

Bolus Feeding in Adults: A Practical Guide

Second Edition: 2025

First Edition: November 2017

(To be reviewed August 2028)

The development of Bolus Feeding in Adults: A Practical Guide (Second Edition, 2025) was supported by an educational grant from Nutricia. The views expressed in the document are those of the expert panel and contributors and do not necessarily reflect those of Nutricia, or the NHS Trusts.

The following organisations have supported the guidance:



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Introduction

Bolus feeding is a method of enteral tube feeding. The practice of bolus feeding has evolved over time in response to the preferences and needs of individual patients using enteral tube feeding, their social circumstances and the experience of the healthcare professionals caring for them.

A survey of bolus feeding practices in the UK reported that one third of patients receiving home enteral tube feeding were receiving part or all of their nutrition via bolus feeding¹. However, despite the widespread use of bolus feeding, there is a limited evidence base to inform its practice.

This guide brings together a wealth of experience from healthcare professionals specialising in enteral tube feeding. It aims to provide a definition of bolus feeding and practical guidance to healthcare professionals who are considering the use of bolus feeding with adults.

NB: Guidance on medication administration is not within the scope of this document

Definition of bolus feeding

The administration of feed through an enteral feeding tube as a series of smaller volume feeds given at regular intervals.

Up to 500 ml of feed over a maximum of two hours* can be given in one 'bolus', depending on the person's tolerance and the enteral access route. A typical bolus is 200 - 250 ml but individual patients may tolerate more or less than this.

Bolus feeds can be delivered with an enteral syringe (using a plunger or gravity), a bolus set, bolus pouch, or a feeding pump.

**Administration of feed over more than two hours is considered by the working group to be intermittent feeding.*

Bolus Feeding in Adults: A Practical Guide at a Glance

Each section is explained in more detail inside - see the relevant colour coded sections

Advantages and Disadvantages

An outline of the potential advantages and disadvantages of bolus feeding compared to continuous pump feeding

Considerations

Factors to consider when determining if bolus feeding is suitable for your patient

Regimen Guidance

Considerations to optimise the bolus feeding regimen

Methods

An overview of the main methods used for bolus feeding:

- Enteral syringe with plunger
- Enteral syringe or bolus set using gravity
- Feeding pump
- Bolus pouch

Advantages

Duration	Reduced time required for each feeding episode
Flexibility	Timing of bolus feed administration can be optimised to: • empower patients to have some control over when they wish to receive their feed • mimic a 'normal' eating pattern, which may resolve problems relating to patients reporting hunger • help support blood glucose control for patients living with diabetes² (dependent on insulin prescription) • enable uninterrupted activity/ rehabilitation sessions
Technical	Bolus feeding via syringe with gravity, plunger or pouch: • eliminates the need to use a feeding pump, which may be confusing for some patients • avoids noise disturbance from feeding pump
Practicality	Often considered simpler to understand and administer Volumes of bolus feeds can be tailored to available feed presentations which may reduce waste Feeding without use of pump reduces use of electricity Easier to transport feed and syringe when feeding outside the home than carrying a pump and pack of feed Provide a break for medications that require administration on an empty stomach Sleep quality could be improved as patient can sleep in preferred position when feed is not being administered overnight Continued >

Social	Allows more flexibility in feeding to allow for work/social outings Administration of feeds by family and/or carers can provide more frequent opportunities for involvement and social interaction, to fit with family life and mimic normal meal times Bolus feeding enables one feeding episode to be administered within one care call which may be safer than being left unsupervised on a continuous pump feed Timing of feeds can be arranged when carers and/or family are available May offer improved discretion of feeding out of the home
Safety	For patients who are agitated, feeding under restraint³, moving around in bed or unable to maintain an upright position for prolonged periods, feeds can be administered when the patient is in the correct position Provide a break between feeds to allow restoration of gastric pH which may help to minimise gastric colonisation^{4,5}
Nutrition	Administration of a high protein bolus may support muscle growth and minimise muscle loss when compared to continuous feeding⁶⁻⁸ <u>Muscle growth:</u> • ingestion of protein bolus is shown to optimise muscle protein synthesis rates during the first few hours post exercise, and also supports muscle growth when given at bedtime⁹⁻¹¹ Continued >

Nutrition

Nutrition optimisation:

- bolus feeding has the potential to improve bowel movements¹²
- bolus feeds can be used as a 'top up' for patients who have a variable oral intake or are transitioning from tube feeding to oral. Ensure 'top up' is given after oral diet to minimise any impact on appetite and achievement of complete prescribed volume

Disadvantages

Duration	Can be time consuming: • if bolus feeding is frequent throughout the day, in addition to water flushes and medications • if bolus feeds of a large volume are being administered, or if a viscous feed is being used • due to the time taken for preparation and post-bolus feed cleaning of the syringe • if bolus feeding through a narrow bore tube
Flexibility	Frequent or large volume bolus feeds may reduce time available to participate in activity/rehabilitation and for these patients overnight feeding, with or without daytime bolus feeds, may be more suitable
Social	For dependent patients: • increased feeding occasions may be perceived by the patient as an invasion of privacy or a burden on their family/ carers • toleration of large volumes in one bolus may be difficult and they may need several episodes • bolus feeding may not be suitable when carer visits are not frequent or long enough • district nurses and carers cannot always guarantee arrival time so some flexibility in the timings of feeds is important Continued >

Practicality

A degree of strength, manual dexterity and visual acuity are required. For example connecting the syringe or connector to the feeding tube, decanting the feed, holding the syringe steady for the duration of the feed, pushing the plunger and/or delivering the feed itself (i.e. squeeze the pouch)

Fatigue, for example from treatments/appointments, may reduce willingness to bolus feed

Frequent or lengthy feeds may cause fatigue for some patients

Use may be limited in nasogastric tube feeding for various reasons including increased pH testing to confirm position of tube, difficulties with self administration and narrow bore tubes which can make the feed run very slowly

If the patient coughs during gravity bolus feeding, feed can be forced back out of the tube and syringe, causing a spillage. It can be difficult to avoid getting the end of the syringe covered in feed when pulling it up into the syringe barrel. The person administering the feed may need to have a piece of gauze or tissue to wipe the end of the syringe to prevent spillage. This issue can be avoided or minimised with a product designed for bolus administration¹³

Use of oral nutritional supplements (ONS) may require a large number of bottles to be stored and recycled

If feeding outside the home there is a need to find somewhere suitable to prepare and administer feed

Can be messy if decanting and drawing up syringes – NB: some methods are messier than others

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Safety	Large and/or rapid administration of bolus feeds are not always well tolerated Consider the risk/management of refeeding syndrome before commencing large or rapid boluses containing significant carbohydrates Bolus feeding is not always well tolerated in post pyloric feeding and should be used with caution Bolus feeding may not be suitable for patients with a history of vomiting, aspirating their feed, severe reflux, gastroparesis, previous gastrointestinal surgery and/or dumping syndrome and should be monitored closely for signs of intolerance e.g. incidence of bloating, reflux, nausea or vomiting With bolus feeding there is a potential risk of feed contamination when using an open system - consider infection control elements Consider a risk assessment - look at the environment, when and where feed will be given, size of bolus (i.e. length of time feed is exposed to the air, can proper handwashing techniques be used, is the area clean and free from potential contaminants e.g. dirt)
Nutrition	Frequent or large volume bolus feeds may have a negative effect on appetite when transitioning from enteral feeding to oral diet. Ensure bolus feeds are always given after meals to lessen any negative effect on appetite/satiety or consider reducing the volume of the feed and delivering small volume boluses as snacks in between meals It can be difficult to meet fluid requirements on a bolus feeding regimen where patients are reliant on care calls or with a reduced frequency of bolus feeds ONS are designed for oral use so various nutritional factors need to be considered, such as levels of micronutrients and macronutrients being met

Considerations

The decision regarding the use of bolus feeding as the chosen method of enteral tube feeding should be patient centred and based upon the individual’s symptoms, social circumstances and preferences. It is important to discuss the options with the patient and/or their carers, and to complete a comprehensive assessment to determine the best enteral feeding regimen.

