What are the therapeutic options for adult patients unable to take solid oral dosage forms?

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Background

Some adults find it difficult to take tablets or capsules orally. This can be due to fear of choking, dry mouth or swallowing difficulties (dysphagia) (1). Dysphagia can result from a neurological or physical impairment and is a common complication of stroke and dementia (2). Patients with dysphagia may also have difficulty swallowing food and drink (1,3). Some patients have medicines administered via a feeding tube. Patients need their medicines in a form that is suitable for them to take.

This *Medicines Q&A* reviews the therapeutic options for adult patients unable to take solid oral dosage forms, and gives advice on how to choose the most appropriate preparation for a patient.

Answer

When choosing suitable preparations for a patient unable to take solid oral dosage forms, the prescriber must consider:

- Clinical appropriateness for the patient,
- Product quality and licensed status,
- Cost.

The first consideration should be to determine if a medicine is needed at all. Any unnecessary medicines should be stopped. If medication is required, consider agents with a prolonged therapeutic effect to reduce the frequency of dose administration (but note most modified or slow-release preparations are not suitable to be crushed or opened).

Choosing an appropriate preparation

If a medicine is required, a stepped approach is suggested to choose an appropriate preparation:

1. Licensed medicines administered as intended

Licensed medicines should be used where possible (4,5,6). They are associated with less risk and are usually less expensive than special-order products. In order to be granted a licence, medicines are assessed for efficacy, safety, and quality (6). Licensed medicines are manufactured to appropriate quality standards, and when placed on the market are accompanied by appropriate product information and labelling (6).

In many cases a licensed medicine will be suitable to meet the patient's needs, for example a licensed liquid or dispersible tablets.

- **Example:** Gabapentin tablets and capsules can be replaced by gabapentin oral suspension.

It may be appropriate to switch to a different medicine.

- **Example:** Ramipril oral solution may be a suitable alternative to perindopril tablets.
- **Example:** Fluoxetine liquid may be a suitable alternative to sertraline tablets.

Consider using dosage forms for administration via other routes such as transdermal patches or suppositories if appropriate.

- **Example:** Transdermal preparations of hormone replacement therapy may be preferred to oral formulations.

Adults who dislike swallowing large tablets or capsules may manage small tablets and capsules, or large, scored tablets snapped in half. Good pill-swallowing techniques can help – examples are available on the NHS website at www.nhs.uk/conditions/problems-swallowing-pills/ (1). The use of costly special-order products for these patients is generally not justified. Community pharmacists may be able to suggest suitable licensed preparations for their patients (1).

2. Licensed medicines administered in an unlicensed manner

If there is no suitable licensed formulation, consider using a licensed medicine in an unlicensed manner, for example by crushing/dispersing tablets or opening capsules immediately prior to administration, or by administering a solution for injection via a feeding tube. Not all medicines are suitable for administration this way and it is important to check beforehand.

The prescriber should be aware of the route and method of administration of medicines they prescribe (4,6). Prescribers should be aware if a medicine is to be used outside its licence and take responsibility for its use in this manner (4,6).

Homecare and care home staff may only administer prescription medicines on the instruction of the prescriber and must be trained and competent to do so (7,8). Medicines must be administered accurately, in accordance with prescriber instructions (9). If staff are to crush tablets or open capsules, or administer medicines via an enteral feeding tube, a written direction should be included in the patient's care plan (10).

Consider the patient's method of feeding

It is important for patients with dysphagia to have their swallow assessed by a speech and language therapist who can recommend the appropriate diet consistency and thickening agent if necessary.

Patients able to swallow thin liquids may take oral liquid medicines, dispersible tablets or solid preparations dispersed in water prior to administration. These options may also be suitable for patients with feeding tubes.

Patients who require thickened fluids may be able to swallow whole, half or crushed tablets (or the contents of capsules) administered with thickened fluid (2,11) or with food of the appropriate consistency (2). Liquid medicines may not be appropriate as they may need thickening (12). Not all liquid medicines can be thickened with any thickener; a notable example is macrogol (polyethylene glycol) laxative powders which can only be thickened with gum-based, not starch-based thickeners (13).

Patients able to tolerate a soft-food diet may be able to swallow some whole, halved or crushed tablets, or the contents of capsules, administered with food of the appropriate consistency (2).

Patients with enteral feeding tubes may have some medicines intended for oral administration given via this route. Some parenteral medicines are also suitable for administration orally or via feeding tubes. A *Medicines Q&A* provides examples (14).

Consider who will be administering the medicine

It is important to identify who will be administering the medicine (the patient themselves or a carer), their manual dexterity and ability to follow instructions to administer the medicine correctly. People manipulating tablets may be at risk of inhalation or topical exposure of the drug – this is particularly important for cytotoxic medicines, antibiotics, immunosuppressants and hormones (15,16). Carers should take precautions such as wearing gloves and using "closed system" crushing syringes. In care homes, equipment used must be thoroughly cleaned to avoid contamination between medicines for different patients.

Appendix 1 provides practical information on crushing and dispersing tablets, opening capsules and giving medicines in soft food.

Check that medicines are suitable for giving the way you want

Not all tablets and capsules are suitable for dispersing, crushing or opening for administration in soft food or via feeding tubes and it is important to check beforehand.

