

ESSEX PARTNERSHIP UNIVERSITY NHS FOUNDATION TRUST

**PROCEDURE FOR THE PREPARATION AND ADMINISTRATION
OF INJECTIONS**

1. INTRODUCTION

- 1.1. Drugs given via the parenteral route are usually absorbed faster than when administered orally or are altered by ingestion. Available options include intradermal, intramuscular, subcutaneous, and intravenous injections. Depot injections, which deposit medication deep into muscle tissue, are given to facilitate the slow-release of the drug. This route of administration provides absorption of relatively large volume (up to 4mls in appropriate sites).
- 1.2. Within this Trust, nurses may be required to administer drugs by subcutaneous (SC) or intramuscular (IM) injection, but should not administer drugs intravenously or by any other parenteral route.
- 1.3. There is little need for drugs to be administered intravenously within mental health settings, and Trust doctors should not normally prescribe drugs by this route. One exception to this is flumazenil, which may need to be given urgently by IV injection to reverse the respiratory depressant effect of benzodiazepines such as lorazepam or midazolam.

The other main exception is within ECT departments, where the administration of drugs intravenously by an anaesthetist from a local acute trust is standard clinical practice. If information is required on the administration of drugs by the intravenous route, please refer to the Royal Marsden Manual (see 1.4 below).

Patients requiring the intravenous administration of medication on a regular basis should be transferred to a general hospital. Certain patients may need to be accompanied by a member of Trust staff.

- 1.4. This procedure contains step-by-step operational techniques to be followed when preparing and administering drugs by subcutaneous and intramuscular injection. It is closely based on the Royal Marsden Manual of Clinical Nursing Procedures, the full version of which is available on the Trust intranet.

2. PROFESSIONAL RESPONSIBILITIES

- 2.1. Prescribers are responsible for ensuring that the prescription indicates the correct route of administration in accordance with the licence of that medication (i.e. deep intra-muscular).
- 2.2. The safe preparation and administration of drugs by subcutaneous or intramuscular injection require that healthcare staff have achieved a series of competences relating to: (a) the prescription of the injection; (b) preparing the injection for administration; (c) the administration of the injection; and, (d) monitoring the administration of injections (for further guidance: www.npsa.nhs.uk/health/).

SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH CLPG13-MH - Appendix 14 (July 2017)

It is expected that these competences will normally be achieved as part of an educational programme leading to registration as a healthcare practitioner (mental health nurse or doctor). Team Managers must ensure that only those practitioners who have achieved the required competences are involved in preparing and administering drugs by injection.

If these competences have not been achieved, then the healthcare practitioner must make their manager aware, in accordance with their code of professional conduct (for example: NMC), and complete a short programme of training before preparing or administering drugs by injection. The Trust's Infection Control & Physical Health Care Lead should be contacted in confirming the arrangements for required training and a period of supervised practice.

The short programme of training and supervised practice to support the acquisition and demonstration of competences must include:

- the prescription, preparation and administration of injections
- the ordering and storage of injectable medicines
- knowledge of the licensed indications for the injectable medicines
- knowledge of and monitoring of side-effects associated with the injectable medicines
- knowledge of the procedure for reporting near misses and errors relating to the preparation and administration of drugs by injection

If the practice of a healthcare professional raises cause for concern, then the Team Manager is required to arrange for a re-appraisal of the practitioner's skills in the preparation and administration of drugs by injection before being permitted to continue this aspect of their practice. In some cases, this may form a component of a professional development plan within a competence or capability framework.

- 2.3. It is the responsibility of the person who administers the medication to ensure that they have the required information and skills to do so safely and effectively in line with current evidence based practice, and their professional code of conduct.
- 2.4. It is the responsibility of the Trust to ensure that staff are provided with the opportunity to update their skills and knowledge base as required.

3. INJECTION ROUTES

- 3.1. Injection can be described as the act of giving medication by use of a syringe and needle. Injections are sterile solutions, emulsions or suspensions. They are prepared by dissolving, emulsifying or suspending the active ingredient and any added substances in water for injections, in a suitable non-aqueous liquid or in a mixture of these vehicles.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

- 3.2. **Single-dose preparations:** The volume of the injection in a single-dose container is sufficient to permit the withdrawal and administration of the nominal dose using a normal technique (see also **Annex 1**, sections (c) and (d)).
- 3.3. **Multi-dose preparations:** Multi-dose aqueous injections contain a suitable antimicrobial preservative at an appropriate concentration except when the preparation itself has adequate antimicrobial properties. When it is necessary to present a preparation for injection in a multi-dose container, the precautions to be taken for its administration and, more particularly, for its storage between successive withdrawals, are given in the product literature (see also **Annex 1**, section (e)).
- 3.4. There are a number of possible routes for injection, including intra-arterial, intra-articular, intrathecal and intra-lesional. However, this procedure is only concerned with administration by the subcutaneous or intramuscular routes.

