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A Guide for Health Professionals

Manipulating medicines to deliver appropriate, reproducible doses to paediatric patients where no suitable product is available at the point of care: a guideline for Healthcare Professionals.

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Recommendations for healthcare professionals prior to manipulating any medicine

Avoid manipulating medicines wherever possible

- Procure dosage forms which are appropriate to the age and ability of the patient:
  - Of an appropriate strength where available
  - These should be licensed products where possible, but it may be necessary to procure unlicensed special formulations or imported medicines

- Consult with the prescriber:
  - Check if a dosage range is applicable to the product and the patient's condition (amending the dose within this range could avoid the need for manipulation)
  - To consider rounding the dose to an available dosage form or convenient measurable volume, if appropriate
  - To consider whether an alternative dosage form can be used. (If this dosage form is intended for a different route of administration confirm whether the dose should be adjusted and whether excipients are safe);
  - To consider whether an alternative medicine within the same therapeutic class with an appropriate dosage form can be used; the prescriber and/or pharmacist should determine whether this can be done safely.

Do not manipulate medicines with a narrow therapeutic index (e.g. digoxin, warfarin)

Never manipulate hazardous medicines e.g. cytotoxic medicines, outside a controlled environment (cytotoxic containment cabinet)

Do not manipulate medicines presented as modified release dosage forms (e.g. CR, SR, MR) unless specific information from the manufacturer or pharmacist permits manipulation

If a manipulation is considered necessary, further information may be required to ensure this is carried out safely and as accurately as possible. Consult hospital/local guidelines/policies prior to undertaking any manipulation.

Where appropriate consult a pharmacist for further information.

Where a manipulation is considered necessary, this should be undertaken immediately prior to administration

- The effects of a manipulated product may differ from those described for the non-manipulated product; careful monitoring of the patient is recommended particularly after administration of the first dose

Ensure that all equipment used to manipulate dosage forms is maintained in accordance with hospital/local policies

Use the appropriate sized syringe for the volume of solution to be measured

Dosage form specific recommendations:

Dosage form	*Recommendations*
Tablets	Where patient preference requires a tablet to be manipulated ensure that the implications of this are discussed with the patient/parents/carers Tablets should be split in preference to dispersing or crushing tablets and taking a proportion. Tablets should only be dispersed in liquid if there is knowledge of the dispersability of products or solubility of active ingredients and any special characteristics of the formulation (e.g. controlled release beads) or capsule (e.g. enteric coated). Manufacturers and/or pharmacists should be consulted (insoluble material may remain after dispersion or dissolution of a drug which is known to be soluble due to the presence of insoluble excipients in the original product). Split tablets using a tablet splitter Clean and replace tablet splitters according to manufacturer and local recommendations Scored tablets should be split along the scoreline, with the scoreline uppermost Consult a pharmacist prior to splitting unscored tablets Do not split tablets into less than ¼ segments, unless specified by manufacturer Visually assess the tablet segments to establish if they appear equal in size prior to administration Remaining segments of the tablet should be managed in accordance with local policy When crushing tablets add the water for dispersal to the container used for crushing so that loss through transfer of the crushed tablet is minimised
Capsules	Unless a capsule is designed as a sprinkle formulation, do not open capsules and take a proportion of their contents without consulting a pharmacist

