

Recommendations for the Management of Nutrition and Hydration in Patients with Stroke – A Guidance Document

National Stroke Programme

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EXECUTIVE SUMMARY

Background

The importance of nutrition as a stroke therapy cannot be underestimated. Malnutrition is a significant predictor of poor outcome in patients post stroke^{6,20}. Malnutrition is associated with reduced functional improvement, increased complication rates, and prolonged hospital length of stay in this patient group^{1,6,7}. The incidence of dysphagia is reported between 37 and 78% in the stroke population, depending on the method of assessment¹¹. This group are at a heightened risk of malnutrition, with deterioration in nutritional status more frequent in those with dysphagia⁶.

International stroke guidelines agree that every person with stroke should be assessed and informed of their risk factors for a further stroke, and educated on possible strategies to modify these identified risk factors^{12, 21, 30}. Dietary intervention plays an integral role in this education and in modifying risk factors.

In 2015 the Irish Heart Foundation/ HSE National Stroke Audit³ highlighted that dietetics staffing levels in acute stroke care was 69% below the requirement. In 2017, the National Stroke Programme (NSP) identified the need for National guidance for nutrition and hydration for patients with stroke to standardise and optimise nutritional interventions.

Purpose

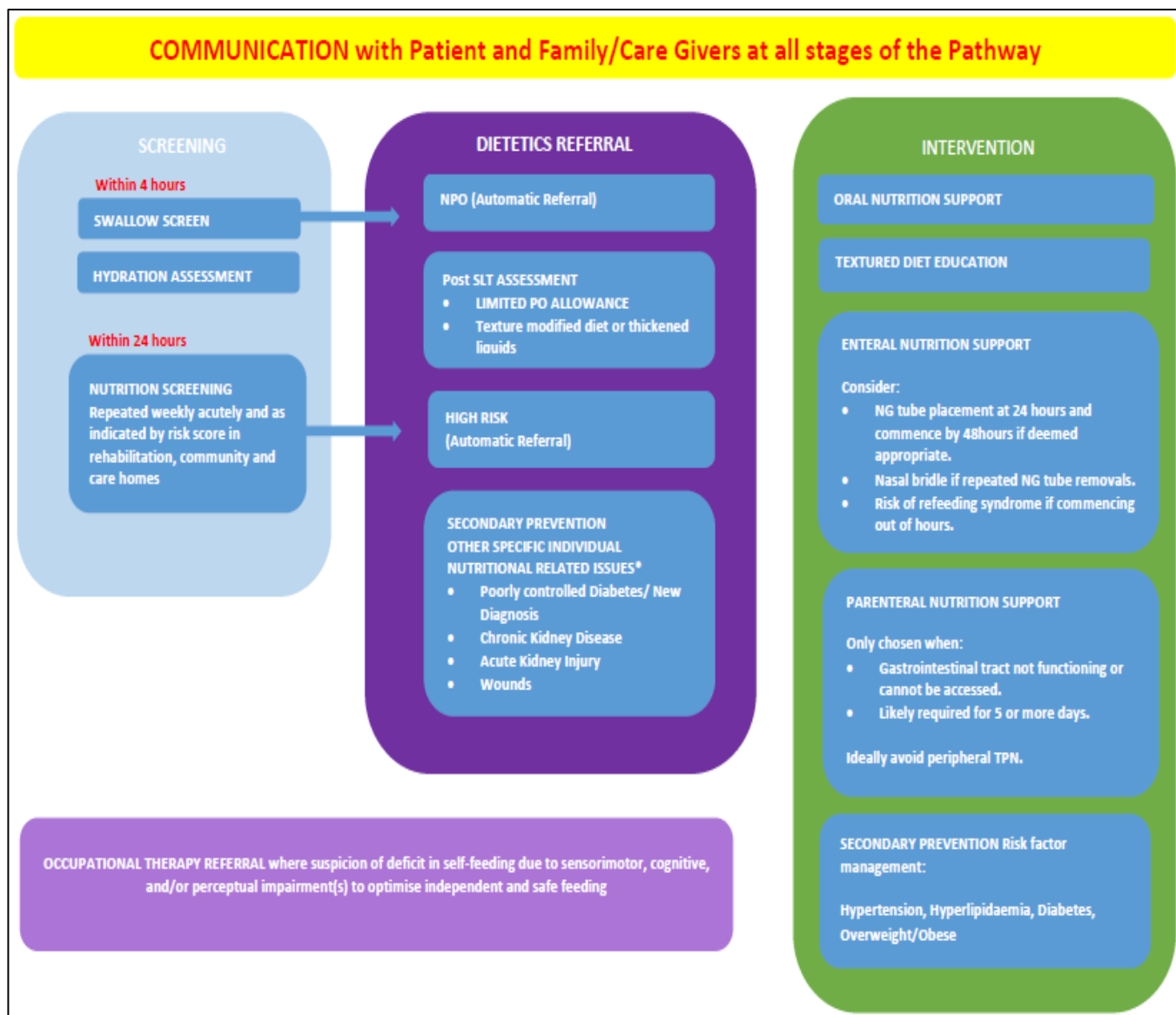
The objective of this document is to outline evidence based nutrition and hydration recommendations for the care of patients post stroke spanning the acute, rehabilitation and secondary prevention services.

The NSP Working Group established a multidisciplinary nutrition and hydration working group who undertook an extensive review of national and international guidelines prior to seeking consultation from relevant bodies (appendix 2) and the final draft being produced.

Recommendations

While the NSP has done extensive work to try to standardise care for patients following stroke, the patient journey pathway can vary between centres and individual patient experiences. Therefore it was decided to structure the document in terms of the nutrition pathway in an assessment, referral and intervention pathway so as to be most useful. Each section of the document begins with the background evidence for that section and ends with the most pertinent recommendations.

Figure 1: Stroke Nutrition & Hydration Summary Pathway



RECOMMENDATIONS

Screening Recommendations

- ✓ All patients should have a swallow screening completed within 4 hours of admission and before taking any food or fluids orally. All patients who fail the swallow screening should have access to a full clinical assessment of swallowing by a speech and language therapist.
- ✓ All patients should be screened for malnutrition within 24 hours of admission to a healthcare setting, using a validated screening tool e.g. Malnutrition Universal Screening Tool (MUST).
- ✓ Screening for malnutrition should be repeated at least weekly thereafter in the acute setting, and as indicated by risk scores in rehabilitation, community and care home settings

- ✓ Local management guidelines resulting from a nutrition screening score should be followed to ensure nutrition intervention is implemented without delay.
- ✓ All healthcare professionals and healthcare care workers, such as nurses and /or healthcare assistants must be adequately trained to use the screening tool.
- ✓ Annual audit of implementation of this guidance document should take place at a local level to inform on-going training needs (appendix 6).
- ✓ All patients post stroke should be monitored for deficits in self-feeding. Those with a suspected functional deficit in self-feeding should receive an assessment of their ability to self-feed by an occupational therapist.

Hydration Recommendations

- ✓ Hydration status and risk of dehydration should be considered within 4 hours of admission. Immediate consideration for alternative fluids until a safe swallow method is established¹².
- ✓ Regular monitoring of fluid balance and electrolytes is recommended in those with severe stroke or swallowing difficulties ^{12,23}
- ✓ Those requiring thickened fluids following a swallow assessment should be considered for alternative fluids if appropriate based on hydration status.
- ✓ Environmental parameters (e.g. temperature of the care setting) and insensible losses (e.g. sweating) should be considered when hydration status is being assessed.
- ✓ Safe positioning of appropriate fluids within reach of the patient, considering any stroke related impairments that may affect a patient's ability to hold fluid containers should occur. Supervision and assistance with fluids should be provided when necessary.

Dietetic Referral Recommendations

Patients with stroke in the following categories should be referred to a dedicated stroke dietitian for specialised individualised assessment, advice and monitoring:

- ✓ Those identified as malnourished or at risk of becoming malnourished from the nutritional screening process ^{17,29}.
- ✓ Those who are unable to take adequate nutrition and fluids orally ^{12, 29, 30}.
- ✓ Those with dysphagia who require a texture modified foods or thickened liquids ^{12, 17,21,30,31,}
- ✓ Those who cannot safely swallow or meet their nutrient and fluid needs orally and require tube feeding ^{12,17,31}.
- ✓ Those with nutrition related co morbidities (i.e. diabetes, components of the metabolic syndrome, constipation, pressure ulcers, falls, renal failure) ^{12,23,31,32}.
- ✓ Those with modifiable secondary prevention risks including hypertension and hyperlipidaemia ^{12,21,30,31,32,33}

Oral Nutrition Support Recommendations

- ✓ Oral nutritional support should be considered for those who can swallow safely and are malnourished or at risk of malnutrition.
- ✓ These recommendations support the implementation of strategies that help to maximise oral nutritional intake in all patients with stroke including the establishment of a ward environment that supports making meal times matter, avoiding unnecessary interruptions, the use of red trays or similar initiatives to highlight and support patients that need assistance or attention at meal times⁴⁶.

- ✓ ONS may be considered for those that are at risk of malnutrition if there is concern about the adequacy of oral nutritional intake. There is no evidence for the routine use of ONS for those following a stroke.
- ✓ A complete oral multivitamin and mineral supplement (providing the recommended daily allowances for all vitamins and trace elements) should be considered if there is concern about the adequacy of micronutrient intake. There is no evidence for the routine use of multivitamin and mineral supplements for those following a stroke.
- ✓ Regular monitoring of the need for, and effectiveness of, oral nutrition support must take place and is best conducted by the relevant dietetic services.

