

How can people who need thickened fluids take medicines?

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Background

People with dysphagia may be unable to swallow solid oral medicines. For many people, a liquid medicine or crushed tablets/capsule contents, administered with water will be suitable alternatives. However, some people are unable to safely swallow thin liquids due to the risk of aspiration and, in such cases cannot take thin liquid formulations or take solid medicines with water.

This Medicines Q&A describes options available for oral administration of medicines in adults who need thickened fluids. It is complemented by two other Q&As: [Thickening agents and thickened fluids: do they interact with medicines?](#) and [Thickening agents: what to consider when choosing a product?](#)

Answer

Why people use thickened fluids

Many people with dysphagia are unable to safely swallow thin liquids due to the risk of aspiration, which can lead to pneumonia. These people may require diet modification to alter food texture and fluid consistency (1). Thickened fluids can be swallowed more safely as they travel more slowly, allowing the person more time to co-ordinate the swallow response (2).

People with dysphagia must be assessed by an appropriately trained health professional (a speech and language therapist [SLT]) who will determine the appropriate fluid consistency, food texture and other swallowing recommendations for the individual (1,3,4).

Fluid consistency and food texture is graded according to the International Dysphagia Diet Standardisation Initiative (IDDSI) framework which provides a common terminology to describe food textures and fluid consistency (5). It consists of a continuum of 8 levels ranging from 0 to 7, with drinks measured from Levels 0 to 4 and foods measured from Levels 3 to 7. Level 0 fluids are described as 'thin' (e.g. water), Level 3 as 'moderately thick' (the same consistency as liquidised food) and Level 4 fluids as 'extremely thick' (the same consistency as pureed foods) (5). Thickening agents can be used to modify the consistency of thin liquids to IDDSI Levels 1, 2, 3 or 4.

Thickening agents

Thickening agents are typically available as tubs (with scoops) or sachets of powder to be mixed with the liquid that needs thickening. Thickening agents must be mixed appropriately in order to produce the required IDDSI Level for the patient. Too thin and the patient is at risk of aspiration, too thick and the liquid can leave a residue that can be aspirated (6). Directions for mixing are product specific and are available on the product packaging, with instructions on the amount of powder (number of 'scoops') to be added to a specified volume of fluid to achieve IDDSI Levels 1, 2, 3 or 4 (7-15). The scoop size is not consistent between different products; always use the correct scoop for the product. The directions on the packaging will say whether to add powder to liquid or liquid to powder; this differs between products.

There are two main types of thickening agent: starch-based (typically modified maize starch) and gum-based. In the UK, gum-based thickening agents are mostly xanthan gum-based (12-15). Different brands may also contain additional ingredients such as maltodextrin.

Products available have different characteristics. The main distinction is between starch-based and gum-based thickening agents and there are various brands of each available in the UK. More information on the differences between starch-based and gum-based thickening agents, and factors that may influence the choice of product is available in the Medicines Q&A [Thickening agents: what to consider when choosing a product?](#)

Thickening agents are not licensed as medicines. Many are classed as Food for Special Medical Purposes (FSMPs) intended for the dietary management, under medical supervision, of individuals who suffer from dysphagia (6). The composition and labelling of FSMPs is regulated by the European Commission (16).

Options for administering medicines for people who need thickened fluids

First consider if the medicine is needed at all, or if an alternative route can be used. See also the Medicines Q&A [What are the therapeutic options for patients unable to swallow solid oral dosage forms?](#) for a step-wise approach to choosing medicines for patients unable to swallow solid oral dosage forms.

For people who require thickened fluids and oral medicines, three options are proposed. The most appropriate option will depend on both patient preference and medicine-related factors. For each option, points to consider are listed, along with advantages and disadvantages.

Options

1. Medicine (whole or crushed tablet, whole or opened capsule) administered with soft food.
2. Medicine (whole or crushed tablet, whole or opened capsule) administered with thickened fluid.
3. Liquid medicine mixed with thickening agent.

In all cases, it is important that people needing thickened fluids are only given liquids that are the appropriate consistency for them. Each patient will have an IDDSI Level of fluid consistency and food texture recommended to them following a swallow assessment (1,3,4). Liquids that are thinner or thicker than this may not be swallowed safely.

Option 1:

Medicine (whole or crushed tablet, whole or opened capsule) administered with soft food

People 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 cold food of the appropriate texture as recommended for them by SLT following a swallow assessment (17). Common foodstuffs for administering medicines include yoghurt and apple puree (18).

