Administration of Medication IV Push to Neonatal/Paediatric & Adult Patients
Self-Learning Package

Prepared by Cheryl Owen, CPL Medicine, Rose Owen CPL NICU/SCN; Jan. 2008
Revised by Rose Owen CPL NICU/SCN; January 2010

Through the amalgamation of
Administration of IV Push Medications (Adult Patients) Self Learning Package, Jan. 2006
Administering Medications by Intravenous Push To Paediatric Patients Self-Learning Package, Dec. 2005

Reviewed by Women & Children’s Health Program Practice Committee March 2008
Reviewed by CPL Group April 2008/January 2010
OBJECTIVE

Upon completion of this learning package, the RN will be able to:

1) Administer an approved IV medication by IV push.
2) Have the knowledge and judgment to determine when IV push is an appropriate method of administration of specific medications.

The RN may administer medications by IV push when he/she has completed all of the following:

1) Received a physician’s order requesting a medication be given by IV
2) Has a medical directive (i.e. SMA Algorithm) to administer the medication in life threatening situations in the absence of a physician.
3) Determined that the medication can be given by IV bolus (Refer to IV Fact Sheets in Intravenous Drug Therapy Manual)
4) Reviewed Self Learning Package
5) Scored 90% or greater on the IV Medication Administration Exam
6) Demonstrated the skill with CPL or designate in the lab and clinical setting until competency is established.

Nature and Purpose of Administering Medications by IV push

Currently there are several methods for the intermittent intravenous delivery of drugs. These include direct intravenous administration, use of buretrol, syringe pumps and the minibag system. The Buretrol is useful when only small volumes of intravenous fluids can be tolerated.

With direct administration the RN reconstitutes the drug and prepares the syringe. The RN then injects the drug directly into the injection port of a running IV solution or saline lock. This method historically was often restricted to physicians and to RNs in specialty areas such as the emergency room, the intensive care unit and PACU. Studies have demonstrated that post-infusion phlebitis is no more frequent using IV drugs with controlled solution osmolarity (i.e. volume adjusted with sterile water for injection if necessary) than with minibag.

Advantages:

- Immediate delivery of the medication
- Rapid onset of effect of medication
- Minimal volume added to the patient’s fluid intake (Neonates, Paediatric, fluid restricted patients)
- Decreased interruptions in infusion of solutions (i.e. TPN)
- Decreased nursing time with multiple medication regimes.
Indications/Risk Factors

Indications:

A physician will order the medication to be given IV or a medical directive will be followed based on the patient’s status

1) The RN will decide whether the medication can be given IV push based on the following criteria:
   - The RN has the knowledge, skill, and judgment to perform IV push
   - The medication can be given IV push (must be clarified with IV medication manual/fact sheets)
   - The dilution and push rates for each drug is adhered to
   - The nurse has determined that the appropriate dose/kg has been ordered and checked with the IV fact sheet.
   - The patient is an appropriate candidate for IV bolus method
     - Has an IV or saline lock in situ
     - Site is clear of inflammation, infiltration, pain and drainage

2) The RN will understand her/his own scope of practice in performing the skill and follow ethical principles to ensure safe professional patient care is provided.

Risk Factors:

Allergic Reaction or anaphylaxis

Because drugs administered by IV push are delivered directly into the circulatory system and can produce an immediate effect, signs of acute allergic reaction or anaphylaxis can develop rapidly. If any signs of anaphylaxis occur (dyspnea, cyanosis, convulsions or increasing respiratory distress), notify the physician immediately and begin emergency procedures.

Extravasation

Extravasation can occur with a medication, which is thought to be administered into the vascular system, has been giving outside of the vein. This can occur when an IV has become infiltrated. When the medication being administered into the surrounding tissue is a vesicant this can cause serious and extensive tissue damage and requires immediate medical attention. Observe for signs of infiltration, the absence of blood backflow, inflammation around the site, and a sluggish flow rate. If swelling or sluggish flow rate occurs during injection, stop the injection, estimate the amount of infiltration and notify the physician immediately. (See Treatment of Infiltration (Extravasation) of Vesicants Policy M-180 (Pharmacy Policy Manual)

Speed shock

Speed shock – a sudden adverse physiological reaction of a patient to intravenous medications or drugs that are administered too quickly. (Mosby Medical, Nursing & Allied Health Dictionary, third edition, 1994). This occurs due to a lack of dilution with the circulating blood, and therefore the vital organs are “shocked” with what has become a toxic dose. Signs and symptoms include flushing of head and neck, feeling of apprehension, hypertension, pounding headache, dyspnea, chest pain, chills, loss of consciousness, or cardiac arrest. Notify the physician immediately.
Steps to Administering Medication by IV Push

***Refer to High Alert Medications and Independent Double Checking Policy – M-2 when administering all IV push medications***
***Always remember to check the safe dosing range and recommended length of time to administer the medication on the appropriate IV fact sheet***

