



# **SAFE OPERATING PROCEDURE FOR ADMINISTRATION OF INTRAVENOUS (BOLUS) MEDICATIONS**



**“PATIENT SAFETY IS OUR RESPONSIBILITY”**

**NURSING DIVISION  
MINISTRY OF HEALTH MALAYSIA**

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## FORWARD

### BY THE DEPUTY DIRECTOR-GENERAL OF HEALTH (MEDICAL)

With the introduction of disposable IV catheters & tubing around the 1970s, the number of patients receiving IV therapy and associated IV medication delivery at bedside by nurses has continuously increased and challenges still exist with the teaching of IV bolus/direct/IV push medication delivery till today.



Today, IV bolus/direct/IV push medication are still not taught in the nursing colleges while nurses are undergoing training, thus deeming them the privilege to practice proficiently and legally after completion of their training. While our organization require competency validation for nurses with IV administration responsibilities, there is lack of guideline from our organization to guide the nurses in this process. It is also known that graduate nurses learned much of this skill and experiences from their senior co-workers hands on while at work.

This guideline will be useful for nurses in the clinical field who need to perform and master this procedure especially for the privileging process. It not only protects patients and the health facility by lowering the risk of medical errors that may be caused by incompetent healthcare providers but also enhances the reputation and credibility of the health facility and the health care community.

Privileging ensures that nurses are competent to practice within a specified scope at their workplace.

In conclusion, I would like to extend my congratulations and appreciation to the Nursing Division, Ministry of Health Malaysia for their effort to produce yet another milestone within their department.

Thank You

A handwritten signature in black ink, featuring a stylized 'J' and 'S'.

*Datuk Dr. Jeyaindran Tan Sri Dr. Sinnadurai*  
Deputy Director-General of Health (Medical)

## MESSAGE

### BY THE DIRECTOR OF NURSING, MALAYSIA

It is estimated that majority of patients admitted to hospital will require a vascular device at some stage of their hospitalisation today. Intravenous therapy has become an integral part of nursing practice which can range from managing a peripheral cannula to multiple and complex infusions and equipment. During the 1970s and 1980s, a quiet transition occurred. The procedure of IV cannulation shifted from being a doctor-dominated one to being nurse-dominated throughout the world.



Nursing has now become a highly specialised practice in the 21<sup>st</sup> century, and nurses are increasingly becoming both professionally and legally responsible for their delivery of nursing and health care services. Thus, making it is essential for nurses to have the training and ability to manage intravenous therapy safely as nurses at present has learnt to give intravenous bolus medications from their senior co-workers in the clinical areas. Patient safety has been the ultimate concern of the Nursing Division and it has taken great effort to improve the safety of their clients and its health care delivery by the nurses.

Therefore, this guideline is developed to assist the process of privileging the nurses in their clinical areas and standardise the way nurses practice across the nation. This guideline will provide the nurses with a single point of reference should they need to undertake this procedure of which they are unfamiliar with or should they choose to refresh their knowledge of the procedure.

Finally, I would like to convey my gratitude and thanks to all the Medication Safety Sub-Committee members of Nursing Division Ministry of Health, contributors and any individual who has contributed directly or indirectly towards the completion of this guideline which will ensure competent and safe nursing practice to our clients.

  
Hajah Rosena Binti Abdul Ghani  
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## Glossary

Term(s)	Definitions
Compatible	Capable of being mixed and administered without undergoing undesirable chemical and or physical changes or loss of therapeutic action.
Dilution	To add a diluent (e.g., normal saline, sterile water) to a solution of medication in order to make it less concentrated or to provide additional solution for ease of administration and titration or to decrease tissue irritation.
Extravasation	Effusion or escape of solution or medication into the tissue surrounding a blood vessel.
Flushing	The act of moving fluids, medications, blood products out of a vascular access device into the bloodstream, ensuring delivery of those components and verifying patency.
Intravenous push	Intravenous push is commonly used when rapid administration of a medication is needed such as in emergency. <b>(less than 30 seconds)</b>
Intravenous bolus	A discrete dose of medication or solution given slowly over at least 1 minute
Preparation	Includes dilution, reconstitution and measurement of drugs and doses in a clean, uncluttered and functionally separate environment.
Reconstitute	The act of adding diluent to powder to create a solution.
High Alert Medication	Are medications that bear a heightened risk of causing significant patient harm when use in error.
Independent Double Check	An independent double check by a second healthcare professional to confirm the right medication prescribed and its correct route of administration according to medication prescription and respective policy prior to administration, especially for High Alert Medication

## SAFE OPERATING PROCEDURE FOR ADMINISTRATION OF INTRAVENOUS (BOLUS) MEDICATIONS

### 1. INTRODUCTION

Nurses play an essential role in medication reconciliation, preparing and administering medication, teaching clients about medication, evaluating and documenting the response to medication.

