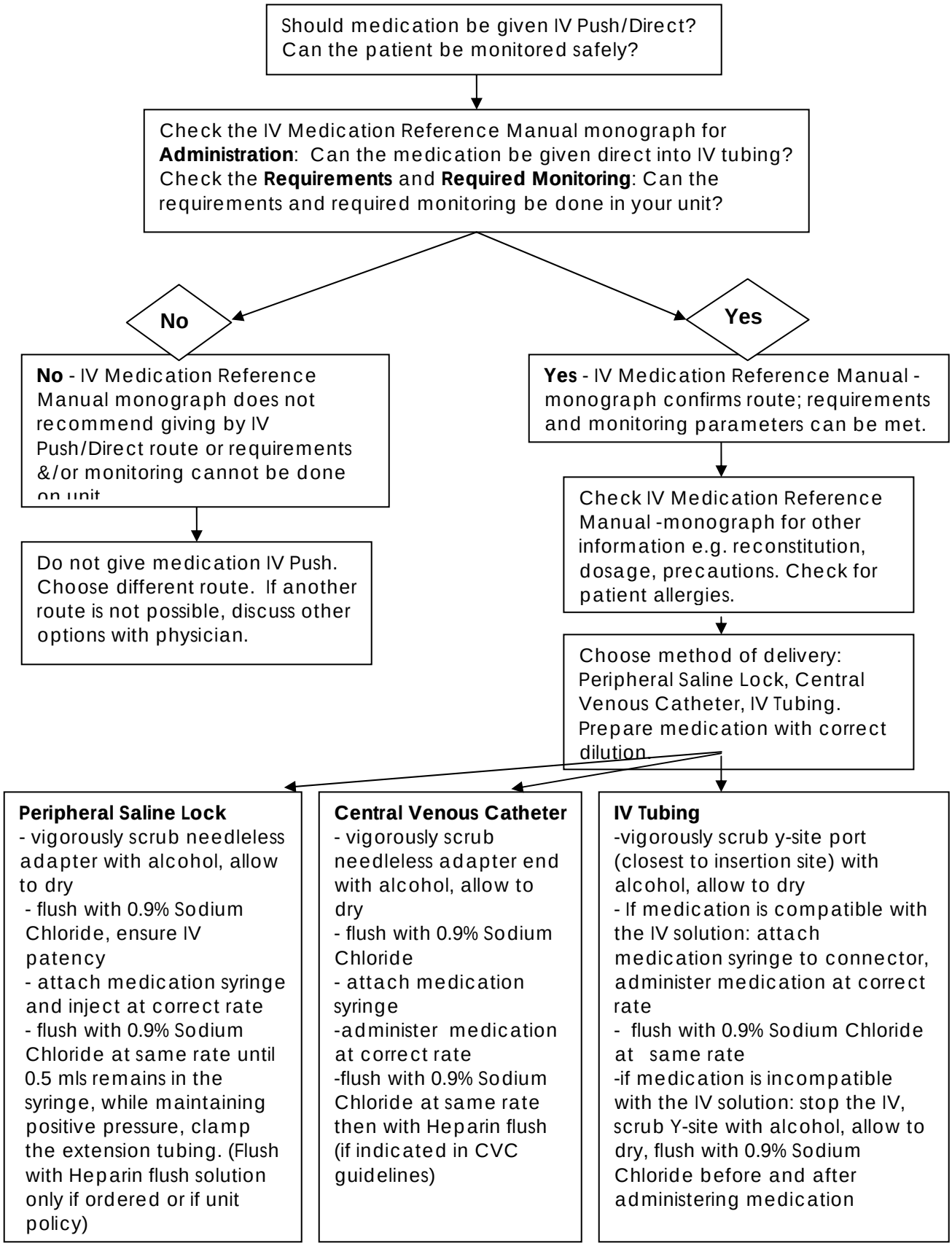
Please review SHR policy: Administration of IV Push/Direct medications (Page 9)

2.2 Checking

Prior to giving an IV Push Medication various safety checks are performed:

- Check **physician's order** to determine medication, dose, route and frequency of administration.
- Using available resources (**IV Medication Reference Manual, CPS, Pharmacy**):
  1. Check if medication can be given IV push/direct
  2. Check if the monitoring requirements can be met on your unit (see Decision Tree 2.3)
  3. Review information about the medication, including **action, purpose, peak onset, normal dose, side effects, and dilution**
- Check that it is the **right patient, right drug, right dosage, right time, right dilution/compatibility, right flow rate and right route**.
- For **High alert medications**, an independent double check and documentation is required.
- Check for any **incompatibilities** of IV medications.
- Check for any known **allergies** and monitor for any reactions during administration.
- Watch for IV related **complications**; ensure venous access is patent prior to administering the medication. Some medications can cause severe tissue damage if injected into the tissue (extravasation).