Enteral Nutrition Support Recommendations

Refeeding Syndrome

- ✓ Screen patients to identify the risk factors of developing refeeding syndrome⁴⁵.
- ✓ Check U&E including, Ca⁺⁺, PO₄³⁻, K⁺ and Mg⁺⁺ pre commencement and daily with replacement of necessary electrolytes as required.
- ✓ ECG monitoring or telemetry is recommended where severe low electrolyte levels are recorded or where appropriate according to clinical judgement³³.
- ✓ Supplement thiamine either IV thiamine (≥250mg IV Thiamine) or enteral thiamine (300mg) daily.
- ✓ Supplement with a general multivitamin and mineral supplement.
- ✓ Slow initiating of enteral feeds as per the dietitian's regimen (or out of hours policy if initiating feeding out of hours).

Commencement of Enteral Feeding

People with acute stroke who are unable to take adequate nutrition and fluids orally should be:

- ✓ Considered for NG feeding within 24 hours of admission with early commencement of NG feeding within 48 hours^{2, 12, 20}.
- ✓ Assessed for a nasal bridle, if the NG tube requires frequent placement using locally agreed protocols^{12, 17}.
- ✓ Assessed for gastrostomy tube if they are unable to tolerate a NG tube with nasal bridle^{12, 17, 20}

Out of Hours Enteral Feeding

A decision to commence enteral feeding out of hours should be authorised by the Consultant or on-call senior decision maker.

- ✓ All stroke units should have an out-of-hours enteral feeding regimen in place (appendix 7: Example of an out of hours regimen).
- ✓ An immediate referral to a dedicated stroke dietitian should be made.
- ✓ An out of hours enteral feeding regimen should consider the following:
 - a. The patient's risk of refeeding syndrome³³(see section 12.1.1)
 - b. Risk of aspiration and chest status
 - c. Conditions such as liver disease, renal impairment and diabetes
 - d. Monitoring electrolytes daily including Na⁺, K⁺, Ca²⁺, PO₄³⁻, and Mg²⁺
 - e. Monitoring tolerance including gastrointestinal, fluid balance and chest status

Nasal Bridle Usage

- ✓ Patients may be considered for a nasal bridle where they are at risk of inadvertent nasogastric tube removal or require frequent tube replacement, using locally agreed protocols^{12, 17, 20}
- ✓ Protocols should include patient selection considerations, indications and contraindications to use and consent procedures along with guidance on insertion and removal of nasal bridles.

- ✓ Before attempting nasal bridle insertion the health professional should undertake training in the procedure and be familiar with the local protocols.

Gastrostomy Tubes

- ✓ Patients in the acute setting should be reviewed weekly by the MDT to ascertain if longer term feeding is required ¹⁴.
- ✓ Patients with stroke should be considered for gastrostomy feeding if they are:
 - a. Unable to swallow adequate food and fluids orally by four weeks from onset of stroke ^{12,14, 20, 30,}
 - b. Need but are unable to tolerate nasogastric tube feeding ^{12, 32}.
 - c. Are at high long-term risk of malnutrition ¹².
- ✓ All patients with stroke and their carers should receive training and ongoing support on enteral tube feeding by a dietitian in a format that is accessible to them.
- ✓ All patients' with stroke on enteral feeding should be able to access dietetic services independent of the location of their care (acute inpatient, inpatient rehabilitation or community based services).

Referral pathways should be in-situ across all services to ensure seamless transferral of nutritional care from those on enteral tube feeding across services (acute, rehabilitation, community and care homes).

Parenteral Nutrition Support Recommendations

- ✓ The parenteral feeding route should only be used if the gastrointestinal tract is not functioning effectively, and/or all enteral nutrition options have been considered and excluded ³⁹, at that point including nasal bridle & PEG placement
- ✓ A decision to commence PN should only be made by a dietitian in consultation with a Consultant and or Senior Registrar and nursing staff.
- ✓ Patients requiring PN should be cared for by appropriately trained staff and following local PN policies.
- ✓ Central vein access is the preferable route of access for all PN.

Ethics Recommendations

- ✓ Decisions regarding the use of artificial nutrition and/or hydration should be made on an individual patient basis.
- ✓ Clear and regular communication with the patient if possible and their family / relative is essential to ensure patient wishes are known, any perceived concerns regarding dehydration or lack of nutrition are discussed and that a clear plan is in place.
- ✓ Clinicians should discuss decisions regarding artificial nutrition and hydration in end of life care with other members of the MDT and/or seek a second opinion from appropriate others including a Palliative Care Team who has specific training, experience and expertise in the area.

Secondary Prevention Recommendations

- ✓ All patients with modifiable risk factors (hypertension, overweight/obesity, suboptimal diabetes control, new diabetes diagnosis and hyperlipidaemia) should be offered specialist dietetics counselling on risk reduction strategies.
- ✓ All staff involved in the provision of food and fluids (catering, nursing, healthcare assistants) to patients post stroke should be educated around secondary prevention of stroke through healthy diet, by a registered dietitian.

- ✓ Staff should encourage patients to choose the healthier options from the menu if they have been recommended a healthy eating meal plan (note this is not always appropriate for all patients especially in the acute phase).
- ✓ Literature to support this education should be available to provide to patients and family members/care givers around secondary prevention of stroke through healthy diet in a format accessible to each person.
- ✓ Micronutrient supplementation is not routinely recommended in patients following ischemic stroke

Staffing

- ✓ 0.71 Senior WTE dietitian/10acute beds. Due to the mixed hyper acute, acute and rehab nature of units in Ireland it is expected that a higher staffing ratio would be required to implement the various nutritional interventions across the stroke journey.
- ✓ Significant investment would also be required to deliver care in both specific rehabilitation settings (0.5-1WTE/rehabilitation 20 beds)⁴⁴ and community settings to ensure seamless nutritional support and secondary prevention education.

1.0 Guidance Document Statement

The National Stroke Programme (NSP) aims to deliver evidence based nutrition and hydration guidance on the management of all patients with stroke. Early nutrition screening within 24 hours and early swallow screening within 4 hours has been identified as an integral part of the nutrition and hydration care of all patients with stroke.

Malnutrition has been shown to be a significant predictor of poor outcome in patients post stroke ¹. All patients at risk of malnutrition should be referred to a dietitian for assessment and intervention.

Considering the numerous nutrition related risk factors for first and recurrent stroke, it is important that patients with stroke are offered specialised nutritional advice post stroke to support them in risk management and secondary prevention of stroke.

2.0 Purpose

The purpose of this guidance document is to outline evidence based nutrition and hydration management of patients post stroke including screening, nutrition in stroke, enteral tube feeding, parenteral nutrition and ethical issues in acute stroke services, stroke rehabilitation and secondary prevention services.

This document has been developed to support the implementation of evidence based nutrition and hydration management of all patients with stroke across acute, rehabilitation, community and secondary prevention services.

While the NSP has done extensive work to try to standardise care for patients following stroke, the patient journey pathway can vary between centres. Therefore it was decided to structure the document in terms of a nutrition assessment, referral and an intervention pathway so as to be most useful to a wide number of centres (Figure 1. Stroke Nutrition & Hydration Summary Pathway). Each section of the document ends with summary recommendations to highlight the most relevant factors.

3.0 Scope

This guidance document applies to all medical, nursing, health and social care professions (HSCP) including students, and all support staff caring for patients with stroke in the acute and rehabilitation setting.

4.0 Glossary of Terms and Definitions

Dysphagia: An eating, drinking and / or swallowing disorder usually resulting from a neurological or physical impairment of the oral, pharyngeal or oesophageal mechanisms.

Food Fortification: Additions or modifications made to food and drinks to make them more nutrient dense without increasing the overall volume of the food/drink.

Macronutrients: any of the nutritional components of the diet (e.g. fat, protein, carbohydrate) which are required in relatively large amounts in the diet.

Malnutrition: Malnutrition refers to undernutrition, typically due to loss of appetite and inadequate intake in someone who has an underlying illness or inflammatory condition

Metabolic syndrome: A cluster of the most dangerous heart attack risk factors: diabetes and prediabetes, abdominal obesity, high cholesterol and high blood pressure.

Micronutrient: Any substance, such as a vitamin, mineral or trace element that is essential for healthy growth and development but required only in minute amounts.

Nasal Bridle: This is a nasal tube retaining system for use with nasogastric (NG) and nasojejunal (NJ) feeding tubes. It is designed to prevent inadvertent displacement or removal of nasal tubes for patients requiring naso-enteral feeding.

Nutrition Support: The provision of enteral or parenteral nutrients to treat or prevent malnutrition that can include oral, enteral, and parenteral nutrition to maintain or restore optimal nutrition status and health.

Oral Nutritional Supplements: (ONS) are sterile liquids, semi-solids or powders, which are typically used in addition to the diet, where diet alone is insufficient to meet nutritional requirements.

Parenteral Nutrition: (PN) is the intravenous administration of a solution containing macronutrients, electrolytes and micronutrients, given as treatment for the management of intestinal failure or where it is not possible to meet nutritional needs by oral or enteral route.

Refeeding Syndrome: Refeeding syndrome refers to biochemical and clinical symptoms and abnormalities caused by severe shifts in electrolyte and fluid balance in malnourished patients upon recommencement of feeding, both enteral and parenteral. The condition typically appears in the first days of refeeding and is potentially fatal if not recognised promptly. It is easily prevented if those at high risk of this condition are identified prior to the initiation of feeding. During refeeding, the reintroduction of glucose induces a series of profound biochemical changes within the body:

- Carbohydrate metabolism becomes the primary focus, and fat metabolism rapidly declines.