4. Intramuscular Injections

- 4.1. Intramuscular injections deliver medication into well perfused muscle, and many drugs may be administered by this route provided they are not irritant to soft tissues and are sufficiently soluble.
- 4.2. Absorption is usually rapid, and can produce blood levels comparable to those achieved by intravenous bolus injection, although depot antipsychotic injections are formulated to release the drug slowly over a period of several weeks.
- 4.3. Relatively large doses, from 1 ml in the deltoid site to 5 ml elsewhere in adults can be given. These values should be halved in children because muscle mass is less. Intramuscular injections should, where possible, be avoided in thrombocytopenic patients.
- 4.4. The choice of site should take into consideration the patient's general physical status and age, and the amount of drug to be given. The proposed site for injection should be inspected for signs of inflammation, swelling, and infection, and any skin lesions should be avoided. The patient's preference as to site should be considered where appropriate.
- 4.5. Five sites are recommended for intramuscular injections (see **Annex 2**):
- **Mid-deltoid:** Used for the injection of drugs such as narcotics, sedatives, vaccines and vitamin B12. It has the advantage of being easily accessible whether the patient is standing, sitting or lying down. It is also a better site than the gluteal muscles for small-volume (less than 2 ml) rapid-onset injections because the deltoid has the greatest blood flow of any muscle routinely used for intramuscular injections. However, as the area is small, it limits the number and size of the injections that can be given at this site.
 - **Gluteus medius:** Used for deep intramuscular and Z-track injections. The gluteus muscle has the lowest drug absorption rate. The muscle mass is also likely to have atrophied in elderly, non-ambulant and

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

emaciated patients. This site carries with it the danger of the needle hitting the sciatic nerve and the superior gluteal arteries. In even mildly obese patients, injections into the dorsogluteal area are more likely to be into adipose tissue than muscle, with consequently slower absorption of the drug.

The Z-track method involves pulling the underlying skin downwards or to one side of the injection site, inserting the needle at a right angle to the skin, which moves the cutaneous and subcutaneous tissues by approximately 1–2cm. The injection is given and the needle withdrawn, while releasing the retracted skin at the same time. This manoeuvre seals off the puncture tract (see diagrams in **Annex 3**).

- **Ventrogluteal:** Used for antibiotics, antiemetics, deep intramuscular and Z-track injections in oil, narcotics and sedatives; typical volume is 1–4 ml. It is best used when large-volume intramuscular injections are required and for injections in the elderly, non-ambulant and emaciated patient as it provides the safer option to accessing the gluteus medius muscle.

This is because the site is away from major nerves and vascular structures and there have been no reported complications. Additionally, the ventrogluteal site has a relatively consistent thickness of adipose tissue over it, thus ensuring that a standard size 21-gauge (green) needle will usually penetrate the gluteus medius muscle area.

- **Rectus femoris:** Used for antiemetics, narcotics, sedatives, injections in oil, deep intramuscular and Z-track injections. It is rarely used in adults but is the preferred site for infants and for self-administration of injections.
- **Vastus lateralis:** Used for deep intramuscular and Z-track injections. This site is free from major nerves and blood vessels. It is a large muscle and can accommodate repeated injections. This is the site used for children up to 7 months since the muscle mass will be greater in this area, but the ventrogluteal site is the optimum choice.

4.6. Although traditionally the dorsogluteal site has been most frequently used for depot injections, current evidence indicates that the ventrogluteal site is safer. This site consists of the gluteus medius lying on top of the gluteus minimus muscle, and should be the primary site for anyone more than 7 months of age, unless contra indicated by muscle contraction or damage to the area such as inflammation, oedema or irritation. See **Annex 4** for more information on locating anatomical sites for intramuscular injections.

4.7. Insert the needle at an angle of 90 degrees to the skin surface, leaving approximately a third of the needle above the skin. Pull back slowly on the plunger to aspirate for blood, if blood is present discard all equipment and re-start the procedure. If no blood is present, slowly and steadily inject the medication into the muscle (a slow, steady injection rate allows the muscle to distend gradually and accept the medication under minimal pressure).

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

4.8. Needle gauge and length

- 4.8.1. Needles should be long enough to penetrate the muscle and still allow a quarter of the needle to remain external to the skin. The most commonly-used needles for IM injections are 21g or 23g and 2.5-5cm (1"-2") in length (the higher the gauge number the finer the bore).
- 4.8.2. Oily depot injections should be given through needles with a bore of at least 21g (green); finer bore needles (higher number) are not recommended. The ampoule should be warmed to room temperature prior to drawing-up and administration, as this makes the oil less viscous.
- 4.8.3. When choosing the correct needle length for intramuscular injections it is important to assess the muscle mass of the injection site, the amount of subcutaneous fat and the weight of the patient. Without such an assessment, most injections intended for gluteal muscle are deposited in the gluteal fat. The following are suggested as ways of determining the most suitable size of needle to use:
- *Deltoid and vastus lateralis muscles*
The muscle to be used should be grasped between the thumb and forefinger to determine the depth of the muscle mass or the amount of subcutaneous fat at the injection site.
 - *Gluteal muscles*
The layer of fat and skin above the muscle should be gently lifted with the thumb and forefinger for the same reasons as before.
- 4.8.4. The position of the patient (lying, standing) will also affect the amount of subcutaneous fat which the needle has to pass through, and should also be taken into consideration.
- 4.8.5. The Royal Marsden Manual recommends that the patient's weight should be used to calculate the needle length required to penetrate the muscle, using the following guide:
- Children 16mm needle
 - 31.5 – 40kg 25mm needle
 - 40.5 – 90kg 25mm needle
 - >90kg 38mm needle
- 4.8.6. The most appropriate Vanishpoint (or equivalent) safety needle and syringe device should be selected to ensure that the length and gauge of needle are appropriate for the site of administration.