2.3 Administering a Medication IV Push/Direct Decision Tree



2.4 IV Medication Reference Manual Monographs

Practice using the IV Medication Reference Manual monograph with this patient scenario:

Maureen McFee is a 70 year old woman who is a patient on a surgical unit. She is a post-op patient recovering from abdominal surgery. The physician has an order on the chart for 2- 5 mg Morphine IV push q 4 hrs.

Using the IV Medication Reference Manual Monograph Sample- **Appendix A** answer the following questions:

- Is this medication drug appropriate for IV push?
- Is this the correct dose?
- What monitoring is required?
- What are the desired effects?
- What are the possible adverse effects?

Check your answers:
See **Appendix B** - IV Medication Reference Manual Monograph Sample-Answer page

This is a **High Alert medication** –Saskatoon Health Region requires an independent double check and documentation for these medications at certain concentrations.

(For complete policy see: Regional Policy 7311-60-020 High Alert Medications-Identification, Double Check and Labelling)

High-Alert Medications are medications that bear a heightened risk of causing significant patient harm when used in error (as defined by the Institute for Safe Medication Practices).

Independent Double-Check means a second independent check by a second healthcare professional confirming the medication correctly reflects the original prescribed medication order, and the medication administration is in accordance with the drug monograph and / or respective policy.

An **independent double-check** is required prior to the administration of any dose which requires use of the following high-alert medications:
• insulin (excluding subcutaneous insulin administered through Home Care),
• intravenous anticoagulants
• concentrated electrolytes,
• chemotherapeutic agents,
• high potency narcotics,
• intravenous vasoactive agents and
• neuromuscular blocking agents.

High Potency Narcotics

High-potency narcotics include dosage forms of:

- Hydromorphone injection greater than 2mg/mL,
- Morphine injection greater than 10mg/mL (adults),
- Morphine injection greater than 2mg/mL (pediatrics),
- Fentanyl injection greater than 250mcg/5mL.

2.5 Potential Complications

Complications to watch for in a patient receiving IV Push medications include complications associated with venous access: thrombophlebitis, infection, infiltration and complications associated with medications: extravasation, allergic reactions and speed shock. Review the complications with these problem solving questions:

1. Prior to administering an IV push medication, you assess the patient's IV. The IV cannot be flushed and the patient tells you his IV "hurts."

i) What are the causes of thrombophlebitis in an IV?

ii) What is one symptom of thrombophlebitis?

iii) You cannot flush the IV. Can you still give the IV push medication through this IV?

2. Your patient has an order for Ancef (Cefazolin). You check the patient's chart and ask the patient if he has any allergies. After finding no evidence that this person would be allergic to the medication, you begin to administer the medication IV Push. After about 1/3 of the medication has been administered, you notice that the patient's face is suddenly flushed.

i) What could be the cause?

ii) What is a sign or symptom of an allergic reaction?

iii) What is the appropriate intervention when an allergic reaction is suspected

3. You are receiving an admission from ER. They report on the care the patient received. The patient experienced Speed Shock after receiving a medication IV push.

i) What is Speed shock?

ii) What are the signs and symptoms?

iii) How can you prevent this from happening?

4. Prior to administering medications you check the IV for any signs of Infection.

i) Signs of infection in an IV include.

ii) IV infections can be prevented by:

5. An interstitral IV allows the IV fluid or medication to infiltrate into the tissues instead of into the vein. Extravasation is when this medication causes damage to the tissues.

i) What are signs/symptoms of infiltration?

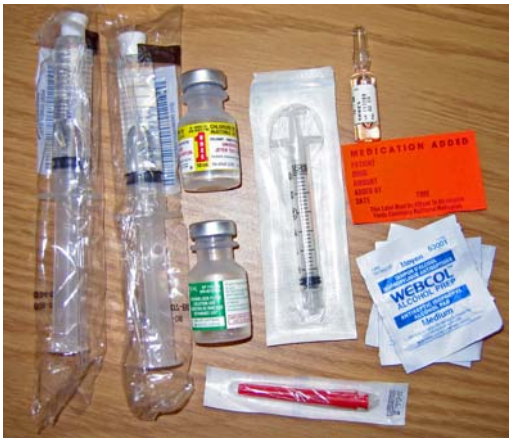
ii) How can you decrease the risk of infiltration and extravasation?

(check your answers Section 2.9)

2.6 Administering the Medication

After you have done the appropriate checking, you can gather your supplies, calculate the correct dosage and administer the drug.

Supplies required:



- Medication Administration Record (MAR) (take it into the room)
- IV medication
- Alcohol swabs
- Syringe with needle or blunt needle
- Medication
- Medication label
- Diluents (sterile saline/water)
- 0.99% Sodium Chloride flush syringes
- Heparin flush (if using a central venous catheter that requires it)

Calculate the dosage

Note: In some circumstances the medication dose will need to be calculated by age, height, and weight or body surface area.
Calculate the dosage for these examples:

Example 1: A physician writes an order for administration of an IV push medication for a patient with pulmonary edema. The order is for **Furosemide (Lasix) 35mg** IV push stat. The vial of Furosemide contains 4mls – each ml contains 10 mg of Furosemide. How much would you draw up?