Medicines in their original form

In some cases, people with dysphagia may be able to swallow small tablets whole with soft food. It has been reported that tablets measuring less than 4mm can sometimes be safely swallowed whole if mixed with food of a suitable consistency such as puree (17). The SLT will be able to advise if the patient can swallow whole tablets or capsules following the swallow assessment. However, it is more likely that tablets would need to be crushed or capsules opened before administration.

Crushed tablets and opened capsules

Not all tablets and capsules are suitable for crushing or opening and it is important to check beforehand with a suitable reference source, such as The NEWT Guidelines, Handbook of Drug Administration via Enteral Feeding Tubes or by contacting your medicines information centre or local medicines management team (19-21).

Modified-release (MR) tablets are usually not suitable for crushing. In many cases, an alternative can be used. Crushing tablets, unless specifically included in a product's Summary of Product Characteristics (SPC), is considered an unlicensed ("off label") use of the product.

- **Example:** Venlafaxine immediate release tablets can be crushed and mixed with jam; this is unlicensed (19). Note that MR venlafaxine tablets must not be crushed (19,20,22).

In a few cases, MR capsules can be opened.

- **Example:** Dipyridamole MR 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 their modified-release coating. Patients must not chew the granules, making this option unsuitable for patients with limited understanding or who are unable to follow instructions. Administering dipyridamole MR capsules this way is unlicensed (19,23). Clopidogrel 75mg tablets could be used as an alternative antiplatelet drug, as the tablets can be crushed (unlicensed use) (19,20).

Tablet coating is also important. Enteric-coated tablets are not suitable for crushing. Film-coated tablets can be difficult to crush and, once crushed, may have an unpleasant taste or anaesthetic effect on the tongue. A bitter taste might be disguised by using a strongly flavoured food or drink. If medicines cause an anaesthetic effect on the tongue, patients must be advised to be careful when eating and drinking, particularly with hot food and drink.

- **Example:** Sertraline film-coated tablets can be crushed and mixed with food but taste bitter and have an anaesthetic effect on the tongue (19). An alternative may be fluoxetine capsules (if clinically appropriate for the patient) as these can be opened (19,20) and the contents mixed with food. Both these options are unlicensed.

Some medicines are formulated for administration with food. For example, topiramate sprinkle capsules are licensed to be opened and the contents sprinkled on a teaspoon of soft food (24). This medicinal product/food mixture is to be swallowed immediately and not chewed.

A decision to switch a patient to a different medicine or formulation must be taken on an individual patient basis. Patients should be involved in decisions about their treatment.

Consider who will be preparing and 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 (20).

Carers should take precautions such as wearing gloves and using 'closed system' tablet crushers (e.g. crushing syringes) that minimise user exposure (20). In care homes, equipment used must be thoroughly cleaned to avoid contamination between medicines for different patients.

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 (25). If staff are to crush tablets or open capsules, a written direction should be included in the patient's care plan. It is important that medicines are given consistently, as inconsistent approaches to dosage modification can make it difficult to stabilise patients on medication regimens (18).

Consider drug-food interactions

Consider whether the medicine interacts with food. Generally, administering crushed immediate release tablets or capsule contents with a small quantity of food seems to have a comparatively small and insignificant effect on drug dissolution or absorption (18). In some cases an interaction can be predicted and specific foods can be avoided.

To determine if an interaction is likely to be a problem, first check for labelling requirements listed in the relevant drug monograph in the British National Formulary (BNF) or SPC. In the BNF, labelling requirements are listed under medicinal forms towards the end of the drug monograph (26). For example, label 7 applies to medicines where milk needs be avoided for two hours before or after administration of the drug. In many cases, an interaction can be avoided by using an appropriate foodstuff.

- **Example:** Ciprofloxacin should not be given for up to two hours before or after dairy products as it can chelate with calcium ions (26,27). Avoid giving with dairy products such as yoghurt or custard. A non-dairy food such as apple puree would be suitable, so long as it is the appropriate texture for the patient's safe swallow. However, in practice, crushed ciprofloxacin tablets taste extremely unpleasant (19), as does ciprofloxacin suspension, and an alternative antibiotic may be preferred.
- **Example:** Phenytoin can interact with some foodstuffs but is commonly given with food to reduce gastric irritation (27). Phenytoin has a narrow therapeutic range and changes in bioavailability may have a clinically relevant effect. If a patient changes the way they take their phenytoin with regards to food, be vigilant for signs of toxicity or reduced effectiveness, or measure serum phenytoin levels, and adjust the dose accordingly. The medicine should be administered consistently with regards to food intake to reduce any difference in bioavailability of the drug.