5. Subcutaneous Injections

- 5.1. The subcutaneous route is used for a slow, sustained absorption of medication up to 1-2ml being injected into the subcutaneous tissue. It is ideal for drugs such as insulin, which require a slow and steady release, and as it is relatively pain free, it is suitable for frequent injections.
- 5.2. These are given beneath the epidermis into the fat and connective tissue underlying the dermis. Injections are usually given using a 25 g needle, at a 45° angle. However, following the introduction of shorter needles the recommendation for insulin injections is at an angle of 90°.
- 5.3. The skin should be gently pinched into a fold to elevate the subcutaneous tissue which lifts the adipose tissue away from the underlying muscle. It is no longer necessary to aspirate after the needle has been inserted, as it has been shown that piercing a blood vessel during a subcutaneous injection is rare. It has also been noted that aspiration of heparin increases the risk of haematoma formation. The maximum volume tolerable using the subcutaneous route is 2ml, and drugs should be highly soluble to prevent irritation.
- 5.4. Recommended sites are the lateral aspects of the upper arms and thighs, the abdomen in the umbilical region, the back and lower loins. Absorption from these sites through the capillary network is slower than that of the intramuscular route. Rotation of these sites decreases the likelihood of irritation and ensures improved absorption. Subcutaneous injections given in the upper arm are thought to be less painful since there are fewer large blood vessels and less painful sensations in those areas. See **Annex 5** for more information on locating subcutaneous injections.
- 5.5. Insulin injections should be systematically rotated within an anatomical site – for example, using the upper arms or abdomen for several months, before there is a planned move elsewhere in the body.
- 5.6. It is no longer necessary to aspirate after needle insertion before injecting subcutaneously. It has also been noted that aspiration before administration of heparin increases the risk of haematoma.

6. SKIN PREPARATION

- 6.1. Studies have suggested that cleansing with an alcohol swab is not always necessary prior to SC and IM injections. This practice may predispose the skin to hardening, and there is no experimental evidence that skin bacteria are introduced into the deeper tissues by injection, thereby causing infection. Also, the antiseptics in current use cannot produce complete sterility in the time allowed in practice (5 seconds on average), and if an alcohol swab is used and the injection is given before the skin is completely dry, it is likely to be more painful for the patient.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

- 6.2. Provided the patient's skin is physically clean and a high standard of hand hygiene and asepsis is maintained during the procedure, skin disinfection with an alcohol swab is not recommended prior to SC and IM injections.
- 6.3. However, the use of an alcohol swab is still recommended prior to taking blood samples and giving IV injections, and before giving any injection to an immunocompromised patient. The recommendation is to clean the skin with an alcohol swab for 30 seconds using a circular motion with friction from the centre of the chosen site and progress outwards. The skin should then be allowed to dry for 30 seconds, otherwise skin cleansing is ineffective and results in the patient feeling a stinging pain on needle entry.

7. OTHER CONSIDERATIONS

- 7.1. Strict hand hygiene and strict aseptic technique should be used during preparation and administration in line with ICPG1 Section 2 (Standard Universal Precautions in Infection Control), and Section 5 (Infection Control in Clinical Practice). It is essential that gloves are worn throughout the administration procedure.
- 7.2. Ensure privacy is maintained prior to administer the inject and position the patient for easy access to the chosen injection site.
- 7.3. An older patient will probably bleed or ooze serous fluid from the site after the injection, because of decreased tissue elasticity, applying a small bandage may be helpful.
- 7.4. If the patient has experienced pain or emotional trauma from repeated injections, consider numbing the area before cleaning it by holding ice on it for several seconds.
- 7.5. Keep a record that lists all available injection sites for patients who require repeated injections. Failure to rotate sites in patients who require repeated injections can lead to deposits of unabsorbed medications. Such deposits can reduce the desired pharmacological effects and may lead to abscess formation of tissue fibrosis. (Lippincott et al 2000).
- 7.6. **Monitoring**
 - 7.6.1. Check with the patient whether they are experiencing any discomfort after the injection. Where circumstances permit, it is good practice to check the injection site 2 – 4 hours after administration, to ensure there are no complications.
 - 7.6.2. In the community, it is advisable to check at subsequent visits that the patient has not had any adverse effects to the medication.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

7.7. Potential problems

Issue:	Remedy:
Immediately after the injection, the patient has a reaction.	Contact the medical staff, monitor the patient and assess the need to giving an adrenaline injection (see CLPG27 - Anaphylaxis Procedures)
On giving the injection, you hit what you think may be a bone.	Withdraw the syringe without removing the needle from the patient. Observe the area and if it appears OK, give the injection causing less prolonged trauma to the area.
When giving an injection you suspect you may have hit a nerve – the patient has an uncontrolled movement either in the immediate area or a nerve related area.	Withdraw the needle completely, get the medical staff to examine the patient. Give the injection in another area on the advice of the medical staff.
After administering the injection, the patient says it was the worst injection they have ever had.	Discuss with the patient why they felt that, try to assure them through effective communication, document what was said in the nursing records.

8. TRAINING

Face to face theory and practical injection technique training must be attended by all qualified clinical staff including student associate practitioners and associate practitioners. A 3-yearly e-learning update must then be completed thereafter. It is the responsibility of the individual to obtain practical training sooner if necessary.

**RECOMMENDED OPERATIONAL PROCEDURES FOR THE PREPARATION AND
ADMINISTRATION OF SUBCUTANEOUS AND INTRAMUSCULAR INJECTIONS
(based on Royal Marsden Manual: Chapter 11)**

a) Equipment and documentation to be assembled prior to injection

- 1 Clean tray or receiver in which to place drug and equipment.
- 2 21 g needle(s) to ease reconstitution and drawing up, 23 g if from a glass ampoule.
- 3 21, 23 or 25 g needle, size dependent on route of administration
- 4 Syringe(s) of appropriate size for amount of drug to be given. Trust-approved safety-devices (i.e. Vanishpoint or equivalent) should be used unit drug is ready supplied in a syringe for administration
- 5 Swabs saturated with isopropyl alcohol 70% (if required - see section 6).
- 6 Sterile topical swab, if drug is presented in ampoule form.
- 7 Drug(s) to be administered.
- 8 Patient's prescription chart, patient group direction or other written direction to administer, in order to check dose, route, etc., and to record administration.
- 9 Recording sheet or book as required by law or local policy.
- 10 Ensure that appropriate equipment is available for the disposal of sharps at the point of use.