Example 2: **Diphenhydramine (Benadryl) 12.5 mg IV** is ordered for a patient having an allergic reaction**.** The ampule of Diphenhydramine contains 1 ml – each ml contains 50mg of Diphenhydramine. How many mls do you draw up?
(check your answers –Section 2.9)

Administer the Medication

IV push medication can be given through a Peripheral Saline Lock, IV tubing or through a Central Venous Catheter. (For procedures see SHR policy: Administration of IV Push/Direct medications -Page 9)

2.7 Documentation and Reporting

This final step in the IV push process is documentation and reporting.

- Chart on the Medication Administration Record (MAR). IV medications should be documented immediately after administration.
- Include the time, dosage, route, initials and co-signer if dose needs to be double-checked. (see Appendix C - for Sample MAR)
- Chart patient response to medication.
- For pediatric patients: record flush solution on MAR and volume if fluid restricted on daily flow sheet/fluid balance record.
- NICU/PICU record medication and flush volume on IV intake record.
- Report to physician if medication is not effective or if the medication causes any adverse effects.

2.8 Summary

Now that you've reviewed the steps of IV push medication administration, it's time to test your knowledge. To complete this module, you must take the final Review Quiz.

2.9 Answers for Study Questions

Potential Complications - Problem Solving (Section 2.5)

Answers:

1. i) clot formation due to irritation ii) pain along the vein iii) no
2. i) possible allergic reaction to the medication ii) Rash, facial swelling iii)discontinue administering the medication & notify the physician
3. i) medication given too fast ii) hypotension, headache flushed face iii) infuse medication and flush at prescribed rate and dilution
4. i) pain, edema, purulent discharge, fever ii) good hand washing prior to care, aseptic technique during insertion, catheter care and removal, changing IV every 96 hours unless contraindicated
5. i) pain, burning and swelling around the insertion site; IV infusing poorly

   ii) check patency of IV prior to administering medications, observe site while administering medications and ask patient to alert you regarding any discomfort.

Administering the Medication - Calculate the dosage (2.6)

Answers:

Example #1 - 3.5 mls should be drawn up

Example #2 - 0.25 mls should be drawn up

3.0 POLICY AND PROCEDURE: Administration of IV Push Medication

Saskatoon Health Region	Title: **INTRAVENOUS – PUSH MEDICATION ADMINISTRATION** I.D. Number: **1089**
Authorization: [ ] Board of Directors [ ] MAC Motion #: [x] Tri-Hospital Nursing Practice Committee	Source: Nursing Date Reaffirmed: November 2010 Date Revised: November 2010 Date Effective: February 2001 Scope: **SASKATOON CITY HOSPITAL** **ROYAL UNIVERSITY HOSPITAL** **ST. PAUL'S HOSPITAL**

1.0 POLICY:

All Nursing Units are targeted for this Special Nursing Procedure:

1.1 Registered Nurses/Registered Psychiatric Nurses/Grad Nurses identified by their manager will be certified to administer IV push medications in accordance with the guidelines of the institutions, the nursing units and with the IV Medication Reference Manual.

NOTE: RN 4th year nursing students may give IV push/direct medications under the direct supervision of a certified RN/RPN/GN.

1.2 IV push/direct medication administration refers to the manual administration of a relatively small volume of a concentrated solution or medication directly into the venous system via a peripheral or central venous access device. The IV push route should be chosen in emergencies or whenever an immediate drug effect is needed.

1.3 The nurse must be knowledgeable regarding:

- compatibility of medication and IV solution
- maximum dosage and rate of administration
- desired therapeutic effects
- possible adverse effects
- appropriate preparation and dilution
- required monitoring parameters

1.4 The nurse must check the medication monograph in the IV Reference Manual to determine if the required monitoring can be met on the unit. NICU: see appropriate IV medication resource. If the monitoring requirements cannot be met, do not give medication IV Push. If another route is not possible, discuss other options with physician.

1.5 The nurse must ensure the following:
- Right patient
- Right drug
- Right dosage
- Right route
- Right time
- Right dilution/fluid compatibility
- Right flow rate
- Right monitoring
- Right documentation

1.6 If the patient has a central venous catheter, administer IV push/direct medication as per this policy and refer to the related policies for Central Venous Catheter flushing and locking in the Tri-Hospital Policy & Procedure Manual.

2.0 PURPOSE:

2.1 To safely administer approved medications intravenously by push/direct route.

3.0 PROCEDURE:

3.1 Supplies:

- alcohol swabs
- syringe
- medication
- medication labels
- diluent, if applicable
- 0.9% Sodium Chloride flush

NOTE: NICU – use D5W as per protocol
PICU – as per unit protocol

3.2 Check for patient allergies.

3.3 Prepare medication as necessary ensuring compatible diluent and correct dilution. Attach a completed medication label. Refer to Policy: Medication Administration #1170.