As early as 1852 until 1940s the administration of intravenous (IV) fluids and medication was usually performed by physicians and remain exclusively a medical role until the 1970s. According to the Institute for Safe Medication Practices, with the introduction of disposable IV catheters and tubing around that time, IV medication therapy by nurses at bedside has increase throughout the 1990s.

As IV therapy becomes common, so did the administration of IV bolus medications throughout the in-patient clinical settings, deeming it essential for nurses to have the knowledge and skill set to manage the challenges associated with IV medication delivery.

### 2. DEFINITION

2.1 Intravenous (IV) bolus is a method of administering concentrated medication (diluted or undiluted) directly into the vein using a syringe through a needleless port on an existing IV line or a saline lock.

It is usually administered in a small volume of fluid / medicine (max 20mls) that is pushed manually into the vein slowly over **AT LEAST 1 minute**.

2.2 Intravenous (IV) push is commonly used when rapid administration of a medication is needed such as in emergency which is given **LESS THAN 30 seconds**.

2.3 Medications placed in an infusion pump or added to an Intravenous bag is excluded from this term of definition.

### 3. OBJECTIVES

To ensure safe and effective administration of medication in the clinical practice setting.



## 4. POLICY

### 4.1 Justification for Certification of nurses in Administration of Intravenous Bolus Medications:-

Based on the Code of Professional Conduct for Nurses (First Edition April 1998) Malaysia Nursing Board, under no 4.4 - Incompetence to practice: the requirement in no. 4.4.2 states that "in the practice of the nurses delegated and / or extended function such as commencing intravenous therapy giving of intravenous drug. The nurse must have undergone an approved course or education and certified as clinically competent by a recognized institution before undertaking such function".

### 4.2 Registered Nurses / Registered Midwife identified by Nurse In-charge will be privileged to administer medication via intravenous (IV) Bolus in accordance with the guideline provided.

### 4.3 The nurse need to have adequate knowledge regarding:

- compatibility of medication and intravenous (IV) solution
- dosage and rate of administration
- possible adverse effects of the drug
- appropriate preparation and dilution
- required monitoring parameters

### 4.4 The nurse must adhere to the following principles of giving intravenous (IV) medication:-

- Right patient
- Right drug
- Right dosage
- Right route
- Right time
- Right dilution
- Right documentation

## 5. SPECIAL INSTRUCTION







Intravenous (IV) Bolus Medication should be administered via a dedicated or a different IV line/cannula if patient is on the following:-

- Patient on Blood Transfusion
- Patient on Control Analgesia (PCA)
- Patient on continuous High Alert Drugs infusion with single lumen IV catheter line.

## CLASSES / CATEGORIES OF HIGH ALERT MEDICATIONS

NO	MEDICATIONS
1	Adrenergic agonist, IV (e.g. adrenaline, noradrenaline)
2	Adrenergic antagonist, IV (e.g. propranolol, labetalol)
3	Anaesthetic agent, general, inhaled and IV (e.g. propofol, ketamine, dexmedetomidine)
4	Antiarrhythmias, IV (e.g. lignocaine (lidocaine), amiodarone)
5	Antifibrinolytics, hemostatic
6	Antithrombotic agents (e.g. warfarin, heparin, tenecteplase, streptokinase)
7	Antivenom (e.g. Sea snake, cobra, pit viper)
8	Chemotherapeutic agents, parenteral and oral
9	Dextrose, Hypertonic, 20% or greater
10	Epidural and intrathecal medications
11	Glyceryl Trinitrate Injection
12	Inotropic medications, IV (e.g. digoxin, dobutamine, dopamine)
13	Insulin, subcutaneous agents, IV
14	Magnesium Sulphate Injections
15	Moderate sedation agents, IV
16	Neuromuscular blocking agents
17	Opiates and Narcotics
18	Parenteral Nutrition preparations
19	Potassium salt injections
20	Sodium Chloride Solution (greater than 0.9%)