b) Preparation of the injection

Action	Rationale
1. Collect and check all equipment.	To prevent delays and enable full concentration on the procedure.
2. Check that the packaging of all equipment is intact.	To ensure sterility. If the seal is damaged, discard.
3. Wash hands with soap and water or bactericidal alcohol hand rub.	To prevent contamination of medication and equipment.
4. Prepare needle(s), syringe(s), etc. on a tray or receiver.	To contain all items in a clean area
5. Inspect all equipment.	To check that none is damaged; if so, discard.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

Action	Rationale
<p>6. Consult the patient's prescription sheet, and ascertain the following:</p> <p>a. Drug b. Dose c. Date and time of administration d. Route and method of administration e. Diluent as appropriate f. Validity of prescription g. Signature of prescriber</p>	To ensure that the patient is given the correct drug in the prescribed dose using the appropriate diluent and by the correct route.
7. Check all details with another nurse if required by local policy.	To minimize any risk of error.
8. Select the drug in the appropriate volume, dilution or dosage and check the expiry date.	To reduce wastage. Treatment with medication that is outside the expiry date is dangerous. Drugs deteriorate with storage. The expiry date indicates when a particular drug is no longer pharmacologically efficacious.
9. Put on non-sterile gloves. Proceed with the preparation of the drug. See (c), (d) and (e) for further information on preparing and drawing-up drugs from ampoules and multi-dose vials.	Risk of coming into contact with body fluids and protect practitioner during preparation.
10. Take the prepared dose to the patient, whose identity is checked	To prevent error and confirm patient's identity.
11. Evaluate the patient's knowledge of the medication being offered. If this knowledge appears to be faulty or incorrect, offer an explanation of the use, action, dose and potential side-effects of the drug or drugs involved.	A patient has a right to information about treatment.
12. Close room door or curtains if appropriate.	To ensure patient privacy and dignity
12. Administer the drug as prescribed. See (f) and (g) for further information on SC and IM administration	To ensure patient received treatment
13. Record the administration on appropriate sheets.	To maintain accurate records, provide a point of reference in the event of any queries and prevent any duplication of treatment.

c) Preparing/drawing-up drugs from single-dose ampoules (liquids)

Action	Rationale
1. Inspect the solution for cloudiness or particulate matter. If this is present, discard and follow hospital guidelines on what action to take, e.g. return drug to pharmacy.	To prevent the patient from receiving an unstable or contaminated drug.
2. Tap the neck of the ampoule gently.	To ensure that all the solution is in the bottom of the ampoule.
3. Cover the neck of the ampoule with a sterile topical swab and snap it open. If there is any difficulty a file may be required.	To aid asepsis. To prevent aerosol formation or contact with the drug which could lead to a sensitivity reaction. To reduce the risk of injury to practitioner.
4. Inspect the solution for glass fragments; if present, discard.	To minimize the risk of injection of foreign matter into the patient.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

Action	Rationale
5. Withdraw the required amount of solution, tilting the ampoule if necessary.	To avoid drawing in any air.
6. Tap the syringe to dislodge any air bubbles. Expel air and/or excess solution back into the ampoule.	To prevent aerosol formation. To ensure that the correct amount of drug is in the syringe.
7. Discard used needle into appropriate sharps container – do not attempt to re-sheath. Fit new needle using no-touch technique.	To reduce the risk of infection. To avoid tracking medications through superficial tissues. To ensure that the correct size of needle is used for the injection. To reduce the risk of injury.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

d) Preparing/drawing-up drugs from single-dose ampoules (powders)

Action	Rationale
1. Tap the neck of the ampoule gently.	To ensure that any powder lodged here falls to the bottom of the ampoule.
2. Cover the neck of the ampoule with a sterile topical swab and snap it open. If there is any difficulty a file may be required.	To aid asepsis. To prevent contact with the drug which could cause a sensitivity reaction. To prevent injury.
3. Add the correct diluent carefully down the wall of the ampoule.	To ensure that the powder is thoroughly wet before agitation and is not released into the atmosphere.
4. Agitate the ampoule according to the manufacturer's instructions	To dissolve the drug.
5. Inspect the contents.	To detect any glass fragments or any other particulate matter. If present, continue agitation or discard as appropriate.
6. When the solution is clear withdraw the prescribed amount, tilting the ampoule if necessary.	To ensure the powder is dissolved and has formed a solution with the diluent. To avoid drawing in air.
7. Tap the syringe to dislodge any air bubbles. Expel air and/or excess solution back into the ampoule.	To prevent aerosol formation. To ensure that the correct amount of drug is in the syringe.
8. Discard used needle into appropriate sharps container – do not attempt to re-sheath. Fit new needle using no-touch technique.	To reduce the risk of infection. To avoid tracking medications through superficial tissues. To ensure that the correct size of needle is used for the injection. To reduce the risk of injury to the nurse.

e) Preparing/drawing-up drugs from multi-dose vials (powders)