NOTE: If more than one medication is to be administered and incompatibilities exist, flush with 0.9% Sodium Chloride (NICU – D5W as per protocol) between each medication.

3.4 Examine insertion site and ensure patency.

3.4.1 If using a running intravenous, observe for free flow of IV solution.
3.4.2 If using a saline/heparin lock, assess ease of flush.

3.5 Using Peripheral Intravenous Tubing Port (Y-Site):

3.5.1 Vigorously scrub y-site port closest to insertion site with alcohol. Allow to dry.
3.5.2 If medication is compatible with the IV solution, attach medication syringe to y-site port by pushing and twisting until tight. Inject at the correct rate, and then flush y-site port with 0.9% Sodium Chloride.
3.5.3 If medication is incompatible with the IV solution, stop the IV infusion, scrub y-site port with alcohol, flush with 0.9% Sodium Chloride and inject medication at the correct rate. Scrub y-site port with alcohol and flush again with 0.9% Sodium Chloride.
3.5.4 Re-establish infusion.

NOTE: The flush following medication administration must be delivered at the same rate as the medication injection.

3.6 Using a Peripheral Saline Lock

3.6.1 Vigorously scrub needleless adapter with alcohol. Allow to dry.
3.6.2 Attach syringe with 0.9% Sodium Chloride to needleless adapter by pushing and twisting until tight and flush.
3.6.3 Repeat 3.6.1 and attach medication syringe. Inject at correct rate.
3.6.4 Repeat 3.6.1 and flush with 0.9% Sodium Chloride until 0.5 ml remains in the syringe. Maintaining positive pressure with the syringe plunger, clamp the extension tubing. A small amount of fluid may remain in the syringe.
(NICU – lock with a minimum of double the lumen volume with 0.9% Sodium Chloride after use and q6h) (PICU – heparin flush as per unit protocol).

3.7 Documentation and Reporting

3.7.1 On the Medication Administration Record (or appropriate record) include date, time, name of drug, dosage, route, initials and co-signer initials if dose is double checked. Refer to Policy: Medication Administration Record (MAR) #1091.
3.7.2 On flow sheet/progress note include rationale for administration and patient response.
3.7.3 Pediatric Units: record flush solution on the MAR and volume if fluid restricted on daily flow sheet/fluid balance record.
3.7.4 NICU/PICU: record medication and flush volume on IV intake record.
3.7.5 Report adverse effects immediately to the physician.

4.0 REFERENCES:

1. Crimlisk, J., et al, 2009. Evidence – Based Practice Clinical Simulations Workshop and IV Medications Medsurg Nursing, May 1 June. Pg 153 – 160.

2. Elkin, M., Perry, A.G., & Potter, P.A. Nursing Interventions + Clinical Skills. 3rd ed. Mosby – an affiliate of Elsevier, St. Louis, MO. Pg 709 – 717.

3. Ingram, L., 2008. Safe Practice in Intravenous Medicines Administration. Nursing Standard, Vol. 22 No. 46. Pg 44 – 47.

4. Jones, S.W., 2009. Reducing Medication Administration, Errors in Nursing Practice. Nursing Standard Vo.l 23 No. 50. Pg 40 – 46.

5. Weinstein, S.M., 2007. Plumer's Principles and Practice of Intravenous Therapy. 8th ed. Lippincott – Williams & Wilkins, Philadelphia, PA., Chapter 9.

4.0 APPENDIX A – IV Medication Reference Manual - Monograph Sample

**** HIGH ALERT MEDICATION **** **MORPHINE SULPHATE**

OTHER NAMES	CLASSIFICATION	* ELDER ALERT
	Opiate Agonist/Narcotic Analgesic	See Cautions

INDICATIONS FOR IV USE

- Severe acute or chronic pain.[1] Analgesic of choice for acute myocardial infarction.[2]
- Acute pulmonary edema secondary to heart failure.[2]
- Sedation to supplement anesthesia and for analgesia during labour.[2]

CONTRAINDICATIONS

- ➢ *Hypersensitivity to morphine (rare). Cross reaction may occur with codeine, oxycodone, hydromorphone, oxymorphone.*
- ➢ *Hypersensitivity to sulfites: certain formulations contain sulfite preservatives.*
- Pulmonary edema due to chemical respiratory irritant.[2]

CAUTIONS[1,2]

- * Elderly(greater than 65): may be more sensitive to adverse effects (e.g. respiratory depression, constipation, urinary retention).
- Prostatic hypertrophy, urethral stricture, severe renal or hepatic impairment, and debilitated patients
- Head injury, other intracranial lesions, or a pre-existing elevated intracranial pressure.
- Respiratory disease; pre-existing respiratory depression; hypoxia or hypercapnia: risk of apnea is increased.
- Depleted blood volume: severe hypotension may result.
- Atrial flutter, other supraventricular tachycardias: ventricular rate may increase significantly.
- Convulsive disorders: pre-existing conditions may be aggravated.