Consider medicines that need to be given on an empty stomach

Consider whether the medicine needs to be given on an empty stomach. Check the labelling requirements in the BNF or SPC. In the BNF, label 23 applies to medicines that should be taken on an empty stomach, defined as one hour before or two hours after food (26). In an SPC, sections 4.2 (Posology and method of administration) and 4.5 (Interaction with other medicinal products and other forms of interaction) may indicate if a medicine can or should be given with or without food.

To determine whether the effect of taking with food is likely to be relevant to the patient, consider to what extent bioavailability is affected by food and whether the medicine has a wide or narrow therapeutic range. Medicines with a wide therapeutic range may not be affected sufficiently by the presence of food for an interaction to be clinically relevant. For medicines with a narrow therapeutic range, when switching from taking on an empty stomach to taking with food, there may be a reduced effect. If there are parameters that can be measured (e.g. serum drug levels, blood pressure) the dose could be adjusted as appropriate. Thereafter, administering the medicine at the same time, with similar food on each occasion would cause little variation in bioavailability. However, in some cases it may be safer to switch a patient to a different medicine.

- **Example:** Tacrolimus preparations should be given on an empty stomach in order to maximise absorption (27-29). However, if the patient needs medicines to be administered with food, immediate-release tacrolimus capsules (Adoport, Prograf, Capexion and Tacni) can be opened and the contents given with soft food such as honey, jam or yoghurt so long as this is the appropriate texture for the patient (unlicensed use) (30). In this case, bioavailability may be reduced. Tacrolimus MR capsules must not be opened. If switching from taking on an empty stomach to with food, advise the patient to first contact the transplant team to arrange an additional blood level test, so that the dose can be adjusted as necessary. Thereafter,

administering the medicine at the same time, with similar food on each occasion would cause little variation in bioavailability. Switching to Modigraf granules for suspension is not a practical option as the granules are licensed for mixing with water (1mg tacrolimus per 2ml of water to a maximum of 50ml), not food (31) and are expensive. It is not acceptable to switch between tacrolimus formulations unless on the advice of the patient's specialist.

- **Example:** Levothyroxine bioavailability might be reduced by food (32) and some SPCs for levothyroxine tablets recommend they are taken 30 minutes before the first meal of the day (33). In practice, so long as the tablets are given consistently with regards to food, the effects can be monitored and the dose adjusted accordingly.
- **Example:** Bisphosphonates have very poor bioavailability, less than 1%, even when taken after an overnight fast. When taken with coffee or orange juice, bioavailability is reduced by 60% and if taken with a meal, bioavailability is negligible (34). Bisphosphonates therefore need to be taken on an empty stomach to improve bioavailability and avoid interactions with polyvalent cations (e.g. aluminium, calcium, iron and magnesium), which can impair their absorption (27). They also need to be taken with plenty of water (at least 200ml) while sitting or standing, and the patient remain upright for at least 30 minutes to reduce the risk of oesophageal ulceration (35). Bisphosphonates are therefore not suitable for administration with food for patients with dysphagia. An alternative to oral bisphosphonates such as intravenous administration or denosumab should be considered.

In practice

For people who cannot take thin liquids, administering medicines in food of the appropriate texture, is generally a safe and practical option.

How to give medicines with soft food

Prepare and administer medicines one at a time. Yoghurt, custard or apple puree are commonly used but must be the appropriate texture for the patient. A small amount (e.g. a teaspoon) should be used to ensure the full dose is taken (19). If taken with a meal, the medicine should be added to the first mouthful of food. Some hospital wards and care homes keep tubs of yoghurt or apple puree specifically for administering medicines. Medicines should only be administered in food with the patient's knowledge and consent, and following the recommendations of food texture by SLT. Hiding medication in food is considered 'covert administration' and is only condoned in certain circumstances (36-38).

Advantages of this method: Taking medicines with soft food is acceptable to most people; soft food is more palatable than thickened fluids.

Disadvantages of this method: Not suitable for a few medicines that cannot be given with food.

Option 2:

Medicine (whole or crushed tablet, whole or opened capsule) administered with thickened fluid

Thickeners are not a beverage of choice, but one of necessity (2). It is likely that people will prefer to take medication with food, where possible. However, some people may wish to take medicines with a spoonful of thickened fluid, at the appropriate IDDSI Level recommended for them following SLT assessment.