Action	Rationale
1. Clean the rubber cap with the chosen antiseptic and let it dry.	To prevent bacterial contamination of the drug.
2. Insert a 21 g needle into the cap to vent the bottle (see Fig. 1a).	To prevent pressure differentials, which can cause separation of needle and syringe.
3. Add the correct diluent carefully down the wall of the vial.	To ensure that the powder is thoroughly wet before it is shaken and is not released into the atmosphere.
4. Remove the needle and the syringe.	
5. Place a sterile topical swab over the venting needle (see Fig. 1b) and shake to dissolve the powder. <i>Note: Other presentations of drugs for injection may be encountered, e.g. vials with a transfer needle. The manufacturer's instructions should be followed in these instances.</i>	To prevent contamination of the drug or the atmosphere. To mix the diluent with the powder and dissolve the drug.
6. Inspect the solution for cloudiness or particulate matter. If this is present, discard.	To prevent patient from receiving an unstable or contaminated drug.
7. Clean the rubber cap with an appropriate antiseptic and let it dry.	To prevent bacterial contamination of the drug.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

Action	Rationale
<p>8. Withdraw the prescribed amount of solution, and inspect for pieces of rubber which may have 'cored out' of the cap (see Fig. 1c).</p> <p><i>Note:</i> coring can be minimized by inserting the needle into the cap, bevel up, at an angle of 45° to 60°. Before complete insertion of the needle tip, lift the needle to 90° and proceed (see Fig. 2).</p>	<p>To prevent the injection of foreign matter into the patient.</p>
<p>9. Tap syringe to dislodge any air bubbles. Remove air and/or excess solution from syringe by injecting back into the vial (see Fig. 1d).</p>	<p>To reduce risk of contamination of practitioner. To prevent aerosol formation. To ensure that the correct amount of drug is in the syringe.</p>
<p>10. Remove syringe and needle from vial and discard used needle into appropriate sharps container – do not attempt to re-sheath. Fit new needle using no-touch technique.</p>	<p>To reduce the risk of infection. To avoid possible trauma to the patient if the needle has barbed. To avoid tracking medications through superficial tissues. To ensure that the correct size of needle is used for the injection.</p>

Figure 1: Suggested method of vial reconstitution to avoid environmental exposure. (a) When reconstituting vial, insert a second needle to allow air to escape when adding diluent for injection. (b) When shaking the vial to dissolve the powder, push in second needle up to Luer connection and cover with a sterile swab. (c) To remove reconstituted solution, insert syringe needle and then invert vial. Ensuring that tip of second needle is above fluid, withdraw the solution. (d) Remove air from syringe without spraying into the atmosphere by injecting air back into vial.

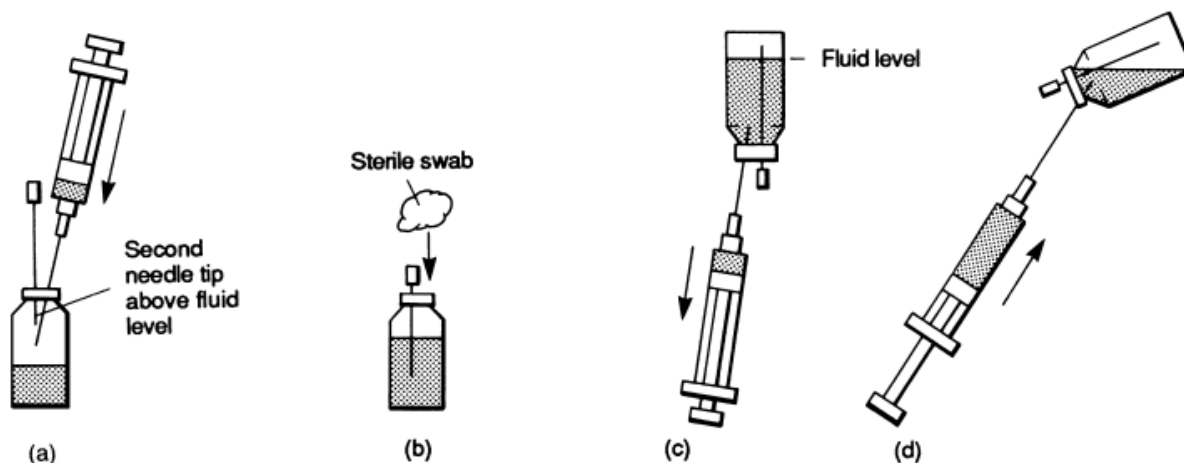


Figure 2: Method to minimize coring.



**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

f) Administration - subcutaneous injections

Action	Rationale
1. Explain and discuss the procedure with the patient.	To ensure that the patient understands the procedure and gives his/her valid consent.
2. Consult the patient's prescription sheet, and ascertain the following: a. Drug b. Dose c. Date and time of administration d. Route and method of administration e. Diluent as appropriate f. Validity of prescription g. Signature of prescriber	To ensure that the patient is given the correct drug in the prescribed dose using the appropriate diluent and by the correct route.
3. Assist the patient into the required position.	To allow access to the chosen site.
4. Remove appropriate garments to expose the chosen site. Assess the injection site for signs of inflammation, oedema, infection and skin lesions	To gain access for injection. To promote effectiveness of administration, reduce risk of infection, avoid skin lesions and avoid possible trauma to the patient.
5. Choose the correct needle size.	To minimize the risk of missing the subcutaneous tissue and any ensuing pain.
6. If appropriate, clean the chosen site with a swab saturated with isopropyl alcohol 70% (not usually necessary for SC and IM injections - see Section 6 for further information).	To reduce the number of pathogens introduced into the skin by the needle at the time of insertion.
7. Gently pinch the skin up into a fold.	To elevate the subcutaneous tissue, and lift the adipose tissue away from the underlying muscle.
8. Insert the needle into the skin at angle of 45° and release the grasped skin (unless administering insulin, when an angle of 90° should be used). Inject the drug slowly.	Injecting medication into compressed tissue irritates nerve fibres and causes the patient discomfort. The introduction of shorter insulin needles makes 90° the more appropriate angle.
9. Withdraw the needle rapidly. Apply pressure to any bleeding point.	To prevent haematoma formation.
10. Record the administration on appropriate sheets.	To maintain accurate records, provide a point of reference in the event of any queries and prevent any duplication of treatment.
11. Dispose of syringe-needle combination by placing directly into a sharps bin, needle down. Do not attempt to re-sheath the needle or separate the needle from the syringe.	To ensure safe disposal and to avoid laceration or other injury to staff.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