## 6. DIFFERENT SIZE OF CANNULA

GAUGE	CLINICAL APPLICATION	CANNULA
14	<ul style="list-style-type: none"> <li>Major trauma</li> <li>Major surgical procedure</li> <li>Large volume fluid or blood replacement</li> <li>Rapid, bolus infusion</li> </ul>	
16	<ul style="list-style-type: none"> <li>Major trauma</li> <li>Major surgical procedure</li> <li>Large volume fluid or blood replacement</li> <li>Rapid, bolus infusion</li> </ul>	
18	<ul style="list-style-type: none"> <li>General surgical procedures</li> <li>Transfusion of blood and blood products</li> <li>Emergency situations</li> <li>Administration of viscous solution</li> </ul>	
20	<ul style="list-style-type: none"> <li>Appropriate for most infusion therapies</li> <li>Transfusion of blood and blood products</li> </ul>	
22	<ul style="list-style-type: none"> <li>Appropriate for most infusion therapies</li> <li>Standard for paediatrics</li> </ul>	
24	<ul style="list-style-type: none"> <li>Suitable for most infusion, but flow rates are limited</li> <li>Used in the scalp veins of infants and neonates</li> <li>Commonly used in the fragile veins</li> <li>Associated with the elderly</li> </ul>	

One of the important things to know when starting an IV is the proper needle size to use. IV needles are sized by gauges and the smaller the gauge number, the bigger the needle will be.

## **7. PREPARATION OF INJECTION TROLLEY**

- Alcohol hand-rub
- Sterile Injection set
- Sterile Alcohol swabs
- Syringe and needles
- Medication
- Medication diluents / Water for injection / Sodium Chloride 0.9%
- Sharp bin
- Clinical waste & General waste bin
- Glove (e.g. for infectious cases)

## 8. RESPONSIBILITY

### A. PRE ADMINISTRATION

Step	Action	Rational
1.	Verify Doctor's written order or prescription based the following principles of giving intravenous (IV) medication:- <ul style="list-style-type: none"><li>• Right patient</li><li>• Right drug</li><li>• Right dosage</li><li>• Right route</li><li>• Right time</li><li>• Right dilution</li><li>• Right documentation</li></ul>	To avoid medication error
2.	Check for patient's medication allergy status and contraindications.	To ensure it is safe to give this medication.
3.	Check duration of drug being prescribed (date of commencement and completion)	To ensure that the medication is still required.
4.	Counter check the prescription, right medication, doses, route, diluent and calculation by another qualified medical personnel (especially for High Alert Drugs).	To avoid medication error.
5.	Dilute and reconstitute medications under aseptic technique.	To reduce the risk of infection from contaminated surfaces.
6.	Push injection trolley, draw medication at patient's bedside.	To avoid medication error and sharp injury

## B. DURING ADMINISTRATION

Step	Action	Rational
1	Greet patient and explain the procedure	To build rapport with patient and allay anxiety.
2	Verify Doctor's written order or prescription.	To ensure correct patient, medication, route, dosage and time. To prevent medication error.
3	Assess patient's injection site.	To ensure the site is suitable location and prevent complication. e.g. phlebitis
4	Perform Hand Hygiene	To prevent cross infection
	i) Patient on Cannula:-	
5	Swab the rubber bung /stopper using sterile alcohol swab.	To reduce the number of potential pathogens introduced by the syringe at the time of insertion.
6	Inject 2-3mls of sodium chloride 0.9% or 0.45% for Paediatric patient into rubber bung / stopper and observe for resistance and complaint of pain.	To detect extravasation of fluid and blockage of cannula. For patency of vein.
7	Inject the medication slowly over at least 1 minute (Max 20 mls) or as prescribed.	To detect early signs of an allergic reaction and complications around the insertion site.
8	After final administration, flush the cannula with sodium chloride 0.9% or 0.45% for Paediatric patients.	To prevent occlusion and blood back flow into the line