Medicines in their original form

In some cases, people with dysphagia may be able to swallow small tablets whole with thickened fluid of the appropriate consistency. The SLT will be able to advise if the patient can swallow whole tablets or capsules, and of what size, following the swallow assessment. However, it is more likely that tablets would need to be crushed or capsules opened before administration.

Crushed tablets and opened capsules

Not all tablets and capsules are suitable for crushing or opening and it is important to check with a suitable reference source or pharmacist beforehand – please see Option 1 above. Drug manufacturers are unlikely to have information on administration of their products with thickened fluids.

Consider who will be preparing and administering the medicine – please see Option 1 above.

Consider drug-thickener interactions

There are fewer data on administering medicines with thickened fluid than with food. *In-vitro* studies have shown thickening agents to have the potential to impair drug release; the thicker the liquid the more impaired the release (18). Drug release from crushed amlodipine, atenolol, carbamazepine and warfarin tablets in “extremely thick” thickened fluids (equivalent to IDDSI Level 4) was reduced *in vitro* compared with crushed tablets in water, orange juice, yoghurt, jam or honey (39). A study of crushed atenolol tablets showed drug release was not reduced by either starch-based or xanthan gum-based thickened fluid at the “mildly thick” level but was reduced by the xanthan-based thickened fluid at the “moderately thick” level and by both starch-based and xanthan gum-based thickened fluids at the “extremely thick” level (39). The Medicines Q&A [Thickening agents and thickened fluids: do they interact with medicines?](#) provides more information on specific drug-thickener interactions and general practice points.

For medicines with a wide therapeutic range, administration in thickened fluid is unlikely to be clinically relevant but may be a problem for medicines with a narrow therapeutic range, particularly with xanthan gum-based thickening agents (18). To determine whether the effect of taking with a thickened fluid is likely to be relevant to the patient, consider to what extent bioavailability is affected by food, whether the medicine has a wide or narrow therapeutic range, and the consistency of the fluid used. For medicines with a narrow therapeutic range, when switching from taking with water to taking with thickened fluid, there may be a reduced effect. If there are parameters that can be measured (e.g. serum drug levels, blood pressure) the dose could be adjusted as appropriate. Administering the medicine with thickened fluid thereafter would cause little variation in bioavailability.

In practice

For people who wish to take solid medicines (whole or crushed tablets, whole or opened capsules) with a spoonful of thickened fluid, this is generally a safe and practical option. Thickened fluids (before addition of a medicine) can be prepared and stored for use later in the day; the length of time depends on the product used and whether or not they are refrigerated. Check the manufacturer’s instructions for use and storage.

How to give medicines with thickened fluids

Prepare and administer medicines one at a time. Prepare the thickened fluid to the appropriate IDDSI Level for the patient or, if prepared earlier, check the storage time. Always follow the manufacturer’s instructions and use the appropriate scoop, as scoop size is not consistent between products. If the medicine to be taken has a bitter taste, it can be helpful to thicken a strong-flavoured liquid such as blackcurrant squash. Do not use milk-based fluids to administer medicines that can chelate with calcium ions – see information in Option 1 above on administering medicines with foods. Crush tablet or open capsule if necessary, and then mix the medicine (whole, crushed tablet or capsule contents) with a small amount (e.g. a teaspoon) of thickened fluid and give immediately.

Advantages of this method: Might be appealing to some people.

Disadvantages of this method: Likely to be less palatable than giving medicines with food.

Option 3: Liquid medicine mixed with thickening agent

Any liquid given to a patient with dysphagia must be of a consistency that is safe for them, at the IDDSI Level recommended by the SLT following swallow assessment. The IDDSI Level of liquid medicines such as oral solutions and suspensions is not reported by manufacturers, but can be determined using the IDDSI Flow Test (40). The test uses 10ml of the liquid in a 10ml slip tip hypodermic syringe and measures the volume remaining from after ten seconds of flow under gravity. Videos showing the IDDSI Flow Test are available [online](#) (41). Some manufacturers indicate the viscosity of their fluids. For example, Rosemont describe some preparations as watery liquid, slightly thicker than water and thick liquid, but do not indicate which IDDSI Level these descriptions correlate to (42).

There is little information on mixing liquid medicines with thickening agents. It is likely that administering a crushed tablet or opened capsule in soft food of the appropriate texture will be preferable in many cases.