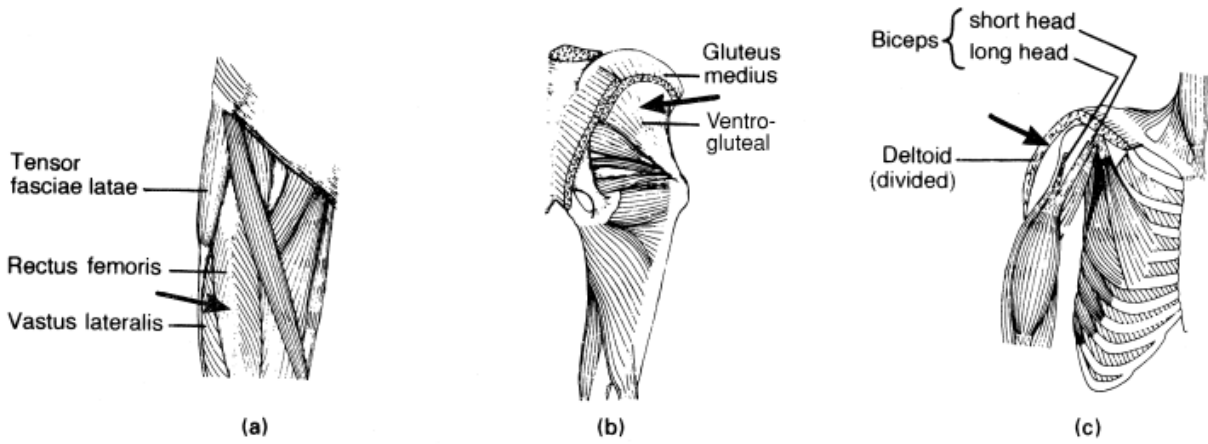
g) Administration - Intramuscular injections

Action	Rationale
1. Explain and discuss the procedure with the patient.	To ensure that the patient understands the procedure and gives his/her valid consent.
2. Consult the patient's prescription sheet, and ascertain the following: a. Drug b. Dose c. Date and time of administration d. Route and method of administration e. Diluent as appropriate f. Validity of prescription g. Signature of prescriber	To ensure that the patient is given the correct drug in the prescribed dose using the appropriate diluent and by the correct route.
3. Assist the patient into the required position.	To allow access to the chosen site and to ensure the designated muscle group is flexed and therefore relaxed.
4. Remove appropriate garments to expose the chosen site. Assess the injection site for signs of inflammation, oedema, infection and skin lesions	To gain access for injection. To promote effectiveness of administration, reduce risk of infection, avoid skin lesions and avoid possible trauma to the patient.
5. If appropriate, clean the chosen site with a swab saturated with isopropyl alcohol 70% (not usually necessary for SC and IM injections - see Section 6 for further information).	To reduce the number of pathogens introduced into the skin by the needle at the time of insertion.
6. Stretch the skin around the chosen site. See Section 5 for details on the Z-track technique.	To facilitate the insertion of the needle and to displace the underlying subcutaneous tissue.
7. Holding the needle at an angle of 90°, quickly plunge it into the skin. Leave a third of the shaft of the needle exposed*. *Note – Risperdal Consta injection is supplied with a special 2" needle that has to be used. It may be necessary to leave more than a third of this needle shaft exposed if the patient is of low weight and has little subcutaneous fat, in order to avoid hitting bone.	To ensure that the needle penetrates the muscle. To facilitate removal of the needle should it break.
8. Pull back the plunger. If no blood is aspirated, depress the plunger at approximately 1 ml every 10 seconds and inject the drug slowly. If blood appears, withdraw the needle completely, replace it and begin again. Explain to the patient what has occurred.	To confirm that the needle is in the correct position. This allows time for the muscle fibres to expand and absorb the solution. To prevent pain and ensure even distribution of the drug.
9. Wait 10 seconds before withdrawing the needle.	To allow the medication to diffuse into the tissue.
10. Withdraw the needle rapidly. Apply pressure to any bleeding point.	To prevent haematoma formation.
11. Record the administration on appropriate sheets.	To maintain accurate records, provide a point of reference in the event of any queries and prevent any duplication of treatment.

**SAFE & SECURE HANDLING OF MEDICINES – ALL STAFF MH
CLPG13-MH - Appendix 14 (July 2017)**

Action	Rationale
12. Dispose of syringe-needle combination by placing directly into a sharps bin, needle down. Do not attempt to re-sheath the needle or separate the needle from the syringe.	To ensure safe disposal and to avoid laceration or other injury to staff.

Intramuscular Injection Sites.



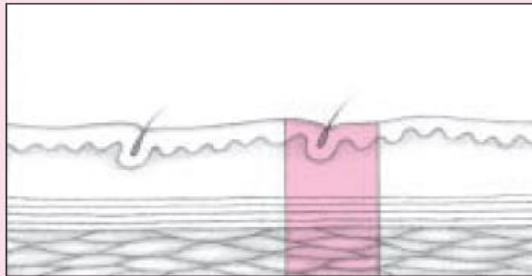
(a) Rectus femoris. (b) Gluteus medius and ventrogluteal. (c) Mid-deltoid.

