An Roinn Sláinte
Department of Health

Nutrition screening and use of oral nutrition support for adults in the acute care setting

National Clinical Guideline No. 22

2020

National Patient Safety Office
Oifig Náisiúnta um Shábháilteacht Othar

NATIONAL CLINICAL EFFECTIVENESS COMMITTEE

This National Clinical Guideline has been developed by the 'Nutrition screening and use of oral nutrition support for adults in the acute care setting' Guideline Development Group (GDG).

Using this National Clinical Guideline

This National Clinical Guideline (NCG) applies to all patients (≥16 years of age) admitted to an adult ward in the acute care setting in Ireland. The NCG does not cover:

- Provision of normal food and drink in hospitals, including ward environment issues and protected meal times.
- Disease-specific or area-specific nutrition screening for malnutrition risk, for example, intensive care units or liver units.
- Disease-specific or area-specific oral nutrition support, for example, intensive care units, liver units.
- Treatment of eating disorders.
- Treatment of inborn errors of metabolism.
- Treatment of obesity.
- Patients admitted to a children's ward/hospital (under 16 years of age).
- Specialised care specific to pregnancy.
- Nutrition screening or nutrition support in the community.
- Enteral tube feeding.
- Parenteral nutrition.
- Day patients, outpatients, or patients who are admitted as a day admission that are not expected to stay overnight.

This National Clinical Guideline is relevant to all frontline, management and food service/catering staff working in adult acute care settings in Ireland.

Disclaimer

NCEC National Clinical Guidelines do not replace professional judgment on particular cases, whereby the clinician or healthcare professional decides that individual guideline recommendations are not appropriate in the circumstances presented by an individual patient, or whereby an individual patient declines a recommendation as a course of action in their care or treatment plan. In these circumstances the decision not to follow a recommendation should be appropriately recorded in the patient's healthcare record.

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Membership of the Guideline Development Group (GDG)

The GDG was chaired by Professor John Reynolds, Consultant Surgeon, and by Dr Declan Byrne, Consultant Geriatrician. This National Clinical Guideline is supported by Irish Health Service Executive (HSE) Acute Operations and HSE Health and Wellbeing Division.

Membership nominations were sought from a variety of clinical and non-clinical backgrounds across Ireland, so as to be representative of all key stakeholders. Irish non-profit nutrition organisations were also represented on the GDG (Table 1). For GDG terms of reference – see Appendix 1.

The National Nutrition Policy and Clinical Guideline Joint Steering and Clinical Advisory Group (JSCAG) provided governance for the NCG development. See Appendix 2 for Membership of the JSCAG. Systematic reviews were carried out by the Health Research Board-Collaboration in Ireland for Clinical Effectiveness Reviews (HRB-CICER).

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Name	Job title and affiliation
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Name	Job title and affiliation
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Mr Paul Gallagher (until February 2018)	Director of Nursing and Nutrition Steering Committee Member, St. James's Hospital
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Consulting to the GDG - Information Technology (IT)	
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Name	Job title and affiliation
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Consulting to the GDG - Training and education framework	
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This national clinical guideline draws on NICE guidance.

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Credits

The role of the NCEC is to prioritise, quality assure and recommend clinical guidelines to the Chief Medical Officer for endorsement by the Minister for Health. It is intended through Ministerial endorsement that full implementation of the guideline will occur through the relevant service plans.

The NCEC and the Department of Health acknowledge and recognise the Chair and members of the Guideline Development Group (GDG) for the development of the guideline. The NCEC and Department of Health express thanks and gratitude to everyone contributing to this National Clinical Guideline, especially those who gave of their time on a voluntary basis.

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- Ms Olivia Sinclair, Ms Niamh Rice, Ms Carmel O'Hanlon, Ms Margaret O'Neill and Ms Jennifer Feighan successfully submitted the guideline proposal for NCEC prioritisation, with assistance from Ms Rosarie Lynch of CEU.
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- Mr Paul J. Murphy of the Royal College of Surgeons in Ireland (RCSI) carried out a search for relevant guidelines and for evidence for both systematic reviews, as well as assisting with referencing.
- Ms Niamh Rice of the Irish Society for Clinical Nutrition and Metabolism (IrSPEN) completed the Budget Impact Analysis (BIA).
- Dr James O'Mahony of Trinity College Dublin completed the economic review.

- Dr Sharon Kennelly provided hospital cost estimates for oral nutritional supplements, enteral nutrition and parenteral nutrition to inform the Budget Impact Analysis (BIA) from Health Business Services (HBS) Procurement.
- Ms Nicola Dervan of the Irish Nutrition and Dietetic Institute (INDI) contributed to section 3.0 on malnutrition definition.
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- Ms Anne Marie Bennett and Ms Barbara Gillman proofread near final NCG drafts.
- Centre for Effective Services (CES) personnel, notably Dr Aisling Sheehan, assisted the GDG in preparing the logic model and implementation plan.
- Dietitian Managers and Dietetic Departments in Beaumont Hospital, St. Luke's Radiation Oncology Network and University Hospital Limerick assisted with the BIA.
- Ms Wendy McMahon assisted with the BIA.
- Beaumont Hospital Supplies Department assisted with the BIA.
- Guideline developers for the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals assisted with the BIA.
- Ms Marian McBride developed the training and education framework and assisted with the BIA.
- The National Human Resources Directorate provided a bespoke report outlining national workforce figures incorporating data from the Acute Public Hospitals.
- Dr Patricia Dominquez Castro assisted with the training and education framework.
- Barbara Gillman shared the implementation toolkit and documents relating to the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals with the GDG.
- Feedback on enablers and barriers to implementation of nutrition screening for malnutrition risk were gratefully received from Professor Marian de van der Schueren (Netherlands), Dr Angela Vivanti (Australia), Associate Professor Carol Wham (New Zealand), Ms Teresa Waitemata (New Zealand), Ms Wendy-Ling Relph (England), Ms Ashleigh Bannister (Northern Ireland) and Ms Pauline Mulholland (Northern Ireland).
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- Mr Kevin Thompson provided Information Technology (IT) support for all GDG meetings.
- Ms Ann Martin advised the GDG on a communications strategy.
- Ms Sheila Walshe, Ms. Patricia Vilap and Ms Teresa Fox booked meeting rooms for GDG meetings.
- Mr Niall Brady compiled GDG meeting minutes in 2018.

The comprehensive external reviews carried out by Professor Marian de van der Schueren and Dr Angela Vivanti are gratefully acknowledged.

Ms Carmel O'Hanlon submitted the guideline for NCEC quality assurance on behalf of GDG. The GDG approved the final guideline.

A full list of members of the Guideline Development Group (GDG) is available in Table 1.

Signed by the Chair(s):





Dr. Declan Byrne *and* Professor John Reynolds Date: February 2020

National Clinical Guidelines

Providing standardised clinical care to patients in healthcare is challenging. This is due to a number of factors, among them variations in environments of care and complex patient presentations. It is self-evident that safe, effective care and treatment are important in ensuring that patients get the best outcomes from their care.

The Department of Health is of the view that supporting evidence-based practice, through the clinical effectiveness framework, is a critical element of the health service to deliver safe and high-quality care. The National Clinical Effectiveness Committee (NCEC) is a Ministerial committee set up in 2010 as a key recommendation of the report of the Commission on Patient Safety and Quality Assurance (2008). The establishment of the Commission was prompted by an increasing awareness of patient safety issues in general and high-profile health service system failures at home and abroad.

The NCEC on behalf of the Department of Health has embarked on a quality assured National Clinical Guideline development process linked to service delivery priorities. Furthermore, implementing National Clinical Guidelines sets a standard nationally, to enable healthcare professionals to deliver safe and effective care and treatment while monitoring their individual, team and organisation's performance.

The aim of NCEC National Clinical Guidelines is to reduce unnecessary variations in practice and provide an evidence base for the most appropriate healthcare, in particular circumstances. As a consequence of Ministerial mandate, it is expected that NCEC National Clinical Guidelines are implemented across all relevant services in the Irish healthcare setting.

The NCEC is a partnership between key stakeholders in patient safety. NCEC's mission is to provide a framework for national endorsement of clinical guidelines and clinical audit to optimise patient and service user care. The NCEC has a remit to establish and implement processes for the prioritisation and quality assurance of clinical guidelines and clinical audit so as to recommend them to the Minister for Health to become part of a suite of National Clinical Guidelines and National Clinical Audit. The aim of the suite of National Clinical Guidelines is to provide guidance and standards for improving the quality, safety and cost-effectiveness of healthcare in Ireland. The implementation of these National Clinical Guidelines will support the provision of evidence-based and consistent care across Irish healthcare services.

NCEC Terms of Reference

1. Provide strategic leadership for the national clinical effectiveness agenda.
2. Contribute to national patient safety and quality improvement agendas.
3. Publish standards for clinical practice guidance.
4. Publish guidance for National Clinical Guidelines and National Clinical Audit.
5. Prioritise and quality assure National Clinical Guidelines and National Clinical Audit.
6. Commission National Clinical Guidelines and National Clinical Audit.
7. Align National Clinical Guidelines and National Clinical Audit with implementation levers.
8. Report periodically on the implementation and impact of National Clinical Guidelines and the performance of National Clinical Audit.
9. Establish sub-committees for NCEC workstreams.
10. Publish an annual report.

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1 National Clinical Guideline summary

See Appendix 17 for glossary of terms and abbreviations.
See Appendix 7 for explanation of grading systems used.

1.1 Summary of recommendations: Nutrition screening for malnutrition risk

Nutrition screening for malnutrition risk: is a rapid, simple and general procedure used by nursing, medical or other staff, often at first contact with the patient, with the purpose of identifying those who are at risk of malnutrition, in order that clear guidelines for action can be implemented and to determine if a detailed nutrition assessment is needed.

Recommendation 1
Screening for malnutrition and the risk of malnutrition should be carried out by healthcare professionals or other healthcare workers with appropriate skills and training.

Grade of recommendation: D (GPP)

Good practice points for implementation
See Section 3.1.11 for implementation responsibilities

1.1 Training on screening for malnutrition risk should be provided for all nursing staff, nursing students and/or other healthcare workers, such as, healthcare assistants, who provide malnutrition screening for hospitalised adult inpatients.

1.2 Standardised training aligning to this guideline should be embedded into local training programmes, courses and procedures where possible.

1.3 Awareness of the risks and consequences of untreated malnutrition should form part of this training.

1.4 Training records should be kept for all staff that perform screening for risk of malnutrition and be available for purposes of internal and external audit. Consider maintaining these records on an Information Communications Technology (ICT) system, for example, Systems Analysis Programme (SAP).

1.5 Malnutrition awareness days should be run annually in hospitals.

Recommendation 2
All hospital inpatients on admission should be screened. Screening should be repeated weekly for inpatients.

Grade of recommendation: D (GPP)

Good practice points for implementation
See Section 3.1.11 for implementation responsibilities

2.1 All wards should have medically approved weighing equipment, that is, a stand-on scales, a chair scales and access to a hoist- or bed-weighing scales.

2.2 Each hospital should have access to bariatric weighing equipment and this should be readily available at the point of care when required.

2.3 All wards should have a stadiometer to measure height, and a measuring tape (for ulna length, knee height, or mid-upper arm circumference) for less mobile patients.

2.4 Patients should be weighed weekly with correctly calibrated weighing equipment.

2.5 Height should be measured initially for all patients on admission. In less mobile patients, surrogate techniques can be used to estimate height, or reported height can be used if known by patient or carer.

2.6 Screening for risk of malnutrition should take place on admission, or at least within 24 hours of admission.

2.7 Patients identified as at risk of malnutrition should be referred to the dietitian for nutrition assessment – see local referral criteria.

2.8 Patients identified as at risk of malnutrition should commence on the locally agreed nutrition care pathway without delay (same day).

2.9 Malnutrition screening rates should be monitored at local level, for example, 6 monthly, as a minimum and should be available for internal and external audit.

2.10 Consider audits of malnutrition risk prevalence at agreed intervals.

Recommendation 3

Use a validated screening tool, e.g. Malnutrition Screening Tool (MST) or Malnutrition Universal Screening Tool (MUST), to screen for malnutrition risk in all adults admitted to acute hospitals. If one of the validated tools from Table 2 is currently being used, there is no need to change practice.

Quality of evidence: Very Low **Strength of recommendation: Strong**

Table 2. Malnutrition screening tools

MNA-SF	Mini Nutritional Assessment - Short Form (for older adults, e.g. >60 years)
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NRS-2002	Nutrition Risk Score 2002

Good practice points for implementation

See Section 3.1.11 for implementation responsibilities

3.1 MST or MUST should be used for screening for risk of malnutrition in general medical and surgical patients, unless MNA-SF or NRS-2002 is already implemented.

3.2 Disease-specific, or area-specific malnutrition screening tools validated for use in specific patient populations, may replace the tools recommended above if clinically indicated.

3.3 The malnutrition screening tool chosen should have an associated explicit plan of action for patients who are identified as at malnutrition risk – see Figure 3 and Figure 4.

3.4 The malnutrition screening tool and result should be incorporated into standard processes, e.g. nursing admission forms, or electronic health records.

3.5 Fidelity to the malnutrition screening tool used should be measured locally and made available for internal and external audit.

Notes:

i. See Appendix 7 for grading system used by NICE (7a) for Recommendations 1 and 2, and the GRADE approach (7b) used for Recommendation 3.

ii. Fidelity in 3.5 is the degree to which the malnutrition screening tool is delivered exactly as set out and intended by those who developed it.

1.2 Summary of recommendations: Oral nutrition support

Oral nutrition support includes:

- Food fortification - food fortified with protein, carbohydrate and/or fat (with or without minerals or vitamins);
- The provision of oral nutritional supplements (ONS) (products used in oral nutrition support given with the aim to increase nutritional intake) as extra nutrition to regular meals;
- Changing meal patterns, the provision of additional snacks and/or the provision of dietary advice to patients on how to increase overall nutritional intake.