- The introduction of glucose and hyperglycaemia induces insulin, and this precipitates a cascade of metabolic events leading to dramatic intracellular shift of potassium and water follows by osmosis
- Electrolytes such as potassium and phosphate shift from the extracellular to the intracellular compartment, causing a sudden profound reduction in serum levels.
- The metabolism of glucose and lipid is itself altered, leading to metabolic acidosis, ketoacidosis and hyperosmolar states.
- Patients may demonstrate initial fluid intolerance with attenuated water and Na⁺ excretion, which may lead to cardiac decompensation, pre-renal failure with metabolic acidosis and even sudden death.
- Intracellular micronutrients and vitamins such as thiamine (B1) are consumed rapidly due to the sudden switch to anabolism induced by feeding. This can induce neurological complications, leukocyte dysfunction leading to increased susceptibility to infection and metabolic acidosis and could lead to Wernicke's encephalopathy or Korsakoff's psychosis.

Self-feeding: This is the process of setting up, arranging, and bringing food or fluid from the plate or cup to the mouth.

Swallow Screening Test: A pass or fail process used to identify the possible presence of dysphagia and to indicate the need for further clinical swallow evaluation.

5.0 Roles and Responsibilities:

5.1 Roles

- The Health Service Executive to ensure that resources required supporting the implementation of the nutrition and hydration in stroke recommendations are viewed as a priority in service planning submissions in acute, rehabilitation and community settings.
- Hospital & Community Management to ensure that there is sufficient dietetic, nursing, medical, other HSCP and support staff to support the implementation of these nutrition and hydration recommendations.
- Dietitian Managers to ensure that dietetic staff are appropriately trained to support the implementation of these recommendations including the training of other professions in acute, community and rehabilitation settings.
- Nursing Managers to ensure that all nursing staff caring for patients with stroke are aware of these recommendations and to facilitate training as required.
- Senior Stroke Clinicians to ensure that all medical staff caring for patients with stroke are aware of these recommendations and to facilitate training as required.
- Nursing, Medical, Dietitian and other HSCP Managers to ensure that employees comply with these recommendations through monitoring, audit and review.
- HSCPs (including Dietitians, Speech & Language Therapists, Occupational Therapists, Physiotherapists, Social Workers and Psychologists), Nurses and Health Care Assistants have a role to support the practical implementation of

these recommendations to optimise the nutrition and hydration status of patient with stroke in all settings.

- Catering Departments have a role in providing food to patients in a format that is safe, appealing and nutritionally adequate.

5.2 Responsibilities

- Each health professional/HSE employee is accountable for their practice. This means being answerable for decisions he/she makes and being prepared to make explicit the rationale for those decisions and justify them in the context of legislation, case law, professional standards and guidelines, evidence based practice, professional and ethical conduct.
- It should be recognised that policies, procedures, protocols guidelines and recommendations represent a statement reflecting an expected standard of care and could be introduced in law as evidence of the standard of care expected. There may be occasions when it is acceptable to deviate from a PPPG but clinical judgement in such a decision must be clearly documented.

6.0 Background

The NSP was established in 2010 with the mission to ensure:

- National rapid access to best- quality stroke services
- Prevent 1 stroke per day
- Avoid death or dependence in 1 patient every day

The National Audit of Stroke Care (2008)² found that stroke services in Ireland were poorly organised and largely ineffective leading to a high rate of preventable death and disability from stroke. The aims of the programme were targeted through the provision of reallocated funding to develop infrastructure and specialist posts within the stroke service nationally, specifically through the development of a national programme for thrombolysis therapy, the creation of designated stroke units on sites managing patients with acute stroke and the recruitment of medical, nursing and HSCP with specialist knowledge in stroke.

In 2015, the NSP commissioned the Irish Heart Foundation/ HSE National Stroke Audit 2015³ which revealed much improvement in many areas of stroke care including a reduction of in-patient mortality by more than a quarter, reduction of discharge to a nursing home by one third and a thrombolysis rate equal to international standards.

Health Information and Quality Authority (HIQA)⁴ and the HSE Food, Nutrition and Hydration Policy⁴⁶ suggest that all patients should be screened for malnutrition on admission to hospital and repeated at regular intervals. The importance of nutrition as a stroke therapy cannot be underestimated, as malnutrition is a significant predictor of poor outcome in patient post stroke^{6,20}. Studies have shown that malnutrition is associated with reduced functional improvement, increased

complication rates, and prolonged hospital length of stay in this patient group^{1,6,7}. With rates of malnutrition among patients with stroke varying between 16 and 49% dependent on time of assessment,^{8,9} the importance of access to dedicated stroke dietetics services at all points of the patient journey is essential.

Stroke can leave patients at risk of dehydration as a result of reduced consciousness or impaired swallowing. It is estimated that up to 62% of patients with stroke suffer from dehydration at some point during their admission¹⁰. The incidence of dysphagia is reported between 37 and 78% in the stroke population, depending on the method of assessment¹¹. This group are at a heightened risk of malnutrition, with deterioration in nutritional status more frequent in those with dysphagia⁶. A combination of physical, social and psychological issues post stroke contribute to a higher risk of malnutrition. Such issues may include dysphagia, restricted arm function, depression or anxiety, fatigue, and poor oral hygiene¹².

In 2017, the NSP identified the need for National guidance for nutrition and hydration for patients with stroke. The NSP Working Group established a multidisciplinary nutrition and hydration working group (appendix 1) with the goal of developing 'Recommendations for the Management of Nutrition and Hydration in Patients with Stroke – A Guidance Document'. This document was sent for consultation to relevant bodies (appendix 2) and feedback was reviewed by the working group.

6.1 Staffing

In 2015 the Irish Heart Foundation/ HSE National Stroke Audit³ highlighted that dietetics staffing levels in acute stroke care was 69% below the requirement. To implement these recommendations and achieve a service as described by the audit, hospital management would need to invest a minimum of 0.71 Senior WTE dietitian/10acute beds. It is important to highlight that this reflects staffing only for the acute/hyper acute setting. Due to the mixed hyperacute, acute and rehab nature of the majority of units in Ireland it is expected that a higher staffing ratio would be required to cover the spectrum of nutritional needs for these sites. Significant investment would also be required to deliver care in both the rehabilitation setting (0.5-1WTE/rehabilitation 20beds)⁴⁴ and community settings to ensure seamless nutritional support and secondary prevention education.

7.0 Nutrition & Hydration Ethical Issues

Ethical dilemmas in the clinical care of patients with stroke often relate to decisions about eating and nutritional interventions. Questions arise about whether to initiate, withhold or withdraw nutritional treatment essential for future life and quality of life. Thus ethical principles should be applied to the decisions regarding interventions for nutrition and hydration in end of life care and the need to have a patient centred approach¹³.

At the end of life it is important to assess whether providing nutrition and/or hydration by oral, subcutaneous, intravenous or enteral routes will be of overall benefit to the patient. The decision to commence nutrition support should balance the risks and benefits and take into consideration individual patient needs.

Patients should also be given the opportunity to decide whether they want to go ahead with a treatment plan/procedure ¹⁴. Patient's and carer's perceptions and expectations of nutrition support should be taken into account, and the benefits, risks and burden of care should be fully explained before initiating feeding ¹⁴.

Consideration should also be given to the emotional impact on the patient and their family of not providing nutrition and/or hydration. It is therefore essential that, where possible, the patient and/or those close to them should be engaged in such discussions as early as possible, and that the reasons for trial commencement, withholding or withdrawing such interventions are clearly communicated, discussed and regularly reviewed. If the patient does not have capacity or where the patient is unable to express a wish / preference, the medical team must make the decisions on feeding in the patient's best interest in line with the HSE National Consent Policy ¹⁵. The decision to instigate nutrition support should be made in discussion with the patient, family and multi-disciplinary team. This communication and the rationale for the decision should be recorded in the patient's healthcare record by the medical team ¹⁶

Issues may also arise for patients with dysphagia who request food and fluid deemed unsafe. In such circumstances careful risk feeding may be considered with clear communication to both the patient, where possible, and relative in relation to the possible consequences of such a decision. The Speech and Language Therapist can play a vital role in supporting patients with communication difficulties, and within the expanded MDT discussion regarding ethical issues for decisions around enteral feeding, and risk oral feeding.

Recommendations
<ul style="list-style-type: none">✓ Decisions regarding the use of artificial nutrition and/or hydration should be made on an individual patient basis.✓ Clear and regular communication with the patient if possible and their family / relative is essential to ensure patient wishes are known, any perceived concerns regarding dehydration or lack of nutrition are discussed and that a clear plan is in place.✓ Clinicians should discuss decisions regarding artificial nutrition and hydration in end of life care with other members of the MDT and/or seek a second opinion from appropriate others including a Palliative Care Team who has specific training, experience and expertise in the area.

8.0 Screening

8.1 Swallow Screening

Swallowing difficulties are common in stroke and can result in increased risk of pneumonia secondary to aspiration (food/fluid entering the airway) ^{12,17}. The NSP developed a national guideline for swallow screening in stroke:

<http://www.iaslt.ie/attachments/National%20Guideline%20for%20Swallow%20Screening%20in%20Stroke.pdf>

This guideline recommends that all patients post stroke have a swallow screening performed within four hours of admission and before any oral intake. A swallow screening pathway to support practice (appendix 4) has been developed to support the practical implementation of this guideline. There is currently no single gold standard process of swallow screening. The NSP and the Irish Association of Speech and Language Therapists (IASLT) recommend that chosen swallowing screening tools should have established validity and reliability.

8.2 Nutrition Screening

Malnutrition refers to undernutrition, typically due to loss of appetite and inadequate intake in someone who has an underlying illness or inflammatory condition ¹⁸. Stroke patients are prone to malnutrition and dehydration mainly due to dysphagia, impaired consciousness, perception deficits and cognitive dysfunction ^{1,17}. Being malnourished or at risk of malnutrition on admission is associated with an increased risk of mortality and poor outcome ^{1,17}. In 2007, the cost of malnutrition in Ireland was over 1.43 billion equating to 10% of healthcare budget ¹⁹.