DRUG INTERACTIONS:[1]

- CNS depressants – additive effects increase the risk of respiratory depression, hypotension, profound sedation, coma.

PREGNANCY/BREAST FEEDING: Safe use other than in labour is not established. Contact pharmacy for most recent information.

ADMINISTRATION

MODE	DIRECT INTO IV TUBING	INTERMITTENT INFUSION	CONTINUOUS INFUSION
	YES	YES	YES
ADULT	Undiluted into running IV, or diluted in 4-5 mL SW or NS. Maximum rate 2 mg/min[3]	Dilute in 50-100 mL minibag. Infuse over 15-30 minutes. Maximum rate 2 mg/min[3]	Dilute in 250-500 mL compatible IV solution. See morphine infusion rate chart.
PEDIATRIC	Maximum rate 2 mg/min[3]		Dilute to 100 mL D5W (patient's weight in kg = dose in mg) Infuse at prescribed rate (1-4 mL/hour = 10-40 mcg/kg/hour)
NEONATE	Over at least 5 minutes[4]	N/A	See pediatric guidelines above. Avoid multidose vials due to benzyl alcohol preservative.
REQUIREMENTS	IV infusion device for continuous infusion.		

MONITORING

REQUIRED

Hold dose and contact physician if significant changes in level of consciousness or vital signs occur from baseline or RR is less than 10 (adults).

Baseline (*Adult* and *Pediatric/Neonate*): RR, HR, BP, sedation and analgesic scale before dose or start of infusion.

Adult

Doses of greater than 5 mg given direct IV:

- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.

Intermittent infusions or doses 5 mg or less given direct into IV tubing:

- No monitoring required. Max rate of administration 2 mg/min.[3]

Continuous infusion when infusion rate is greater than 2 mg/hr:

- RR, HR, BP, sedation and analgesic scale q15 min x 4, then q1h x 4, then q4h if stable.

Patient controlled analgesia (PCA):

- RR, HR, O_2 saturation, sedation and comfort levels upon initiation, dose increase, or dose decrease due to over sedation: q15min x 4; q1h x 4; then q4h until PCA discontinued.

Pediatric/Neonate

Direct into IV tubing:

- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.
- Observe patient continually for 5 minutes post dose for signs/symptoms of respiratory depression.
- Continuous electronic respiratory monitoring during and for 15 minutes post dose.

Intermittent infusion:

- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.

Continuous infusion in patients 6 months old or less: Continuous electronic respiratory monitoring.

MONITORING RECOMMENDED (continued).....

** HIGH ALERT MEDICATION ** **MORPHINE SULPHATE**

MONITORING (continued)……

RECOMMENDED

- Monitor fluid intake and output; check for bladder distension.
- Check for abdominal distension, gas or constipation.

RECONSTITUTION

- None required. Available in a variety of concentrations and volumes. Contact Pharmacy for information.

COMPATIBILITY/STABILITY

- Stable in dextrose 5% and NS for at least 24 hours at room temperature and in the refrigerator.[5]
- Compatible with dextrose, saline, dextrose-saline combinations and lactated Ringer's solutions.[5]
- For drug-drug compatibility contact Pharmacy.

ADVERSE EFFECTS[1,2,6,7]

RESPIRATORY

- Respiratory depression (dose related, may occur with therapeutic doses).
- Decreasing quality/depth of respirations may be the initial indication of respiratory depression.
- Treatment: naloxone IV, and respiratory support.

CARDIOVASCULAR

- Hypotension – related to dose and concentration of morphine solution.
- Circulatory depression

DERMATOLOGICAL

- Pruritus, urticaria, rash and wheals – due to direct stimulation of histamine release, **not a true** allergic reaction.
- Sweating

GASTROINTESTINAL

- Nausea and vomiting, constipation
- Dry mouth, biliary tract spasm

CENTRAL NERVOUS SYSTEM

- Sedation, dizziness
- Confusion, myoclonus, dysphoria, hallucinations
- Increased intracranial pressure
- Seizures (related to excessive doses) have been reported in neonates.[4]

MISCELLANEOUS

- Urinary retention
- True allergy (very rare)

DOSE

There is no upper limit to dose as long as patient is free of toxicity.

ADULT

- *Direct IV bolus*:[2] usual dose range 2-15 mg; frequency determined by patient's clinical condition and response.
- *Continuous infusion*: usual starting dose 2-5 mg/h (dependent upon previous narcotic use). Calculate 24h IV morphine dose based on 100% of previous 24h IM/SC dose or 50% of previous 24h oral morphine dose.
- *PCA dose*: usual: 1 mg (range 0.5 - 5 mg) with an average lockout of 8 min (range 5 - 90 min).[3]

ELDERLY

- Analgesia should be effective at lower doses. Consider age-related renal impairment.