1.2.1 General Indications for oral nutrition support

Recommendation 4
Healthcare professionals should consider using oral, enteral or parenteral nutrition support, alone or in combination, for people who are either malnourished or at risk of malnutrition. Potential swallowing problems (dysphagia) should be taken into account.

Grade of recommendation: D (GPP)

Recommendation 5
Healthcare professionals should ensure that people having nutrition support, and their carers, are kept fully informed about their treatment. They should also have access to appropriate information and be given the opportunity to discuss diagnosis and treatment options.

Grade of recommendation: D (GPP)

Recommendation 6
Healthcare professionals should consider oral nutrition support to improve nutritional intake for people who can swallow safely and are malnourished or at risk of malnutrition.

Grade of recommendation: A

Recommendation 7
Healthcare professionals should ensure that the overall nutrient intake of oral nutrition support offered contains a balanced mixture of protein, energy, fibre, electrolytes, vitamins and minerals.

Grade of recommendation: D (GPP)

Recommendation 8
If there is concern about the adequacy of micronutrient intake, a complete oral multivitamin and mineral supplement providing standard requirements, should be considered by healthcare professionals with the relevant skills and training in nutrition support who are able to determine the nutritional adequacy of a patient's dietary intake.

Grade of recommendation: D (GPP)

Recommendation 9
The prescription should be reviewed according to the person's progress, and care should be taken when:

- using food fortification which tends to supplement energy and/or protein without adequate micronutrients and minerals
- using supplements that meet full energy and protein needs, as they may not provide adequate micronutrients and minerals.

Grade of recommendation: D (GPP)

Recommendation 10
Oral nutrition support should be stopped when the patient is established on adequate oral intake from normal food.

Grade of recommendation: D (GPP)

Good practice points for implementation of recommendations 4 to 10
See Section 3.2.8.1 for implementation responsibilities

4.1 Oral nutrition support should commence without delay in patients identified as at risk of malnutrition in accordance with the locally agreed nutrition care pathway, before nutrition assessment if necessary – see Figure 3 for care pathway and Figure 4 for treatment options.

4.2 Once a nutrition assessment is completed, the patient-specific nutrition care plan should be implemented.

4.3 Goals of the nutrition care plan should be re-evaluated based on monitoring a patient's clinical and nutritional progress.

4.4 A range of oral nutrition support options should be available in each hospital.

4.5 Local hospital guidelines on management of refeeding syndrome should be used in conjunction with the nutrition care pathways outlined in this guideline.

4.6 Local policy should be followed for management of patients with complex nutritional requirements, for example, requiring enteral tube feeding or parenteral nutrition in addition to oral nutrition support.

4.7 Supervision and assistance at mealtimes should be provided when required regardless of malnutrition risk.

5.1 A Food Nutrition and Hydration Information leaflet should be available to all admitted patients (see Appendix 10).

6.1 Oral nutritional supplements (ONS) should only be used in the context of evidence-based pathways, such as Figures 3 and 4.

6.2 Food intake records (semi-quantitative) should be commenced on patients identified as at risk of malnutrition while awaiting nutrition assessment, to monitor nutritional intake.

6.3 Designated healthcare professionals with the necessary knowledge and expertise should chart ONS on hospital wards to ensure patients are offered the correct types and volume of ONS in a timely manner.

8.1 Micronutrient supplementation, where indicated, should be in line with individual requirements, using the local hospital formulary, and taking into consideration possible interactions with other treatments, as well as the expected duration of therapy.

10.1 Reassessment by a dietitian is needed to determine if/when a patient's oral diet is meeting nutritional needs.

10.2 As outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018) (Section 2.2, recommendation 38), the discharge plan/letter should include information on nutritional status, dietary requirements, requirement for oral nutritional supplements and/or thickening agents including type, amount and duration required post-discharge, and follow-up arrangements.

10.3 As outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018) (Section 2.2, recommendation 39), a summary of the patient's nutritional status, including the most recent nutrition screening result and BMI (if appropriate), and individualised nutrition care plan (if appropriate) should be included in the medical discharge letter to the GP.

1.2.2 Oral nutrition support in patients with dysphagia (swallowing impairment)

Recommendation 11
People who present with any obvious or less obvious indicators of dysphagia listed in Table 3 should be referred to healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders.

Grade of recommendation: D (GPP)

Table 3. Indicators of dysphagia

Obvious indicators of dysphagia	Less obvious indicators of dysphagia
- Difficult, painful chewing or swallowing - Regurgitation of undigested food - Difficulty controlling food or liquid in the mouth - Drooling - Hoarse voice - Coughing or choking before, during or after swallowing - Globus sensation - Nasal regurgitation - Feeling of obstruction - Unintentional weight loss - for example, in people with dementia	- Change in respiration pattern - Unexplained temperature spikes - Wet voice quality - Tongue fasciculation (may be indicative of motor neurone disease) - Xerostomia - Heartburn - Change in eating habits - for example, eating slowly or avoiding social occasions - Frequent throat clearing - Recurrent chest infections - Atypical chest pain

Recommendation 12
Healthcare professionals should recognise that people with acute and chronic neurological conditions and those who have undergone surgery or radiotherapy to the upper aero-digestive tract are at high risk of developing dysphagia.

Grade of recommendation: D (GPP)

Recommendation 13
When managing people with dysphagia, healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders should consider:

- the risks and benefits of modified oral nutrition support and/or enteral tube feeding
- the factors listed in Table 4.

Grade of recommendation: D (GPP)

Table 4. Factors to be considered before modification of nutrition support and hydration in people with dysphagia

- Recurrent chest infections - Mobility - Dependency on others for assistance to eat - Perceived palatability and appearance of food or drink - Level of alertness - Compromised physiology	- Poor oral hygiene - Compromised medical status - Metabolic and nutritional requirements - Vulnerability (for example, immunocompromised) - Comorbidities - Prognosis

Recommendation 14
People with dysphagia should have a drug review to ascertain if the current drug formulation, route and timing of administration remains appropriate and is without contraindications for the feeding regimen or swallowing process.

Grade of recommendation: D (GPP)

Recommendation 15
Healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders should regularly monitor and reassess people with dysphagia who are having modified food and liquid until they are clinically stable.

Grade of recommendation: D (GPP)

Good practice points for implementation of recommendations 11 to 15
See Section 3.2.8.2 for implementation responsibilities

11.1 Patients with new or worsening indicators for oropharyngeal dysphagia should be referred to a speech and language therapist (SLT) for assessment.

11.2 Patients with new indicators for dysphagia who are identified to be at risk of malnutrition should be referred to a dietitian for nutrition assessment.

11.3 Oral nutritional supplements prescribed must be in line with current recommendations for safe swallowing.

14.1 Patients with new indicators for dysphagia should be referred to a clinical pharmacist for a regular review of their medication until they are clinically stable.

15.1 Medical staff, nursing staff, SLTs, dietitians, healthcare assistants, food service/catering managers, chefs and food service support staff should ensure that appropriate modified texture diets and oral nutrition support are provided to patients with dysphagia identified as at risk of malnutrition, using effective communication channels and referral pathways (see Figure 5 for sample malnutrition risk and dysphagia pathway. See Section 5 of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

15.2 Texture modified diets should be prepared according to the relevant standard (Section 5.2) in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

1.2.3 Oral nutrition support in surgical patients

Recommendation 16
Peri-operative oral nutrition support should be considered for surgical patients who can swallow safely and are malnourished.

Grade of recommendation: B

Recommendation 17
Healthcare professionals should consider giving post-abdominal surgery patients who can swallow safely, and in whom there are no specific concerns about gut function or integrity, some oral intake within 24 hours of surgery. The patient should be monitored carefully for any signs of nausea or vomiting.

Grade of recommendation: A

Good practice points for implementation of recommendations 16 to 17
See Section 3.2.8.3 for implementation responsibilities

16.1 An evidence-based fasting policy/procedure/protocol/guideline (PPPG) should be available in all hospitals.

16.2 Fasting for tests, therapies and procedures should be kept to a minimum, as specified in Section 2, recommendation 26, of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

16.3 Consider use of oral pre-operative carbohydrate treatment pre-surgery if implementing an Enhanced Recovery After Surgery (ERAS) programme, as specified in Section 2, recommendation 27, of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

17.1 Audit of fasting times and procedures should be considered at ward and hospital levels.

17.2 Patients with expected or unexpected delays in returning to oral diet, for example, for five days or more, should be referred to the dietitian for nutrition assessment and possible alternative route of nutrition support until established on oral diet.

Notes:

i. See Appendix 7(a) for NICE grading systems used for Recommendations 4 to 17.

ii. 'Prescription' in Recommendation 9 refers to food fortifying agents and oral nutritional supplements.

iii. The term 'normal food' in Recommendation 10 refers to 'oral diet' i.e. regular hospital or therapeutic diet (meals and snacks); if dysphagia is present – see recommendations 11 to 15.

iv. All recommendations other than Recommendation 3 are adapted from NICE Clinical Guideline 32 (2006a). Wording has been changed in six of the original NICE recommendations, as follows:

- Recommendation 1 – addition of 'or other healthcare workers'.
- Recommendation 4 – addition of the word 'dysphagia'.
- Recommendation 8 – addition of 'standard requirements' in place of 'the reference nutrient intake for all vitamins and trace elements'.
- Recommendation 9 – removed the words 'feed' and 'when only used in a supplementary role'.
- Recommendation 13 (Table 4) - added 'Prognosis'.
- Recommendation 15 – addition of the word 'clinically'.

v. Good practice points for implementation 10.2, 10.3, 15.1, 15.2, 16.2 and 16.3 are aligned with, or refer to, the Food Nutrition and Hydration Policy (HSE, 2018b). These will be updated if any changes are made to the original policy.

2 Development of the National Clinical Guideline

See Appendix 17 for glossary of terms and abbreviations.

2.1 Background

Malnutrition has been consistently found to increase mortality and morbidity in all care settings and in all age groups (see Section 3.0 for definition criteria and categorisation of malnutrition). The mean prevalence of malnutrition risk in patients on admission to Irish hospitals is 30% (Russell and Elia, 2011; Russell and Elia, 2012). Prevalence is based on two major studies conducted in 27 Irish hospitals in 2010 (Russell and Elia, 2011) and 2011 (Russell and Elia, 2012), in which approximately 30% (32.8% of 1601 patients in 2010; 28.2% in 1100 patients in 2011) of patients screened using the Malnutrition Universal Screening Tool (MUST) had a positive risk score for malnutrition, with 74% in the high risk category. Malnutrition risk was common in all age groups and diagnostic categories with no significant difference between men and women when adjusted for age. However, risk increased with age, and prevalence was higher in those with gastrointestinal disease (48%), respiratory disease (38%) and neurological disease (32%). It was also higher in patients with cancer than those without (44% versus 34%) and in those admitted from nursing homes rather than from their own homes (54% versus 30%), (Russell and Elia, 2011).

Since these patients spend an estimated 30% longer in hospital (Elia and Russell, 2009) compared with patients not at risk, they account for an estimated 36% of bed days each year, which would be the expected prevalence at ward level (Rice and Normand, 2012). It can be concluded, therefore, that malnutrition is a prevalent problem in Ireland that affects at least 1 in 3 patients in acute care settings, requiring some form of nutrition support.

In comparison with Europe, in which malnutrition is estimated to affect approximately 5% of the adult population at any point in time (Ljungqvist and de Man, 2012), the total number of adults affected in the Republic of Ireland is estimated to be around 3% of the total population, that is, 140,000 adults with 52% over 65 years of age (Rice and Normand, 2012). The lower prevalence is due to demographic differences in the proportion of the population over 65 years of age and not to better management. In a recent international systematic review, Crichton et al (2019) showed that older people receiving homecare services in the community had the highest prevalence of malnutrition (as determined by Mini Nutritional Assessment, Patient-Generated Subjective Global Assessment or Subjective Global Assessment) at 14.6%.

A recent European systematic review in older adults (Leij-Halfwerk et al., 2019) demonstrated a 28% pooled prevalence rate of high malnutrition risk across all countries using a variety of malnutrition screening tools for the hospital setting. Prevalence rates in Irish hospitals are similar to other countries in Europe in which nutrition screening programmes are not routinely implemented, but higher than in countries such as the Netherlands, which have achieved impressive reductions in malnutrition since introducing a national programme in 2007.

Whilst the majority of patients at risk of malnutrition are based in community, the concentration of patients likely to require nutrition support is greatest in acute care settings due to the close relationship between chronic and acute inflammatory disease and poor nutritional status and/or conditions that preclude normal eating. Inadequate dietary intake is frequently seen in hospitalised adults and is strongly associated with poor patient outcomes. ‘Nutrition Day’ is an international, standardised one-day multinational cross-sectional audit of hospitalised adults with a one-month follow-up that includes

food intake data. Results over a 9 year period showed that the majority of the 91,245 adult patients (53.3%) surveyed, ate one half or less of their main meal, with 5.8% eating nothing at all (although diet was allowed) (Schindler et al., 2016). Although Irish data was not included in this audit, Western Europe had the highest patient representation (32% of all patients).

2.2 Clinical and financial impact of malnutrition

2.2.1 Summary of clinical impact of malnutrition

Malnutrition, particularly in the face of inflammation, adversely affects every system in the body and is associated with impaired cognitive function, muscle function, cardiovascular function, renal function, respiratory function, gastrointestinal function, thermoregulation, immune function, wound healing and quality of life (van Bokhorst-de van der Schueren et al., 2011; Norman et al., 2008). It is also important to note that irrespective of underlying nutritional status, inadequate recent dietary intake has been shown to affect metabolic, psychological and physical function (in the presence or absence of disease, and in surgical patients) and to reduce collagen deposition, with implications for effective wound healing and recovery. A summary of the key physical and psychosocial effects of undernutrition is presented in Table 5 below.