<b>Step</b>	<b>Action</b>	<b>Rational</b>
9	Swab the rubber bung /stopper using sterile alcohol swab.	To prevent infection.
	ii) Patient on Intravenous Drip:-	
10	Momentarily stop the intravenous flow.	To stop fluid from flowing while giving intravenous (IV) medication.
11	Swab the rubber bung with sterile alcohol swab.	To prevent infection.
12	Inject the medication slowly (Max 20 mls) over at least 1 minute or as prescribed.	To detect early signs of an allergic reaction, complications around the insertion site and to avoid speed shock.
14	Swab the rubber bung with sterile alcohol swab.	To prevent infection
15	Continue the intravenous flow.	To ensure patency of vein.

### C. POST ADMINISTRATION

Step	Action	Rational
1	Upon completion of the procedure, place all sharp items into sharp bin.	To prevent sharp injury and practice good infection control.
2	Other waste should be placed into the general and clinical waste bin accordingly.	
3	Document correctly.	To maintain accurate records, provide a point of reference in the event of any queries and prevent duplication of treatment.
4	Monitor patient's response to medication. Immediately inform the Doctor, if patient develop adverse effect.	For immediate intervention

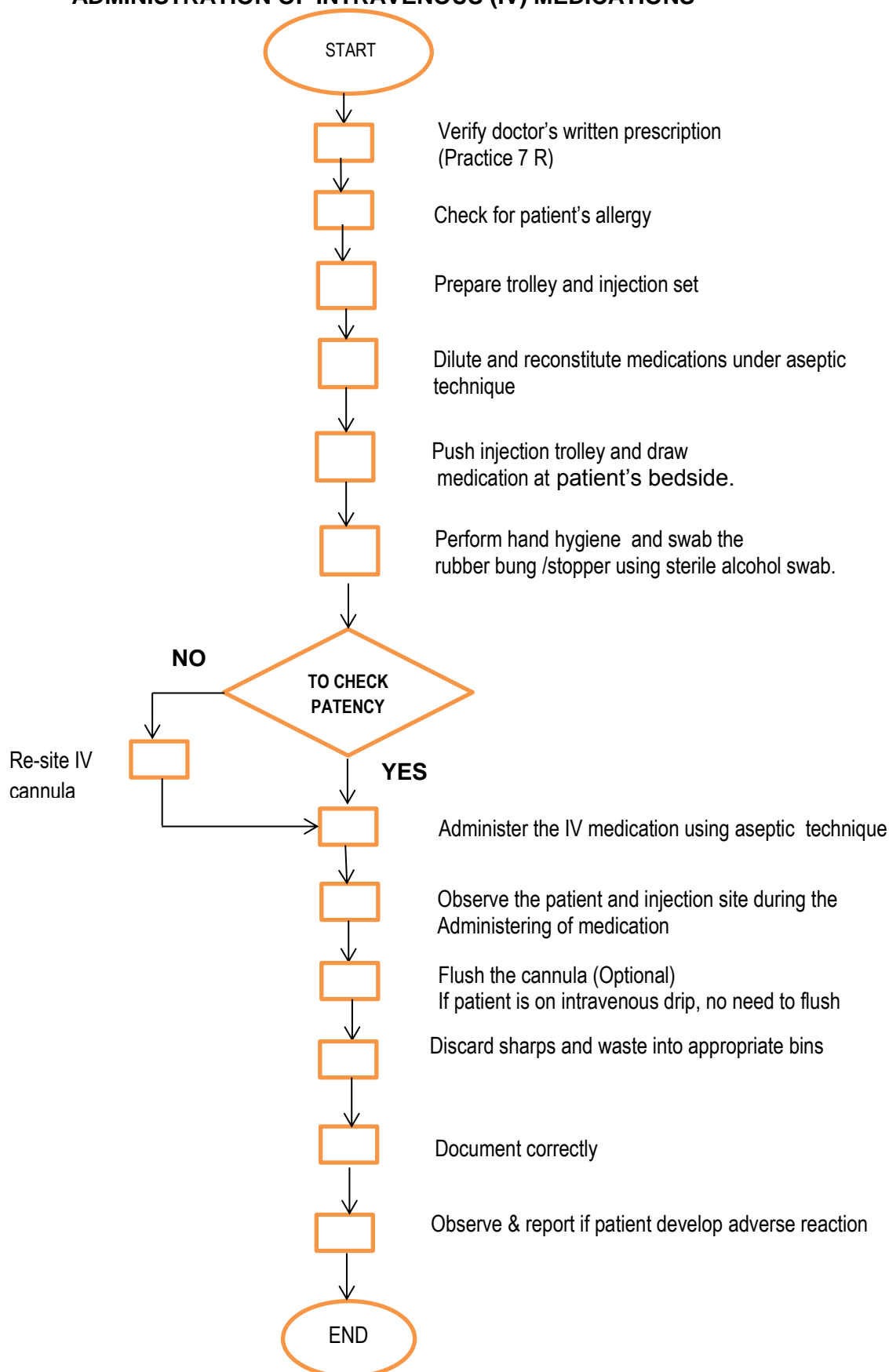
## 11. PROCEDURE CHECKLIST

SN	PROCEDURE STEPS	YES	NO	COMMENTS
1	Verify Doctor's written order or prescription according to the following principles of giving intravenous (IV) medication:- <ul style="list-style-type: none"> <li>• Right patient</li> <li>• Right drug</li> <li>• Right dosage</li> <li>• Right route</li> <li>• Right time</li> <li>• Right dilution</li> <li>• Right documentation</li> </ul>			
2	Check the patient allergy status and drug contraindications.			
3	Check duration of drug being prescribed (date of commencement and completion)			
4	Counter check the prescription, right medication, doses, route, diluent and calculation by another qualified medical personnel <b>(especially for High Alert Drugs)</b>			
5	Dilute and reconstitute medications under aseptic technique.			
6	Push injection trolley, draw medication at patient's bedside.			
7	Greet patient and explain the procedure			
8	Verify Doctor's written order or prescription.			
9	Assess patient's injection site			
10	Perform Hand Hygiene			
11	Swab the rubber bung /stopper using sterile alcohol swab.			