Z-Track Injection Technique

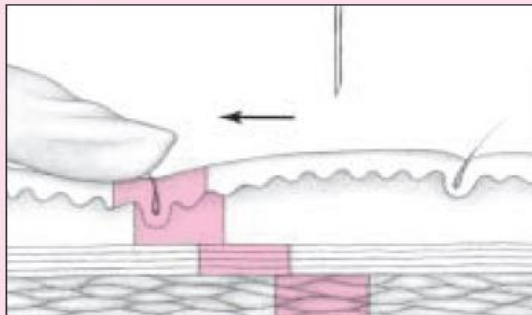
Displacing the skin for Z-track injection

By blocking the needle pathway after an injection, the Z-track technique allows I.M. injection while minimizing the risk of subcutaneous irritation and staining from such drugs as iron dextran. The illustrations below show how to perform a Z-track injection.

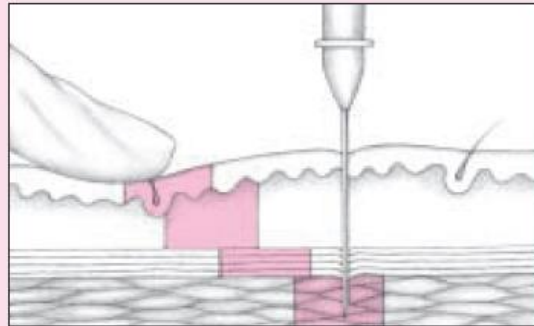
Before the procedure begins, the skin, subcutaneous fat, and muscle lie in their normal positions.



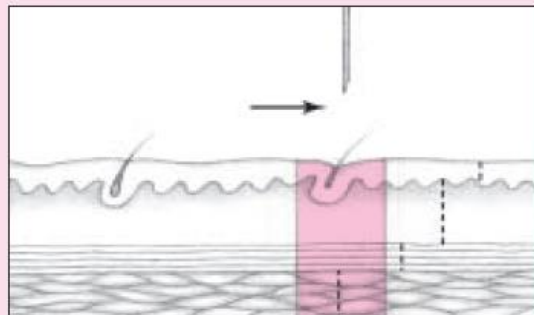
To begin, place your finger on the skin surface, and pull the skin and subcutaneous layers out of alignment with the underlying muscle. You should move the skin about 1/2" (1 cm).



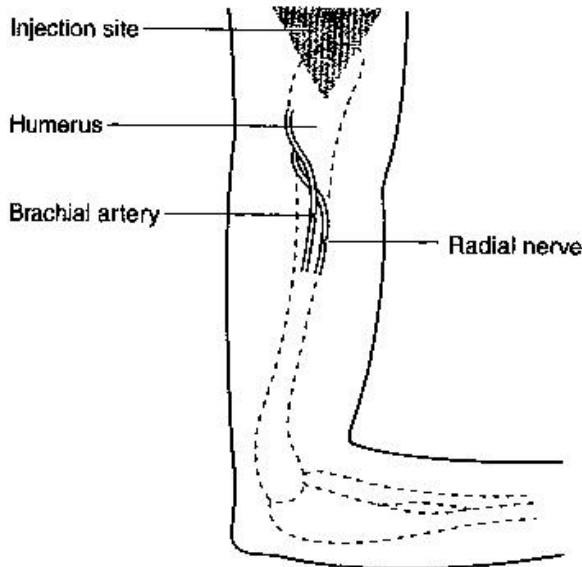
Insert the needle at a 90-degree angle at the site where you initially placed your finger. Inject the drug and withdraw the needle.



Finally, remove your finger from the skin surface, allowing the layers to return to their normal positions. The needle track (shown by the dotted line) is now broken at the junction of each tissue layer, trapping the drug in the muscle.



Locating Anatomical Sites for Intramuscular Injections



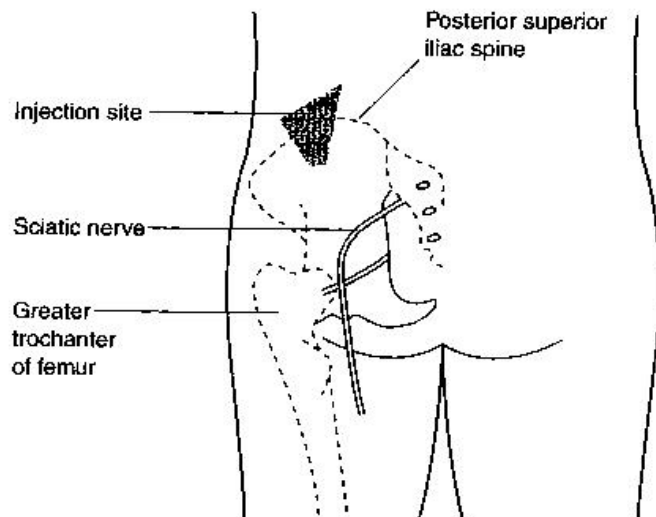
(a) The deltoid site

Deltoid:

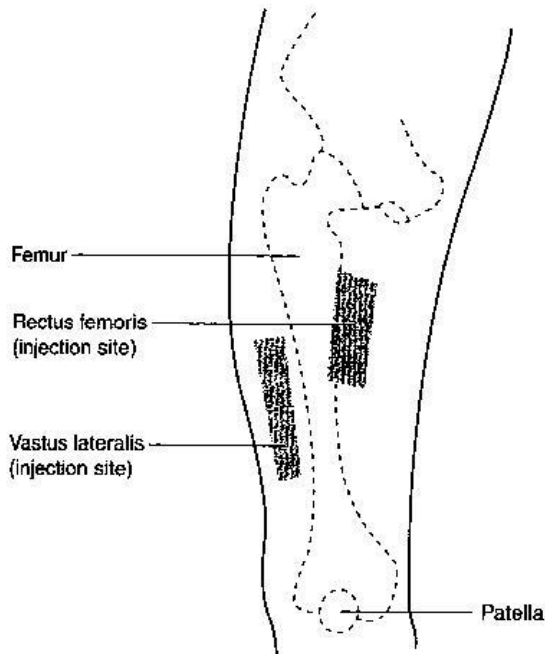
Find the lower edge of the acromial process and the point on the lateral arm in line with the axilla. Insert the needle 1" to 2" (2.5 to 5cm) below the acromial process, usually two to three finger-breaths, at 90 degree angle or angled slightly towards the process. Typical injection: 0.5ml (range: 0.5 to 2.0ml).