Signs and symptoms of malnutrition include:

- Loss of appetite
- Loss of weight (lean body and fat mass)
- Lethargy
- Reduced ability to perform normal tasks
- Reduced physical performance
- Altered mood
- Poor concentration

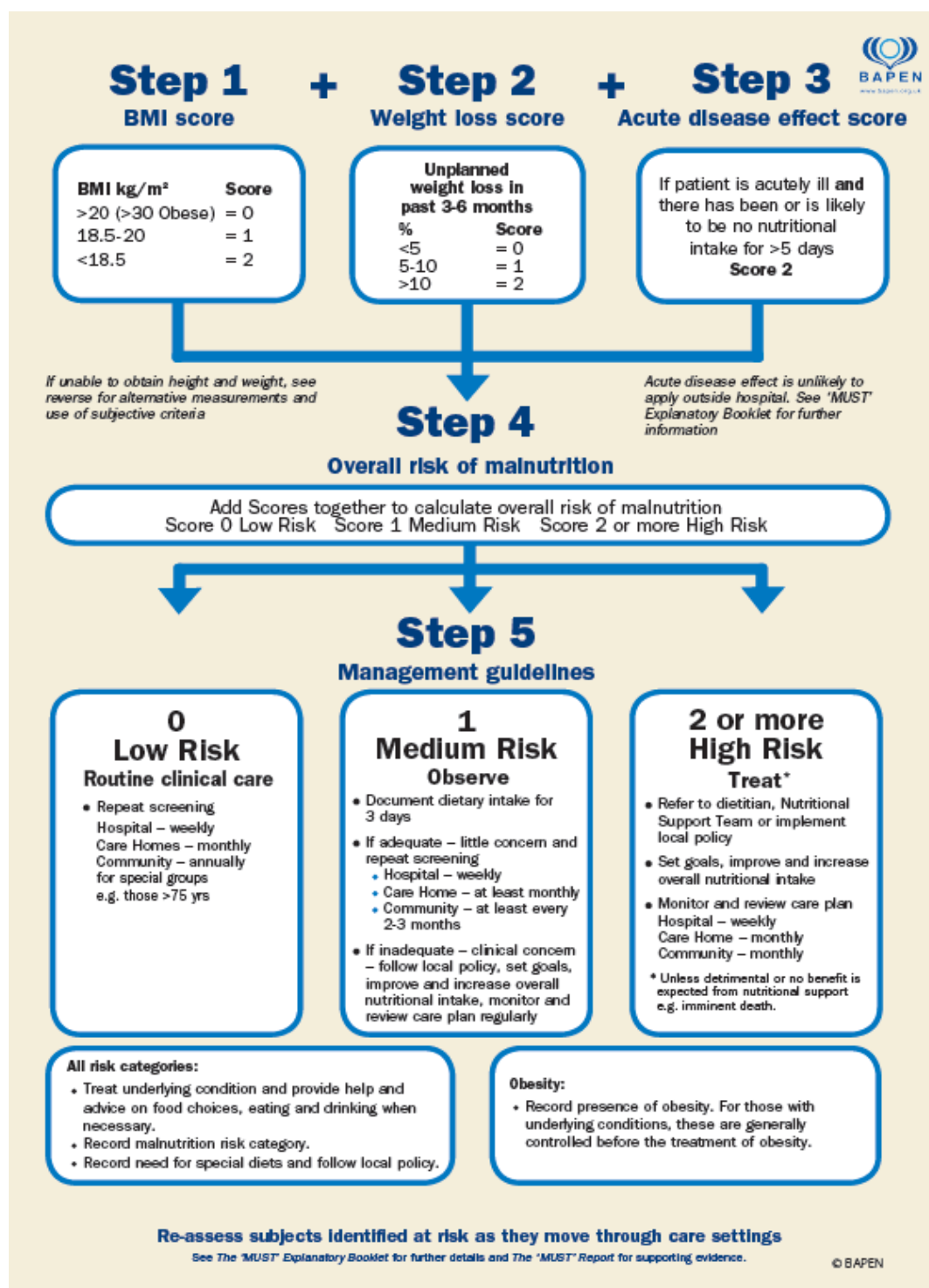
Patients with stroke should be screened for malnutrition within 24 hours of admission and weekly thereafter in the acute setting and as indicated by risk scores in rehabilitation, community and care homes ^{5,12,17,20} (Figure 2). This screening should be completed using a validated tool by trained healthcare staff ^{12,20}.

Malnutrition screening should measure body mass index, percentage unintentional weight loss and consider the time frame in which nutrition intake has been reduced and or the likelihood of future reduced nutrition intake ²⁰. Although there is no single recommended nutrition screening tool specific to those who have suffered a stroke,

the Malnutrition Universal Screening Tool (MUST) is an example of a tool that addresses these three considerations¹⁷ and has been included as a recommended screening tool by the HSE in 2019. In a recent study risk of malnutrition as assessed using MUST was shown to predict the 6-month mortality, LOS and costs independent of age, gender, ethnicity, type of stroke, stroke severity and several stroke risk factors, suggesting that MUST is a tool that can be used on stroke patients to identify those who are more likely to benefit from medical nutrition therapy^{1,17}.

See flowchart (Figure 2) for quick guide below and for further information see <http://www.bapen.org.uk/screening-and-must/must/introducing-must>. In a recent study, being at risk of malnutrition identified by MUST has been shown to be an independent predictor of mortality, length of hospital stay at 6 months post stroke¹.

Figure 2. Malnutrition Universal Screening Tool (MUST)



8.3 Self-feed Screen

There is currently no identified screening tool to capture feeding ability. However, all patients post stroke should be screened for their ability to self-feed that takes account of:

- The patient 's position for feeding, including consideration of both the chair and table or tray
- Use of cutlery, including spreading, cutting, and transport of food to the mouth
- Suitability of drinking vessels, from both feeding and swallowing perspectives
- Fatigue during the eating and drinking task
- Eating speed

Patients with a suspected functional deficit in self-feeding secondary to a sensorimotor, cognitive, and/or perceptual impairment(s) should be seen by an occupational therapist with expertise in stroke that can advise on a management plan to address this issue. The occupational therapist should advise staff and carers on techniques and equipment to maximise the patient's engagement and independence at mealtimes ^{12, 21,22}

Recommendations

- ✓ All patients should have a swallow screening completed within 4 hours of admission and before taking any food or fluids orally. All patients who fail the swallow screen should have access to a full clinical assessment of swallowing by a speech and language therapist.
- ✓ All patients should be screened for malnutrition within 24 hours of admission to a healthcare setting, using a validated screening tool.
- ✓ Screening for malnutrition should be repeated at least weekly thereafter in the acute setting, and as indicated by risk scores in rehabilitation, community and care home settings
- ✓ Local management guidelines resulting from a nutrition screening score should be followed to ensure nutrition intervention is implemented without delay.
- ✓ All nursing staff must be adequately trained to use the chosen nutrition screening tool and any local management guidelines.
- ✓ Annual audit of implementation of these recommendations should take place at a local level to inform on-going training needs (appendix 6).
- ✓ All patients post stroke should be monitored for deficits in self-feeding. For those with a suspected functional deficit in self-feeding should receive an assessment of their ability to self-feed by an occupational therapist.

9.0 Hydration

Following a stroke, patients are often at risk of dehydration due to reduced level of consciousness and swallowing difficulties¹⁷. It is estimated that up to 62% of patients in the acute stroke setting suffer from dehydration at some point of their admission¹⁰. Adequate hydration/early rehydration is recommended to prevent venous thromboembolism²³. Management of hyperglycaemia supports the avoidance of fluids containing dextrose in the early post-stroke phase²³.

Recommendations

- ✓ Hydration status and risk of dehydration should be considered within 4 hours of admission. Immediate consideration for alternative fluids until a safe swallow method is established¹².
- ✓ Regular monitoring of fluid balance and electrolytes is recommended in those with severe stroke or swallowing difficulties^{12,23}
- ✓ Those requiring thickened liquids following a swallow assessment should be considered for alternative fluids if appropriate based on hydration status.
- ✓ Environmental parameters (e.g. temperature of the care setting) and insensible losses (e.g. sweating) should be considered when hydration status is being assessed.
- ✓ Safe positioning of appropriate fluids within reach of the patient, considering any stroke related impairments that may affect a patient's ability to hold fluid containers should occur. Supervision and assistance with fluids should be provided when necessary.

10.0 Referral to Dietetics

The importance of nutrition as a stroke therapy cannot be underestimated. Malnutrition has been shown to be a significant predictor of poor outcome in those with stroke¹⁷. The existing evidence suggests that individualised nutrition counselling tailored to the specific needs of each patient with stroke, can help to meet energy requirements and prevent weight and fat loss, and also contribute to improvement of functional status and quality of life^{24,25,26}.

In the acute setting, patient's dietary energy intake during the first 2 weeks of admission has been shown to significantly predict both the extent and rate of restoration of functional abilities, highlighting the importance of nutrition in the acute period²⁷. Implementing nutrition standards for stroke care leads to more appropriate nutritional interventions (a reduction in the number of nasogastric (NG) tubes used per patient with fewer gastrostomy tubes being placed, fewer patients acquiring chest infections, aspiration pneumonia, and/or sepsis of unknown origin)²⁸. Unlike other predictors, dietary energy intake can be easily maximised with nutritional therapy modalities, including oral and enteral tube nutrition support, again highlighting the importance of access and referral to dedicated stroke dietetics

services¹⁷. Ongoing nutrition intervention is essential in the rehab phase to optimise patient's rehabilitation potential and functional outcomes.