Useful resources include the NEWT guidelines (17) and Handbook of drug administration via enteral feeding tubes (15), both of which are available online. Medicines Information centres (18) and local medicines management pharmacy teams may provide advice. Information on administration to patients with swallowing difficulties or via feeding tubes is commonly not included in a product's Summary of Product Characteristics or Patient Information Leaflet.

Appendix 2 lists options available in several therapeutic areas and provides specific examples for adults with swallowing difficulties or feeding tubes.

- **Example:** Venlafaxine immediate release tablets can be crushed and dispersed in water for administration orally or via a feeding tube (15,17) or crushed and given orally with jam (17). Note: MR tablets must not be crushed (15,17,19).
- **Example:** Pregabalin capsules can be opened and the contents dissolved in water (15,17).

As before, consider switching to a different agent within the same therapeutic class in order to use a licensed product.

- **Example**: Bendroflumethiazide tablets can be dispersed in water (15,17). They may be a suitable alternative to other thiazide diuretics, none of which are available as a licensed liquid preparation.

In most cases, modified-release tablets are **not** suitable to be crushed.

3. Special-order products

Medicines not commercially available in suitable licensed formulations may be obtained as special-order liquids or extemporaneous preparations. Special-order medicines ('Specials') and extemporaneous preparations are unlicensed and should only be considered for use when a patient's needs cannot be met by licensed medicines (4,5,6,20).

The use of special-order or extemporaneous products may increase the risk to both patient and prescriber. The products are not assessed for safety or efficacy by the regulatory authorities and prescribers assume greater liability for their use (6,20).

In many case, special-order medicines or extemporaneous preparations are not required. The MHRA acknowledges that, while it does not recommend "off-label" use, the use of licensed medicines "off-label" is preferred to the use of unassessed, unlicensed medicines (20).

Regulation

UK manufacturers or assemblers of special-order medicines must hold a Manufacturer's Specials (MS) Licence granted by the Licensing Authority and their manufacturing sites must be inspected for compliance with Good Manufacturing Practice (20,21). Products made under a MS licence do not have a marketing authorisation and are unlicensed. They may be identified by a MS number on their label (if they have been packaged in the UK); imported special-order products (including those manufactured in the UK but packaged in another country in the EU), and extemporaneously-prepared products do not have a MS number on their label (21).

Special-order medicines may be produced as batch-prepared products or individual bespoke preparations. Batch-prepared products undergo final testing for quality assurance, and the purchaser should be provided with a Certificate of Analysis (CoA) - evidence that the product meets the specification for certain parameters (22). Bespoke special-order medicines are not tested after manufacture. For these products, the purchaser should receive a certificate of conformity (CoC) - a statement signed by the manufacturer that says they believe the product complies with the purchaser's specification (22,23).

Extemporaneous products can be made by, or under the supervision of, a pharmacist (in a registered pharmacy, hospital, care home service or health centre) or can be made by 'Specials' manufacturers outside of their MS licence (21). These products do not have a MS number on their label (21).

Special-order and extemporaneous products legally do not require a Patient Information Leaflet (24).

Choice of preparation

Special-order products can be expensive, sometimes many times the cost of alternative licensed medicines (25,26,27). It can be difficult to identify a 'Special' at the point of prescribing and prescribers can be unaware of the high cost of special-order medicines they prescribe.

Since late 2011 a tariff for some special-order or extemporaneous products has been in place. Part VIIIB of the Drug Tariff lists around 250 products with prices that pharmacy contractors will be reimbursed, regardless of how they are sourced (25). Contractors are additionally paid a fixed price (currently £20) for out of pocket expenses if they endorse the prescription SP (for special-order products) or ED (for extemporaneously prepared preparations) (28).

The cost of special-order or extemporaneous medicines not listed in Part VIIIB of the Drug Tariff is unregulated.

For 'Specials' not listed in Part VIIIB of the Drug Tariff, the contractor must stamp, date, initial and endorse the CoA or CoC with the invoice price less discount, and the prescriber's details (28).

Prescribers are advised to consult the Drug Tariff (or check with a pharmacy professional) for preparations listed in Part VIIIB in order to choose a product with known costs. Because of the higher quality assurance measures, batch-prepared products may be preferred over bespoke and extemporaneous preparations. However, when prescribing, it is not possible to specify a batch-made or bespoke product. The dispensing pharmacist can consider the type of special-order product when ordering.

Some special-order medicines have a very short shelf-life. There is a risk of wastage if ordered in advance or in too large a quantity.

Prescribers are reminded that, in many cases, a special-order preparation is not required.

- **Example: bendroflumethiazide**
  Special-order bendroflumethiazide 2.5mg/5ml oral suspension is listed in Part VIIIB of the Drug Tariff; the price for a 150ml bottle providing 30 doses of 2.5mg is about £25 (23). Of the 'Specials' manufacturers contacted, one could provide a batch-prepared 'Special' that requires fridge storage and has an 18-month shelf-life (29), one could provide a bespoke 'Special' that does not require fridge storage but has a shelf-life of only one month (30) and one was unable to supply (31).

