

Administration of medicines to children: a practical guide

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SUMMARY

Getting children to take medicines can be difficult. There is no 'one-size-fits-all' approach.

When selecting medicines for children, it is important to consider the child's age, swallowing ability, ease of administration and accessibility of the product.

Ask the child, parent or caregiver about their preference for formulations and flavours.

There are different ways to alter the taste, aftertaste and mouth feel of medicines, which may help improve palatability.

Pharmacists or medicines information services can assist with advice on suitable formulations or methods of administration.

Introduction

Giving medicines to infants and children can be challenging. Children may refuse to take medicines for many reasons, such as fear, taste, embarrassment or inconvenience.

This problem is compounded by a lack of suitable formulations for paediatrics, restricting prescribing options and posing safety concerns. There is also limited information for parents and caregivers on how to give medicines to children, with most information coming from experience and anecdotal reports.

Choosing the right formulation

There is a well-recognised lack of suitable paediatric formulations available,¹ contributing to an increased risk of dosing errors and difficulties in administration. When selecting medicines for children, it is important to consider factors such as the child's age, swallowing ability, ease of administration and accessibility of suitable formulations of the product. Understanding the characteristics of each formulation can assist with choosing the most appropriate medicine for a child.

Oral liquids

Oral liquids are the preferred formulation for younger children as they are easier to swallow² and allow for flexible dosing based on the child's age and weight. Liquids may also be mixed with different flavours at the time of administration to help mask the taste and smell of a medicine.

However, liquid formulations are not without risk and can result in over- or underdosing, particularly in the following cases:

- Small volumes are required to be measured. Although smaller volumes may be preferable, the use of more concentrated liquids may create an additional risk, particularly with drop formulations that are marketed for adult use, but may sometimes be given to children (e.g. tramadol 100 mg/mL).³ Their use can more easily result in 10-fold dosing errors, such as measuring 1 mL instead of 0.1 mL. This can be minimised by providing carers with an oral syringe marked with the correct dose and appropriate counselling.⁴
- Multiple formulations of the same active ingredient are available. For example, paracetamol oral liquids are available in concentrations of 24 mg/mL, 48 mg/mL, 50 mg/mL and 100 mg/mL. When discussing medicines for children, it is important for carers, clinicians and pharmacists to include instructions with the dose by weight (e.g. mg or micrograms) and dose by volume.

Oral liquids may contain excipients such as colourings, solvents and preservatives at concentrations that may not be suitable for children.⁵ For example, furosemide (frusemide) oral solution contains 12.7% ethanol, which is typically considered insignificant in adults. However, it exceeds the maximum allowed ethanol content of 0.5% for children younger than six years of age, limiting the use of the proprietary furosemide (frusemide) product in this age group.⁶

Oral liquids often contain sugars to help improve palatability. It is important to consider the effects of sugar on teeth, particularly with chronic medicines. To minimise dental cavities, consider sugar-free formulations and encourage children to brush their teeth after taking a dose.⁷

Solid dosage forms

If an oral liquid is not available, alternative oral formulations may be suitable. If a solid dosage form requires manipulation (chewing, crushing, dispersing, halving or breaking) to facilitate administration, particular drug properties should be considered:

- palatability
- physiochemical (e.g. acid labile or light sensitive)
- hazardous (e.g. irritant, cytotoxic)
- drug release kinetics (e.g. modified release, enteric coating).

Tablets

Tablets are a suitable alternative to oral liquids, particularly when medicines are unpalatable.⁸ However, a child's ability to swallow tablets must be considered. There is no established age at which children are able to swallow tablets, as it is a skill that must be learned.⁹ Several resources are available for caregivers to assist with teaching children to swallow tablets or capsules (see Box). Some children may be able to swallow tablets from a young age, although most children are usually at least 8–10 years of age before they can routinely take tablets.¹⁰ If prescribing or dispensing for a child, the child or carer should always be asked if they would prefer tablets or oral liquids.