Addressing individual risk factors of hypertension, hyperlipidaemia, overweight and obesity, diabetes and the metabolic syndrome should be a major consideration for all patients in reducing recurrent stroke risk. All patients post stroke with these risk factors should be offered dietetic counselling for secondary prevention.

All patients' with stroke should be able to access dietetic services independent of the location of their care (acute inpatient, inpatient rehabilitation or community based services). Referral pathways should be in-situ across all services to ensure equitable access to all patients with stroke and seamless transferral of nutritional care across services.

Recommendations

Patients with stroke in the following categories should be referred to a dedicated stroke dietitian for specialised individualised assessment, advice and monitoring:

- ✓ Those identified as malnourished or at risk of becoming malnourished from the nutritional screening process ^{17,29}.
- ✓ Those who are unable to take adequate nutrition and fluids orally ^{12, 29, 30}.
- ✓ Those with dysphagia who require modified texture foods or thickened liquids ^{12, 17,21,30,31},
- ✓ Those who cannot safely swallow or meet their nutrient and fluid needs orally and require tube feeding ^{12,17,31}.
- ✓ Those with nutrition related co morbidities (i.e. diabetes, components of the metabolic syndrome, constipation, pressure ulcers, falls, renal failure) ^{12,23,31,32}.
- ✓ Those with modifiable secondary prevention risks including hypertension and hyperlipidaemia ^{12,21,30,31,32,33}

11. Oral Nutrition Support

11.1 Assessment

A thorough nutrition assessment is indicated for those who are able to take nutrition orally and are deemed at risk of malnutrition. A variety of factors need to be taken into account during this assessment, including:

Medical history, tests and procedures.
Relevant biochemistry
Relevant medications
Nutrition focused physical findings
Anthropometric measurements
Nutritional requirements
Food and nutrition related history
Nutrition diagnosis, issues and goals

It is important to determine the factors contributing to an inadequate oral intake to allow for tailoring of further multidisciplinary team (MDT) input and nutrition support provision. Following a stroke, these factors contributing to a risk of poor oral intake may include:

- Consequences of disease (e.g. dysphagia requiring a texture modified diet or thickened liquids, depression, cognitive decline)
- Treatment (e.g. medication side-effects such as nausea, fatigue and abdominal cramping)
- Social (e.g. loneliness, isolation)
- Functional (e.g. need for assistance with eating)
- Physical (e.g. poor appetite, early satiety, fatigue, nausea, drowsiness)
- Mechanical (e.g. poor dentition)
- Environmental (e.g. distractions on ward)
- Communication difficulties (e.g. reduced ability to communicate needs and likes/dislikes)

Food intake records assist the assessment of oral intake for those with a reduced ability to recall oral intake (e.g.: cognitive deficits, language deficits).

11.2 Intervention

11.2.1 Oral Nutrition Support

Oral nutrition support should be considered for those who can swallow safely and are malnourished or at risk of malnutrition³⁴. Oral nutrition support describes the options available to optimise nutritional status via the oral route. These options may include:

- Provision of dietary counselling and advice: Nutritional counselling may open the discussion regarding barriers to adequate oral intake and may motivate the patient and family to make recommended improvements to their diet and lifestyle. The efficacy of nutritional counselling and advice giving may be limited in those with reduced consciousness and limited comprehension, as well as where possible time constraints limit time spent with the patient.
- Alteration of meal pattern: A “little and often” dietary pattern may help to improve oral intake in those with poor appetite, tiredness and early satiety. Offer smaller portions of food and encourage regular nutritious snacks between meals. Consider offering food when appetite is best and when the person is awake. This may not always be at the usual designated meal times. Avoid large volumes of oral fluids before a meal as this will reduce appetite for food. Encourage eating after some light exercise as this may improve appetite.
- Use of snacks: Additional food offered in the form of snacks may help to increase nutritional intake. Compliance is often good with this strategy as snacks are often liked and familiar. Consider snacks that will increase energy, protein and micronutrient intake. Snacks should preferably be offered between meals so as to not affect appetite for meals. Ensure that snacks offered are suitable for the person’s recommended dietary consistency.
- Fortification of the diet: Food fortification aims to increase the nutrient density of the food consumed, rather than increase the volume of diet taken. Examples of this are the adding of butter or cream to potato. This strategy may be especially useful for those with early satiety and poor appetite.
- Oral nutritional supplements: Where oral intake remains inadequate, ONS may be initiated for people with stroke that are at risk of malnutrition^{12,14,17,21,34,35}. Routine use of ONS is not recommended for people with acute stroke that are adequately nourished on admission and are able to meet their nutritional needs orally from diet^{12,17,20,21,23,35}. There are different types of ONS which may benefit specific groups of people following a stroke. The dietitian is able to advise on which supplement may be most suitable.

In order to ensure the success of all forms of oral nutrition support, there must be close collaboration between dietitians, SLT's, OT's, nursing staff, healthcare assistants and catering.

Initiatives to enhance the meal experience and optimise meal-time assistance are encouraged e.g. "Red Tray" systems.

Oral nutrition support should be individualised and patient specific¹⁷. Priority should first be given to food based strategies to optimise oral intake prior to use of nutritional supplements.

11.2.2 Texture Modified Diets

Dysphagia is observed in up to 50% of stroke patients¹⁷. It is recommended texture modified foods and thickened liquids should be provided in accordance with the International Dysphagia Diet Standardisation Initiative (IDDSI)⁴⁷ framework (see appendix 5).

Those requiring texture modified diets and thickened liquids are at risk of reduced energy and fluid intake¹⁷. Hence it is important to ensure that the texture modified meals offered are nutritionally adequate. Suitably thickened liquids should be readily available and in reach of each person to allow for adequate hydration. Suitable texture modified foods need to be available at all times to allow for an alteration of meal pattern where needed. Suitable texture modified snacks must be available for all on a texture modified diet. Fortification of texture modified meals must be considered to enhance the nutrient density of these meals where needed.

Texture modified diets and thickened liquids may negatively impact on one's quality of life¹⁷. Therefore, these diets should be attractively presented where possible. Choice should be available and offered to all patients who have been recommended texture modified diets and thickened liquids⁴⁶.

11.2.3 Micronutrient supplementation

A complete oral multivitamin and mineral supplement should be considered if there is concern about the adequacy of micronutrient intake. There is no evidence for the routine use of multivitamin and mineral supplements³⁴.

11.3 Monitoring

Regular monitoring of the need for, and effectiveness of, oral nutrition support and ONS must take place. In order for accurate monitoring to take place, the following should be maintained:

- Weekly weights.
- Dietary intake records for those unable to provide a verbal recall of oral intake. Include volumes of ONS taken (if charted).
- Fluid balance charts.

Monitoring must be done for both in-patients (acute/rehabilitation) and upon discharge to the community. If the patient requires oral nutrition support upon discharge, he/she should be followed up by the relevant dietetic services.

Recommendations

- ✓ Oral nutritional support should be considered for those who can swallow safely and are malnourished or at risk of malnutrition.
- ✓ Textured modified diet and thickened fluids should be provided in accordance with the IDDSI framework⁴⁷
- ✓ These recommendations support the implementation of strategies that help to maximise oral nutritional intake in all patients with stroke including the establishment of a ward environment that supports making meal times matter, avoiding unnecessary interruption and the use of red trays³⁶.
- ✓ ONS may be considered for those that are at risk of malnutrition if there is concern about the adequacy of oral nutritional intake. There is no evidence for the routine use of ONS for those following a stroke.
- ✓ A complete oral multivitamin and mineral supplement (providing the recommended daily allowances for all vitamins and trace elements) should be considered if there is concern about the adequacy of micronutrient intake. There is no evidence for the routine use of multivitamin and mineral supplements for those following a stroke.
- ✓ Regular monitoring of the need for, and effectiveness of, oral nutrition support must take place and is best conducted by the relevant dietetic services.

12.0 Enteral Tube Feeding

12.1 Assessment

Patients with stroke who are at risk of malnutrition and/or are unable to meet requirements orally should be considered for enteral nutrition support. This may be in the form of enteral tube feeding, in accordance with their expressed wishes or, if the patient's lacks decision making capacity, in their best interests^{12, 34, 38} as decided by the medical team in conjunction with relevant members of the multidisciplinary team and the patients next of kin or relative.

12.1.1 Refeeding syndrome

When decisions regarding commencement of enteral feeding are being made consideration of refeeding risk should be undertaken. Refeeding syndrome is defined as severe fluid and electrolyte shifts and related metabolic complications occurring in malnourished patients precipitated by the introduction of nutrition⁴¹. Refeeding syndrome can occur in patients receiving oral diet, enteral tube feeding and parenteral nutrition. Complications include cardiac failure, pulmonary oedema, and acute circulatory fluid over load, renal, hepatic and GI problems. Refeeding syndrome is a potentially fatal condition which may be successfully managed or prevented when detected early³³.

Irish Society for Clinical Nutrition and Metabolism (IrSPEN) advocates for the development of local guidelines using IrSPEN Guidelines: Prevention and Treatment of Refeeding Syndrome in the Acute Care Setting, adapted in the context of the local setting³³.