  Bendroflumethiazide 2.5mg tablets can be dispersed in water for administration orally or via a feeding tube (17). A box containing 28 doses of 2.5mg costs less than £1 (26).

- **Example: sertraline**
  Special-order sertraline 50mg/5ml oral suspension is listed in Part VIIIB of the Drug Tariff; the price for a 150ml bottle providing 30 doses of 50mg is about £25 (25). Of the 'Specials' manufacturers contacted, two could provide a batch-prepared 'Special' with a shelf life >18 months (unopened) and expiry of one month after opening (31,32), and one could provide a bespoke 'Special' with a shelf-life of one month from manufacture (30); none would require fridge storage (30,31,32).
- Fluoxetine 20mg/5ml is available as a licensed oral solution and licensed sugar-free oral solution. Two 70ml bottles providing 28 doses of 20mg costs about £6 for the sugar-containing product and £26 for the sugar-free product (26).

Other considerations

- Consider the needs of patients and carers. It may not be practical for a patient to store or carry several bottles of liquid medicines. Some liquid medicines require fridge storage.
- NHS healthcare professionals have a duty to make the best use of public resources; cost as well as clinical suitability and product quality must be considered when choosing appropriate preparations.
- The cost of special-order products can vary enormously between products and suppliers. For medicines listed in Part VIIIB of the Drug Tariff, cost to the NHS is defined. For items not listed in the Drug Tariff, the cost to the NHS is unregulated.
- Whichever product is selected, review the prescription regularly to ensure continued appropriateness; the patient's needs may have changed or an alternative treatment option may be available.

Summary

- Some adults are unable to take medicines in solid oral dosage forms for reasons such as swallowing difficulties. The choice of medicine for these patients should be made on an individual basis taking into account the patient's clinical needs, method of feeding, the practicalities of administration, product quality and cost.
- A stepped approach to choosing a suitable medicine is suggested:
  1. If possible, use a licensed medicine in a suitable formulation to meet the patient's needs (e.g. a dispersible tablet or licensed liquid medicine). Consider switching to a different agent in the same class, or to a different route of administration to allow a licensed medicine to be used.
  2. Consider using a licensed medicine in an unlicensed manner, for example by crushing/dispersing tablets or opening capsules. Not all medicines are suitable for use in this manner and it important to check beforehand with a pharmacy professional or appropriate reference source. Take into account the patient/carer's ability to administer medicines in this way and consider any risks to the carer from exposure to medicines such as cytotoxics or hormones.
  3. In situations where the patient's needs cannot be met by licensed medicines, consider using a special-order product ('Special').
- Licensed medicines should be used where possible. They are manufactured to specific standards and have been assessed for efficacy, safety and quality.
- Special-order products are unlicensed and are not required to meet the same standards as licensed preparations. Prescribers assume greater liability when using them and should document why they are required.
- Special-order products listed in Part VIIIB of the Drug Tariff have a defined price to the NHS. The cost of 'Specials' not listed in the Drug Tariff is unregulated.
- An appendix to this Medicines Q&A lists some therapeutic options for adult patients unable to take solid oral dosage forms. Another appendix provides practical advice on administration of medicines for these patients.

Limitations

The table of options (Appendix 2) is not comprehensive and is the opinion of the author. Where different medicines are suggested, this does not imply therapeutic equivalence. This document applies to` use of medicines in adults, not children.

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Search strategy

- In-house enquiries, National MI Sharer, SPS website
- Professional guidance: General Medical Council, British Medical Association, General Pharmaceutical Council, Royal Pharmaceutical Society, Nursing and Midwifery Council, Care Quality Commission
- Regulation: Medicines and Healthcare products Regulatory Agency.
- Reimbursement and costs: NHS Business Services Authority, Drug Tariff, British National Formulary, Pharmaceutical Services Negotiating Committee.
- Special-order manufacturers: Association of Pharmaceutical Specials Manufacturers, Rosemont Pharmaceuticals, Nova Laboratories, The Specials Laboratory
- Prescribing data: NHS Business Services Authority

Appendix 1

Administering medicines to patients unable to take solid oral dosage forms

In all cases, first establish that a medicine is suitable for administration in the intended manner. Consult standard reference texts or contact your medicines management team or medicines information centre for advice (1,2,3).

Home care and care home staff may only administer prescription medicines on the instruction of the prescriber and must be trained and competent to do so (4,5). If they are to crush tablets or open capsules, or administer medicines via an enteral feeding tube, a written direction should be included in the patient's care plan (6).

People manipulating tablets may be at risk from inhalation or topical exposure of the drug – this is particularly the case for cytotoxic medicines, antibiotics, immunosuppressants and hormones (1,7). Carers should take precautions such as wearing gloves and using "closed system" crushing syringes (1). In care homes, equipment used must be thoroughly cleaned to avoid contamination between medicines for different patients (1).

Crushing or dispersing tablets

Many immediate-release tablets will disperse sufficiently in water to be suitable for administration via an enteral feeding tube without the need for crushing (1). Place the tablet into a medicine pot or suitable syringe, add 10ml water (larger volumes may be needed for some tablets) and allow the tablet to disintegrate (1). Make sure the pot or syringe is rinsed and the rinsing water administered to ensure the full dose is given (1).