NB: In some situations, this will be a multidisciplinary team (MDT) consultant-led decision for example where patients are detained under the Mental Health Act and being fed under restraint for life saving treatment³

The following questions can be a useful guide in determining whether bolus feeding is suitable:

1. Would bolus feeding be safe and well tolerated?	Consider past medical history, gastrointestinal symptoms and ability to tolerate volumes required for bolus feeding
2. What are the patient’s social circumstances?	Consider the patient’s daily commitments and activities and whether the timing and frequency of bolus feeding would be suitable. A regimen for different settings, such as day service, respite care, school, may need to be constructed and provided
3. What is the availability of care, if required?	If the patient is not self-caring, consider whether the carers can commit to the timing and frequency required for bolus feeding and whether this aligns with the patient’s wishes <i>NB: If feeding under restraint this usually requires 2-5 members of staff trained in safe methods of restraint and safe delivery of NGT feeding³</i>
4. What would the patient prefer?	Consider the patient’s preference after discussing the advantages and disadvantages

5. Do the patient and/or their carer have sufficient strength and dexterity?	Consider whether the patient and/or their carer have the upper body strength and hand dexterity required to administer the feeds via bolus feeding with a syringe via gravity, using the plunger, pump or bolus pouch
6. My patient has requested a blended diet. What should I consider?	Currently, most enteral feeding tubes are unlicensed to be used for blended diet in the UK and, therefore the use is not advocated in all healthcare settings. Check if your trust/board has a policy on the use of blended feeding. If patients are keen to follow a blended diet, this should be under the supervision of a Dietitian who will need to discuss the potential risks, benefits and practical elements, before, where possible, coming to a shared clinical decision which is documented and signed by the patient. The British Dietetic Association has produced a practice toolkit on the use of blended diet with enteral feeding tubes¹⁴. Further information can be found at: https://bit.ly/3XXnUkl
7. What should I consider in relation to sustainability?	A sustainable approach to enteral feeding is encouraged when devising feeding regimens. For example, how you can minimise the use of plastic

Guidance for specific conditions

There are no specific clinical conditions within which bolus feeding is contraindicated, as the decision is based upon each individual’s needs. However, there are a number of conditions within which bolus feeding is commonly suitable and utilised.

NB: For all patients with a nasogastric tube, bolus feeding may be difficult. It may be more time consuming and could have more contraindications and complications (see disadvantages section for more information).

The following table outlines some examples of the pros and cons for bolus feeding within these specific patient groups.

Patient Group	Pros	Cons
Oncology - such as Head and Neck Cancer	• For patients who are active, including those who work, bolus feeding offers more flexibility to fit within their daily schedule and avoids interfering with independence • For patients with regular treatments, bolus feeding offers more flexibility to fit around appointments and enable assistance from nursing staff if required, and may reduce the risk that feeds are missed	• Self-caring patients may become fatigued from treatment and could struggle with the frequency and process required to bolus feed • Nausea and vomiting from treatment may limit the tolerance for bolus feeding • Patients taking high doses of analgesia due to radiotherapy treatment are at high risk of constipation and feeds containing fibre may not be effective in encouraging bowel movements

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Patient Group	Pros	Cons
Learning Disabilities	• Enables flexibility to ensure feeds are administered when the patient is in the most suitable feeding position • Suitable alternative for patients who cannot tolerate continuous feeding via pump • Allows greater scope for being active for people who are out and about or have a busy activity programme • Each feeding episode is another 'activity' and chance for interaction, e.g. meal times with family and friends	• Patients may not like repeated interventions required for bolus feeding • Patients with severe scoliosis may not tolerate the volumes required for bolus feeding due to altered anatomy
Stroke or Brain Injury	• For patients undergoing rehabilitation, bolus feeding offers more flexibility to fit around appointments and may reduce the risk that feeds are missed • For patients who are agitated or moving around in bed, bolus feeding can allow feed to be administered at times when the patient is in the correct feeding position	• For patients requiring care, frequency or duration of care calls may not be sufficient to support bolus feeding Continued >