Table 5. Key physical and psychosocial effects of malnutrition (adapted from Elia and Russell, 2009)

Malnutrition effects	Physical and psychosocial impact
Impaired immune response	Impaired ability to fight infection.
Reduced muscle strength and fatigue	Inactivity and reduced ability to work, shop, cook and self-care. Poor muscle function may result in falls, and poor respiratory muscle function may result in poor cough pressure - delaying expectoration and recovery from chest infection.
Inactivity	In bed-bound patients this may result in pressure ulcers and venous blood clots.
Impaired temperature regulation	Hypothermia (low body temperature).
Impaired wound healing	Increased wound-related complications, such as infections and poor healing fractures.
Impaired ability to regulate salt and fluid	Predisposes to over-hydration or dehydration.
Impaired psycho-social function	Apathy, depression, introversion, self-neglect, hypochondria*, loss of libido and deterioration in social interactions.

Footnote:

*Hypochondria - excessive and undue worry about having a serious illness when this illness is not present.

One of the known risks associated with treating malnutrition is the development of *refeeding syndrome.* Patients can develop fluid and electrolyte disorders, especially hypophosphatemia, along with neurological, pulmonary, cardiac and neuromuscular complications. In one major acute teaching hospital in Dublin, a high risk of refeeding syndrome was demonstrated in 20-22% of consecutive non-elective admissions from the Hospital's Emergency Department, over two separate study periods (Boland et al., 2013).

Malnutrition risk (using MUST) has been shown to double the risk of mortality in hospital patients and to triple mortality in older patients in hospital (Stratton et al., 2006). The findings from a large multicentre study showed that patients with malnutrition risk (using other screening tools for identifying malnutrition risk) had a twelvefold increase in hospital mortality (Sorensen et al., 2008), whereas a prospective cohort study of newly admitted adult patients (18–74 years of age) to an acute tertiary hospital (Lim et al., 2012) found that the mortality rate was significantly higher in those assessed to be malnourished, at 1 year (34.0% versus 4.1%), 2 years (42.6% versus 6.7%) and 3 years (48.5% versus 9.9%); $p < 0.001$ for all. Malnutrition was a significant predictor of mortality (adjusted hazard ratio [HR] of 4.4 [95% CI 3.3–6.0], $p < 0.001$).

Results from a large, international, multicentre study looking at malnutrition risk in 5051 patients in 26 hospitals across 12 countries (Sorensen et al., 2008), demonstrated that hospital patients identified to be at risk of malnutrition experience significantly increased complication rates compared with well-nourished patients (30.6% versus 11.3%, $p < 0.001$). This is consistent with findings of studies to evaluate the impact of malnutrition on specific complications, such as pressure ulcers (Tappenden et al., 2013).

Similarly, the rate of healthcare-associated infections (HCAI) has consistently been found to be more than three times greater among malnourished versus non-malnourished patients (Fry et al., 2010; Schneider et al., 2004, Sorensen et al., 2008). Fry et al (2010) found undernutrition to be an independent risk factor for HCAI (odds ratio [OR] 3.0) in a retrospective analysis of over 900,000 patient records, alongside odds ratios for pressure ulcer, Methicillin-resistant Staphylococcus aureus (MRSA) and catheter-associated urinary tract infection of 3.8, 2.9 and 5.1, respectively. A recent single-centre cross-sectional Irish study (Fitzpatrick et al., 2019) demonstrated that patients with HCAI were more likely to be at high risk of malnutrition (MUST ≥ 2) (OR 4.3, $p < 0.001$, CI 1.7 to 11.2). A higher MUST score was a significant predictor of a patient having HCAI.

Treatment effectiveness has also been shown to be adversely affected by malnutrition. Malnourished patients receiving chemotherapy have more pronounced treatment-related side-effects (Aaldriks et al., 2013). Significant muscle loss during chemotherapy was prognostic of poor survival in a recent Irish study (Daly et al., 2018). It is estimated that 10% to 20% of cancer deaths can be attributed to malnutrition rather than to the underlying malignancy (Pressoir et al., 2010; Wie at al., 2010). Malnutrition is associated with loss of weight and muscle, reduced immune competence and more infections, psychosocial stress, lower quality of life, and greater risk of mortality in cancer patients (Arends et al., 2017). Older individuals with malnutrition are also more likely to experience poor quality of life (Kvamme et al., 2011; Rasheed and Woods, 2013).

2.2.2 Summary of financial impact of malnutrition

In both prospective and large scale retrospective studies across a range of hospital inpatients in different countries, malnourished patients (with a variety of conditions) have been consistently found to use significantly more healthcare resources than well-nourished patients in terms of increases in length of hospital stay; increases in readmission rates and delays in returning home/need for institutional care (Lim et al., 2011; Marco et al., 2011; Melchior et al., 2012; Pirlich et al., 2006; Schindler et al., 2010).

It is estimated that the annual public healthcare cost of disease-related malnutrition in Ireland is €1.42 billion euro, or more than 10% of the total annual healthcare budget (Rice and Normand, 2012). On a European scale, this cost rises to €170 billion euro (Ljungqvist and de Man, 2012). The majority of these costs are due to significantly increased healthcare utilisation by malnourished compared with non-malnourished patients, with acute care costs accounting for over 60% of the total and nursing home care another 25% to 30%, the remainder relating to primary care costs (around 8% to 10%) and nutritional interventions between 2% and 4%. It is estimated that malnourished patients (those with risk score according to MUST criteria) account for 1.1 million inpatient bed days, of which 251,000 are the additional bed days resulting from longer length of hospital stay (Rice and Normand, 2012).

2.2.3 Financial impact of interventions to prevent/treat malnutrition

Whereas malnutrition has been established as a serious and costly problem for patients and the healthcare system, screening and appropriate intervention has been shown to be cost-effective and associated with cost savings (National Institute for Health and Care Excellence (NICE), 2006a). NICE Clinical Guideline (CG) 32 (2006a) concludes that improving systematic screening, assessment and treatment of malnutrition would result in better nourished patients and this would lead to reduced complications, admissions and length of stay. NICE subsequently conducted a budget impact analysis of implementing NICE CG32, updated in 2012 (NICE, 2012). They calculated the potential savings (based on a 10% reduction in malnutrition in hospital) at £71,000 per 100,000 patients, highlighting that the benefits achieved by earlier detection and treatment of patients with oral nutritional supplements (ONS) or other forms of nutrition support, would more than pay for the costs of implementing screening throughout the healthcare system, the increased number of dietetic assessments and nutrition support. A more detailed assessment conducted by the National Institute for Health Research (NIHR) has confirmed the findings of the NICE report, but has identified greater potential for savings, exceeding £170,000 per 100,000 population (Elia, 2015).

A systematic review of the cost effectiveness of using standard ONS in the hospital setting found a mean net cost saving of 12.2% when patients receiving ONS were compared to those receiving routine care (Elia et al., 2016). In 2015, NICE ranked the implementation of its CG32 (NICE, 2006a) as the third greatest potential means of achieving net cost savings for the National Health Service (NHS) in the United Kingdom, having reviewed 400 of its clinical guidelines, technological assessments and quality standards, of which just 39 were cost saving. The potential for savings in the Irish healthcare system are equally substantial.

2.3 Rationale for this National Clinical Guideline

Nutrition and hydration in the acute hospital setting has been recognised as an important barometer of the quality and safety of services. Recent Health Service Executive's (HSE) National Service Plans considered nutrition and hydration as a key priority with a number of work-streams being delivered across several HSE divisions. This included a key action to develop a Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) - recently published. As part of this work the 'Food and Nutritional Care in Hospitals, Guidelines for preventing Under-Nutrition in Acute Hospital' (Department of Health (DOH), 2009) was highlighted as requiring review and following discussion with the Department of Health, Chief Medical Officer's office, a recommendation was made that this could be considered as an opportunity to develop a National Clinical Guideline. The current National Clinical Guideline (henceforth known as NCG in this document) was developed in alignment with the HSE's Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals.

A key recommendation in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) is that screening for malnutrition and risk of malnutrition using a validated tool should be implemented for each patient on admission. This is consistent with Health Information and Quality Authority (HIQA) report on the review of nutrition and hydration care in public acute hospitals (HIQA, 2016). HIQA assessed public acute hospitals against the National Standards for Safer Better Healthcare (HIQA, 2012) to determine if they were adequately assessing, managing and evaluating the nutrition and hydration needs of patients. HIQA reported that 21% of hospitals did not screen for malnutrition risk at all. A key recommendation from this report is that all patients admitted to hospital should be screened for risk of malnutrition. HIQA advocates a nutrition screening programme which facilitates appropriate nutrition assessment and treatment of patients identified as at risk of malnutrition, supported by nutrition education and training for healthcare staff.

Multiple international evidence-based guidelines and standards from Europe (NICE, 2006a; Gomes et al., 2017; Kondrup et al., 2003b; Volkert et al., 2019; Weimann et al., 2017), Australia (Dietitians Association of Australia (DAA), 2009), America (Mueller et al., 2011; Ukleja, 2018), and elsewhere, support the need to screen for malnutrition followed by an appropriate care pathway to ensure early intervention.

Prevention of malnutrition by establishing risk as early as possible is essential to prevent the adverse consequences and reduce costs. Given that malnutrition is prevalent, associated with significant adverse events, relatively easy and quick to identify and treat by those with adequate training in methods of nutrition support, failure to establish systems for its detection and appropriate treatment with nutrition support place service users at increased avoidable risk. If patients are not screened for risk of malnutrition, then they are not being identified and malnutrition prevention and treatment strategies cannot be implemented in a timely fashion. If left untreated, approximately two-thirds of patients with risk of malnutrition will experience a further decline in their nutritional status during their inpatient stay (Braunschweig et al., 2000). Furthermore, unless systems are in place in hospitals to detect and treat patients at risk, nutritional status will continue to be adversely affected by underlying disease, inflammation, medical treatments, associated gastrointestinal symptoms and fasting for procedures and surgery (Stratton and Elia, 2011).

There is also potential for inappropriate or incorrect use of nutrition support by staff that lack the necessary training to ensure safe, effective nutritional care of patients. Providing nutrition support to those who are not at risk is wasteful of resources and may be detrimental to the individual. This guideline provides guidance on indications, as well as a framework for safe and effective delivery of oral nutrition support to those who need it. The use of guidelines per se in clinical practice is known to be associated with improved outcomes for patients (Heyland et al., 2010; Martin et al., 2004).

The need for a national clinical guideline to ensure a standardised approach to the prevention, identification and treatment of malnutrition risk is clear to underpin the HSE's service plan priorities and to ensure compliance with the National Standards for Safer Better Healthcare (HIQA, 2012). This is also consistent with the Healthy Ireland Framework which espouses to improve the health and wellbeing of the nation through real and measurable change (DOH, 2013).

2.4 Aim and objectives

2.4.1 Overall aim

The ultimate aim of this clinical guideline is to improve patient health outcomes and experience during hospitalisation, by standardising practice and to improve decision-making on preventing, identifying and treating malnutrition risk. This can be achieved through:

- The early identification of malnutrition risk in hospitalised adult patients through nutrition screening for risk of malnutrition.
- The provision of timely and appropriate oral nutrition support to those patients who are malnourished or identified as at risk of malnutrition.

Other forms of nutrition support, that is, enteral tube feeding and parental nutrition, are not considered in this document. A standardised approach to nutrition screening and nutrition support provision is advocated (NICE, 2006a). The implementation of this NCG should promote a more streamlined and systematic approach to the identification of malnutrition risk and the appropriate use of oral nutrition support in Irish hospitals.

Project objectives:

- To develop a National Clinical Guideline (NCG) on 'Nutrition screening and the use of oral nutrition support for adults in the acute care setting' through the NCEC process. The NCG is to be developed by adapting an existing clinical guideline (using the formal ADAPTE process), combined with de novo development using a systematic review process.
- To align with the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

2.4.2 Expected benefits of nutrition screening for malnutrition risk and use of oral nutrition support

Screening of patients for malnutrition risk on admission and weekly thereafter, provides equality of care, allowing all patients admitted to have their risk of malnutrition identified and allows for appropriate nutrition assessment and intervention. Screening for malnutrition does not in itself improve outcomes (Omidvari et al., 2013), but it is through nutritional intervention, such as oral nutrition support, that patients identified at risk of malnutrition achieve better nutritional and clinical outcomes.

When used appropriately in patients identified as at risk of malnutrition, the overall aim of oral nutrition support (Elia et al., 2011) is to:

- Increase nutritional intake.
- Improve nutritional status.
- Improve body composition and function (muscle and immune).
- Aid in wound healing.
- Enhance duration of recovery.
- Improve quality of life.
- Reduce malnutrition-associated complications and mortality.
- Reduce healthcare utilisation.

The benefits of oral nutrition support on any individual patient will depend on a number of factors including indication, underlying clinical condition and expected clinical course and prognosis, degree of nutrition risk and depletion, gastrointestinal symptom control, tolerance of nutrition support, and concurrent medical therapies, among others. Oral nutrition support strategies aim to improve energy and protein intake through diet, oral nutrition supplements (ONS), dietary counselling, food fortification, or use of additional snacks. A combination of strategies is usual in clinical practice (see Table 6).

Table 6. Methods of oral nutrition support *(alphabetical order)*

Method	Description
Diet	High protein high energy food, e.g., Regular or Energy Dense diets (HSE, 2018b). Modified meal pattern. Assistance with menu choices.
Dietary counselling/advice	Tailored advice based on individual nutrition assessment that includes modifying food intake to improve nutritional intake. Advice on regular and additional menu choices when available. Counselling on individual nutrition support plan.
Food fortification	Foods products with added protein, carbohydrate and/or fat (with or without minerals or vitamins).
Oral nutritional supplements	Commercial products used in oral nutrition support given with the aim to increase nutritional intake, provided as ready-to-drink liquids, puddings, or powders.
Snacks	Additional snacks between meals ideally of a higher protein and energy content.