	Do not disperse the contents of a capsule and take a proportion without knowledge of the solubility characteristics. The contents of capsules should only be dispersed in liquid if there is knowledge of the dispersability of products or solubility of active ingredients and any special characteristics of the formulation (e.g. controlled release beads) or capsule (e.g. enteric coated). Manufacturers and/or pharmacists should be consulted. Avoid removing the contents of liquid-filled capsules where possible • For liquid filled capsules, where the fill volume of the capsule is known, withdraw the required calculated volume into a syringe to measure the required dose - Note: as a needle will be required to extract the capsule contents an IV syringe will have to be used – to avoid the danger of inadvertent intravenous administration the required volume should be drawn up and administered in one operation without interruption. The needle should be removed and safely disposed of prior to administration. Discard the remaining portion of the capsule in accordance with local policy
Sachets	Do not disperse the contents of a sachet and take a proportion without knowledge of the solubility characteristics of the drug Discard remaining portion in accordance with local policy
Oral liquids	Volumes of less than 5ml should be administered using an oral syringe If very small volumes of oral liquid medicines are required (less than 0.1 ml), they should be diluted to ensure that a volume can be measured accurately. Consult the pharmacist. If dilution is undertaken this should be on a dose by dose basis and diluted liquids should not be stored for future use. Ensure that the chosen diluent is compatible with the medicinal product
Intravenous injections	Note: dilution or reconstitution in accordance with manufacturer instructions is not considered a manipulation in these guidelines The NPSA advises that certain injectable therapy manipulations are undertaken in pharmacy – see NPSA 20 http://www.nrls.npsa.nhs.uk/resources/?entryid45=59812

	Consult local/hospital IV guidelines prior to any manipulation of an intravenous preparation • Ensure that the chosen diluent is compatible with the injectable product The measurement of volumes of less than 0.1ml should be avoided (with the exception of insulin because it is measured in insulin syringes). If a volume of less than 0.1ml must be obtained then the dose required should be measured after an appropriate dilution When further diluting an intravenous injection preparation do not add the diluent to the syringe which contains the drug. Ensure that the drug is withdrawn into one syringe and added to the diluent which is in a separate syringe. Mix the active drug and diluent and withdraw the required volume into a separate syringe
Subcutaneous injections	Note: dilution or reconstitution in accordance with manufacturer instructions is not considered a manipulation in these guidelines Consult local/hospital guidelines prior to any manipulation of a subcutaneous preparation • Ensure that the chosen diluent is compatible with the injectable product The measurement of volumes of less than 0.1ml should be avoided (with the exception of insulin because it is measured in insulin syringes). If a volume of less than 0.1ml must be obtained then the dose required should be measured after an appropriate dilution. When further diluting a subcutaneous injection preparation do not add the diluent to the syringe which contains the drug. Ensure that the drug is withdrawn into one syringe and added to the diluent which is in a separate syringe. Mix the active drug and diluent and withdraw the required volume into a separate syringe
Nebuliser solutions	Withdraw the required dose volume from the vial into the syringe and add to the nebuliser chamber • note: if a needle is required to extract the nebuliser contents an IV syringe will have to be used – ensure the syringe and unused contents are appropriately disposed of immediately • To avoid the danger of inadvertent intravenous administration nebuliser solutions should be drawn up and added to the nebuliser chamber in one operation without interruption • The recommended diluent should then be added to the nebuliser chamber and the solution mixed using a suitable, preferably sterile, device
Transdermal patches	Prior to any transdermal patch manipulation, check with the pharmacy department what release characteristics the

	patch has (i.e. whether the patch is a matrix or a reservoir patch). • note: different brands of the same drug may have different delivery systems within the patch and may not be equivalent in the way or rate the drug is delivered Do not manipulate reservoir transdermal patches Where a proportion of a matrix transdermal patch is required cut with scissors along the full thickness of the patch to produce symmetrical segments Do not cut patches into more than 4 segments Follow local policy on storage or discarding the remainder of the patch.
Suppositories	Consult pharmacist to identify whether drug distribution is homogenous within the suppository Cut suppositories from tip to base using a scalpel blade Visually assess the suppository segments to establish if they appear equal in size prior to administration Manage the remaining suppository segments in accordance with local policy
Enemas	Withdraw from the container using a syringe and needle, the proportion of the enema which is not required and discard: administer the remainder of the enema from the original container • note: if a needle is required to extract the enema contents an IV syringe will have to be used – ensure the syringe and unused contents are disposed of immediately If the enema container nozzle is not suitable for administration, then the dose required should be withdrawn and administered via a suitable rectal tube.