Tablets are more accessible with easier storage and transport options than those for oral liquids. However, tablets have limited dose flexibility, decreasing the ability to prescribe weight-based doses.⁵

Box Useful resources

[Society of Hospital Pharmacists of Australia. Don't rush to crush. 4th ed. \[Booklet\]](#)

[NPS MedicineWise. How to give medicines to children](#)

[Royal Children's Hospital, Melbourne. How to give medications to children. \[Pamphlet\]](#)

[Royal Children's Hospital, Melbourne. Teaching children how to swallow tablets and capsules](#)

[Medicines for Children. Helping your child to swallow tablets](#)

Most tablets are intended to be swallowed whole, but some immediate-release preparations may be chewed, crushed, or halved or quartered using a tablet cutter.⁵ Caution should be taken when manipulating tablets as this may result in a small portion of the dose being lost. This is particularly significant when giving medicines with a narrow therapeutic index. Additionally, most tablets are not formulated to be palatable, so crushing or dispersing them may impact a child's willingness to take the medicine.

Modified-release tablets

Modified-release tablets should be swallowed whole, as chewing or crushing them may damage the modified-release formulation, causing toxicity by releasing the total amount of medicine at once.¹¹

Capsules

Some children may find capsules easier to swallow than tablets. However, capsules cannot be halved, which limits their dose flexibility.

Most capsules are formulated to be swallowed whole. Some hard capsules (filled with powder or coated granules) may be opened and their contents mixed or sprinkled in food or drinks. Similarly, some soft capsules (filled with liquids or semisolids) may be chewed (e.g. colecalciferol).⁵

Oro-dispersible tablets

Oro-dispersible dosage forms, including tablets, wafers and films, are formulated to disperse rapidly once placed on the tongue. Alternatively, they can be dispersed in a small volume of liquid before administration. These preparations may be useful in children, as they do not need to be swallowed whole or crushed.⁵

Oro-dispersible medicines are commonly formulated with additive flavours to help mask the taste. Due to their delicate composition, it may be difficult to half or quarter these dosage forms, limiting their dose flexibility.

'Making the medicine go down'

There are some common 'Dos & Don'ts' for administering medicines to children, which depend on the type of formulation (Table 1). These suggestions are also outlined in a consumer-friendly leaflet (see Fig.).¹²

Taste

Taste is a powerful deterrent for children and is thought to have evolved as a safeguard against ingesting toxic substances.¹³ The unpleasant taste of a medicine can be improved by mixing it with various

flavoured syrups or cordials (Table 2).^{6,7} However, the child's taste preferences must be considered before mixing with flavours. Liquorice, peppermint and coconut flavours may taste reasonable to adults but may be disliked by children.¹⁴

Mixing medicines with a small amount of food or liquid is unlikely to cause drug-food interactions, even with medicines recommended to be given on an empty stomach (e.g. flucloxacillin). A small reduction in absorption of the medicine will pose less of a problem than that created by a child refusing to take the medicine at all.

Table 1 Common recommendations and precautions for administering medicines to children

Recommendations	Precautions
Oral liquids, suspensions and elixirs	
Use metric measures, such as a medicine syringe or cup	Do NOT use everyday utensils, such as teaspoons or tablespoons
Count oral drops on a spoon before administering	Do NOT administer drops directly from the bottle into the child's mouth
Mix oral liquids with a small amount of water or juice	Do NOT mix the medicine in large volumes
If the medicine is available in multiple flavours, ask the child for their preference	Do NOT mix the medicine with a child's essential foods (e.g. milk or formula), as the altered taste may cause future aversion to the essential foods
Tablets, capsules and solid dosage formulations	
Place the tablet in the middle of the tongue and follow with a large volume of liquid	Do NOT mix with honey in children younger than one year of age due to the potential risk of infant botulism
Try drinking a small amount of liquid from a bottle or using a straw	Do NOT give large volumes (i.e. aim for one mouthful)
Try halving or quartering tablets	Do NOT break modified-release, cytotoxic or hazardous medicines
Crush tablets between two spoons and mix with a small amount of soft food such as yoghurt, cold custard, fruit puree or jam	Do NOT crush modified-release, cytotoxic or hazardous medicines
Try dispersing the tablet in a small volume of liquid (water or juice)	
Check with a pharmacist if the tablets can be crushed or the capsules opened	
Encourage parents and caregivers to teach children how to swallow tablets. There are several resources to assist with teaching children to swallow solid dosage forms (see Box)	

Aftertaste

The aftertaste of a medicine is a difficult issue to navigate, particularly if it prevents a child from accepting subsequent doses.^{13,14} When administering a medicine, try and avoid the tongue, aiming oral liquids towards the back of the mouth against the cheek. Alternatively, consider swapping to a capsule or tablet formulation, which can be swallowed whole. Some children may find it more palatable to take a medicine via a straw or follow with a cold drink to lessen the aftertaste.