Patient Group	Pros	Cons
Critical Care	Increased likelihood that the patient receives the total volume of feed prescribed^{15 - 17}	More nursing time is spent on looking after the patient's feed compared to continuous feed
Neuro-degenerative conditions	Can be titrated against oral intake; if oral intake reduces, bolus feeding can be increased	Patients may feel full and uncomfortable if large volumes of feed are given at one time
Feeding Under Restraint^{3*} (For patients sectioned under the Mental Health Act) <i>*(Consultant led MDT decision NOT a stand-alone dietetic decision. Consult the BDA Naso-gastric tube feeding under restraint Best Practice for Dietitians document for further information/advice)</i>	Compared with continuous pump feeding, bolus feeding can reduce episodes of distress and risk to patients and staff by having only 2 bolus feeds per day (or 1 episode in extreme circumstances)	- Complex ethical and medico-legal implications - Risks of delivering only 1-2 boluses per day needs addressing, especially if patient is taking no oral diet/fluids (e.g. tolerance to larger boluses sizes; impact on refeeding syndrome risks/ hydration status/liver function/bowels)
Post pyloric feeding <i>(Check whether your local NHS Trust policy has specific guidance about bolus administration of tube feeds into the jejunum)</i>	Bolus feeding should not be routinely used as the first line method of enteral tube feeding in patients requiring post-pyloric feeding. However, it has been used successfully and may be suitable as an alternative for patients who do not wish to have continuous feeding. Use extra precautions, i.e. initiate feeding with smaller boluses at a slower rate and monitor for signs of intolerance including pain, vomiting, abdominal discomfort, bloating and irregular bowel movements and measure blood biochemistry if there are signs of malabsorption ¹⁸	
Other	Bolus feeding can be considered in many patient groups on an individual patient basis e.g. palliative care, patients undergoing life prolonging treatments	

Regimen Guidance

The bolus feeding regimen should be patient centred and meet nutritional, lifestyle and clinical needs whilst also minimising product wastage and ensuring cost-efficiency.

Volume and frequency of feeds

- Consider the patient's previous intake when determining appropriate volume of bolus feeds
- Consider a concentrated feed that provides nutritional adequacy (check micronutrients) and that the patient can tolerate
- Discuss with the patient and/or their carers to ensure the timing of bolus feeds fits within daily routine, e.g. timing of medications, rehabilitation sessions, appointments, work and social commitments
- Confirm with the patient the flexibility around timing and volume of feeds, i.e. is the timing and volume of each feed fixed or can they vary the timing and volume of each feed provided the total volume is administered daily? This is particularly important in different social settings e.g. when out on trips
- Discuss with the patient where feeding will take place and consider impact on timing and volume of feed as well as space and equipment needed
- Consider the contribution of water for flushes and medications as part of the total volume of fluid being administered
- Ensure the patient has sufficient equipment to bolus feed safely and regularly, remembering that some equipment such as giving sets, reusable syringes, connectors and containers can be safely reused to avoid unnecessary ancillary wastage (refer to manufacturers instructions)

Starter regimen

- If there are concerns that the patient may not tolerate the total bolus volume initially, start on a reduced volume and increase gradually while monitoring tolerance

Hydration

It is important to ensure the patient is receiving adequate hydration:

- for regular feeding intervals, attempt to meet the patient’s fluid requirements during the bolus feed and medication administration to reduce the frequency of bolus feeds and flushes required throughout the day
- when there are long breaks between feeds, ensure hydration is maintained through water flushes if possible and pre and post each feed

Nutritional completeness

- The range of feeds available allows for the macro-nutrient requirements of patients to be easily met
- Many oral nutritional supplements have lower concentrations of electrolytes than some tube feeds, however remember to consider the contribution of medications and any over the counter/prescribed vitamins/minerals to a patient’s total electrolyte intake
- Check electrolyte levels provided in feeds, these can be maximised by using a combination of feeds. Monitor for signs of insufficiency and request bloods are checked where there are concerns and give supplementation if required. Further discussion with GP/MDT may be needed

Administration Method

	Pros	Cons
Bolus by syringe using plunger	• Can be helpful if flow rate is slow with gravity bolus • Provides patient and/or carers with more control of rate	• Requires a degree of dexterity and strength to push the plunger to administer the feed • Can be quite fiddly and messy as syringe is refilled and reconnected • May not be suitable for patients experiencing nausea or vomiting