Modified-release tablets are not suitable for crushing or dispersing (1). Enteric-coated tablets are not suitable for crushing for most patients as without the coating intact, the drug will degrade in the stomach (1).

For medicines that are suitable for and require crushing, crush using a tablet crusher (2), crushing syringe (1) or pestle and mortar (1,2). A crushing syringe is preferred for medicines such as cytotoxics, to avoid environmental contamination and exposure of a carer to the medicine (1). Only crush medicines one at a time; do not crush all the patient's medicines together (2).

- When using a crushing syringe: after crushing the tablet to a fine powder, mix with 10-15ml water and administer. Then add another 10-30ml water, shake and administer to enure the full dose is given (1).
- When using a pestle and mortar: crush the tablet then add 5ml water and draw into an oral syringe. Add 10-20ml to the mortar and stir, then draw this into the syringe and administer (1). Rinse the mortar again and administer the rinsing water to ensure the full dose is given (1). For tube administration, add water to the crushed tablet to create a suspension and draw into an oral or enteral syringe for administration via a feeding tube (1).

Crushing or dispersing should only be performed immediately before administration.

Opening capsules

Some hard gelatin capsules can be opened and their contents (powder or granules) mixed with water or administered with food. Some capsules may be too small to manipulated and opened (1). After opening the capsule, mix the contents with water and draw into an oral or enteral syringe for administration orally or via a feeding tube (1).

Capsules should only be opened immediately before administration.

Administering medicines in liquids or soft food

Crushed medicines or capsule contents may be given with a small amount of cold liquid or soft food such as a teaspoon of yoghurt (8,9); they do not need to be mixed with water beforehand. A small amount of food (e.g. a teaspoon) should be used to ensure the full dose is taken (2); if taken with a meal, the medicine should be added to the first mouthful of food.
Crushed tablets or capsule contents may taste very bitter (2); it can be helpful to mask the taste for patients taking these medicines orally by using food with a strong flavour, or giving a strong-flavoured drink afterwards.

Medicines should only be administered in food with the patient's knowledge and consent. Hiding medication in food is considered 'covert administration' and is only condoned in certain circumstances (5).

Administering medicines via feeding tubes

Feeding tubes should be flushed with water before and after each medicine is administered (1). If the medicine is viscous, flushing or dilution with water may be required during administration (1). For patients who are fluid-restricted, the volume of water used for flushing needs to be considered (1). Medicines should not be added to enteral feeds due to the risk of interactions between the medicine and the feed (1).

When administering crushed tablets or opened capsules via a feeding tube, mix the powder or granules with water. Draw into an enteral syringe and administer via the feeding tube. If you have used a mortar, tablet crusher or crushing syringe, rinse this with water and administer the rinsings also. Flush the tube post-dose with water. For medicines that are licensed for administration via feeding tubes, instructions may be included in the Summary of Product Characteristics.

Suggested protocol for administering medicines via a feeding tube (2):

1. Stop the feed (leaving a feeding break if necessary).
2. Flush the tube with 30ml water
3. Prepare the first medicine for administration, and administer it.
4. Flush with 10ml water.
5. Repeat stages 3 and 4 with subsequent medicines.
6. Flush with at least 30ml water.
7. Re-start the feed (leaving a feeding break if necessary).

The administration of medicines via feeding tubes by care workers in care homes and those providing domiciliary care should only be performed by those with the competency and skills required (6). Procedures should be in place to ensure care workers who agree to give medicines via feeding tubes receive appropriate training.

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Appendix 2

Table of therapeutic options for adult patients unable to take solid oral dosage forms

- The following table lists therapeutic options for adult patients unable to swallow solid oral dosage forms. Information included can be used to help choose medicines for patients with swallowing difficulties or feeding tubes.

- The choice of medicine should be made on an individual basis taking into account the patient's clinical need, method of feeding, the practicalities of administration, product quality and cost.

- The *Medicines Q&A* which this appendix accompanies reviews therapeutic options for patients unable to take solid oral dosage forms, and gives advice on how to choose the most appropriate preparation.

  A stepped approach is suggested:

  1. If possible, use a licensed medicine in a suitable formulation to meet the patient's needs (e.g. a dispersible tablet or licensed liquid medicine). Consider switching to a different agent in the same class, or to a different route of administration to allow a licensed medicine to be used.
  2. Consider using a licensed medicine in an unlicensed manner, for example by crushing/dispersing tablets or opening capsules. Not all medicines are suitable for use in this manner and it important to check beforehand. Information is available from pharmacists, medicines management teams, medicines information centres and resources such as the NEWT guidelines and Handbook of drug administration via enteral feeding tubes. Take into account the patient/carer's ability to administer medicines in this way and consider any risks to the carer from exposure to medicines such as cytotoxics or hormones..
  3. In situations where the patient's needs cannot be met by licensed medicines, consider using a special-order medicine ('Special').

- The inclusion of a special-order medicine in the table does not endorse its use. For special-order medicines listed in Part VIIIB of the Drug Tariff, cost to the NHS is defined. For items not listed in the Drug Tariff, the cost to the NHS is unregulated.

- The therapeutic drug classes chosen for inclusion in the table have been highlighted as having particular relevance to primary care, and include those where there has been a high spend on special-order medicines.