PEDIATRIC

- *Intermittent dose*: 0.1 - 0.2 mg/kg q2-4h. Max dose: 15 mg/dose.[7]
- *Bolus prior to infusion*: 50 - 100 mcg/kg[8]
- *Continuous infusion*: postoperative pain: 10-40 mcg/kg/hour. Sickle cell and cancer: 40-70 mcg/kg/hour.[7]
- *PCA dose*: 10 - 25 mcg/kg with a lockout of 6-12 minutes.[8] An infusion of 10 - 25 mcg/kg/hour may be used in addition to bolus dosing.[8] Physician to specify maximum dose of morphine (200 - 400 mcg/kg) to be delivered during each 4 hour period.[8]

NEONATE[4]

- *Intermittent dose*: 50 - 200 mcg/kg. Repeat as required (usually every 4 hours).
- *Continuous infusion*: give loading dose 100 mcg/kg over 1 hour followed by 10 - 15 mcg/kg/hour.

RENAL IMPAIRMENT ADJUSTMENTS[9]

Creatinine Clearance (mL/s)	Creatinine Clearance (mL/min)	Dose
greater than 0.8	greater than 50	No adjustment required
0.2 - 0.8	10 - 50	75%
less than 0.2	less than 10	50%

HEPATIC IMPAIRMENT ADJUSTMENTS[10]

- No dose adjustment in mild liver disease. Reduce dose with cirrhosis to avoid excessive sedation.

HEMO/PERITONEAL DIALYSIS[9]

- Hemodialysis – no supplemental dose required.
- CAPD – no information available at this time.
- CAVH – dose as for creatinine clearance 0.2 – 0.8mL/s, i.e. 75% dose

References available in SHR Pharmacy Department S:\Pharmacy\IV monographs for infonet\morphine SHR Apr 2010-revised

4.0 **Appendix B- IV Medication Reference Manual- Monograph Sample-Answer page**

** HIGH ALERT MEDICATION ** **MORPHINE SULPHATE**

OTHER NAMES	CLASSIFICATION	* ELDER ALERT
	Opiate Agonist/Narcotic Analgesic	See Cautions

Q. What are the desired effects?
A. Analgesic

INDICATIONS FOR IV USE
- Severe acute or chronic pain.[1] Analgesic of choice for acute myocardial infarction.[2]
- Acute pulmonary edema secondary to heart failure.[2]
- Sedation to supplement anesthesia and for analgesia during labour.[2]

CONTRAINDICATIONS
- *Hypersensitivity to morphine (rare). Cross reaction may occur with codeine, oxycodone, hydromorphone, oxymorphone.*
- *Hypersensitivity to sulfites: certain formulations contain sulfite preservatives.*
- Pulmonary edema due to chemical respiratory irritant.[2]

CAUTIONS[1,2]
- * Elderly(greater than 65): may be more sensitive to adverse effects (e.g. respiratory depression, constipation, urinary retention).
- Prostatic hypertrophy, urethral stricture, severe renal or hepatic impairment, and debilitated patients
- Head injury, other intracranial lesions, or a pre-existing elevated intracranial pressure.
- Respiratory disease; pre-existing respiratory depression; hypoxia or hypercapnia: risk of apnea is increased.
- Depleted blood volume: severe hypotension may result.
- Atrial flutter, other supraventricular tachycardias: ventricular rate may increase significantly.
- Convulsive disorders: pre-existing conditions may be aggravated.

DRUG INTERACTIONS:[1]
- CNS depressants – additive effects increase the risk of respiratory depression, hypotension, profound sedation, coma.

PREGNANCY/BREAST FEEDING: Safe use other than in labour is not established. Contact pharmacy for most recent information.

ADMINISTRATION

Q. Is this drug appropriate for IV use?
A. Yes, this drug can be given by IV push

MODE	DIRECT INTO IV TUBING	INTERMITTENT INFUSION	CONTINUOUS INFUSION
	YES	YES	YES
ADULT	Undiluted into running IV, or diluted in 4-5 mL SW or NS. Maximum rate 2 mg/min[3]	Dilute in 50-100 mL minibag. Infuse over 15-30 minutes. Maximum rate 2 mg/min[3]	Dilute in 250-500 mL compatible IV solution. See morphine infusion rate chart.
PEDIATRIC	Maximum rate 2 mg/min[3]		Dilute to 100 mL D5W (patient's weight in kg = dose in mg) Infuse at prescribed rate (1-4 mL/hour = 10-40 mcg/kg/hour)
NEONATE	Over at least 5 minutes[4]	N/A	See pediatric guidelines above. Avoid multidose vials due to benzyl alcohol preservative.
REQUIREMENTS	IV infusion device for continuous infusion.		

Q. What monitoring is required?
A. Baseline RR, HR, BP sedation and analgesic scale before dose.

MONITORING

REQUIRED

Hold dose and contact physician if significant changes in level of consciousness or vital signs occur from baseline or RR is less than 10 (adults).