Administration Method

	Pros	Cons
Bolus set using gravity	- Prevents excessive force, or too fast administration which may affect tolerance - May be easiest if dexterity is poor	- Flow may be slower with more viscous feed, if back pressure is high or tube is narrow - Requires a degree of strength to hold the syringe steady for long enough to administer the bolus feed without spillage. N.B. bolus set hangers may be available for stands
Bolus by pump (pump-assisted bolus feeding)	- Beneficial when a larger volume or a specific rate is required - Good for patients and/or carers who cannot hold the syringe for the duration of the feed - Prevents spillage¹⁸	- Being attached to pump may restrict mobility/activity in feeding periods - Requires some technical ability (e.g. set up & maintenance) - Many pumps have maximum rate of 400 ml/hr so feeds can take longer than 1 hour¹⁸ - Increased risk of tube displacement in active patients¹⁸ - Potential for waste if incomplete bags of enteral nutrition product are used
Bolus by pouch	Good for patients who can self-administer, allowing for independence and feeding discretion out of the home	May not be suitable for patients with limited strength and dexterity

Methods

Bolus feeds can be delivered using different methods dependent on patient and/or carer preference or circumstances. These include the use of:

- 60 ml enteral syringe or bolus set to administer the feed via gravity
- 60 ml enteral syringe to administer the feed using the plunger
- Feeding pump
- Bolus pouch and connector

NB: For all methods refer to your local policy and specific product guidelines. All equipment used should be ENFit compliant.

For all methods of feed administration

- Always wash hands before and after preparing for and administering the feed
- Prepare the equipment on a clean tray or table and ensure all the equipment is clean, assembled and fit for purpose
- Check the feed instructions, label and expiry date
- Ensure the patient is sitting upright (or head and shoulders are raised by at least 30 degrees if they have difficulty sitting upright) during feeding and for a short duration after feed administration (up to 1 hour is suggested¹⁹ but duration may vary according to patient preference, tolerance and circumstances)
- If using a nasogastric tube it is important to check the position of the tip of the tube before administering any fluids by measuring the pH value of the gastric aspirate - the correct safe pH reading should be 5.5 or below²⁰. Refer to local policy for more detailed guidance
- If using a nasojejunal tube, check the position at the nose and any reported discomfort, nausea or vomiting. For all other feeding tubes, the position should be checked as required by local policy
- If using a low profile gastrostomy tube, attach the extension set, which has been primed with water, before administering the feed

- Flush the tube with water before and after the administration of feeds using the enteral syringe with a plunger or via gravity (refer to local policy for the type of water used). A minimum of 30 ml is recommended but amend according to patient's fluid requirements and restrictions
- Following administration of feed, dispose of or wash and air-dry all equipment, as per manufacturer's recommendations or local policy. Ensure the cap on the end of the feeding tube is replaced securely to avoid gastric leakage. The cap on the end of the giving set, if used, can be replaced to keep this clean allowing the giving set to be reused again for the next bolus (reuse up to 24 hours - refer to local policy)
- Reseal and refrigerate any leftover feed and use within 24 hours or as per manufacturer's recommendations or local policy. When bolus feeding smaller volumes from a larger bottle, it is recommended to decant the required volume and allow it to reach room temperature while keeping remaining feed sealed and refrigerated
- Refer to any administration instructions from feed/equipment manufacturer which may be available as user guides, information sheets, or videos

Administering a bolus feed using an enteral syringe with plunger

Equipment required

- 60 ml enteral feeding syringe
 - Extension set (for low profile gastrostomies)
 - Cup/Jug
1. Complete steps for all methods of feed administration
 2. Ensure the clamp on the enteral feeding tube (if present) is closed
 3. Draw the prescribed feed up into the enteral syringe (may need to have a piece of gauze or tissue to wipe the end of the syringe to prevent dripping)

4. Attach the filled syringe onto the end of the feeding tube or extension set and open the clamp (if present)
5. Push the plunger to gently administer the feed. Administration of each syringe should last on average 20 seconds, but some patients may be able to tolerate it faster, while others may need to take longer
6. Close the clamp on the feeding tube (if present) before removing the syringe
7. Refill the syringe and repeat steps 3-6 until the prescribed volume of feed has been administered
8. On completion of the feed, administer water flush
9. Close the clamp (if present), disconnect the syringe and replace the cap on the end of the feeding tube (follow local policy on clamp use between feeds)