Table 1. Identification of patients at risk of developing refeeding syndrome ^{20, 33, 34,}

Risk by Patient Category *	Risk Factors
Chronic alcohol abuse	BMI <18.5kg/m ²
Older Adult living alone	Unintentional weight loss > 10% in the previous 3 – 6 months
Chronic GI symptoms	Little or no nutritional intake for > 5 days
Chronic debilitating disease	Low levels of potassium, phosphate and magnesium prior to feeding
Eating disorders	History of alcohol abuse* or drugs including insulin, diuretics, chemotherapy or antacids.
Chronic severe dieting	
Oncology patients on chemotherapy*	
Obviously malnourished	

*Indicates patient types more likely to be associated with risk of refeeding syndrome

Recommendations
<ul style="list-style-type: none"> ✓ Screen patients to identify the risk factors of developing refeeding syndrome. ✓ Check U&E including, Ca ⁺⁺, PO₄³⁻, K⁺ and Mg⁺⁺ pre commencement and daily with replacement of necessary electrolytes as required. ✓ ECG monitoring or telemetry is recommended where severe low electrolyte levels are recorded or where appropriate according to clinical judgement ³³. ✓ Supplement thiamine either IV thiamine (≥250mg IV Thiamine) or enteral thiamine (300mg) daily. ✓ Supplement with a general multivitamin and mineral supplement. ✓ Slow initiating of enteral feeds as per the dietitian's regimen (or out of hours policy if initiating feeding out of hours).

12.2 Intervention

12.2.1 Commencement of Enteral Feeding

The decision to proceed to tube feeding should be made in collaboration with the patient, family and the multidisciplinary team³¹. Where sufficient oral food intake is not possible during the acute phase of stroke, the preferred route of enteral nutrition should be the nasogastric route¹⁷. For those patients who have been thrombolysed NG tube placement is contraindicated for 24hours post thrombolysis¹².

Recommendations

People with acute stroke who are unable to take adequate nutrition and fluids orally should be:

- ✓ Considered for NG feeding within 24 hours of admission with early commencement of NG feeding within 48 hours ^{2, 12, 20}.
- ✓ Assessed for a nasal bridge, if the NG tube requires frequent placement using locally agreed protocols ^{12, 17}.
- ✓ Assessed for gastrostomy tube if they are unable to tolerate a NG tube with nasal bridge ^{12, 17, 20}

12.2.2 Out-of-hours Enteral Feeding

When a decision is made to commence NG feeding in the evenings or at the weekends an out-of-hours enteral feeding regimen should be available to use to avoid prolonged period of fasting.

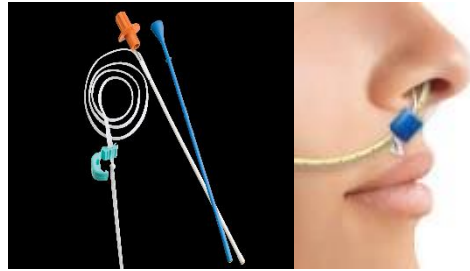
Recommendations

A decision to commence enteral feeding out of hours should be authorised by the Consultant or on-call senior decision maker.

- ✓ All stroke units should have an out-of-hours enteral feeding regimen in place (appendix 7: Example of an out of hours regimen).
- ✓ An immediate referral to a dedicated stroke dietitian should be made.
- ✓ An out of hours enteral feeding regimen should consider the following:
 - f. The patient's risk of refeeding syndrome³³(see section 12.1.1)
 - g. Risk of aspiration and chest status
 - h. Conditions such as liver disease, renal impairment and diabetes
 - i. Monitoring electrolytes daily including Na⁺, K⁺, Ca²⁺, PO₄³⁻, and Mg²⁺
 - j. Monitoring tolerance including gastrointestinal, fluid balance and chest status

12.2.3 Nasal Bridles

A nasal bridle is a nasal tube retaining system for use with NG and nasojejunal (NJ) feeding tubes. It is designed to prevent inadvertent displacement or removal of nasal tubes for patients requiring naso-ental feeding.



Patient Selection Considerations:

Careful patient selection, giving due consideration to indications and contraindications for use, is essential as not all patients who remove NG tubes are suitable for a nasal bridle. It is recommended that the decision to insert a nasal bridle should be considered only after discussion and agreement between the stroke dietitian and primary clinician and other relevant clinical staff.

Contraindications for use:

- The device is contraindicated for patients with mechanical obstructions in nasal airway, facial fractures or nasal fractures, anterior cranial fractures, basilar skull fractures.
- Bridles should be used with caution in patients who have nasal septal perforation as placement of the bridle may be difficult or impossible in these cases.
- Excessive traction on the bridle may cause serious nasal injury. Do not use with patients who may pull on the bridle to such a degree as to cause serious injury. In such cases, an alternative means of feeding must be employed.
- The nasal bridle should not be used to secure a naso-enteric tube in patients who do not wish to be fed.

Indications for use:

- Two or more consecutive inadvertent NG tube dislodgements/removals.
- First-line in patients where there is evidence of agitation or inadvertent dislodgement deemed likely.
- To reduce risk of aspiration secondary to naso-enteric tube dislodgement, in patients deemed at high risk.

Recommendations

- ✓ Patients may be considered for a nasal bridle where they are at risk of inadvertent nasogastric tube removal or require frequent tube replacement, using locally agreed protocols ^{12, 17,20}
- ✓ Protocols should include patient selection considerations, indications and contraindications to use and consent procedures along with guidance on insertion and removal of nasal bridles.
- ✓ Before attempting nasal bridle insertion the health professional should undertake training in the procedure and be familiar with the local protocols.

12.2.4 Gastrostomy Feeding

Short term enteral feeding is usually via NG tube. Medium to longer term enteral feeding is undertaken primarily via percutaneous endoscopic gastrostomy (PEG) or radiologically inserted gastrostomy (RIG) where PEG is unsuitable.

Training on the care of long term enteral feeding tubes is central to the successful discharge of patients. Upon discharge, all stroke patients with a long term feeding tube should receive training and supporting written information on topics including:

- How to care for their feeding tube
- Dealing with complications associated with long term feeding tubes
- Arrangements for replacement feeding tubes
- Contact details of relevant healthcare professionals who can support them with their nutrition care plan in the community.

Recommendations

- ✓ Patients in the acute setting should be reviewed weekly by the MDT to ascertain if longer term feeding is required ¹⁴.
- ✓ Patients with stroke should be considered for gastrostomy feeding if they are:
 - d. Unable to swallow adequate food and fluids orally by four weeks from onset of stroke ^{12,14, 20, 30,}
 - e. Need but are unable to tolerate nasogastric tube feeding ^{12, 32.}
 - f. Are at high long-term risk of malnutrition ¹².
- ✓ All patients with stroke and their carers should receive training and ongoing support on enteral tube feeding by a dietitian in a format that is accessible to them.
- ✓ All patients' with stroke on enteral feeding should be able to access dietetic services independent of the location of their care (acute inpatient, inpatient rehabilitation or community based services).
- ✓ Referral pathways should be in-situ across all services to ensure seamless transferral of nutritional care from those on enteral tube feeding across services (acute, rehabilitation, community and care homes).

12.3 Monitoring

Whether on NG, PEG, RIG as a sole or supplemental means of nutrition patients with stroke require regular monitoring while on enteral nutrition support throughout their journey in the acute or rehabilitation phase, in the acute hospital, rehabilitation, community or care home setting. The frequency of monitoring will be dependent on the phase of stroke care the patient is in, their clinical condition at any point and their stability on enteral feeding and will be determined by the dietitian.

Table 2. Monitoring on Enteral Tube Feeding

Factors Requiring Monitoring
Anthropometrics including weight
Fluid Balance
Oral Dietary Intake
Observations (temperature, pulse, BP, respirations & general chest status)
Clinical condition
Stool chart/Bowel pattern
Biochemistry possibly including blood glucose readings
Medications
Condition of enteral feeding tube incl. position of NG tube
Stoma Site (PEG/RIG)
Patient compliance with oral and enteral diet prescription

For patients in the community (home or care home) the type and frequency of monitoring will vary depending on the patient, severity of the stroke and underlying conditions, type of gastrostomy tube, expected duration and individual goals of nutrition support.

Table 3. Suggested Frequency of monitoring for adult patients on home enteral nutrition ³⁹

Review	Frequency
Initial	This review should take place within the first 7 days of discharge
Second visit	Within 2 – 6 weeks of discharge or sooner if clinically indicated
Further visit	Every 3 months or more frequently if clinically indicated
Stable patients	Minimum every 6 months

Local monitoring protocols should be devised based on the evidenced based guidelines, and implemented to ensure patient safety and service quality.

Recommendations
<ul style="list-style-type: none"> ✓ All patients on enteral feeding in the acute, rehabilitation, community (home or care home) should be reviewed by a dietitian at regular intervals. ✓ All patients on enteral feeding should be able to access regular dietetic review independent of the location of their care (acute inpatient, inpatient rehabilitation or community based services).

13.0 Parenteral Nutrition

While Parenteral Nutrition (PN) is not seen as standard nutritional care for patients with stroke there may be instances where its use is considered.

PN is the intravenous administration of a solution containing macronutrients, electrolytes and micronutrients. Administration of nutrition via parenteral route should only be used if the gastrointestinal tract is not functioning effectively, and oral/enteral nutrition has been considered and excluded^{27, 28}. It is therefore not usually necessary for patients who have suffered a stroke and, where possible, every effort should be made to feed the patient enterally. Benefits of the use of enteral nutrition as a preferred route of nutrition provision include maintenance of mucosal integrity of the gut, prevention of bacterial translocation, prevention of parenteral associated complications such as catheter-related sepsis, and economic benefits.

13.1 Assessment

The decision to commence PN should be made following a multidisciplinary discussion, and should be made on a case by case patient specific basis.