Small-volume medicines

Thickened fluids are prepared by mixing fluid (typically 200ml) with a specified amount of powder to produce the correct IDDSI Level. Medicines formulated as oral solutions and suspensions are generally at concentrations to allow for doses of around 5-20ml, far less than 200ml. There are therefore two possibilities for thickening individual doses of liquid medicines, both of which are problematic:

- **Dilute** the dose of medicine to 200ml and then thicken following the manufacturer's directions for the thickening agent.

Problem: The patient would need to drink the full 200ml to receive the full dose so this is unlikely to be acceptable, particularly if they take multiple medicines.

OR

- **Thicken** the dose directly.

Problem: It would not be possible to determine if the dose was thickened to the appropriate IDDSI Level.

Large-volume medicines

In some cases, patients are required to take large volumes of a medicine, such as macrogol laxatives (e.g. Movicol) and electrolyte replacement therapy (e.g. Dioralyte). For these medicines, thickening to the appropriate IDDSI Level may be a reasonable option for the patient to safely swallow the medicine. There are few data on liquid medicines mixed with thickening agents and it is not without risk. Of note is the interaction between macrogol laxatives (e.g. Movicol) and starch-based thickening agents, which creates a thin, watery liquid (43,44). Administration of this mixture was considered a factor in the death of a patient needing thickened fluids. As an alternative, xanthan gum-based thickening agents can be used to thicken macrogol laxatives and some (e.g. Thick & Easy Clear, Swalloweze Clear) have specific directions for this use (45,46).

For further information on this and other potential interactions between medicines and thickeners, see the Medicines Q&A [Thickening agents and thickened fluids: do they interact with medicines?](#)

In practice

It is vital that any liquid medicine that has been thickened is the appropriate IDDSI Level for the patient at the time of administration. Administering solid medicines with food of the appropriate texture is safer than thickening liquid medicines.

How to thicken liquid medicines with thickening agent

If thickening a large-volume medicine or a small-volume dose that has been diluted to a large volume, follow the instructions for the thickening agent in order to produce the appropriate IDDSI Level. Check the desired consistency has been achieved. If the final product does not appear to be the appropriate consistency, do NOT give. Not all medicines and thickening agents are compatible; in particular macrogol laxatives cannot be thickened with starch-based thickening agents.

There are insufficient data available on the stability of medicines mixed with thickening agents. Do not thicken a bottle of oral solution or suspension. Only thicken one dose at a time, immediately before use, and only if no other option is available.

If thickening an individual small-volume dose, sprinkle thickening agent onto the dose of medicine and stir, wait a minute to thicken, and then add more thickener if necessary. It is not possible to properly assess the consistency achieved, making this option unsuitable other than as a last resort.

Advantages of this method

Mixing a liquid medicine and thickening agent may be the best option if a patient needs an unusual dose only achievable with a liquid medicine and is unable to take the liquid medicine in its usual form due to the risk of aspiration.

Disadvantages of this method

It is difficult to determine the consistency of small volumes of liquid, with the potential the patient receives a liquid they cannot swallow safely. Where small-volume doses are diluted and then thickened, patients may struggle to take the whole dose. Some medicines are not suitable for mixing with thickening agents, for example macrogol laxatives must not be mixed with starch-based laxatives.

Other considerations

Crushing tablets and opening capsules, unless specifically advocated in the SPC, renders them unlicensed ("off label"). Similarly, medicines with instructions to take on an empty stomach might be considered unlicensed ("off label") when given with food.

Prescribers should be aware of the route and method of administration of medicines they prescribe. They should be aware if a medicine is to be used outside the terms of its licence and take responsibility for its use in this manner (47,48). 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 (25). It is helpful for thickeners to be included in a patient's medicines administration record (MAR) chart; if medicines are to be crushed, opened or otherwise manipulated and administered with soft food or thickened fluid, this should be documented in the patient's MAR chart and care plan.

Patients must be provided with written and verbal administration instructions for each medicine they are prescribed. This is particularly important when patients move between care settings. GPs should be informed of patients' IDDSI Level requirements and how medicines are to be administered when patients are discharged from hospital.

When choosing the most appropriate method of administration, a pragmatic approach is required, considering the need for the medicines and the practicality and safety of administration. Unnecessary medication should be stopped. If changes are made, these should be on an individual basis and patients monitored accordingly. Monitoring patients for clinical efficacy or side effects of treatment can provide a helpful guide and is particularly important for people taking medicines with a narrow therapeutic range.