2.4.2.1 Oral nutritional supplements (ONS)

Most of the evidence to support the use of oral nutrition support in malnourished hospitalised patients, or those at risk of malnutrition, comes from studies conducted with ONS. A meta-analysis by NICE (2006a) demonstrated that intervention with ONS in patients at risk of malnutrition results in statistically significant improvements in body weight and reductions in complications and mortality. These benefits were reaffirmed in the evidence update (NICE, 2013a) and in the most recent surveillance review (NICE, 2017). The European Society for Clinical Nutrition and Metabolism (ESPEN) gives higher grade evidence-based recommendations for use of ONS in patients with a variety of clinical diagnoses that are malnourished or at risk of malnutrition (Gomes et al., 2017; Kondrup et al., 2003b; Volkert et al., 2019; Weimann et al., 2017).

2.4.2.2 Dietary counselling

In practice dietary counselling often accompanies the use of ONS. A Cochrane review by Baldwin and Weekes (2011) suggested that dietary advice with or without ONS in malnourished adult patients (across care settings) may improve body weight and indicators of muscle mass. Studies addressing nutritional counselling outcome effects based largely in the hospital outpatient setting have shown beneficial effects

with respect to increasing energy intake and weight maintenance in cancer patients and patients with amyloidosis (Caccialanza et al., 2015; Poulsen et al., 2014; Uster et al., 2013). Dietary counselling has shown benefit and is recommended for older persons at risk of malnutrition (Volkert et al., 2019), and for adult patients with cancer, as an initial strategy for tackling malnutrition risk (Arends et al., 2017).

2.4.2.3 Food fortification

Studies involving food fortification are not as common, but a recent systematic review (Mills et al., 2018) showed that food fortification can be an effective, well-tolerated and cost-effective intervention to improve dietary intake in older inpatients. Food fortification is recognized as a method of increasing energy and protein intakes in patients at risk of malnutrition and is recommended by ESPEN (Gomes et al., 2017; Arends at al.,2016; Arends et al., 2017), by NICE (2006a) and by the DAA (2009).

2.5 Guideline scope

This guideline is aimed at all frontline, management and food service/catering staff involved in the provision of care to adult patients in the acute care setting. It applies to adult patients admitted to a hospital ward and does not specifically cover practices in emergency departments.

This guideline covers:

- Malnutrition definition.
- Nutrition screening for malnutrition risk from point of admission to ward.
- Oral nutrition support.
- Considerations for oral nutrition support in dysphagia.

This guideline does not cover:

- Provision of normal food and drink in hospitals, including ward environment issues and protected meal times.
- Disease-specific or area-specific nutrition screening for malnutrition risk, for example, intensive care units or liver units.
- Disease-specific or area-specific oral nutrition support, for example, intensive care units, liver units.
- Treatment of eating disorders.
- Treatment of inborn errors of metabolism.
- Treatment of obesity.
- Patients admitted to a children’s ward/hospital (under 16 years of age).
- Specialised care specific to pregnancy.
- Nutrition screening or nutrition support in the community.
- Enteral tube feeding.
- Parenteral nutrition.
- Day patients, outpatients, or patients who are admitted as a day admission that are not expected to stay overnight.

2.6 Conflict of interest statement

An NCEC declaration of interest form was signed by all GDG members initially and then yearly as per NCEC guidance (NCEC, 2016). Minor conflicts of interest were identified and were deemed by both Chairs not to be significant for the current guideline development.

2.7 Sources of funding

The Health Service Executive (HSE) funded the following:

- License fee to adapt NICE CG32: Nutrition Support in Adults: Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition (NICE, 2006a).
- Project Dietitian to be released from clinical work to co-ordinate NCG development.

The HRB Collaboration in Ireland for Clinical Effectiveness Reviews (CICER) conducted one full systematic review and one update of evidence tables from NICE CG32. This support was funded by the Department of Health.

2.8 Guideline methodology

General overview

This guideline is a combination of the formal adaptation of an existing guideline using the ADAPTE tool, and de novo guideline development using the NCEC guideline development process. The ADAPTE tool was developed by the ADAPTE Collaboration (2009), an international collaboration of researchers, guideline developers, and guideline implementers. Adaptation is the systematic approach for considering the use and/or modifying a guideline produced in one cultural and organisational setting for application in a different context (DOH, 2019). De novo guideline development involves using primary research and can be used to develop new recommendations within a clinical guideline (DOH, 2019).

The ADAPTE process involves three phases (see Appendix 3):

1. The set-up phase.
2. The adaptation phase.
3. The finalisation phase.

Phases 1 and 3 align with the de novo guideline development process recommended by the NCEC (DOH, 2019). The adaptation phase involves an assessment step. Initial assessment of the quality of a guideline is achieved by applying the Appraisal of Guidelines for Research and Evaluation II (AGREE II) tool. This is followed by a set of standardised tools to examine a guideline in more detail to assist in the adaptation process. See Table 7 for tools used by the GDG during the assessment step of the adaptation phase (after quality assessment using AGREE II).

Table 7. ADAPTE tools used by the GDG for assessment of the selected guideline during the adaptation phase

Tool number	Tool description	Rationale
1	**Currency survey for guideline developers**	Evaluates if the guideline is up-to-date. Availability of evidence updates and surveillance reviews for the guideline are relevant here.
2	**Recommendation matrix**	Extrapolates tables of recommendations from the guideline for review by the GDG.
3	**Search and selection evaluation**	Evaluates the quality of the search strategies used in the guideline.
4	**Scientific validity evaluation**	Evaluates the evidence supporting each recommendation, that is, if recommendations are consistent with the evidence presented.
5	**Acceptability and applicability (subgroups)**	Assesses if a recommendation will be used in practice – going through each individual recommendation.
6	**Acceptability and applicability consensus (individuals)**	Building on subgroup work, this seeks consensus for adapting each proposed recommendation.
7	**Overall results consensus**	Summarises results and final decision is made to accept each proposed recommendation.

A highly relevant and rigorously developed guideline by the National Institute for Health and Care Excellence (NICE) in the UK was chosen through the ADAPTE process. NICE CG32 on Nutrition Support in Adults (NICE, 2006a): Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition, was adapted for two of the research areas identified. The original guideline was published in 2006 (NICE, 2006a), an evidence update document was produced in August 2013 (NICE, 2013a), and regular surveillance reviews have followed. The last surveillance report in July 2017 (NICE, 2017) looked at evidence published up until October 2016. This concluded that no evidence was identified that would impact on the current guidance. See Appendix 3 for formal ADAPTE process used and for the NCEC process used for this guideline development.

In view of the currency of the original guideline and recommendations, having considered the evidence update and surveillance review data, and recognising the need to select a screening tool(s) that would inform this NCG, one systematic review and one update of evidence tables from NICE CG32 (screening and data extraction only) on two key areas core to the current NCG were undertaken by HRB-CICER on behalf of the GDG.

Step 1: Formulate the key questions

Key areas of nutritional practice that impact on patient care were identified by the GDG and were agreed during initial GDG meetings. Questions around these key areas were then developed by the GDG and were agreed at subsequent GDG meetings. Questions were initially limited to 12 and concerned broad topics around malnutrition prevention, screening and treatment (oral nutrition support, enteral tube feeding and parenteral nutrition) in Irish hospitals. These questions then formed the basis for assessing

existing guidelines for adaptation.

For the purposes of using the formal adaptation process, questions were initially formatted as PIPOH research questions:

- **P**opulation
- **I**nterventions
- **P**rofessionals (Patients)
- **O**utcomes
- **H**ealthcare Setting/Context.

To enable completion of the clinical guideline in a timely manner and within realistic implementation parameters (DOH, 2019), the GDG reviewed the 12 research questions and selected two key questions, specifically on nutrition screening for malnutrition risk and use of oral nutrition support for adults in acute care. See Appendix 4(a) for the PIPOH questions pertinent to this guideline. These questions were chosen by the GDG as being cornerstones for future guideline development on other related topics, such as provision of enteral tube feeding and parenteral nutrition. It was also felt that a guideline on the two questions chosen would complement the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (FNHP) (HSE, 2018b). The NCG provides some of the evidence that underpins this Policy. Recommendations in the NCG align with recommendations made in the Policy. This was achieved through regular consultation between the co-ordinators of the NCG and the FNHP and was ensured through the oversight of the National Nutrition Policy and Clinical Guideline Joint Steering and Clinical Advisory Group.

One systematic review and one update of evidence tables from NICE CG32 (screening and data extraction only) were undertaken by HRB-CICER on behalf of the GDG to complete the current guideline on the two key areas identified. The relevant research questions were reformulated to the PICO/S format to aid the systematic review process (see Appendix 4(b) for key question used):

- **P**opulation
- **I**ntervention/Exposure
- **C**ontrol/Comparison
- **O**utcome
- **S**tudy design.

In 2017, an update of evidence tables from NICE CG32 was undertaken to determine the clinical and cost-effectiveness of **oral nutrition support** for the primary outcomes of all-cause mortality, complications/ morbidity and nutritional status and on secondary outcomes. The resultant evidence tables are available in Annex 2. In 2018, a systematic review was undertaken to identify and evaluate clinical and economic evidence on **nutrition screening tools** used in adult patients in acute hospital settings for the detection of patients at risk of malnutrition. This systematic review was informed by a previous systematic review by van Bokhorst-de van der Schueren et al (2014). See Annex 1 for the full systematic review process and results.

Step 2: Search methodology

Search for clinical guideline to adapt

A search for screening/assessment/nutrition support international guidelines was made from January 2006 to March 2017. See Appendix 5(a) for search strategy. Sources can be broadly categorised as:

1. National and International Guideline Repositories and Portals - German Guidelines Portal, Guidelines International Network, National Guideline Clearinghouse, National Institute for Health and Care Excellence, (NICE), National Guideline Alliance.
2. Bibliographic Databases and Evidence Based Summaries - PubMed Medline, Trip Database, DynaMed.
3. Websites of the academic societies, professional colleges, associations.

Search update for clinical guidelines 2017-2018

The initial search for suitable international guidelines was current to March 2017. Considering the duration of the guideline development process, a repeat systematic search was undertaken to identify additional international guidelines published between March 2017 and December 2018. See Appendix 5(b) for search strategy. Guideline search was limited to the two research questions of interest to this NCG, and included:

1. Search of websites of guideline agencies.
2. Oral: database searches limited to 'guidelines' or 'protocol'.
3. Screen: database searches limited to 'guidelines' or 'protocol'.

Search for systematic review evidence

A full systematic review of evidence and an update of evidence tables from NICE CG32 (screening and data extraction only) were undertaken by HRB-CICER on behalf of the GDG for two key research questions. For the update of evidence tables on 'Clinical and cost-effectiveness of oral nutrition support interventions in hospitalised adults', electronic searches were conducted in Ovid Medline, Embase, Cochrane, CINAHL and Web of Science using a search string adapted from NICE CG32. Searches were carried out for the period January 2013 (just before the last NICE CG32 evidence update was produced) to July 2017. Randomised controlled trials (RCTs) and systematic reviews were included. For the review of cost-effectiveness health economic studies including full economic evaluation studies, cost analysis, comparative resource use studies, and systematic reviews were included. See Annex 2 for further search strategy details and resultant tables of evidence.

For the systematic review on 'Nutrition screening tools for adult patients in acute hospital settings', electronic searches were conducted in Ovid Medline, Embase, Web of Science, CINAHL and the Cochrane Library from 2nd February 2012 for the clinical question, or from 1st June 2008 for the cost-effectiveness question, to 20th June 2018. Reference review, database searching, and hand-searching reference lists was used to complete the search. Cohort (retrospective and prospective), cross-sectional and case-control studies were included for review. See Annex 1 for further search strategy details and resultant systematic review.

Step 3: Screen and appraise the evidence

For the adaptation process

A total of 58 guidelines were identified that were eligible for further evaluation. The GDG screened the 58 guidelines based on agreed inclusion and exclusion criteria (see Table 8) and reduced the number of guidelines to 18 that were within scope (see Appendix 6). Six subgroups of four GDG members applied an AGREE II tool to three guidelines each to assess quality, looked at guideline characteristics and whether the initial 12 health questions were addressed within the guideline. One of the 18 was not appropriate for an AGREE II, as on examination it was not a clinical guideline. The GDG met when results were collated for the remaining 17 guidelines and selected the guideline with the highest quality (emphasis on the rigour score), that addressed the majority of the health questions. This was NICE CG 32 on Nutrition Support in

Adults (2006): Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition (2006a).

Table 8. Inclusion and exclusion criteria used for initial nutrition support guideline search

Inclusion	Exclusion
From 2006 to 1st March 2017	Exclusively paediatric guidelines that cover: - patients admitted to a children's ward in an adult hospital - patients admitted to a paediatric hospital
Available in English	Treatment of obesity per se
Pertaining to adult hospitalised patients	Disease-specific nutrition support, e.g. renal disease, liver disease, cystic fibrosis, etc.
Oral nutrition support guidelines	Area-specific nutrition support, e.g. intensive care, transplant unit, dialysis unit, maternity unit, etc.
Enteral nutrition guidelines	Specialised care specific to pregnancy
Parenteral nutrition guidelines	Nutrition support in the community other than home parenteral nutrition
	Provision of normal food and drink in hospitals; ward environment issues; protected meal times

For the search update for clinical guidelines 2017-2018
Nine clinical guidelines from the European Society for Clinical Nutrition and Metabolism (ESPEN) were identified, and one standards of care publication from the American Society of Clinical Nutrition and Metabolism (ASPEN) was retrieved. Two GDG members went through the search results. Six of the nine ESPEN guidelines were disease-specific or area-specific and were not relevant to this NCG. Three ESPEN guidelines were of relevance but were too narrow in focus to replace NICE (2006a) as the guideline to adapt. The standards of care publication was useful but was not a clinical guideline.