Administering a bolus feed with an enteral syringe or bolus set using gravity

Equipment required

- 60 ml enteral feeding syringe and/or bolus feeding set
 - Extension set (for low profile gastrostomies)
 - Cup/Jug
1. Complete steps for all methods of feed administration
 2. Ensure the clamp on the enteral feeding tube (if present) is closed
 3. Take the plunger out of the enteral syringe
 4. Secure the barrel of the enteral syringe or the end of the bolus set to the end of the feeding tube or extension set
 5. Slowly pour the feed into the syringe, holding it upright to ensure no feed spills out and open the clamp on the tube (if present)
 6. Hold the syringe at a comfortable height above the feeding tube to allow the feed to run through the feeding tube. *(NB: speak to your enteral feeding manufacturer as a bolus set hanger may*

be available). It is important the feed runs through at a speed the patient can tolerate: the feed will run faster when the syringe is held higher, and the rate can be slowed by lowering the syringe. Adjust the height of the syringe and therefore speed of administration according to patient comfort and tolerance. Administration of each syringe should last on average 20 seconds, but some patients may be able to tolerate it faster, while others may need to take longer

7. Refill the syringe and repeat steps 5-6 as required until the prescribed volume of feed has been administered
8. On completion of the feed, administer water flush
9. Close the clamp (if present)
10. Disconnect the syringe /bolus set and remove the extension set if low profile gastrostomy
11. Replace the cap on the end of the feeding tube to keep it clean for next planned bolus feed
12. The cap on the end of the feeding tube can be replaced to keep this clean

NB: If using gravity only to administer feed and fluids/ water the tube may be more likely to block due to sediment build up. It is suggested to flush the tube at least once a day using a syringe with the plunger to remove feed build up

Administration of a bolus feed using a bolus pouch

Equipment required:

- Bolus connector
 - Bolus pouch
 - Syringe for use in flushing the tube
 - Extension set (for low profile gastrostomies)
 - Cup/Jug
1. Complete steps for all methods of feed administration
 2. Ensure the clamp on the enteral feeding tube (if present) is closed
 3. Remove cap from the pouch end of the connector

4. Open the pouch and securely attach the connector
5. Remove cap from the ENFit end of the connector and prime tube with feed
6. Attach ENFit end of the connector to feeding tube
7. Open clamp and gently squeeze pouch to administer feed (NB: average feeding time is approximately 10 minutes)
8. On completion of feed, administer water flush
9. Close the connector clamp before disconnection and discard of pouch
10. Replace clamp on end of feeding tube to keep clean before next bolus feed

NB: The above points are general considerations for using a bolus pouch - follow the manufacturer's instructions for the specific bolus pouch product you are using.

Administering a bolus feed using a feeding pump

Equipment required

- Feeding pump
 - Feed reservoir or container (if decanting required)
 - Giving set
 - Syringe for use in flushing the tube
 - Extension set (for low profile gastrostomies)
 - Cup/Jug
1. Complete steps for all methods of feed administration
 2. Connect the prescribed feed to the enteral giving set or decant the feed into the reservoir or container
 3. Connect the giving set to the enteral pump
 4. Switch on the pump
 5. Prime the giving set to ensure the feed is administered throughout the length of the giving set
 6. Programme the pump to deliver the required amount of feed and the delivery rate as prescribed by the regimen
 7. Flush the feeding tube with water, then attach the giving set and open the clamp to begin feeding

8. Start the pump to administer the feed
9. If the pump has been set to deliver a specific volume of feed, or to feed over a specific period of time, once this is complete the pump will alarm and can be turned off
10. Close the clamp on the feeding tube (if present) and disconnect the giving set
11. Administer water flush
12. Replace the cap on the end of the feeding tube to keep it clean for next planned bolus feed
13. The cap on the end of the giving set can be replaced to keep this clean. This allows the giving set to be reused again for the next bolus (most can be reused for up to 24 hours)
14. If a reservoir or container has been used for decanted feed, this can be reused as per manufacturers guidelines (up to 24 hours)
15. Clean pump and place on charge

Trouble shooting

For trouble shooting, follow local protocol/policy or refer to manufacturers trouble shooting leaflets.

Summary

This guide has been put together based on available evidence, best practice and professional experience. It is designed to aid healthcare professionals in deciding on the appropriateness of bolus feeding according to patient preference and circumstances and to give guidance on the available methods of administration of a bolus feed. This practical guide also aims to provide an evidence base to empower healthcare professionals to review current policies and procedures and to support education of peers, patients and their carers on the practice of bolus feeding.

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