Mouth feel

The mouth feel of a medicine may also be a deterrent for some children. To improve the feel of oral liquids, consider diluting in water or a flavoured drink to reduce their viscosity.^{13,14} To combat the grittiness of crushed tablets or granules, try mixing with thick or gelatinous foods such as jelly, custard or spreads.

Advice for prescribers

When prescribing medicines for children, some practical considerations include:

- minimising the dosing frequency where appropriate (e.g. prescribing cefalexin 12-hourly (twice a day) rather than six-hourly (four times a day))
- avoiding medicines that are known to be less palatable (e.g. flucloxacillin is known to be bitter, so using cefalexin as an alternative)
- using alternative routes of administration, especially for children who cannot tolerate oral fluids (e.g. using a rectal paracetamol formulation rather than an oral formulation).

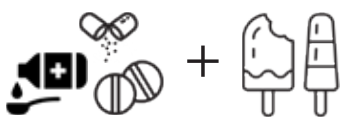
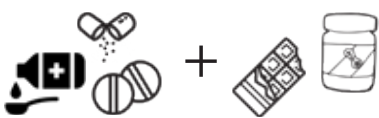
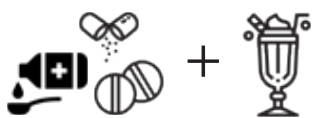
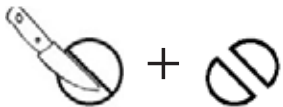
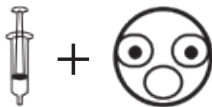

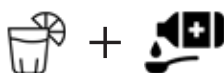

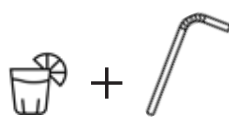
Conclusion

There are several techniques and strategies that can be used to improve the palatability and acceptance of medicines by children. Often, there is no single solution, and instead, there are many strategies that may be implemented by the parent or caregiver. Further guidance may be obtained from the local pharmacist or medicines information service. ◀

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Fig. Suggestions for administering medicines to children¹²

General		
 <p>Try cold treats like an ice cream or ice blocks to numb the tastebuds</p>	 <p>Try mixing with fatty foods like peanut butter or chocolate to coat the tastebuds</p>	 <p>Have the child's favourite drink ready to follow the medicine</p>
Tablets/capsules	Liquids	
 <p>Try cutting the tablet in halves before swallowing it*</p>	 <p>Try using an oral syringe, aiming towards the back of the mouth against the inner cheek Avoid the tongue</p>	
 <p>Try crushing the tablet or opening the capsule and sprinkling the contents on foods such as yoghurt or custard*</p>	 <p>Try mixing the medicine into a small amount of fruit juice before drinking†</p>	
 <p>Try crushing the tablet or opening the capsule and sprinkling the contents in a small amount of fruit juice*</p>	 <p>Try pouring the medicine in a small cup and drinking with a straw</p>	

* Not all tablets and capsules can be altered. Confirm with your local pharmacist.

† The entire drink must be consumed to ensure the full dose has been taken.

Adapted from reference 12

Table 2 Tastes and masking flavours

Taste of the medicine	Examples*	Flavour to mask the taste of the medicine
Sour	Multivitamins (e.g. vitamin C)	Cherry, lemon, lime, mandarin, orange, strawberry, raspberry, pineapple
Bitter	Antibiotics Paracetamol Corticosteroids	Cherry, chocolate, liquorice, strawberry, peach, coffee, mint, lemon, lime, raspberry, tutti-frutti, orange, cinnamon
Sweet	Lactulose Sorbitol	Caramel, lemon, orange, vanilla, bubble-gum
Salty	Iron supplements Antihistamines Macrogol laxatives Oral rehydration solutions	Banana, caramel, cream, chocolate, grape, vanilla, raspberry, orange, cinnamon, nut, butter, butterscotch, maple
Any		Spreadable yeast extract, peanut butter, jam, honey, apple sauce, custard, ice cream

* Common examples are based on patient reports, although any drug may be considered 'bad' tasting depending on subjective taste preferences.

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