Summary

- People with dysphagia who need thickened fluids must have their medicines in a form they can swallow safely; they are at risk of aspiration if they take thin liquid medicines or take solid medicines with water.
- People with dysphagia must be assessed and reviewed by an appropriately trained health professional (a speech and language therapist) who will recommend the appropriate fluid consistency and food texture for that individual.
- Fluid thickness and texture are measured according to the International Dysphagia Diet Standardisation Initiative (IDDSI) framework. Thickening agents can be used to modify liquids to the appropriate IDDSI Level for the patient.
- This Medicines Q&A outlines options available for oral administration of medicines for people who need thickened fluids, describing advantages and disadvantages of each and points to consider. The most appropriate option must be made on an individual patient basis.
- Options described are:
 1. Whole tablets or capsules, crushed tablets or opened capsules taken with a spoonful of food (e.g. yoghurt, apple sauce) at the appropriate IDDSI Level for the patient. This is likely to be the best option for most patients.
 2. Whole tablets or capsules, crushed tablets or opened capsules taken with a spoonful of thickened fluid at the appropriate IDDSI Level for the patient.
 3. Liquid medicine mixed with a thickening agent.
- Not all tablets and capsules are suitable to be crushed or opened and it is important to check beforehand with a pharmacy professional or appropriate reference source.
- If administering medicines with food, consider drug-food interactions and medicines to be given on an empty stomach.
- Thickening agents can be starch-based or gum-based. Not all thickening agents are suitable to be mixed with all liquid medicines. Macrogol laxatives (e.g. Movicol) can NOT be thickened with starch-based thickening agents.
- Crushing tablets, opening capsules and mixing liquid medicines with thickening agent, unless specifically included in the product Summary of Product Characteristics, is unlicensed.
- Take into account the patient or carer's ability to administer medicines and consider any risks to the carer from exposure to medicines such as cytotoxics or hormones.
- Patients and carers should be provided with verbal and written instructions on how to safely administer their medicines.

Limitations

- This Medicines Q&A offers pragmatic advice. The examples given are not comprehensive and are the opinion of the authors.
- Where different medicines are suggested, this does not imply therapeutic equivalence.
- This Q&A only considers thickening agents used in adults, not children or infants.

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Search strategy

1. Embase via NICE Evidence

(DYSPHAGIA/ + "THICKENING AGENT"/) (exp DYSPHAGIA/ + "THICKENING AGENT"/)
 (exp DYSPHAGIA/ + exp "THICKENING AGENT"/) (exp *DYSPHAGIA/ + *"ORAL DRUG
 ADMINISTRATION"/) (XANTHAN/ + exp "DRUG INTERACTION"/) ("THICKENING AGENT"/
 + exp "DRUG INTERACTION"/) ("LEVOTHYROXINE SODIUM"/ + "FOOD DRUG
 INTERACTION"/)

2. Medline via NICE Evidence

(thicken*.ti,ab + "DEGLUTITION DISORDERS"/) ("DEGLUTITION DISORDERS"/ +
 *"ADMINISTRATION, ORAL"/) ("ADMINISTRATION, ORAL"/ + "DEGLUTITION
 DISORDERS"/ + "PHARMACEUTICAL PREPARATIONS"/) ("DEGLUTITION DISORDERS"/
 + medication.ti,ab + thickened liquid.ti,ab) (medication.ti,ab + thickened liquid.ti,ab)
 ("DEGLUTITION DISORDERS"/ + VISCOSITY/) (thickened liquid.ti,ab + dysphagia.ti,ab)
 (thickeners.ti,ab + medication.ti,ab) ("DEGLUTITION DISORDERS"/ + thickeners.ti,ab)

3. In-house database/ resources

4. Manufacturers:

- (a) Abbott Laboratories. Communication by email on 05/06/2020.
- (b) Aymes International Ltd. Communication by email on 05/06/2020.
- (c) Fresenius Kabi. Communication by email on 03/06/2020.
- (d) Nestle Health Science. Communication by email on 03/06/2020.
- (e) Nualtra. Communication by email on 02/06/2020.
- (f) Nutricia. Communication by email on 17/06/2020.

5. Internet search (Google; use of thickening agents with medicines, administering medicines to patients with dysphagia, crushing medication and giving with thickened fluids, speech and language therapy IDDSI, dysphagia guidance UK, stroke guidance UK, crush tablets care home safety, can I take tacrolimus with yoghurt)