Indications for PN³⁹ include:

- Gastrointestinal surgery (where there is no suitable enteral feeding access or enteral feeding is contraindicated)
- Perforation of the gastrointestinal tract
- Enterocutaneous fistulae (where position and volume or sepsis prevent enteral feeding)
- Gastrointestinal obstruction (if suitable enteral feeding access is not possible)
- Post-operative ileus
- Severe malabsorption
- An inability to meet estimated nutritional requirements via the enteral route due to poor gastrointestinal function

Recommendations

- ✓ The parenteral feeding route should only be used if the gastrointestinal tract is not functioning effectively, and/or all enteral nutrition options have been considered and excluded³⁹, at that point including nasal bridge & PEG placement
- ✓ A decision to commence PN should only be made by a dietitian in consultation with a Consultant and or Senior Registrar and nursing staff.
- ✓ Patients requiring PN should be cared for by appropriately trained staff and following local PN policies.
- ✓ Central vein access is the preferable route of access for all PN.

14.0 Secondary Prevention

International stroke guidelines agree that every person with stroke should be assessed and informed of their risk factors for a further stroke, and educated on possible strategies to modify these identified risk factors^{12, 21, 30}.

Dietary intervention plays an integral role in this education and in modifying risk factors, and includes the following specific dietary recommendations:

- Five to seven portions of fruit and vegetables per day from variety of sources^{12, 21, 23, 30, 40, 41, 42}
- Two portions of oily fish per week^{12, 41}.
- Fibre rich foods such as whole grains and protein from plant sources, such as nuts and seeds, lentils and pulse vegetables^{12, 40, 41, 42}
- Reduce saturated fats which are often found in fatty and processed meats, butter, ghee and lard, cream, full fat dairy products and confectionary items^{12, 23, 30, 40, 41}.
- Replace saturated fats with polyunsaturated or monounsaturated fats by using low fat dairy products, and replacing with products based on vegetable and plant oils such as rapeseed and olive oil¹².
- Reduce salt intake by not adding salt to food at the table, using little or no salt in cooking, avoiding high salt foods such as processed meat like ham and salami, cheese, stock cubes, pre prepared soups, and savoury snacks such as crisps and salted nuts^{12, 21, 23, 30, 40, 42}
- Excessive alcohol intake increases the risk of ischemic stroke and intracranial haemorrhage⁴⁰. International guidelines advocate the reduction of alcohol consumption to moderate levels to support secondary prevention of stroke^{23, 41} with many guidelines recommending limiting alcohol intake to 2 units a day or less^{12, 21, 35}.
- The HSE national guidelines for alcohol recommended: The maximum recommended amount of alcohol per week for men is 17 units and for women is 11 units, with no more than 6 units at one sitting.

Recommendations

- ✓ All patients with modifiable risk factors (hypertension, overweight/obesity, suboptimal diabetes control, new diabetes diagnosis and hyperlipidaemia) should be offered specialist dietetics counselling on risk reduction strategies.
- ✓ All staff involved in the provision of food and fluids (catering, nursing, healthcare assistants) to patients post stroke should be educated around secondary prevention of stroke through healthy diet, by a registered dietitian.
- ✓ Staff should encourage patients to choose the healthier options from the menu if they have been recommended a healthy eating meal plan (note this is not always appropriate for all patients especially in the acute phase).
- ✓ Literature to support this education should be available to provide to patients and family members/care givers around secondary prevention of stroke through healthy diet in a format accessible to each person.
- ✓ Micronutrient supplementation is not routinely recommended in patients following ischemic stroke

15.0 Implementation

15.1 This guidance document will be circulated for the attention of the health service senior management team within all centres. The senior management team should bring this best practice recommendation to the attention to all health care staff.

15.2 It is the responsibility of each line manager to ensure all healthcare staff read and understand the recommendations.

15.3 The document will be available on the HSE Clinical Strategy Programme website.

16.0 Audit

16.1 It is recommended that each centre complete the National Stroke Programme Nutrition & Hydration Audit Tool yearly (appendix 6).

16.2 Nutrition screening data will be collected on the National Stroke Register.

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18.0 Appendices

Appendix 1. Membership of the Nutrition and Hydration in Stroke Working Group.

Mary Fitzpatrick, Senior Dietitian, Cavan & Monaghan Hospital.

Mary Kate Meagher, Clinical Nurse Specialist-Stroke, St Vincent's University Hospital.

Jackie Boyle, Senior Dietitian, St Mary's Hospital, Phoenix Park.

Diewerke de Zwarte, Senior Dietitian, St Vincent's University Hospital.

Karina Somers, Clinical Nurse Specialist-Stroke, Wexford General Hospital.

Aisling O'Grady, Dietitian, Wexford General Hospital.

Siobhan Healy, Senior Dietitian, Tallaght University Hospital.

Frances Shinkins, Senior Speech and Language Therapist, University Hospital Limerick.

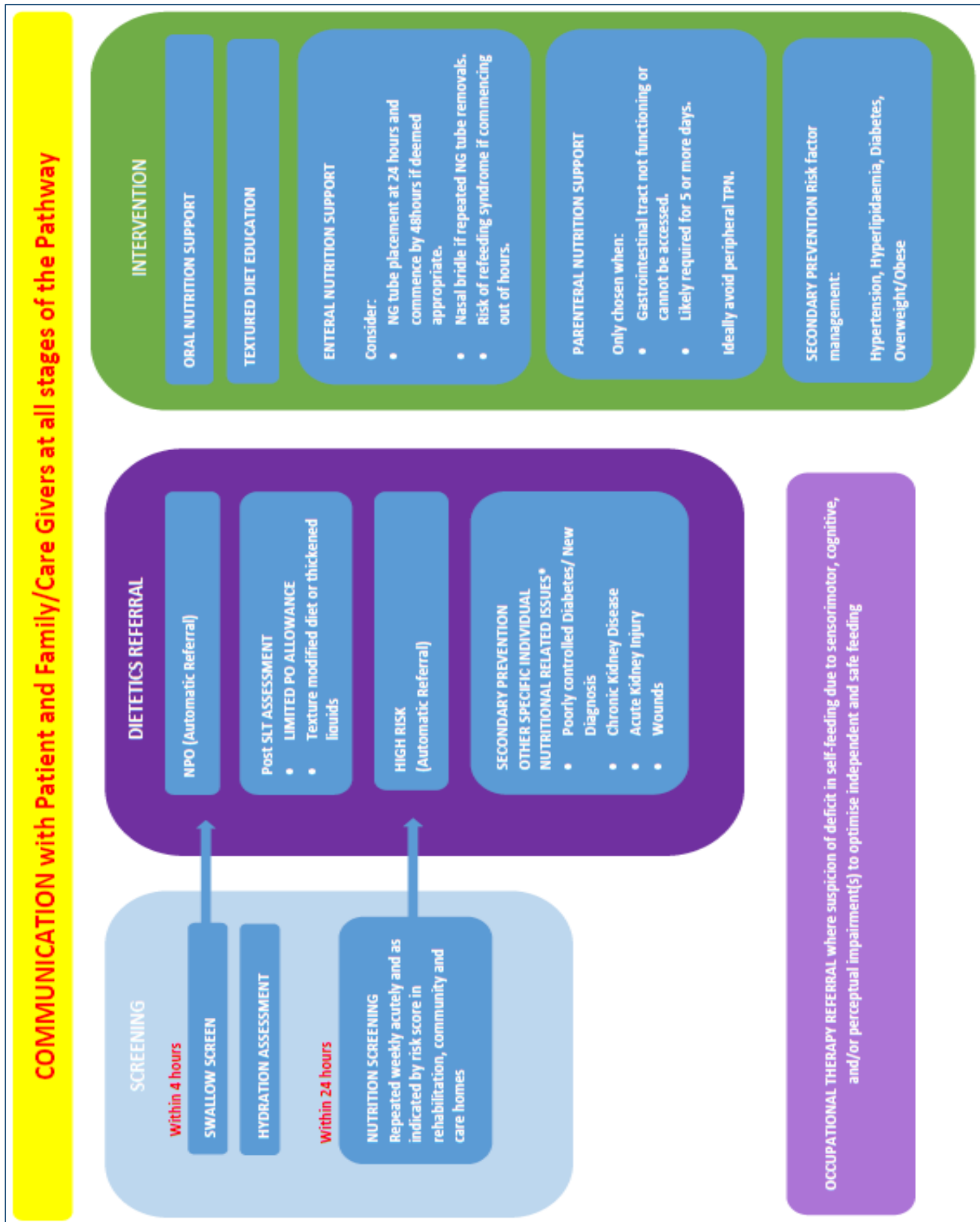
Reema Antony, Clinical Nurse Manager, Cork University Hospital.

Libby Cunningham, Senior Occupational Therapist, Mater Misericordiae University Hospital.