Dorsogluteal:

Inject above and outside a line drawn from the posterior superior iliac spine to the greater trochanter of the femur. Or, divide the buttock into quadrants and inject in the upper outer quadrant, above 2" to 3" (5 to 7.6cm) below the iliac crest. Insert the needle at a 90 degree angle. Typical injection: 1 to 4 ml (range: 1 to 5 ml).



(b) The dorsogluteal site



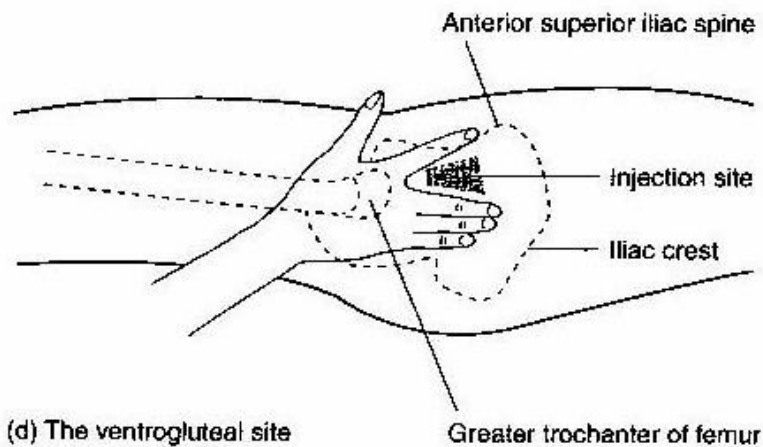
(c) The rectus femoris and vastus lateralis sites

Vastus lateralis:

Use the lateral muscle of the quadriceps group, from a hand-breadth below the greater trochanter to hand-breadth above the knee. Insert the needle into the middle third of the muscle parallel to the surface on which the patient is lying. You may have to bunch the muscle before insertion. Typical Injection: 1 to 4 ml (range: 1 to 5 ml; 1 to 3 ml for infants).

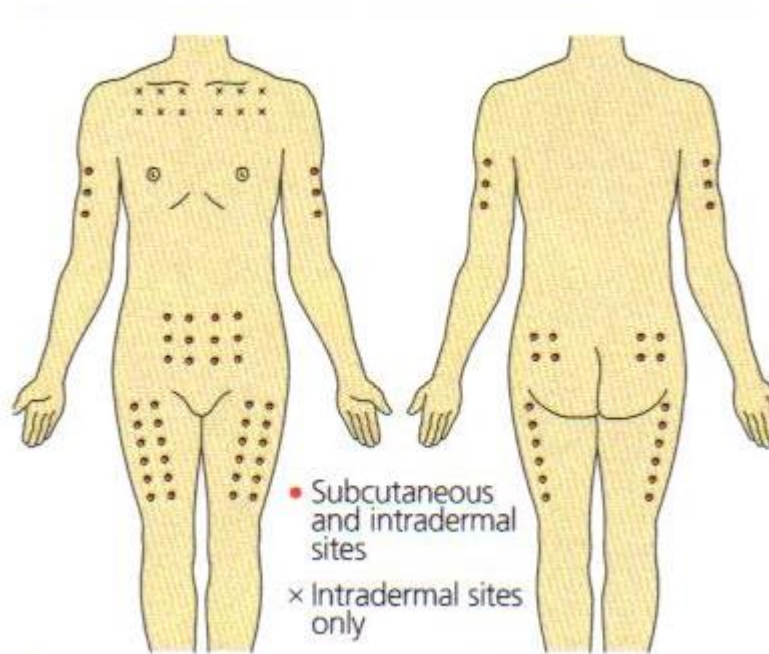
Ventrogluteal:

Locate the greater trochanter of the femur with the heel of your hand so your index finger points towards the anterior superior iliac spine (Use the palm of your right hand on the left greater trochanter or your left hand on the right greater trochanter). Then, spread your index and middle fingers from the anterior superior iliac spine to as far along the iliac crest as you can reach to form a V. The injection site is in the middle of the V. Insert the needle between the two fingers at 90 degree angle to the muscle. (Remove your fingers before inserting the needle) Typical injection: 1 to 4 ml (range 1 to 5 ml).



(d) The ventrogluteal site

Anatomical sites for Subcutaneous injections.



Subcutaneous:

Traditionally, subcutaneous injections are given at 45 degree angle into raised skin fold. However, when giving Insulin due the introduction of shorter needles, (5, 6 or 8mm), the recommendation for Insulin injection is now an angle of 90 degrees. The skin should be pinched up to lift the adipose tissue away from the underlying muscle especially in thin people. This is to prevent the injection being inadvertently absorbed by the muscle, as Insulin is absorbed more rapidly and can lead to glucose instability and potential hypoglycaemia (low blood glucose levels). Insulin Injections should be systematically rotated with anatomical sites.