- Where alternative agents are suggested, therapeutic equivalence is not implied. Patients will require monitoring and possibly dose titration when switching between different agents.

- The prescriber should be aware of the licensed status, route and method of administration of medicines they prescribe. Prescribers assume greater liability for use of unlicensed medicines and for use of licensed medicines in an unlicensed manner, than for licensed medicines used as intended.

- Indicative prices are included in the table*. Prices for licensed medicines are for medicines prescribed generically and reflect NHS costs in primary care. For special-order preparations listed in Part VIIIB of the Drug Tariff, the Tariff price is listed. This is the price pharmacy contractors are reimbursed (plus an additional fee), regardless of how these products are sourced. The cost of special-order products outside of the Drug Tariff is unregulated and can vary enormously between suppliers.

* Prices are taken from the December 2019 Drug Tariff Part VIIIA (Basic prices of drugs) and Part VIIIB (Arrangements for payment for specials and imported unlicensed medicines).

BNF chapter 1

Proton pump inhibitors

Licensed medicines in suitable formulations

Lansoprazole orodispersible tablets can be allowed to disperse in the mouth then swallowed, or mixed with water to give a dispersion of small granules that can be given orally or via a nasogastric (NG) feeding tube. They are licensed to be given this way - check the relevant SPC for details. The granules must not be crushed or chewed.
Note: lansoprazole is not absorbed sublingually; the gastroresistant granules must be swallowed to be effective. (28 x 15mg: £3; 28 x 30mg: £5)

Lansoprazole capsules contain granules. Some brands are licensed for the capsules to be opened and the granules mixed with a small amount of water, apple or tomato juice or sprinkled onto a small amount of soft food such as yoghurt or apple sauce - check the relevant SPC for details. Some brands are licensed for administration via NG tubes, after mixing with 40ml apple juice – check the relevant SPC for details. (28 x 15mg or 30mg: £1)
Note: For patients with fine bore feeding tubes, lansoprazole orodispersible tablets (Zoton FasTabs) may be preferred as the granules are smaller than those in other preparations.

Esomeprazole gastro-resistant granules for oral suspension are to be mixed with water and are licensed to be given orally or via a NG or PEG tube - check the SPC for details. (28 x 10mg sachets: £25)

Esomeprazole tablets and capsules - most are licensed to be dispersed in water (not carbonated water or other liquid) and administered orally or via a NG or PEG tube - check the relevant SPC for details of administration. (28 x tablets: £3-4, depending on strength; 28 x 20mg or 40mg capsules: £2)

Omeprazole dispersible tablets are licensed to be dispersed in water and given orally. The dispersion can be mixed with fruit juice or apple sauce (but not milk or carbonated water) - check the SPC for details. Care must be taken not to crush or chew the granules. Mezzopram brand are licensed to be dispersed in water and administered via NG or PEG tubes - check the SPC for details. *Losec MUPS* are not licensed to be dispersed in water and administered via feeding tubes, but there is experience of their use in that manner. (28 x 10mg: £9, 28 x 20mg: £14, 7 x 40mg: £7)

Omeprazole capsules are licensed to be opened and the contents mixed with water or a mildly acidic liquid such as fruit juice or apple sauce for administration orally. Check the relevant SPC for details. (28 x 10mg or 20mg: £1, 7 x 40mg: £1)

H2-receptor antagonists may be an option for patients in whom step-down therapy is appropriate: Ranitidine effervescent tablets (60 x 150mg: £35, 30 x 300mg: £35) and ranitidine oral solutions (300ml x 75mg/5ml: £7; 150ml x 150mg/5ml: £8) are suitable for administration orally or via feeding tubes (but are not licensed for tube administration).

Licensed medicines used in an unlicensed manner

In view of the licensed options available, administering medicines in an unlicensed manner may not be required.

Special-order medicines

In view of the licensed products available, special-order preparations may not be required.

The following lansoprazole and omeprazole oral suspensions are listed in Part VIIIB of the Drug Tariff:

Lansoprazole 15mg/5ml oral suspension (100ml: £54)
Lansoprazole 30mg/5ml oral suspension (100ml: £34)
Lansoprazole 5mg/5ml oral suspension (100ml: £25)

Omeprazole 10mg/5ml oral suspension (75ml: £26)
Omeprazole 20mg/5ml oral suspension (150ml: £44)
Omeprazole 40mg/5ml oral suspension (100ml: £47)
Omeprazole 5mg/5ml oral suspension (70ml: £28)

Note: the price of special order products not listed in the Drug Tariff is unregulated.

BNF chapter 2

Thiazide and related diuretics

Licensed medicines in suitable formulations

There are no suitable licensed formulations of bendroflumethiazide or other thiazide / thiazide-related diuretics.

Loop diuretics are available as liquid preparations for oral administration. They can be given via feeding tubes but may require dilution with water before administration:

Furosemide 20mg/5ml, 40mg/5ml and 50mg/5ml oral solutions are available. (150ml: £15-21 depending on strength). *Frusol* brand is licensed for administration via NG and PEG tubes - check the relevant SPC for details. Furosemide oral solutions do not require fridge storage.