For the systematic review and update of evidence tables
Citations were screened by one HRB-CICER reviewer to eliminate clearly irrelevant studies for the evidence tables. Two people independently reviewed the remaining citations per the inclusion criteria, with any disagreements being resolved by discussion, or where necessary, by a third reviewer. Data extraction was performed independently by two people with any disagreements being resolved by discussion, or where necessary, by a third reviewer. See Annex 1 and Annex 2 for further details.

Step 4: Develop and grade the recommendations

Appendix 7 outlines the different grading systems used for guideline recommendations. Oral nutrition support recommendations were adapted from NICE CG32 (2006a) and maintained the grading system used by NICE – see Appendix 7(a). The evidence tables from the systematic review on ONS were considered by the GDG and were found to largely support the NICE guideline recommendations. See

Annex 2 for details. The evidence tables did not lead to new recommendations. Good practice points for implementation were developed and agreed by GDG discussion and consensus.

Nutrition screening for malnutrition risk recommendations 1 and 2 were adapted from NICE CG32 and maintained the grading system used by NICE – see Appendix 7(a). Recommendation 3 was informed by the HRB-CICER systematic review (2018) (see Annex 1). The GRADE approach was used to assess the level of evidence - see Appendix 7(b). Due to the overall low certainty of evidence for screening for malnutrition risk (PICO/S questions 1 and 2 - see Appendix 4), and considering the lack of evidence for cost-effectiveness, the GDG applied an evidence-to-decision (EtD) process, in accordance with Department of Health manual (DOH, 2019), to make recommendation 3. Benefits and harms, resource use, equity, acceptability, feasibility, and balance of consequences were considered by the GDG. Additional considerations relevant to the decision-making process were considered by the GDG as part of the EtD process and are outlined in Section 3.1. An EtD tool was completed by the GDG after full discussion and agreed at GDG meeting. See Appendix 12 for completed EtD tool.

2.9 Consultation summary

An advanced draft of the NCG was sent to key stakeholders for a three-week consultation period in March 2019. The GDG agreed to align with the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) regarding key stakeholders identified for consultation (see Appendix 8). A similar feedback form was developed, and a similar process was followed. Forms and documents were emailed to all key stakeholders and external reviewers. See report in Appendix 8.

Main adjustments to guideline

- National Patient Forum was engaged – followed by preparation of a service user version of the guideline.
- Section 3 was re-written with the GDG Malnutrition Definition Subgroup and Appendix 13 was added.
- Changes to Section 2 – methodology.
- Formatting – better contents section to provide clarity, improved numbering of sections, better division between sections, updated Figure 3 and 4 and timeframe for action included.
- Terminology changed, for example, changed Catering Staff to Food Service Staff in recognition of their important role.
- Additions to Pharmacist's role.
- Additional reference in Education and Training section.
- BIA added after consultation feedback – addressed some of the resource issues.
- Summary document will be considered.
- Subsection added to 3.1.8.
- Good practice point 15.2 was added.
- Update of monitoring and audit criteria in Appendix 11.

2.10 External review

Based on knowledge and expertise of the GDG, four international experts were nominated to review the draft guideline. Nominees were purposefully selected from different countries, different professional backgrounds and with particular interests and experience relevant to the current guideline. These included an expert from the United Kingdom who was involved with NICE CG32 (2006a), an expert from ESPEN (European Society for Clinical Nutrition and Metabolism) who is involved with the Life-Long-Learning Programme in Clinical Nutrition and Metabolism (see Section 3.3), an expert from the Netherlands who is involved with Malnutrition in the Elderly Knowledge Hub (see logic model in Appendix 9) and an expert from Australia who is involved with the Nutrition Care Process (see Section 3.0). All four nominees were approached, two of whom were available during March 2019 – Professor Marian de van der Schueren (the Netherlands), and Dr. Angela Vivanti (Australia) – see Appendix 2. These reviewers are respected authorities and widely published in the field of nutrition. Both have a particular interest in the prevention, identification and treatment of malnutrition risk and related research, education and practice.

2.11 Implementation

The implementation plan is designed as a framework to guide actions required to promote effective implementation of recommendations made in this NCG on nutrition screening for risk of malnutrition and effective use of oral nutrition support for adult patients in acute hospitals. Funding for guideline implementation is subject to service planning and estimates process.

To inform this plan, the GDG requested feedback on facilitators and barriers from experts with experience in implementing nutrition screening programmes for malnutrition risk on an organisational, regional or national level. An overview of feedback received is available in Appendix 9. Issues identified were similar to those outlined by a systematic review by Green and James (2013), who related facilitators and barriers to organisational culture, competing priorities, the value of clinical judgement, training and education, and discrepancy between attitudes and practice. The implementation influences identified by experts were considered by the GDG when developing the implementation plan.

The Chief Executive Officer or General Manager of each hospital has the corporate responsibility for ensuring implementation. The Hospital Nutrition and Hydration Steering Committee is key to local implementation. The national oversight of this guideline sits with the Chief Clinical Officer until a model of care for nutrition and hydration is elaborated and a governance structure is described. A proposed education and training framework to support implementation is provided in Section 3.4. Implementation of the NCG should be monitored nationally through the HSE's National Service Plan, Acute Service's Operational Plan, and Healthy Ireland Implementation Plan.

The logic model and implementation plan for this NCG are presented in Appendix 9. Healthcare staff roles and responsibilities to support this plan are outlined in Appendix 9. A list of tools to support implementation is available in Appendix 10.

2.12 Monitoring and audit

The overall objective of this NCG is to improve patient care. Clinical audit is used to describe a process of assessing clinical practice against standards (HSE, 2013). In this case the NCG is the standard and is closely aligned with the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b), see Policy toolkit (see Appendix 10 for web link). Audit criteria are aligned with the NCG implementation plan and logic model (see Appendix 9).

National and local audit criteria are specified in Appendix 11. Audit criteria are a mixture of structure criteria (what is needed), process criteria (what is done) and outcome criteria (what is expected to happen as a result). Key Performance Indicators (KPIs) for national consideration are outlined. Essential and desirable audit criteria as agreed by the GDG are highlighted for inclusion in local audit mechanisms.

2.13 Plan to update this National Clinical Guideline

The guideline will be updated three years from publication as per the process recommended by NCEC (DOH, 2019). A subgroup of the GDG will reconvene to assist in this update under the governance of the Chief Clinical Officer. If there is a major change in evidence, or if the Food Nutrition and Hydration Policy (HSE, 2018b) is updated requiring changes in recommendations, prior to the planned review of this NCG, a rapid update may be conducted as per NCEC procedures.

3 National Clinical Guideline Recommendations

See Appendix 17 for glossary of terms and abbreviations.

3.0 Malnutrition definition

Malnutrition (undernutrition form) is a state of nutrition in which a deficiency of energy, protein and other nutrients causes measurable adverse effects on body structure, function and clinical outcome. Reduced food intake or reduced nutrient absorption, combined with acute or chronic inflammation leading to altered body composition and diminished function, characterises malnutrition associated with disease or injury (adapted from Elia, 2003; Cederholm et al., 2018; Jensen et al., 2018).

The international Nutrition Care Process (NCP), developed by the American Academy of Nutrition and Dietetics (AND) (White et al., 2012), is extensively used in Canada and Australia, and has now been adopted by the European Federation of the Associations of Dietitians (EFAD) for use across Europe. The NCP is a systematic method of recording nutrition care that provides a framework for critical thinking and decision-making in the dietetic management of patients. It is currently being integrated into Irish dietetic practice with support from the Irish Nutrition and Dietetic Institute (INDI) and the Health Service Executive (HSE). The four-step process that describes dietetic care using NCP is outlined in Figure 1. This process is also outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

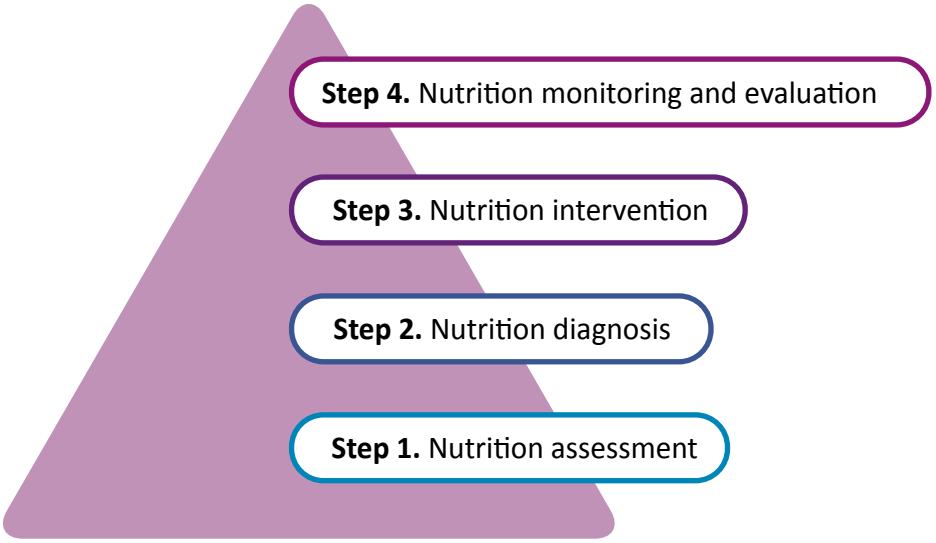


Figure 1. Nutrition Care Process (NCP) steps

The NCP includes a nutrition diagnosis of malnutrition, based on evidence-based aetiology (see Appendix 13) and observable signs and symptoms, and provides detailed reference sheets to guide grading the severity of malnutrition. A detailed nutrition assessment, which includes a Nutrition Focused Physical Examination (NFPE), is incorporated into the NCP assessment. The NFPE is a methodical head-to-toe examination of a patient's physical appearance and function to help determine nutritional status by uncovering signs of malnutrition, nutrient deficiencies and excesses. It can provide the necessary supportive data to identify malnutrition accurately (Mordarski and Hand, 2019).

A recent consensus report from the Global Leadership Initiative on Malnutrition (GLIM), (Cederholm et al., 2018; Jensen et al., 2018) has attempted to establish a pragmatic approach to the diagnosis of

malnutrition using clinically relevant diagnostic criteria that can be applied by healthcare professionals with readily available methods (see Appendix 13). This approach builds on previous approaches, such as that outlined in NICE CG32 (2006a), and takes into consideration a broader range of both phenotypic and aetiologic criteria that can be used to diagnose malnutrition – see Figure 2.

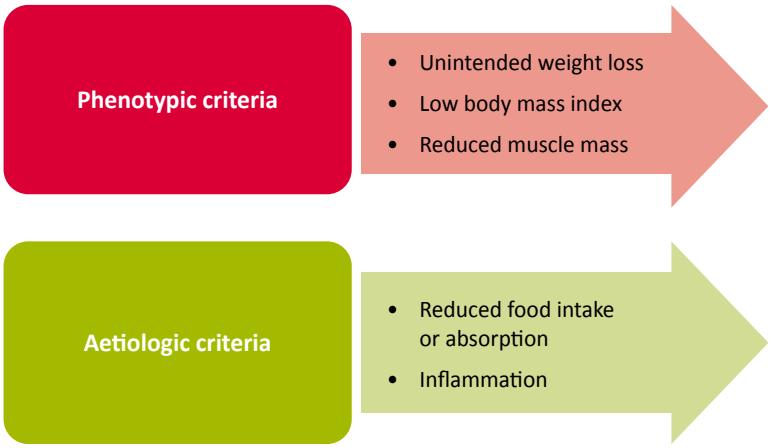


Figure 2. GLIM phenotypic and aetiologic consensus criteria for malnutrition

This approach does not replace a comprehensive nutrition assessment by skilled nutrition practitioners such as dietitians, needed for the development of an individualised care plan (as included in NCP). The aim of the GLIM, similar to the NCP approach, is to promote the global use of the phenotypic and aetiologic consensus criteria to complement such assessments and other approaches to diagnose malnutrition.

Using GLIM and NCP guidance, malnutrition can be broadly categorised based on its underlying aetiology – see Table 9 for overview and Appendix 13 for details.

Table 9. Categories of malnutrition

GLIM approach	NCP approach
Chronic disease-related with inflammation	Chronic disease or condition-related
Chronic disease-related with minimal or no perceived inflammation	
Acute disease or injury-related with severe inflammation	Acute disease or injury-related
Starvation-related	Starvation-related

Both GLIM and NCP acknowledge that diagnosis of malnutrition is an evolving area and approaches used need further validation testing. Both emphasise the importance of considering change in muscle mass when diagnosing malnutrition. Self-reported difficulties walking 100m and climbing stairs, used as indicators of mobility limitations and implying declining physical function, independently predicted malnutrition two years later in well-nourished older adults in The Irish Longitudinal Study on Ageing (TILDA) (Bardon et al., 2018). The NFPE can be used by trained dietitians to assess muscle mass as part of the NCP. Functional assessment can be used, for example, hand-grip strength as an indicator of impaired muscle strength and forms part of the NFPE.

3.1 Key questions and evidence statements: Nutrition screening for malnutrition risk

3.1.1 Terminology used in section 3.1

- Nutrition screening in this national clinical guideline (NCG) refers to screening for risk of malnutrition. This is the first step in a patient's journey of nutritional care on admission to a ward of an acute care hospital. Nutrition screening is a rapid, simple and general procedure used by nursing, medical or other staff, often at first contact with the patient. The purpose of nutrition screening is to identify those who are at risk of malnutrition, in order that clear guidelines for action can be implemented (NICE, 2006a) and to determine if a detailed nutrition assessment is needed (Mueller et al., 2011). Nutrition screening detects if a patient is at risk of malnutrition – further nutrition assessment is needed to diagnose malnutrition.
- A nutrition screening tool (NST) in this NCG refers to a validated tool used to screen for risk of malnutrition. Many NSTs were developed in different populations. They may incorporate different parameters, with different objectives, designed for use by various healthcare workers (or members of the public in the case of self-screening), and in one or more settings. All NSTs were developed to detect risk of malnutrition, but some were also developed to predict adverse clinical outcomes.