Through An Existing IV Line:

1) Collect all required equipment
   - Prescribed medication
   - Syringe (Size appropriate to amount of total volume of diluent)
   - Diluent
   - Chlorhexidine swab

2) Verify the medication order on the MAR and/or on the doctor’s order sheet

3) Verify the medication against the appropriate IV Facts Sheet

4) Check the eight rights of medication administration (The right patient, right medication, right reason, right dose, right frequency, right route, right site and right time)

5) Draw up the prescribed medication in the syringe and dilute if required (Check the label three times – when the medication is selected, drawn up and returned)

6) Check the compatibility of the drug with the IV solution in use. If medication is incompatible, flush with normal saline before and after the medication.

7) Check IV site for complications. Do not inject if IV site infiltrated, inflamed, leaking or blocked.

8) Close the flow clamp and stop pump (if applicable)

9) Clean injection port closest to the site with the chlorhexidine swab

10) Inject the medication bolus over the recommended time

11) Open the flow clamp and readjust the flow rate or restart pump (as applicable)

Clave Flush Technique

1. Swab as per hospital protocol
2. Attach 10 cc luer lock syringe to Clave port (3cc luer lock syringe for the neonate)
3. Complete turbulent flush
4. With syringe still attached, CLAMP line
5. Remove syringe
Through A Saline Lock:

1) Collect all required equipment
   - Prescribed medication
   - Three syringes (Sizes appropriate to amount of total volume of diluent)
   - Diluent
   - Sodium chloride 0.9% (N/S)
   - Chlorhexidine swab

2) Follow steps 2 through 6 of “Through an existing IV”

3) Prepare 2 syringes with 1 ml N/S. 3 ml N/S pre-filled syringes may be used.

4) Clean the clave connector with the chlorhexidine swab.

5) Flush with 1 ml N/S to ensure patency. Do not inject if IV site infiltrated, inflamed, leaking or blocked.

6) Inject the medication bolus over the recommended time. (as per IV fact sheet)

7) Flush with 1 ml N/S using turbulent method. Ensuring positive pressure is applied post flushing.

8) Repeat all steps for additional medications. Flushing well between medications, and allowing sufficient time intervals between medications. Allowing absorption of one medication prior to another being administered.
## Related Policies

<table>
<thead>
<tr>
<th>Policy</th>
<th>Number</th>
<th>Manual</th>
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<tbody>
<tr>
<td>Saline Lock</td>
<td>S-1</td>
<td>Nursing Standards Manual</td>
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</tbody>
</table>

## RESOURCES


Rouge Valley Health System IV Drug Manual

Rouge Valley Health System Paediatric/Neonatal I.V. Manual

## References


Clinical Calculation Formulas

Drug Calculation

Basic Formula:

\[
\frac{D}{H} \times V
\]

D (desired dose) \hspace{1cm} X V(vehicle, drug form)

H (am’t on hand)

Example:
Order Ampicillin 100mg IV push
Available: Ampicillin 250 mg/5ml

\[
\frac{100 \text{ mg}}{250 \text{ mg}} \times \frac{5 \text{ ml}}{250} = \frac{500}{250} = 2 \text{ ml of Ampicillin}
\]

Ratio and Proportion:

H(On hand): V(vehicle) :: D(desired) : X (unknown)

Example
Order Ampicillin 100 mg IV push
Available Ampicillin 250 mg/5 ml
H:V :: D:X
250 mg : 5 ml :: 100 : X ml

\[
250X = 500 \\
X = 2 \text{ ml}
\]

IV Flow Rate

\[
\text{Ml/hr} \times \text{ gtt/ml (drop factor)} = \text{ gtt/min} \\
\frac{60 \text{ minutes}}{}
\]

Example:
Order: Give 125 ml/hr
IV gtt factor = 15 gtt/ml

\[
\frac{125 \text{ ml/hr} \times 15 \text{ gtt/ml}}{60 \text{ min/hr}} = \frac{1875}{60} = 31.25 \text{ gtt/min}
\]

= 31 gtt/min
Medication Quiz

Neonatal

1. Baby Boy Smith, a term infant, was born to a GBS+ woman who received only one dose of intrapartum antibiotics 1 hour prior to delivery. He is now 36 hours old and weighs 3.5 kg. He is receiving Ampicillin and Gentamicin pending his 48 hr. culture report. You have just come on shift and are checking his orders:
   - Ampicillin 88 mg IV q8h
   - Gentamicin 11 mg IV q18h
Check to make sure that the infant is receiving the correct dose (if not, figure out what he should receive). Then, calculate how much you would draw up (Ampicillin is mixed to supply 100 mg/ml and Gentamicin is 10 mg/ml.)