Bumetanide 1mg/5ml oral solution is available. It does not require fridge storage. (150ml: £200)

Licensed medicines used in an unlicensed manner

Bendroflumethiazide tablets can be dispersed in water and given orally or via a feeding tube. Tablets disperse in one to five minutes. (28 x 2.5mg: <£1)

Special-order medicines

Bendroflumethiazide 2.5mg/5ml oral suspension is listed in Part VIIIB of the Drug Tariff. (150ml: £27)

Note: the price of special order products not listed in the Drug Tariff is unregulated.

ACE inhibitors

Licensed medicines in suitable formulations

Ramipril 2.5mg/5ml oral solution is available as a licensed product; it requires fridge storage and has one month expiry once opened (150ml: £95). Some brands are licensed for administration via NG and PEG feeding tubes - check the relevant SPC for details.

Captopril 5mg/5ml (100ml: £95) and 25mg/5ml (100ml: £105) oral solutions are available as licensed products; they do not require fridge storage but have a shelf-life of 21 days once opened. Some products are licensed for administration via NG feeding tubes - check the relevant SPC for details. *Note: captopril is not usually suitable for once daily administration.*

Lisinopril 5mg/5ml oral solution is available as a licensed product. It does not require fridge storage and has a one-month expiry once opened. (150ml: £155)

Licensed medicines used in an unlicensed manner

Enalapril tablets can be crushed or dispersed in water for administration orally or via a feeding tube; the crushed tablets may have a bitter aftertaste. Without crushing, some brands will disperse in around 5 minutes. (28 tablets: £2-6, depending on strength)

Lisinopril tablets can be dispersed in water for administration orally or via a feeding tube (28 tablets, any strength: <£1). The tablets disperse in one to five minutes.

Perindopril erbumine tablets can be crushed and mixed with water for administration orally or via a feeding tube. Perindopril erbumine may not be effective when administered through enteral tubes terminating in the jejunum due to decreased absorption. (30 tablets, any strength: £2-3)

Ramipril tablets can be crushed or dispersed in water for administration via a feeding tube. The drug is poorly soluble. (28 tablets, any strength: £2-3)

Ramipril capsules can be opened and the contents dispersed in water for administration orally or via a feeding tube. The drug is poorly soluble. The capsule contents can be placed directly in the mouth but taste unpleasant. The capsule contents can be placed directly onto bread or mixed with apple juice or apple sauce. (28 capsules, any strength: £1)

ACE inhibitors - continued

Special-order medicines
In view of the licensed preparations available, a special-order product may not be necessary.

The following preparations are listed in Part VIIIB of the Drug Tariff:

Enalapril 10mg/5ml oral suspension (100ml: £103)
Enalapril 5mg/5ml oral solution: (150ml: £71)
Enalapril 5mg/5ml oral suspension (75ml: £48)

Lisinopril 20mg/5ml oral solution (100ml: £49)
Lisinopril 20mg/5ml oral suspension (100ml: £69)

Perindopril erbumine 4mg/5ml oral solution (150ml: £32)
Perindopril erbumine 4mg/5ml oral suspension (100ml: £55)

Angiotensin II receptor antagonists

Licensed medicines in suitable formulations

Valsartan 3mg/ml oral solution is available as a licensed preparation. It has a three-month expiry once opened and does not require fridge storage. *Note: it is only licensed for children and young people aged 1 to less than 18 years of age, not for adults. When converting from tablets to oral solution, halve the tablet dose.*(160ml: £7)

Note: ACE inhibitors are preferred for most patients; angiotensin II receptor antagonists are reserved for patients unable to tolerate ACE inhibitors.

Licensed medicines used in an unlicensed manner

The following options are suitable for administration orally or via feeding tubes. Irbesartan tablets disperse more readily than other preparations and may be preferred for administration via feeding tubes.

Irbesartan tablets are film-coated but can be crushed and dispersed in water. Without crushing they disperse in 2 to 5 minutes. The drug is practically insoluble so flush well if giving via a feeding tube. (28 tablets: £2-5, depending on strength)

Candesartan tablets can be crushed and dispersed in water. Without crushing they disperse in around 5 minutes. (28 x 8mg, 16mg or 32mg: £2)

Losartan tablets are film-coated but can be crushed and mixed with water. (28 tablets: £2-6, depending on strength)

Valsartan *capsules* can be opened and the contents dispersed in water. The capsule contents are not very soluble so flush well if giving via a feeding tube. The capsule contents taste bitter. (28 capsules: £5-14, depending on strength)

There is no information on the administration of **valsartan *tablets*** for patients with swallowing difficulties or feeding tubes.

Special-order medicines

Note: valsartan 3mg/ml oral suspension is available as a licensed product.

Losartan 50mg/5ml oral suspension is listed in Part VIIIB of the Drug Tariff. (150ml: £42)

Note: the price of special-order products not listed in the Drug Tariff is unregulated.