3.1.2 Key questions 1, 2 and 3 for nutrition screening

See Appendix 4 for full PICO/S format.

Key question 1	What is the diagnostic accuracy of nutrition screening tools (NST) compared with a reference test in assessing the nutritional status of adults at risk of undernutrition in acute settings?
Key question 2	What is the accuracy of NSTs in identifying adverse outcomes in adults at risk of malnutrition in acute hospital settings?
Key question 3	What is the cost-effectiveness, of using nutrition screening tools for the identification of adult (non-pregnant) patients at risk of malnutrition in acute settings?

3.1.3 Evidence summary

Sources of evidence used for this section of the National Clinical Guideline (NCG) include the HRB-CICER systematic review (2018) of nutrition screening tools (NSTs) for adult patients in acute hospital settings (see Annex 1), NICE CG32 (NICE, 2006a), NICE evidence tables (NICE, 2006b), evidence update (NICE, 2013a) and surveillance review data (NICE, 2017). Comparisons of recommendations are made with current published national guidelines, and with international guidelines that were identified through a systematic search (see Section 2.8 on guideline methodology).

Recommendations 1 and 2 were formally adapted from NICE CG32. Recommendation 3 was generated by the Guideline Development Group (GDG) based on the HRB-CICER systematic review (2018) and a GRADE evidence-to-decision process. The systematic review used to inform the HRB-CICER review (van Bokhorst-de van der Schueren et al., 2014) and evidence from the Malnutrition in the Elderly Knowledge Hub (MaNuEL) project was considered by the GDG to be pertinent to the evidence-to-decision process.

3.1.3.1 Issues to consider when reviewing the evidence

All studies on nutrition screening for risk of malnutrition are influenced by some fundamental issues relating to research in the area (Elia and Stratton, 2012; Power et al., 2018a; Power at al., 2018b; van Bokhorst-de van der Schueren et al., 2014). This includes:

- Varying definitions of malnutrition used. This also has implications for establishing thresholds for nutritional parameters used in NSTs, such as Body Mass Index (BMI) thresholds.
- No consensus on a gold standard malnutrition assessment reference method against which NSTs can be validated. This has resulted in different reference standards being used in different studies.
- Inconsistencies exist over terminology used: nutrition screening tools, malnutrition screening tools and nutrition assessment tools. Several studies use 'screening' and 'assessment' interchangeably, even though these are significantly different processes.
- Observational studies do not primarily set out to examine nutritional intervention effects. Weight is sometimes given to the ability of screening tools to predict outcomes without interventions.
- A nutrition screening tool developed in one distinct healthcare system may perform differently in another, for example, between populations from different continents, as body composition, lifestyle factors, dietary/cultural habits, and mortality may vary between populations.
- NSTs developed and validated for use in one age group have been applied to other age groups. This will impact on interpretation, as questions implicit in the tool may be specific for one age group.
- Several studies that examine predictive validity of a NST (the ability to predict adverse clinical outcomes) do not adjust for severity of primary disease, co-morbidities, inflammation, or other risk factors. Heterogeneity in background disease has been noted in studies.
- Differences in study designs and other methodological problems need to be considered when interpreting results, particularly in studies with small sample sizes.
- Differences in timing of malnutrition screening between studies will impact on results.
- Reliability of NSTs is only sparsely reported in the literature, yet this is an important measure of a tool's performance.

3.1.3.2 HRB-CICER systematic review on nutrition screening for malnutrition risk

The aim of the HRB-CICER systematic review (2018) was to identify and evaluate clinical and economic evidence on NSTs used in adult patients in acute hospital settings for the identification of patients at risk of malnutrition, to guide best practice regarding screening for risk of malnutrition in Irish hospitals. Only externally validated NSTs were included.

Reference standards considered as 'semi-gold' were considered acceptable. These encompassed assessment by a nutritionally-trained professional, that is, a dietitian or a clinician who was nutritionally trained, and assessment tools MNA-FF (Mini Nutritional Assessment - Full Form) (Guigoz et al., 1994) and SGA (Subjective Global Assessment) (Baker et al., 1982). A similar approach has been used in other reviews (Power et al., 2018a; Power at al., 2018b; van Bokhorst-de van der Schueren et al., 2014; Miller et al., 2018).

See Annex 1 for methodology, results including tables of evidence, discussion and conclusions from the HRB-CICER systematic review (2018).

Question 1 on the ability of NSTs to detect malnutrition risk

Fourteen studies using 11 unique NSTs were identified relevant to this question. The mean age reported in 12 studies varied from 45 to 75 years. Sample sizes ranged from 61 to 995 patients. The methodological quality of all studies was very low (using the GRADE approach). Heterogeneity of age and disease severity was noted.

Results:

- Malnutrition prevalence using one of the three reference standards for nutrition assessment listed above was reported by 13 studies and ranged from 13.6% to 72%.
- The majority of NSTs were compared to SGA.
- The two most featured tools were Malnutrition Universal Screening Tool (MUST) (Elia, 2003) in eight studies and Nutritional Risk Score 2002 (NRS-2002) (Kondrup et al, 2003a) in six studies. The remainder of NSTs featured in one study each, with the exception of Malnutrition Screening Tool (MST) (Ferguson et al., 1999) and Nutrition Risk Index (NRI) (Wolinsky et al., 1990), which were evaluated in each of two studies.
- The ability of MUST and NRS-2002 to accurately identify those who were malnourished or at risk of malnutrition varied considerably across studies.
- When MUST and NRS-2002 were directly compared in four studies, the two tools identified malnutrition and malnutrition risk similarly.
- Two studies compared MST with MUST. MUST had a higher sensitivity and MST had a higher specificity, for the identification of malnutrition/risk of malnutrition, but differences were not statistically significant. Both were rated as having good validity to screen for risk of malnutrition.
- Overall certainty of the evidence is 'very low' for all NSTs, due to a high risk of bias, inconsistency of reference test and thresholds used, small sample sizes, and that for most NSTs evidence was only from a single study.

Question 2 on the ability of NSTs to predict adverse clinical outcomes

Seventeen studies relevant to this question that used six unique NSTs across 15 countries were identified. Nine of these reported the presence of nutritional interventions, but these interventions were inadequately described. Age within each study ranged from a median of 37 to a mean of 73 years. Sample size ranged from 57 to 419,086 patients. Mortality, increased length of hospital stay (LOS) and clinical complications were considered to be the outcomes of interest. The methodological quality of the evidence was very low. There was large variation in methods used and the definitions of the clinical outcomes selected. Heterogeneity regarding age, disease severity and prevalence of malnutrition (6% to 63%) was also noted.

Results:

- The most frequently featured tools were MUST (6 studies) and NRS-2002 (11 studies), followed by Mini Nutritional Assessment Short Form (MNA-SF) (Rubenstein et al., 2001) and NRI. The Short Nutritional Assessment Questionnaire (SNAQ) tool (Kruizenga et al., 2005) and the 3-Minute Nutrition Screening (3-minNS) tool (Lim et al., 2009) featured in one study each.
- For the three outcomes of interest, all NSTs showed positive associations.
- NRS-2002 was most frequently assessed and was consistently associated with mortality, increased LOS and clinical complications.

- Higher MUST scores were associated with mortality and increased LOS. No study assessed the association between MUST and clinical complications.
- One study directly compared two NSTs in the same sample, and two studies directly compared three NSTs using the same sample.
- One study compared NRS 2002 (score of ≥3), MNA-SF (score of ≤11) and MUST (score of ≥1) for predicting in-hospital mortality. All NSTs were rated as having fair validity. MUST had a lower area under the curve and was, therefore, less accurate than the other NSTs in predicting in-hospital mortality.
- Three studies directly compared the association with LOS and two or more NSTs in the same population. All used different definitions of LOS.
    - One study compared MUST and NRS-2002 and found that patients identified to be at risk of malnutrition using either tool, were less likely to be discharged from hospital earlier than those identified as 'not at risk'.
    - Another study measured the association between NRI, MUST and NRS-2002, and LOS ≥11 days. NRI and MUST cut-offs representing moderate and medium risk of malnutrition showed no association with LOS. All other cut-offs reported a statistically significant association. MUST (score ≥2) was rated as having fair validity while all other NSTs and cut-off points were rated as having poor validity.
    - A third study assessed the association between NRS-2002, MUST and MNA-SF, and LOS ≥16 days. All three were rated as having fair validity.
- Overall the certainty of the evidence is 'very low' for all NSTs for all outcomes, due to confounding factors that were not considered (such as almost complete lack of adjustment for nutritional interventions), small sample sizes and wide confidence intervals, and poor recruitment practices. There was also a variety of single centre settings in different countries, such that findings may not be applicable to other health care settings. Evidence for some NSTs was only from a single study.

Question 3 on cost-effectiveness of NSTs

There were no studies identified that could provide evidence for the cost-effectiveness of NSTs.

In summary

Results from this systematic review suggest that the most studied NSTs for hospitalised adults are MUST and NRS-2002. Methodological quality was very low across the research literature identified. No single NST that could be used to accurately screen for malnutrition or risk of malnutrition, or to predict adverse outcomes, emerged from this review. Data on cost-effectiveness are missing from the research literature. The systematic review results were considered by the GDG and were used to inform an evidence-to-decision process to determine the NST(s) which could provide the best fit for Irish hospitals.

3.1.3.3 NICE evidence for nutrition screening for malnutrition risk recommendations

A systematic review was conducted by NICE for CG32 (NICE, 2006a) on the effectiveness of nutrition screening for malnutrition risk on improving quality of care and patient outcomes. Only three primary studies were eligible for inclusion. These had generally weak study designs and mixed results. Two of these studies were conducted in the hospital setting.

Results:

- One controlled study (Jordan et al., 2003) examined the use of the Nursing Nutritional Screening Tool for patients admitted to two hospital wards and used two other wards as controls (received usual care). The study did not report patient outcomes. The documenting of weight significantly improved (from 26% to 72%) on the intervention wards while it decreased on the control wards. Referrals to the dietetic service declined in both groups, while no change was noted in patient care at mealtimes for those identified as at risk of malnutrition.
- Another study (Rypkema et al., 2003) compared screening for malnutrition risk (using MNA-SF), dysphagia and dehydration on admission in patients who were over 60 years of age, compared to standard care. Screening was followed by immediate treatment as oral nutrition support. A statistically significant weight gain and a reduced hospital-acquired infection rate were noted in the intervention group. Pressure ulcer rates and LOS were unaffected.

Seven years later, in 2013, a Cochrane systematic review on the effectiveness of nutrition screening in improving professional practices of benefit to patient outcomes in hospital and primary care settings (Omidvari at al., 2013) identified exactly the same studies as NICE (2006a). No additional studies were identified. The paucity of evidence for the effectiveness of screening for malnutrition and risk of malnutrition compared with no screening may indicate poor understanding within the research community of the effects of malnutrition. It may also reflect poor alignment between screening for malnutrition and risk of malnutrition and nutritional intervention pathways. It was noted in the HRB-CICER systematic review (2018) that only nine of the 17 studies identified for question two reported the presence of a nutritional intervention.

The evidence update for NICE CG32 (NICE, 2013a) and subsequent surveillance reviews highlighted additional studies related to malnutrition screening, some of which were hospital-based. Evidence identified included:

- A study by Holyday et al (2012) in Australia on the impact of malnutrition screening associated with a nutrition care plan in older hospitalised adults (mean age 83 years). The tool used was MNA-FF, considered by many to be an assessment tool to diagnose malnutrition rather than a tool to screen for malnutrition. The tool was applied to both the intervention and control groups; hence, this study was omitted from the Cochrane review by Omidvari et al (2013). Patients identified as malnourished or at risk of malnutrition were assigned a malnutrition care plan; this was comprised of oral nutrition support informed by a dietetic assessment, along with assistance with meals, compared with usual care. Overall LOS was similar, but in the malnourished group, LOS was significantly reduced after the intervention compared with usual care (10.6 days versus 19.5 days, p=0.013) and a trend to reduced readmissions was noted. There was no difference in weight change between groups.
- An Austrian study (Roller et al., 2016) aimed to validate the Graz Malnutrition Screening tool in older hospitalised adults (≥70 years old). It compared well to the reference standard used. The reference standard, however, was another NST, thereby weakening the methodological quality of the study.
- All evidence identified largely supported the NICE recommendations (NICE, 2006a).

Due to the lack of research evidence for the effectiveness of nutrition screening for risk of malnutrition versus no screening, NICE used a modified Delphi consensus approach (Murphy et al., 1998) to apply the expertise of the NICE guideline developers to making recommendations in this area (NICE, 2006a). In

the 2017 surveillance review (NICE, 2017), the use of malnutrition screening tools other than MUST, was an area identified as 'not covered' by the NICE recommendations. Topic expert feedback noted that the appropriate use of malnutrition screening tools and identification of risk of malnutrition was a key issue, and that alternative methods of screening for malnutrition could be considered.

In view of the dearth of evidence and in recognition of the need to identify an appropriate screening tool for use in Irish hospitals, the GDG made a decision to adapt the nutrition screening recommendations made by NICE (2006a), and to generate a recommendation on nutrition screening tool(s) for risk of malnutrition through systematic review.

3.1.4 Comparison of adapted NICE recommendations and the GDG-generated recommendation with other national guidelines, policies and reports

A key recommendation in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) is that screening for malnutrition and risk of malnutrition using a validated tool should be implemented for each patient on admission as part of a food, nutrition and hydration needs assessment, and that screening should be repeated weekly for inpatients. Furthermore, the Policy recommends that patients identified as being at risk of malnutrition should be referred to the dietitian for nutrition assessment, and a patient-centred care plan developed that includes oral nutrition support, monitoring and assistance with meals. This links the screening process with nutritional interventions as advocated in the NICE guidelines (2006a) and in this NCG.