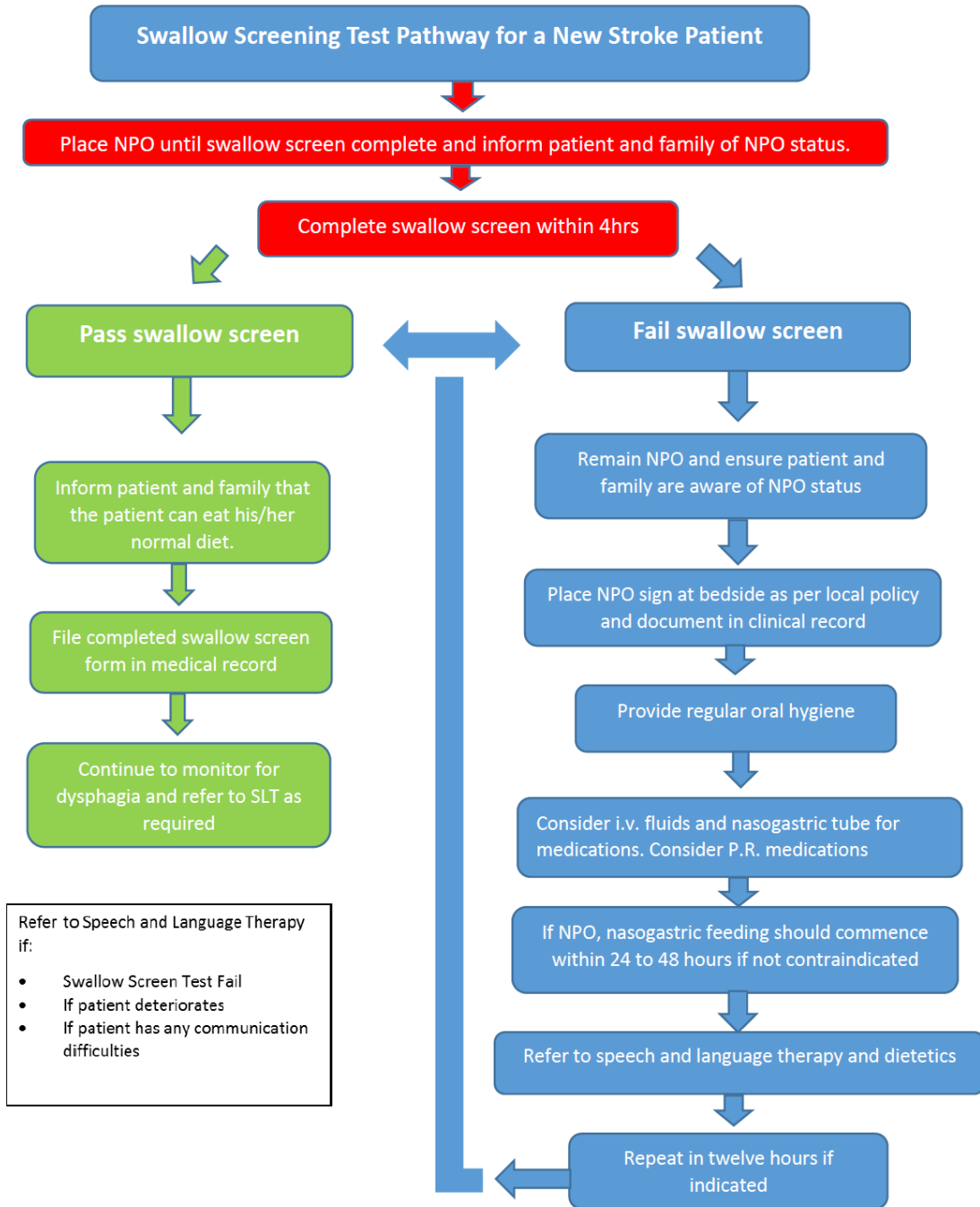
Joan McCormack, National Stroke Programme, Programme Manager, RCPI.

Appendix 2. Consultation bodies.

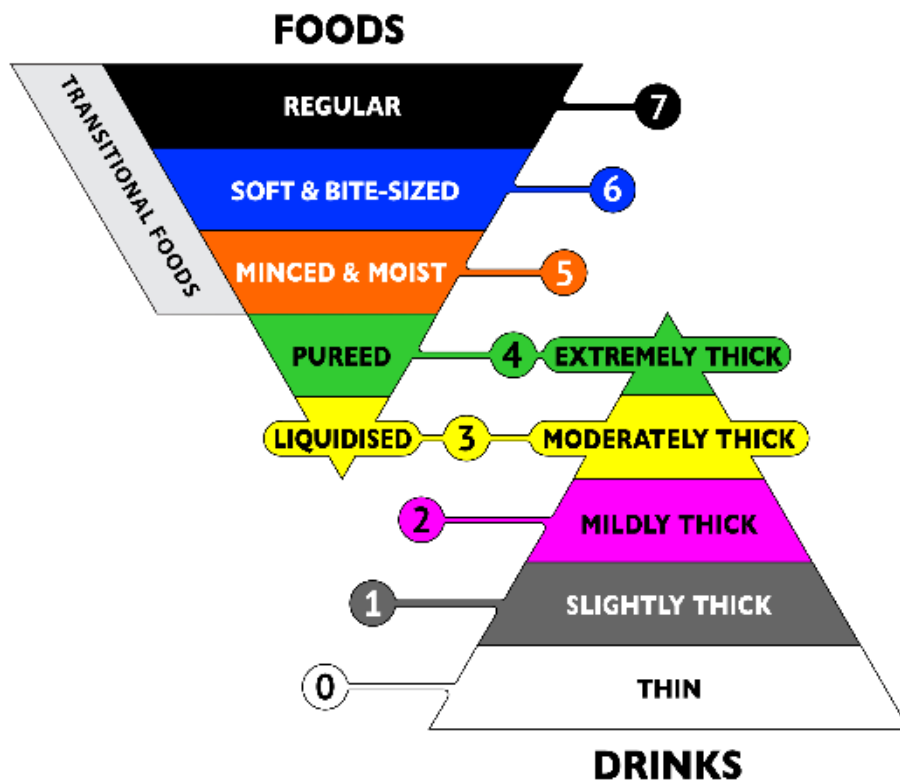
Association of Occupational Therapists Ireland
Clinical Advisory Group for Stroke RCPI
Clinical Leads in Stroke
Clinical Nurse Specialists in Stroke
Irish Association of Speech and Language Therapists
Irish Heart Foundation Council on Stroke
Irish Nutrition and Dietetic Institute
Irish Society for Clinical Nutrition & Metabolism
National Acute Medicine Programme
National Clinical Programme for Critical Care
National Clinical Programme for Emergency Medicine
National Clinical Programme for Neurology
National Clinical Programme for Older People
National Stroke Programme Working Group
Office of the Nursing and Midwifery Services



Appendix 4. National Stoke Programme Swallow Screen Pathway



Appendix 5: The International Dysphagia Diet Standardisation Initiative Framework



The IDDSI Framework and Descriptors are licensed under the Creative Commons Attribution Sharealike 4.0 Licence <https://creativecommons.org/licenses/by-sa/4.0/legalcode>. Attribution is requested as follows: (c) The International Dysphagia Diet Standardisation Initiative 2016 @ <http://iddsi.org/framework/>. Attribution is NOT PERMITTED for derivative works incorporating any alterations to the IDDSI Framework that extend beyond language translation.

Appendix 6. National Stroke Programme Suggested Nutrition & Hydration Audit Tool

"Nutrition and Hydration in Stroke" Audit Tool			
Swallow screen completed within 4 hours of admission?	Yes	No	N/A
Nutrition screening completed within 24 hours of admission?	Yes	No	N/A
Where a <u>nutrition</u> screen was completed, what was the level of risk?	Low	Med	High
If patient met the following criteria, was patient referred to the dietitian? <ul style="list-style-type: none"> • NPO • Limited PO allowance • Texture modified diet or thickened liquid recommendation • At risk of malnutrition as per nutritional screening • Requiring secondary stroke prevention advice • Other specific individual nutritional related issues 	Yes	No	Did not meet criteria
If the patient was unable to take adequate nutrition/fluids orally, was NG tube feed considered within 24 hours, and commenced within 48hours?	Yes	No	N/A
Was the decision to proceed with enteral feeding made in collaboration with the patient, their family and MDT and was this documented in the medical chart?	Yes	No	N/A
If NG was repeatedly removed, was the patient considered for a nasal bridle?	Yes	No	N/A
If a decision is made to commence NG feeding in the evening or at the weekend, was an out-of-hours enteral feeding protocol in place and followed?	Yes	No	N/A
Was parenteral nutrition commenced?	Yes	No	N/A
If parenteral nutrition was commenced, please indicate the reason:	<input type="checkbox"/> <input type="checkbox"/> Describe:		
GI access not available (NG/PEG)			
Gastrointestinal malfunction			
Other			
If needed, was patient referred to occupational therapy to optimise independent and safe feeding?	Yes	No	N/A

Appendix 7. Example of Out of Hours Enteral Feeding Process

Authorisation to Commence Enteral Feeding By Consultant or Senior Registrar (patient NPO or too drowsy for oral intake)

Prior to feed commencement consider the risk of refeeding syndrome:

Has the patient any one of the following:

- i) Had little or no intake for ≥ 5 days.
- ii) Had recent unintentional weight loss $\geq 5\%$ in 1 month.
- iii) Have a $BMI < 18.5 \text{ kg/m}^2$.
- iv) Have low Potassium, Phosphate and Magnesium level.
- v) Have a history of alcohol abuse or on chemotherapy.

If patient has any one of the above they are deemed at risk and the following should be undertaken:

- Check U&E, Phosphate, Potassium & Magnesium before feed commencement, correct as required and continue to monitor daily.
- Supplementation: on feeding commence a) 300mg Thiamine and a general multivitamin x 10 days OR b) IV Pabrinex I & II once daily for 3 days

Nasogastric Tube Placement & Confirmation as per local guidelines

Feed: (INSERT NAME - Use a standard 1kcal/ml enteral feed) at 30ml/hr over 14 hours (420mls)

Ensure patient at a minimum 45° angle during and 1 hour post feeding

Note: Patient may require additional IV/sub cut fluids on this regimen

NOTE: for patients less than 42kg with multiple refeeding risk factors they may be at a higher risk of refeeding syndrome on this regimen, therefore careful electrolyte monitoring is essential.

1. Refer to Dietitian immediately for review on next work morning

2. Daily Monitoring required until reviewed by dietitian

- Biochemistry: U&E, Phosphate, Potassium & Magnesium & correct as required. Where Sodium levels rise $\geq 150 \text{ mmol/l}$ hold enteral feeding until this is corrected
- Bowel pattern
- Fluid balance
- Infection markers
- Blood sugars as necessary
- Feed tolerance: Monitor for nausea, vomiting, abdominal pain/distension, chest status

3. For further support refer to the local guidelines on managing patients on enteral feeding.