Oral anticoagulants

Licensed medicines in suitable formulations

Apixaban tablets (*Eliquis* brand) are film-coated but are licensed to be crushed and dispersed in water or glucose 5% for administration orally or via an NG feeding tube - check the SPC for details. They are also licensed to be dispersed in apple juice or apple puree for administration orally. (60 x 2.5mg: £7, 56 x 5mg: £53)

Rivaroxaban tablets (*Xarelto* brand) are film-coated but are licensed to be crushed and mixed with water for administration via NG or PEG feeding tubes - check the SPC for details. They are also licensed to be mixed with water or apple puree for administration orally. Crushed 15mg and 20mg strengths should be immediately followed by food or enteral feeding. Rivaroxaban tablets are not suitable for administration via feeding tubes that terminate beyond the stomach owing to decreased absorption of the drug. (56 x 2.5mg, 30 x 10mg, 28 x 15mg or 28 x 20mg: £50)

Warfarin 1mg/1ml oral suspension is available as a licensed preparation and is suitable for administration orally or via feeding tubes (not licensed for tube administration). It does not require fridge storage and has an expiry of 28 days once opened. (150ml: £108)

Licensed medicines used in an unlicensed manner

Edoxaban tablets are film-coated but can be crushed and mixed with water for administration orally or via a feeding tube. They may also be mixed with apple sauce for administration orally. (10 x 15mg: £18, 28 x 30mg or 60mg: £49)

Dabigatran capsules must not be opened; bioavailability of the capsule contents may be increased by 75% when taken without the shell. (60 capsules, any strength: £51)

Warfarin tablets can be crushed and mixed with water for administration orally or via feeding tubes. There is a risk of reduced absorption of warfarin if given via feeding tubes that terminate beyond the stomach; monitor closely when switching between routes of delivery. (28 tablets, any strength: <£2)

Special-order medicines

In view of the licensed options for crushing oral direct-acting anticoagulant tablets and the licensed warfarin 1mg/1ml oral suspension that is available, special-order preparations are unlikely to be required.

Antiplatelets

Licensed medicines in suitable formulations

There are no suitable licensed formulations of clopidogrel or modified-release dipyridamole.

Dispersible aspirin tablets can be considered for patients post stroke/TIA who are unable to take clopidogrel or modified-release dipyridamole. (28 x 75mg: <£1)

Dipyridamole 50mg/5ml oral suspension (150ml: £40) and 200mg/5ml oral suspension (150ml: £135) are available as licensed products. Neither require fridge storage; 50mg/5ml has an expiry of one month once opened, 200mg/5ml has an expiry of 60 days once opened. They are only licensed for use in patients with prosthetic heart valves in combination with oral anticoagulation.
Note: Evidence only supports use of modified-release, not immediate-release, dipyridamole preparations for prevention of vascular events.

Ticagrelor *(Brilique*) orodispersible tablets are available; the tablet should be placed on the tongue where it will rapidly disperse in saliva and can be swallowed. Ticagrelor orodispersible tablets are licensed to be dispersed in water and given via an NG tube. It is important to flush the tube thoroughly afterwards - check the SPC for details. (56 x 90mg: £55)

Ticagrelor (*Brilique*) film-coated tablets are licensed to be crushed to a fine powder and mixed with water for administration orally or via an NG tube. It is important to flush the tube thoroughly afterwards - check the SPC for details of administration. (56 x 60mg or 90mg: £55)

Antiplatelets - continued

Licensed medicines used in an unlicensed manner

Clopidogrel tablets are film-coated but can be crushed and dispersed in water for administration orally or via a feeding tube. Most brands disperse without crushing within 1 to 5 minutes but some take longer. (28 x 75mg: <£2)

Dipyridamole *modified-release capsules* may be opened and the modified-release granules mixed with water, juice or soft food for administration orally, but the granules must not be crushed as this would damage the modified-release coating. Patients must not crush or chew the granules, making this option unsuitable for patients with limited understanding or who are unable to follow instructions. The modified-release granules may be administered via wide-bore feeding tubes but the tube must be flushed well as there is a potential for the granules to cause a blockage. (60 x 200mg: £13)

Dipyridamole *immediate-release tablets* can be crushed and mixed with water for administration orally or via a feeding tube but there is a risk of tube blockage. (84 x 100mg: £6)
Note: Evidence only supports use of modified-release, not immediate-release, dipyridamole preparations for prevention of vascular events.

Special-order medicines

The following preparations are listed in Part VIIIB of the Drug Tariff:

Clopidogrel 75mg/5ml oral *solution.* (150ml: £49)
Clopidogrel 75mg/5ml oral *suspension.* (100ml: £50)

Note: the price of special order products not listed in the Drug Tariff is unregulated.

HMG CoA reductase inhibitors 'statins'

Licensed medicines in suitable formulations

Simvastatin 20mg/5ml and 40mg/5ml oral suspensions (Rosemont) are available as licensed products, and are licensed for administration orally or via NG or PEG feeding tubes – check the relevant SPC for details. They do not require fridge storage and have an expiry of one month after opening. (150ml x 20mg/5ml: £153; 150ml x 40mg/5ml: £233)

Atorvastatin chewable tablets are available and may be suitable for some patients. (30 x 10mg: £14; 30 x 20mg: £26)

Licensed medicines used in an unlicensed manner

Simvastatin tablets are film-coated but can be crushed and mixed with water for administration orally or via a feeding tube. (28 tablets, any strength: <£2)

Atorvastatin tablets are film-coated but can be crushed and mixed with water for administration orally or via a feeding tube. (28 x 10mg, 20mg, 40mg or 80mg: <£2; 28 x 30mg or 60mg: £25-£28)

Rosuvastatin tablets are film-coated but can be crushed and mixed with water for administration orally or via a feeding tube. (28 tablets, any strength: £1-2)

Pravastatin tablets can be crushed and mixed with water for administration orally or via a feeding tube; the drug is very soluble. (28 tablets, any strength: <£2)

Fluvastatin *immediate-release capsules* can be opened and the contents mixed with water for administration orally or via a feeding tube. The 20mg capsules are small and may be fiddly to open. (28 x 20mg or 40mg: <£3)

Fluvastatin *modified release tablets* should not be crushed.