Baseline (*Adult* and *Pediatric/Neonate*): RR, HR, BP, sedation and analgesic scale before dose or start of infusion.

Adult

Doses of greater than 5 mg given direct IV:
- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.

Intermittent infusions or doses 5 mg or less given direct into IV tubing:
- No monitoring required. Max rate of administration 2 mg/min.[3]

Continuous infusion when infusion rate is greater than 2 mg/hr:
- RR, HR, BP, sedation and analgesic scale q15 min x 4, then q1h x 4, then q4h if stable.

Patient controlled analgesia (PCA):
- RR, HR, O_2 saturation, sedation and comfort levels upon initiation, dose increase, or dose decrease due to over sedation: q15min x 4; q1h x 4; then q4h until PCA discontinued.

Pediatric/Neonate

Direct into IV tubing:
- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.
- Observe patient continually for 5 minutes post dose for signs/symptoms of respiratory depression.
- Continuous electronic respiratory monitoring during and for 15 minutes post dose.

Intermittent infusion:
- RR, HR, BP, sedation and analgesic scale at 5 and 15 minutes, post dose/infusion.

Continuous infusion in patients 6 months old or less: Continuous electronic respiratory monitoring.

MONITORING RECOMMENDED (continued).....

** HIGH ALERT MEDICATION ** **MORPHINE SULPHATE**

MONITORING (continued).....

RECOMMENDED
- Monitor fluid intake and output; check for bladder distension.
- Check for abdominal distension, gas or constipation.

RECONSTITUTION
- None required. Available in a variety of concentrations and volumes. Contact Pharmacy for information.

COMPATIBILITY/STABILITY
- Stable in dextrose 5% and NS for at least 24 hours at room temperature and in the refrigerator.[5]
- Compatible with dextrose, saline, dextrose-saline combinations and lactated Ringer's solutions.[5]
- For drug-drug compatibility contact Pharmacy.

Q. What are the possible adverse effects?
A. Respiratory depression, hypotension, pruritis, sedation, confusion, nausea, vomiting, urinary retention.

ADVERSE EFFECTS[1,2,6,7]

RESPIRATORY
- Respiratory depression (dose related, may occur with therapeutic doses).
- Decreasing quality/depth of respirations may be the initial indication of respiratory depression.
- Treatment: naloxone IV, and respiratory support.

CARDIOVASCULAR
- Hypotension – related to dose and concentration of morphine solution.
- Circulatory depression

DERMATOLOGICAL
- Pruritus, urticaria, rash and wheals – due to direct stimulation of histamine release, **not a true** allergic reaction.
- Sweating

GASTROINTESTINAL
- Nausea and vomiting, constipation
- Dry mouth, biliary tract spasm

CENTRAL NERVOUS SYSTEM
- Sedation, dizziness
- Confusion, myoclonus, dysphoria, hallucinations
- Increased intracranial pressure
- Seizures (related to excessive doses) have been reported in neonates.[4]

MISCELLANEOUS
- Urinary retention
- True allergy (very rare)

DOSE

There is no upper limit to dose as long as patient is free of toxicity.

Q. Is this the correct dose?
A. Yes, it is within the recommended range.
Note: Elder Alert

ADULT
- *Direct IV bolus*:[2] usual dose range 2-15 mg; frequency determined by patient's clinical condition and response.
- *Continuous infusion*: usual starting dose 2-5 mg/h (dependent upon previous narcotic use). Calculate 24h IV morphine dose based on 100% of previous 24h IM/SC dose or 50% of previous 24h oral morphine dose.
- *PCA dose*: usual: 1 mg (range 0.5 - 5 mg) with an average lockout of 8 min (range 5 - 90 min).[3]

ELDERLY
- Analgesia should be effective at lower doses. Consider age-related renal impairment.

PEDIATRIC
- *Intermittent dose*: 0.1 - 0.2 mg/kg q2-4h. Max dose: 15 mg/dose.[7]
- *Bolus prior to infusion*: 50 - 100 mcg/kg[8]
- *Continuous infusion*: postoperative pain: 10-40 mcg/kg/hour. Sickle cell and cancer: 40-70 mcg/kg/hour.[7]
- *PCA dose*: 10 - 25 mcg/kg with a lockout of 6-12 minutes.[8] An infusion of 10 - 25 mcg/kg/hour may be used in addition to bolus dosing.[8] Physician to specify maximum dose of morphine (200 - 400 mcg/kg) to be delivered during each 4 hour period.[8]

NEONATE[4]
- *Intermittent dose*: 50 - 200 mcg/kg. Repeat as required (usually every 4 hours).
- *Continuous infusion*: give loading dose 100 mcg/kg over 1 hour followed by 10 - 15 mcg/kg/hour.