The National Wound Management Guidelines (HSE, 2018a) make five recommendations on screening for risk of malnutrition as part of the nutritional management of wounds, and three recommendations on screening for malnutrition risk in the prevention of pressure ulcers. Recommendations include screening all patients with, or at risk of, a wound or pressure ulcer for risk of malnutrition within 24 hours of admission using a validated tool, repeating screening weekly, referring patients at malnutrition risk to a dietitian or a nutrition support team for a nutrition assessment. These recommendations support the adapted NICE (2006a) recommendations included in this NCG.

Recommendations in this NCG are consistent with the 'Report of the review of nutrition and hydration care in public acute hospitals' (HIQA, 2016). A key recommendation from this report is that all patients admitted to hospital should be screened for risk of malnutrition. The report advocates implementation of a nutrition screening programme which facilitates appropriate assessment and treatment for patients identified to be at risk of malnutrition. This reinforces the importance of having care pathways in place that lead to individualised nutrition care plans for the management of malnutrition risk. See Figure 3 for HSE Malnutrition risk management pathway for hospitalised adults. HIQA also highlights the importance of staff training and access to equipment to enable implementation of malnutrition screening programmes.

3.1.5 Comparison with other international guidelines

Australian evidence-based guidelines for the nutritional management of malnutrition in adult patients across the continuum of care (Dietitians Association of Australia (DAA), 2009) recommend that malnutrition should be prevented, and if present, identified and treated in all healthcare settings. Routine screening for malnutrition risk in the acute care setting using a valid screening tool appropriate to the population and setting is recommended to improve identification of risk and to allow for nutrition care planning. Educating healthcare professionals on the adverse effects associated with malnutrition

is also recommended. Tools recommended for the acute care setting based on screening accuracy are: MST, MUST, MNA-SF in older adults, NRS-2002 and SNAQ (Netherlands). Practice points identified for malnutrition screening are similar to the good practice points outlined in this NCG, such as incorporation of the malnutrition screening tool into standard processes, determining prevalence of malnutrition risk or malnutrition within different healthcare settings and patient populations, repeating screening weekly in hospital, considering who undertakes the screening and the burden of completion when selecting a screening tool, using a tool that categorises patients to help prioritise those who require nutrition assessment, and considering a tool with at least two parameters. NSTs with more than one parameter have higher sensitivity and specificity at predicting nutritional status (DAA, 2009).

The American Society for Parenteral and Enteral Nutrition (ASPEN) clinical guidelines on nutrition screening, assessment and interventions in adults (Mueller et al., 2011) also support the adapted NICE (2006a) recommendations. Based on low level evidence, screening for malnutrition risk is suggested for hospitalised adults, with follow-up nutrition assessment for those at risk of malnutrition. Based on RCTs, nutrition support is recommended for patients identified by screening and assessment as malnourished or at risk of malnutrition.

ASPEN standards for nutrition support in adult hospitalised patients (Ukleja, 2018) outline the standards of care to ensure provision of sound and efficient nutrition support to those who need it. Nutrition screening for malnutrition risk forms one of these standards and is considered the first step in the nutrition care process. A validated screening process is recommended, with periodic re-screening in accordance with institutional policy, the process being regularly reviewed by a designated nutrition committee. The results of nutrition screening should be documented, communicated and appropriate interventions initiated within the timeframe specified by the hospital or as clinically indicated. This is consistent with recommendations and good practice points in this NCG.

The European Society for Clinical Nutrition and Metabolism (ESPEN) has developed multiple guidelines that include recommendations on screening for malnutrition risk across a range of clinical areas and diagnoses. The clinical guidelines on nutrition support for hospitalised 'polymorbid' medical patients (presence of two or more chronic health conditions) include a recommendation that screening for malnutrition risk using a validated tool, followed by a nutrition assessment in patients identified at risk of malnutrition, should be implemented. A treatment plan associated with the NST, and early intervention that can positively impact on outcome is promoted (Gomes et al., 2017). Monitoring the care plan, with emphasis on dietary intake, body weight, and measurements of mental and physical function and clinical outcome are advocated. Similarly for surgical patients, ESPEN considers that a systematic screen for risk of malnutrition in all patients on hospital admission or first contact is a basic requirement (Weimann et al., 2017). The need to routinely screen for malnutrition risk, followed by nutrition assessment and intervention is reiterated in ESPEN's guideline on clinical nutrition in older adults (Volkert et al., 2019), to include both overweight and obese older patients. Although this recommendation is based on lower grade evidence, it achieved 100% consensus among the guideline developers. ESPEN endorses the general use of MUST and NRS-2002, as well as MNA-SF to screen for malnutrition in older adults (Kondrup et al., 2003b), and recommends malnutrition screening on admission and weekly re-screening in the hospital setting.

The international guidelines and standards discussed here largely support the adapted NICE (2006a) recommendations made in this NCG.

3.1.6 NICE clinical guideline adaptation considerations

In clinical practice, nurses are key implementers of nutrition screening for risk of malnutrition in Irish hospitals. When adapting the NICE guidelines, a change was made to recommendation 1. The term 'or other healthcare workers' was added to permit other healthcare workers to assist nursing staff in undertaking malnutrition screening. Such staff could include healthcare assistants (HCAs).

Recommendation 2 adapted from NICE (2006a) has been altered to remove the reference to outpatient screening as this is outside the scope of the current NCG. NICE (2006a) recommendations on screening for risk of malnutrition in community settings were also excluded from this NCG as outside its scope.

The GDG used an evidence-to-decision process to develop a replacement for the original NICE (2006a) screening tool recommendation. This forms recommendation 3 of the NCG.

The original NICE CG32 (NICE, 2006a) makes a recommendation with an opt-out clause for screening patients with low malnutrition risk. The GDG agreed that this should be omitted in the current NCG. The rationale for this position results from evidence outlined in the Nutrition Surveys in 2010 (Russell and Elia, 2011) and 2011 (Russell and Elia, 2012). Both surveys demonstrate that risk of malnutrition occurs across all specialties in Irish hospitals, making it difficult to clearly identify patient groups with low risk. The GDG wants to ensure that screening for malnutrition risk becomes embedded in routine practice, before consideration is given to exemptions. This will be revisited in future updates.

Following discussion within the NCG, all agreed with the recommendation that weekly screening for malnutrition risk should be undertaken. The nursing time required for malnutrition screening and the dietetic time required for nutrition assessment was highlighted as potential resource issues. It was agreed that these issues be addressed in the Budget Impact Analysis (BIA) and implementation plan.

On completion of the adaptation process, the GDG approved and agreed the adapted NICE (2006a) recommendations set out in this NCG. Good practice points for implementation were also agreed.

3.1.7 Evidence to decision (EtD) framework

The purpose of the GRADE EtD framework is to assist guideline developers to use evidence in a structured and transparent way to inform healthcare decisions in the context of clinical recommendations (DOH, 2019), in this case to recommend tools to screen for risk of malnutrition in acute hospitals in Ireland.

Benefits and harms, resource use, equity, acceptability, feasibility, and balance of consequences were considered by the GDG – see Appendix 12 for the completed EtD tool. Given the prevalence of malnutrition and risk of malnutrition (see Section 2), the adverse clinical and economic consequences of malnutrition (see Section 2), other national and international recommendations, and considering that potential benefits clearly outweigh potential harms, a strong recommendation was made in favour of screening for malnutrition risk in acute hospitals.

Given the very low certainty of evidence that one tool is better than another for screening accuracy or for prediction of adverse clinical outcomes (HRB-CICER systematic review, 2018), additional considerations were examined. These include:

- The HIQA review (HIQA, 2016) indicated that 65% of Irish hospitals that screened patients for risk of malnutrition already used MUST and 20% used MST. NRS-2002 did not appear to be used, while MNA-SF was used in 5% of hospitals. Experience and expertise in MST and MUST already

exist within Irish hospitals.

- MUST performed well in identifying malnutrition risk in adult hospitalised patients, but not as well in older adults (van Bokhorst-de van der Schueren et al., 2014).
- In the MaNuEL studies, MST performed well in older hospitalised adults (Power et al., 2018b) as did NRS-2002 and MNA-SF.
- A limitation of NRS-2002 is that it is limited to the hospital setting, while MUST is currently used in Irish hospitals and residential care settings and MST is included in wound care documentation in hospital and community settings. This may facilitate effective transition of nutrition care between settings (Elia and Stratton, 2012).
- MST is quick and easy to use, and needs less training.
- MUST is already supported by an education module on HSELanD (HSE, 2016).
- Both MST and MUST include parameters that are considered to be criteria for diagnosing malnutrition as evident in the SGA and MNA. See brief descriptions of both tools below.
- From the HRB-CICER systematic review (2018), the two studies that compared MST with MUST showed that both compared well and were rated as having good validity.
- A NICE costing report (NICE, 2012) demonstrated an overall cost saving in favour of a malnutrition screening and intervention pathway. A detailed assessment conducted by the National Institute for Health Research (Elia, 2015) demonstrated greater potential cost savings with the implementation of a nutrition screening programme in England (using MUST as the NST associated with interventions using oral nutritional supplements).

Taking into consideration these factors, the GDG selected MST and MUST as the two tools for use in general medical and surgical adult patients in Irish hospitals. If NRS-2002 or MNA-SF tools are already in use, these NSTs should continue to be used.

3.1.8 Brief description of recommended malnutrition screening tools

Malnutrition Screening Tool (MST)
This is considered to be a quick and easy NST developed in Australia (Ferguson et al., 1999) for use in adults at hospital admission. The combination of nutrition screening questions with the highest sensitivity and specificity at predicting SGA was used to develop this tool. It has been validated in studies across Europe and Australia for older adults (Power et al., 2018a) and in other settings. Two parameters are included: unintentional weight loss and decreased appetite that are scored separately. Unintentional weight loss is further divided into 4 categories based on weight loss thresholds that are each assigned a score, and a category for 'unsure' that is also scored. An overall score of 0-1 indicates no risk. A score of 2 or more indicates risk of malnutrition and requires referral for assessment of nutritional status or other intervention. The two questions are considered core criteria and should not be altered. An associated care plan developed for local use can be adjusted. Repeat screening is possible with MST.

Malnutrition Universal Screening Tool (MUST)
This NST for adults was developed in the UK by a multidisciplinary group of healthcare professionals (Elia, 2003), and is a British Association for Parenteral and Enteral Nutrition (BAPEN) initiative. It was devised for screening for malnutrition risk across patient types and care settings, although most of the initial validation studies were in the hospital setting (Elia and Stratton, 2012). It aims to detect malnutrition risk and the need for nutrition support. Parameters include BMI categories (<18.5, 18.5-20, and >20 kg/m2),

weight loss in the previous 3-6 months (<5%, 5-10%, and >10%) and an acute disease effect (absence of food in previous 5 days or likely absence in the next 5 days). When objective measurements are not possible, surrogate measurements are suggested, for example surrogate measurements of height include self-reported height, knee height or ulna length (conversion charts are provided). A scoring system is used to categorise risk as: no risk (score of 0), medium risk (score of 1) and high risk (score of 2 or more). The three parameters form core criteria that should not be changed when using the tool. The scoring system is linked to a care plan. The care plan can be adapted for local implementation. Repeat screening is possible with this tool.

Nutrition screening for malnutrition risk in 16 to 18 year olds

HRB-CICER's systematic review (2018) highlighted tools that have been validated in adults, where an adult is usually classed as 18 years of age or older. A malnutrition screening tool (NST) suitable for 16 to 18 year old hospitalised patients was not identified. NSTs developed for children may not cover this age category and are not as well studied as tools developed for adults (Lee, 2018). Although similar principles apply when screening 16 to 18 year olds, adult screening tool parameter cut-off limits may not apply. MST or MUST screening scores in 16 to 18 year olds should be interpreted in the light of these limitations, and clinical judgement used to assess if further nutrition assessment by a dietitian is warranted.

3.1.9 Screening for malnutrition risk and intervention care pathways

Nutrition screening programmes incorporate the initial screening test, the associated nutritional management and the resultant follow-up plan (Elia and Stratton, 2012). A screening tool for risk of malnutrition without a nutrition care pathway is not recommended (van Bokhorst-de van der Schueren et al., 2014). It is the intervention that is expected to improve nutritional and clinical outcomes. Elia and Stratton (2012) also point out that it is the ability of NSTs to predict outcomes of nutritional interventions (such as oral nutrition support) that is more valuable in clinical practice, than those that predict outcomes in the absence of nutritional interventions.

Choosing a nutrition screening tool to screen for malnutrition risk is only the first step in the nutrition care process for each patient. Where risk of malnutrition is identified, nutrition assessment to diagnose and identify the aetiology of the condition is required, and intervention is needed. Figure 3 depicts a care pathway for screening for risk of malnutrition, a range of treatment options and follow-up care. This was adapted from NICE CG32 (NICE, 2006a) using GDG clinical expertise and considers the framework suggested by Elia and Stratton (2012). Development of the pathway was informed by the HRB-CICER systematic review (2018) and evidence tables (2017) (see Annex 1 and Annex 2). This is consistent with the national and international guidelines discussed in this NCG.

The shorter care pathways (Figure 4 and Figure 5) emphasise different aspects of the main care pathway, as clearly and concisely as possible. Implicit in these care pathways is the importance of a multidisciplinary team approach to the nutritional management of patients in acute care. For instance, nurses often lead on screening for malnutrition risk, dietitians lead on nutrition assessment, SLTs lead on dysphagia assessment and management, and medical teams lead on managing the underlying medical conditions that are associated with disease-related malnutrition. HCAs, pharmacists, healthcare catering and food service staff, occupational therapists and physiotherapists, among others, contribute to improving relevant nutritional and clinical patient care outcomes.