HMG CoA reductase inhibitors 'statins' - continued

Special-order medicines

In view of the licensed simvastatin oral suspensions available, special-order preparations are unlikely to be required.

Atorvastatin 20mg/5ml oral suspension is listed in Part VIIIB of the Drug Tariff (100ml: £38)

Note: the price of special order products not listed in the Drug Tariff is unregulated.

BNF chapter 4

Sertraline and other SSRIs

Licensed medicines in suitable formulations

There are no suitable licensed formulations of sertraline.

Other SSRIs are available in suitable formulations and may be preferred:

Fluoxetine 20mg/5ml oral solutions are available and can be administered orally or via a feeding tube. For administration via a feeding tube (not licensed), some recommend it should first be mixed with an equal volume of water. Some brands have a one-month expiry once opened (check the relevant SPC for details); they do not require fridge storage. (70ml 'oral solution': £3, 70ml 'oral solution sugar free': £13).

Fluoxetine 20mg dispersible tablets are available. A whole or half tablet can be dispersed in half a glass of water. The tablets should not be crushed or chewed. (28 x 20mg: £3)

Citalopram 40mg/ml oral drops are available and should be mixed with water, orange juice or apple juice before administration. Citalopram drops are not bioequivalent to citalopram tablets; four drops (8mg) is equivalent in effect to one 10mg tablet. They have an expiry of 16 weeks once opened and do not require fridge storage. (15ml: £13)

Escitalopram 20mg/ml oral drops are available and can be mixed with water, apple juice or orange juice before administration. They have an eight-week expiry once opened and do not require fridge storage. (15ml: £20)

Paroxetine 10mg/5ml oral suspension can be administered orally or via a feeding tube. For administration via a feeding tube (not licensed) it should first be mixed with an equal volume of water. It has an expiry of one month once opened and does not require fridge storage. (150ml: £9)

Licensed medicines used in an unlicensed manner

Sertraline tablets can be dispersed or crushed and mixed with water for administration orally or via a feeding tube. They dispense in one to five minutes. Crushed tablets can be mixed with food. Note the crushed tablets have a bitter taste and may have a local anaesthetic effect on the tongue. (28 tablets, any strength: £1-2)

Fluoxetine capsules can be opened and the contents dispersed in 120ml water for administration orally or via a feeding tube; they will dissolve in about five minutes. (30 x 10mg: £50,30 x 20mg, 30mg or 40mg: <£2; 30 x 60mg: £6)

Citalopram tablets can be dispersed in water for administration orally or via a feeding tube. The tablet contents taste unpleasant. If given via feeding tube, flush well. (28 tablets, any strength: £1)

Escitalopram tablets can be dispersed in water for administration orally or via a feeding tube. The tablet contents taste unpleasant. If given via feeding tube, flush well. (28 tablets, any strength: £3-6)

Paroxetine tablets can be crushed and mixed with water for administration orally or via a feeding tube. The crushed tablets have a bitter taste and a slight local anaesthetic effect. (28 x 10mg: £5; 30 x 20mg or 30mg: <£2; 28 x 40mg: £17)

Sertraline and other SSRIs - continued

Special-order medicines

In view of the licensed products available, special-order preparations may not be required.

Sertraline oral suspensions 50mg/5ml (150ml: £24) and 100mg/5ml (100ml: £62) are listed in Part VIIIB of the Drug Tariff.

Sertraline 25mg/5ml oral suspension is also listed in Part VIIIB of the Drug Tariff but is considerably more expensive than other strengths (150ml: £266).

Note: the price of special-order products not listed in the Drug Tariff is unregulated.

BNF chapter 6

Gliclazide

Licensed medicines in suitable formulations

There is no suitable licensed formulation of gliclazide. Consider whether switching to insulin would be appropriate.

Licensed medicines used in an unlicensed manner

Gliclazide immediate-release tablets can be crushed and mixed with water or orange juice. The drug is practically insoluble; the tablets need to be crushed well. Monitor blood glucose in case crushing affects pharmacokinetics and glycaemic control. (28 tablets, any strength: <£2]

Gliclazide modified-release tablets must not be crushed. If switching to immediate-release tablets, note 30mg modified-release gliclazide is approximately equivalent to 80mg immediate-release gliclazide. Monitor blood glucose when changing the formulation.

Special-order medicines

Gliclazide oral suspensions 40mg/5ml (100ml: £29) and 80mg/5ml (150ml: £27) are listed in Part VIIIB of the Drug Tariff.

Note: the price of special-order products not listed in the Drug Tariff is unregulated.

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