RENAL IMPAIRMENT ADJUSTMENTS[9]

Creatinine Clearance (mL/s)	Creatinine Clearance (mL/min)	Dose
greater than 0.8	greater than 50	No adjustment required
0.2 - 0.8	10 - 50	75%
less than 0.2	less than 10	50%

HEPATIC IMPAIRMENT ADJUSTMENTS[10]
- No dose adjustment in mild liver disease. Reduce dose with cirrhosis to avoid excessive sedation.

HEMO/PERITONEAL DIALYSIS[9]
- Hemodialysis – no supplemental dose required.
- CAPD – no information available at this time.
- CAVH – dose as for creatinine clearance 0.2 – 0.8mL/s, i.e. 75% dose

References available in SHR Pharmacy Department S:\Pharmacy\IV monographs for infonet\morphine SHR Apr 2010-revised

4.0 **Appendix C- Sample MAR**

Saskatoon Health Region – Medication Administration Record

24 HOURS FROM 00:00 18-June-10 THRU 23:59 18-June-10

Name: McFee, Maureen L
BirthDate: Apr-15-1940
Facility: ROYAL UNIVERSITY HOSPITAL
Location: 3000-1 3007 ***MRN#*** 536586
Age: 70 yrs ***Sex:*** F
Allergies: *CEPHALEXIN (Hives), MOXIFLOXACIN*
Comments:

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

---- Scheduled Medications ----

Order# 1 RAMIPRIL CAP 10 MG
Dose: 10 MG (1 CAP) PO OD
Dr. Smith, John *1st * ✓ BC
(08) HS

---- PRN Medications ----

Order# 2 dimenhyDRINATE
Dose: 25-50MG IV/PO Q6H PRN
Dr. Smith, John (WARDSTOCK) *1st * ✓ BC

Order# 3 MORPHINE 2-5 mg IV q 4hr prn
Dose: 2-5 MG IV q 4hr PRN
Dr. Smith, John *1st * ✓ BC
(05) BC 2mg (10) HS 2mg

Medication Administration List for: **McFee, Maureen L**

Verified Correct: B. Careful **Registered/Licensed Nurse**

Generated: 18-June -2010
Actuate\report\marintvl\mar24st.rod
GE Medical Systems

4.0 REVIEW QUIZ

Administering IV Push/Direct Medications Quiz

1. Which method of administering a medication is not considered to be IV Push/Direct?
   a) medication is given into a Central Venous Catheter over 3 minutes
   b) medication is given into a peripheral saline lock
   c) medication is given through the secondary port of the IV pump
   d) medication is given through the y-site of the IV tubing

2. The IV Medication Reference Manual is a resource used to: (circle all that apply):
   a) check for therapeutic dose ranges for different ages of the population
   b) check if the drug needs to be diluted before giving
   c) find out information on the recommended monitoring for the drug
   d) find out if the medication is on the Saskatchewan Formulary

3. Your patient is exhibiting respiratory depression. Naloxone (Narcan) is ordered 0.1 mg IV Push (supplied 0.4mg/ml ampule). How many mls will you draw up?
   a) 2.5 mls
   b) 0.025 mls
   c) 0.25 mls
   d) 4 mls

4. True or False (circle the correct answer):

   T F Flush IV line before and after medication administration with 0.9% Sodium Chloride or D5W (NICU) if incompatibilities exist.

   T F When using a Y-site, the flush following medication administration must be delivered at the same rate as the medication injection.

   T F Signs of infection in an IV can include: pain, edema, purulent discharge, fever.

5. What is Speed shock?
   a) medication is given without enough dilutent
   b) medication is given too fast
   c) medication is given too slow
   d) medication is given with too small a syringe causing pressure or “shock”

6. How can you prevent speed shock?
   a) Good hand washing prior to accessing IV
   b) Use appropriate size syringe for medication
   c) Infuse medication and flush at prescribed rate and dilution
   d) Assess IV site for infiltration

7. What is extravasation?
    a) patient has pain in his IV site
    b) patient experiences some pain when medication is infused
    c) vesicant or irritant medication was given
    d) damage to subcutaneous tissue from an interstitial medication

8. What is one way nurses can help decrease the chances of extravasation?
    a) Use aseptic technique during administration
    b) ensure patency and position of IV prior to infusion
    c) Change IV site before administering any IV push drug
    d) Ensure medication and IV solution are compatible

9. Your patient requires Digoxin by IV push. The order is for 0.0625 mg. Digoxin is supplied in a 0.25mg/ml ampule. How many mls will you draw up?
    a) 4mls
    b) 0.4 mls
    c) 2.5 mls
    d) 0.25 mls

10. It is 0530; you have just received an admission from ER. Your patient has an order for IV antibiotics for an infected wound. His IV won't flush. What is the appropriate next step?

    a) Call Pharmacy and see if they can send the oral form of the antibiotic
    b) Leave it for the next shift to deal with
    c) Discontinue the IV , insert a new one, so the antibiotic can be given IV
    d) Try giving the antibiotic through the IV anyway