2. Baby girl Jones was born at 37 weeks with a weigh of 3.0 kg. She is currently 24 hrs. old. She is receiving IV antibiotics, as there was a history of leaking membranes for 5 days. Her orders are as followed:
   - Ampicillin 100 mg IV q12h
   - Gentamicin 9 mg IV q24h
Check to make sure that the infant is receiving the correct dose (if not, figure out what he should receive). Then, calculate how much you would draw up (Ampicillin is mixed to supply 100 mg/ml and Gentamicin is 10 mg/ml.)
Paediatric

3. A six week infant weighing 4.22 kg. is admitted to 7W. His orders are as follows:
   - Ancef (Cefazolin) 84 mg IV q8h.

Check to make sure that the infant is receiving the correct dose (if not, figure out what he should receive). Then, calculate how much you would draw up (Ancef is mixed to supply 100 mg/ml).

Adult

4. You have a 76 yr old female admitted with a diagnosis of Congestive Heart Failure. The doctor has ordered Furosemide 60 mg IV BID. The furosemide is available in 40 mgs/4 mls. How many mls will you draw up? Your patient is on a strict fluid restriction and you have decided to give this IV push. What rate will you push this medication?

5. You are caring for a 43 yr old patient who is admitted to a medical floor with a diagnosis of lung cancer. The doctor has order Morphine 2 – 4 mg IV push for breakthrough pain q1h. The patient received 2 mgs the last hour and this has not provided acceptable results. You have decided to increase this dose to 3 mgs. Does this dose fall under the acceptable amount for IV direct push in adult patients? Is the frequency within the defined parameters of IV direct push in adult patients? Can this dose be given IV push by a RN on a medical floor? What method could this nurse use to give this dose to the patient?
Answers

**Neonatal**

1. The medications are both ordered correctly. The Ampicillin is 75mg/kg/day q8h (75 mg × 3.5 kg ÷ 3 (# of doses per day) = 87.5 mg (round up to 88 mg) and the Gentamicin is 3 mg/kg/dose q18h (3 mg × 3.5 kg = 10.5 mg (round up to 11 mg). Based on the dilution given in the question, you would draw up 0.88 ml of Ampicillin and 1.1 ml of Gentamicin.

2. The medication order is wrong in this case. Baby Jones should receive Ampicillin 75 mg IV q8h (correct dosing is 75 mg/kg/day q8h (75 mg × 3 kg ÷ 3 doses per day = 75 mg) and Gentamicin should be 9 mg IV q18h (3 mg/kg/dose q18h (3 mg × 3 kg = 9 mg). Based on the dilution given in the question, you would draw up 0.75 ml of Ampicillin and 0.9 ml of Gentamicin.

**Paediatric**

3. The medication order is wrong in this case. The dose of Ancef for an infant is 50 mg/kg/day q6-8h. If given q8h, the infant should receive 70 mg IV (50 mg × 4.22 kg ÷ 3 doses per day = 70.3 mg (round to 70 mg). (if given q6h – 53 mg IV should be given (50 mg × 4.22 kg ÷ 4 doses per day = 52.75 mg (round up to 53 mg)). Using the dilution supplied to you in the question, 0.7 ml should be drawn up for the q8h dosing.

**Adult**

4. You would give 6 mls of Fluosemide 40 mg/4 mls. You would push the Fluosemide over 1 – 2 minutes.

5. Yes, this dose fall under the acceptable amount for IV direct push in adult patients. No, this frequency is greater than the q2-4h recommended in the fact sheet for adult patients. No, this dose cannot be given by a nurse on a medical floor. Nurses, outside critical care area, cannot give dose greater than 2 mg/dose by IV push. This nurse could give this medical by minibag, buretrol or syringe pump. He/she may also suggest the physician reevaluate this patient analgesic as it is not providing effective pain control.
## Administering Medications by IV Push

### Skills Check List

Name: ___________________________   Unit: _____________  Date: ____________

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<thead>
<tr>
<th></th>
<th>Satisfactory</th>
<th>Needs Improvement</th>
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<tbody>
<tr>
<td>1.</td>
<td>Collects all required equipment.</td>
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<td>2.</td>
<td>Verifies the medication order on the MAR and/or on the Ordering Practitioner’s Order Sheet.</td>
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<tr>
<td>3.</td>
<td>Verifies the medication against the appropriate IV Fact Sheet.</td>
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<tr>
<td>4.</td>
<td>Checks the eight rights of medication administration. (right patient, medication, reason, dose, frequency, route, site &amp; time).</td>
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<td>5.</td>
<td>Draws up the prescribed medication in the syringe and dilutes appropriately if required. (Check the label three times – when the medication is selected, drawn up and returned)</td>
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<td>6.</td>
<td>Completes an independent double check.</td>
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<td>7.</td>
<td>Checks the IV site for redness, pain, tenderness, edema, leakage.</td>
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</table>
| 8. | **IV push meds for an existing IV line:** Check the compatibility of the medication with the IV solution.  
**IV push meds for a saline lock:** Prepare two syringes with 1 ml normal saline. (prefilled syringes may be used) | |
| 9. | Cleanse injection port closest to the IV site with a Chlorhexidine wipe. | |
| 10. | **IV push for an existing IV line:** Close the flow clamp and stop the IV pump (if applicable). Inject the medication over the recommended time. (if incompatible flush with normal saline before and after the medication)  
**IV push for a saline lock:** Flush the IV with 1 ml of normal saline to ensure patency. Inject the medication over the recommended time. Flush with 1 ml normal saline using the turbulent method. Clamp the tubing (as required). | |