SN	PROCEDURE STEPS	YES	NO	COMMENTS
12	<p><b>Patient on cannula:-</b></p> <ul style="list-style-type: none"> <li>Inject 2-3mls of sodium chloride 0.9% or 0.45% for Paediatric patient, into rubber bung / stopper and observe for resistance and pain.</li> <li>Re-site if IV cannula is not patent.</li> <li>Inject the medication slowly (Max 20 mls) over at least 1 minute or as prescribed.</li> <li>After completion of administration, flush the cannula with sodium chloride 0.9% or 0.45% injection.</li> <li>Swab the rubber bung / stopper using sterile alcohol swab.</li> </ul> <p><b>Patient on Intravenous Drip:-</b></p> <ul style="list-style-type: none"> <li>Momentarily stop the intravenous flow.</li> <li>Swab the rubber bung with sterile alcohol swab.</li> <li>Inject the medication slowly (Max 20 mls) over at least 1 minute or as prescribed.</li> <li>Swab the rubber bung with sterile alcohol swab.</li> <li>Continue the intravenous flow.</li> </ul>			
13	Upon completion of the procedure, place all sharp items into sharp bin and other waste should be placed into the general and clinical waste bin accordingly.			
14	Document correctly.			
15	Monitor patient's response to medication and immediately inform the Doctor, if patient develop adverse effect.			

## 12. WORK FLOW

### ADMINISTRATION OF INTRAVENOUS (IV) MEDICATIONS



### 13. POTENTIAL COMPLICATIONS

- i) Phlebitis
- ii) Thrombophlebitis
- iii) Infiltration
- iv) Cannula Occlusion
- v) Complications associated with medication:-
  - Extravasation
  - Allergic reactions
  - Speed shock

### 14. Formula

If a fractional dose is to be taken from a powder vial, make up the solution by adding the precise volume of diluent as stated, then calculate the volume to draw out from the vial as follows:

$$\text{Amount required} = \frac{\text{Required dosage} \times \text{Quantity in ml}}{\text{Dose in stock}}$$

### CONCLUSION

This Safe Operating Procedure is developed to guide the trained nurses in knowing their roles and responsibilities during the process of performing intravenous administration of medications. It will provide the trained nurses a standardize procedure to practice across the nation with the aim of ultimately improving patient outcomes via reduced technical errors.



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