**Comments:**

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

CPL/Designate: ________________________________  Date: __________________
IV PUSH MEDICATION TEST

NAME:______________________________

DATE:______________________________

You must score 90% or more in order to pass this test. A passing mark is a requirement for certification in the administration of IV push medications. Please return completed test to your Clinical Practice Leader.

1. In this package, IV push is defined as the RN injecting the drug directly into.
   a. The injection port of an existing IV solution
   b. A saline lock
   c. A vein (no IV or saline lock insitu)

   1. All of the above
   2. None of the above
   3. a and b
   4. b and c
   5. a and c

2. Describe three advantages of using IV push
   a. ___________________________________________________________
   b. ___________________________________________________________
   c. ___________________________________________________________

3. List three (3) conditions under which the RN may administer medications by IV bolus.
   a. ___________________________________________________________
   b. ___________________________________________________________
   c. ___________________________________________________________

4. Describe the treatment for an allergic reaction.

   ___________________________________________________________
   ___________________________________________________________
5. List the 8 rights of medication administration.

1. ___________________________________
2. ___________________________________
3. ___________________________________
4. ___________________________________
5. ___________________________________
6. ___________________________________
7. ___________________________________
8. ___________________________________

6. The correct way to administer a medication through a saline lock is to:
   a. Flush with 1 ml N/S solution post medication injection
   b. Attach syringe, aspirate back to determine patency, then inject the medication
   c. Inject the medication, no need to determine patency because it was flushed last medication time
   d. Flush with 1 ml N/S solution pre and post medication administration

7. Extravasation may be present when the patient shows the following symptom(s)
   a. There is swelling at the site and/or the flow rate is sluggish
   b. Blood leaking from the insertion site of the IV catheter
   c. The infusion has stopped and you are unable to flush the line with N/S
   d. The patient develops hives, increased respiratory rate and decreased LOC.

8. You know that you have completed an “independent double check of your medication when”
   a. You have a co-signature on the MAR sheet
   b. A senior RN on your unit gives you the go ahead to give the medication
   c. The medication, dose, strength, dosing time, route and patient are independently verified against the MAR/doctors order by a second nurse.
   d. When the nurse preparing the medication show a second nurse what he/she has done and seeks of approval before administration.

9. When preparing a medication IV push administration it is necessary to check this resource to confirm that it can be given IV on the unit you are working.
   a. IV manual (Adult/Paediatric)
   b. Nursing Standards Manual
   c. CPS
   d. RVHS Formulary
10. When administering 2 medications that are incompatible it is necessary to
   a. Inject the medications in separate syringes
   b. Wait 15 minutes between the injection of these medications
   c. Incompatible medication should never be given through the same IV site
   d. Flush with N/S 1 ml between medications

11. Review the Intravenous Adult Drug Therapy Manual and provide the following details on the IV
    push administration of Narcan.

   a. Indications for administration
      ____________________________________________________________
      ____________________________________________________________
   b. Administration is to be given over ________ minute(s).
   c. Two (2) potential hazards of administration
      i. ___________________________________________________________
      ii. _________________________________________________________
   d. Time of onset is ____________ minute(s)
   e. Time of duration is _____________ minutes(s)/hour(s)

12. What are the recommended push time and complication for each of the following medications
    from the Paediatric Manual?

   a. Gentamicin
      i. Push time: _____________
      ii. Complication: _________________________________

   b. Ampicillin
      i. Push time: _____________
      ii. Complication: _________________________________

   c. Penicillin
      i. Push time: _____________
      ii. Complication: _________________________________
## IV Push Medications Certification

<table>
<thead>
<tr>
<th>Criteria for Initial Certification</th>
<th>Date completed</th>
<th>Signature of RN</th>
<th>Signature of CPL or Designate</th>
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<tbody>
<tr>
<td>Read the self learning package</td>
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<tr>
<td>90% on written test</td>
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<td>hands-on lab demonstration with CPL or designate</td>
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<td>Completed demonstrations in the clinical setting</td>
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<td>2.</td>
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<td>3.</td>
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<tr>
<td>Return this page completed to CPL, designate or manager</td>
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