It is in the context of multidisciplinary teams that key decision-making and nutrition support for individual patients should be managed. Formal nutrition support teams are recommended by NICE (2006a). Hospital

management structures including Nutrition and Hydration Steering Committees play key roles in providing governance frameworks that enable delivery of efficient and effective nutritional care for hospitalised adults. See Appendix 9 for roles and responsibilities of key multidisciplinary team members which align with the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

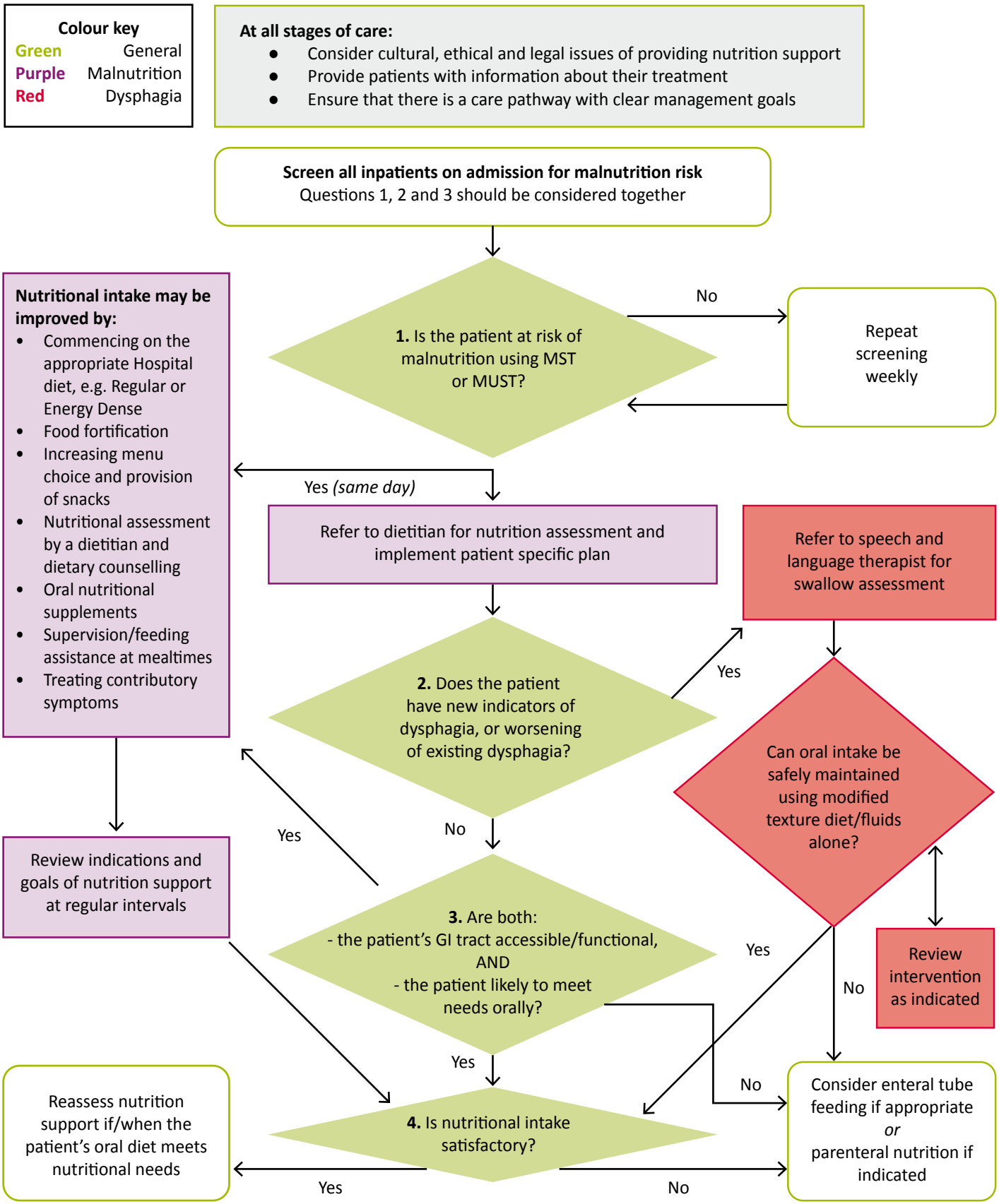
3.1.10 Other considerations

Screening for malnutrition risk in outpatient settings

The outpatient setting was out of scope for this NCG. The importance of this setting for screening for malnutrition has been highlighted (Miller et al., 2018; van Bokhorst-de van der Schueren et al., 2014). LOS is falling internationally and patient care is moving to the outpatient setting. More research is needed to validate existing tools used to screen for risk of malnutrition for use in the outpatient setting. Screening for risk of malnutrition in the outpatient setting is advocated by NICE (2006a) and should be considered in future NCG guideline updates.

Disease or area-specific tools for screening for malnutrition risk

The GDG recognises that screening tools for malnutrition risk in general medical and surgical patients may not be as appropriate for use in patients with disease-specific conditions, for example, in liver disease, or area-specific assessment of malnutrition risk or response to nutrition support, for example in the Intensive Care Unit (ICU). It was outside the scope of this guideline to give recommendations for screening for malnutrition risk in specific diseases or specialist care settings. If validated disease-specific or area-specific NSTs are available that outperform MST or MUST in those clinical conditions/areas, clinical experts and multidisciplinary teams should use an EtD process to decide on the most appropriate tool for the patients under their care.



Notes:

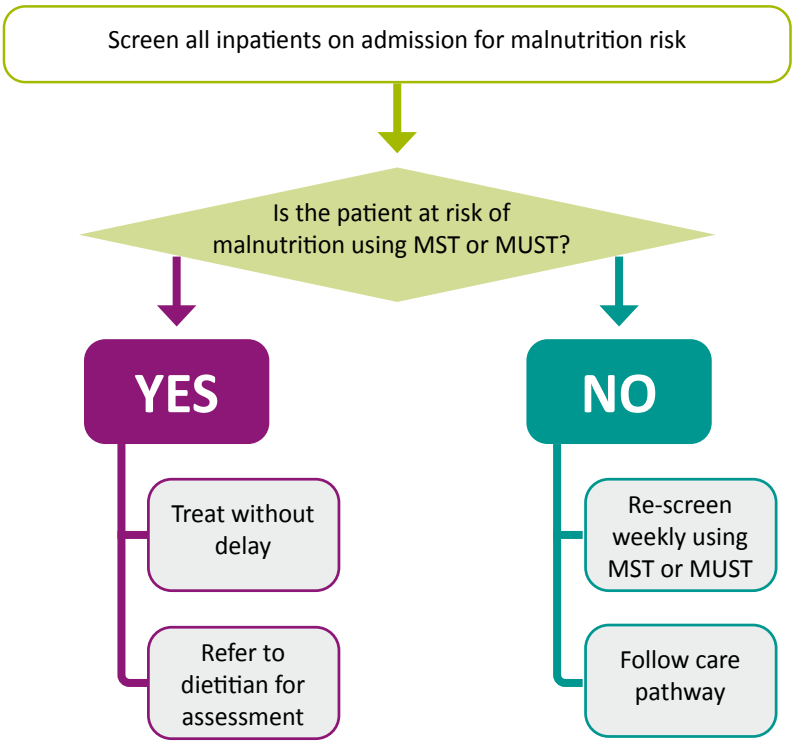
i. Refer to local referral criteria to the dietitian for MST and MUST.

ii. Ask question 2 where patient has not already had a swallow assessment as part of treatment pathway.

iii. For appropriate diet, see HSE Food Nutrition and Hydration Policy algorithm – Appendix 14.

iv. See International Dysphagia Diet Standardisation Initiative (IDDSI) Framework – Appendix 15.

Figure 3. HSE Malnutrition Risk Management Pathway for Hospitalised Adults *(adapted from NICE CG32)*



Treatment Options ***(alphabetical order)***

- Commencing on the appropriate hospital diet, e.g. Regular or Energy Dense
- Food fortification
- Increasing menu choice and provision of high energy snacks
- Oral nutritional supplements
- Supervision/feeding assistance at mealtimes
- Treating contributory symptoms

Key: MST - Malnutrition Screening Tool, MUST - Malnutrition Universal Screening Tool

Notes:

i. Refer to local policy for treatment options
ii. Refer to dietitian and treat on same day as screen.
iii. Refer to local referral criteria to the dietitian for MST and MUST.

Figure 4. Inpatient malnutrition risk screening and treatment pathway

3.1.11 Recommendations for nutrition screening for malnutrition risk

See Appendix 7 for explanation of grading systems used.

Recommendation 1
Screening for malnutrition and the risk of malnutrition should be carried out by healthcare professionals or other healthcare workers with appropriate skills and training.

Grade of recommendation: D (GPP)

Note:
The term 'or other healthcare workers' was added by the GDG to allow other healthcare workers such as healthcare assistants, and student nurses, to participate in the screening process. This will depend on individual hospital governance frameworks, training programmes and staff resources.

Good practice points for implementation

1.1 Training on screening for malnutrition risk should be provided for all nursing staff, nursing students and/or other healthcare workers, such as, healthcare assistants, who provide malnutrition screening for hospitalised adult inpatients.

1.2 Standardised training aligning to this guideline should be embedded into local training programmes, courses and procedures where possible.

1.3 Awareness of the risks and consequences of untreated malnutrition should form part of this training.

1.4 Training records should be kept for all staff that perform screening for risk of malnutrition and be available for purposes of internal and external audit. Consider maintaining these records on an Information Communications Technology (ICT) system, for example, Systems Analysis Programme (SAP).

1.5 Malnutrition awareness days should be run annually in hospitals.

The following are responsible for implementation of recommendation 1:

- Trained nurses are responsible for malnutrition screening. Healthcare assistants and nursing students with the appropriate knowledge and skills may also carry out malnutrition screening under nursing supervision.
- In-hospital education and training should involve dietitians to 'train the trainers', such as key nursing staff, nurse champions and nurse educators, who can then continue to train other nursing staff, healthcare assistants and student nurses.
- Hospital Nutrition and Hydration Steering Committees should organise annual malnutrition awareness days in collaboration with dietetic departments.
- Hospital staff trained in nutrition screening for malnutrition risk, are responsible for keeping personal training records in accordance with professional CPD practices. Records should also be kept by local hospitals, usually by CNMs and preferably on an ICT system.

Recommendation 2
All hospital inpatients on admission should be screened. Screening should be repeated weekly for inpatients.

Grade of recommendation: D (GPP)

Note:
The GDG removed reference to outpatient screening from Recommendation 2, as out of scope for this NCG.

Good practice points for implementation

2.1 All wards should have medically approved weighing equipment, that is, a stand-on scales, a chair scales and access to a hoist or bed weighing scales.

2.2 Each hospital should have access to bariatric weighing equipment and this should be readily available at the point of care when required.

2.3 All wards should have a stadiometer to measure height, and a measuring tape (for ulna length, knee height, or mid upper arm circumference) for less mobile patients.

2.4 Patients should be weighed weekly with correctly calibrated weighing equipment.

2.5 Height should be measured initially for all patients on admission. In less mobile patients, surrogate techniques can be used to estimate height, or reported height can be used if known by patient or carer.

2.6 Screening for risk of malnutrition should take place on admission, or at least within 24 hours of admission.

2.7 Patients identified as at risk of malnutrition should be referred to the dietitian for nutrition assessment – see local referral criteria.

2.8 Patients identified as at risk of malnutrition should commence on the locally agreed nutrition care pathway without delay (same day).

2.9 Malnutrition screening rates should be monitored at local level, e.g. 6 monthly, as a minimum and should be available for internal and external audit.

2.10 Consider audits of malnutrition risk prevalence at agreed intervals.

The following are responsible for implementation of recommendation 2:

- Hospital managers should ensure that appropriate equipment for malnutrition screening as advised by the Nutrition and Hydration Steering Committee is available on all wards and that access to bariatric equipment is available when needed.
- Ward Clinical Nurse Managers (CNMs) are responsible for general maintenance and correct storage of equipment needed for malnutrition screening, and for reporting damaged equipment that needs repair or replacement, per local hospital procedure.
- Calibration of weighing scales should take place yearly, or as per local service agreement/contract.
- Ward CNMs should check malnutrition screening rates and timeliness of screening (within 24 hours of admission), for example, monthly checks.
- Hospital Nutrition and Hydration Steering Committees should audit malnutrition screening rates. Results reporting and action taken should be in keeping with each hospital's overarching accountability mechanism and governance framework. This information should be made available to the local Quality and Safety Directorate to inform the national data as required.

- Hospital Nutrition and Hydration Steering Committees are responsible for local hospital audit of malnutrition risk prevalence rates. This information should be made available to the local Quality and Safety Directorate to inform the national data as required.

Recommendation 3
Use a validated screening tool, e.g. Malnutrition Screening Tool (MST) or Malnutrition Universal Screening Tool (MUST), to screen for malnutrition risk in all adults admitted to acute hospitals. If one of the validated tools from Table 2 is currently being used, there is no need to change practice.

Quality of evidence: Very Low **Strength of recommendation: Strong**

Table 2. Malnutrition Screening Tools

MNA-SF	Mini Nutritional Assessment - Short Form (for older adults, e.g. >60 years)
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NRS-2002	Nutrition Risk Score 2002

Note:
Different grading system used for Recommendation 3 - see Appendix (7b)

Good practice points for implementation

3.1 MST or MUST should be used for screening for risk of malnutrition in general medical and surgical patients, unless MNA-SF or NRS-2002 is already implemented.

3.2 Disease-specific, or area-specific malnutrition screening tools validated for use in specific patient populations, may replace the tools recommended above if clinically indicated.

3.3 The malnutrition screening tool chosen should have an associated explicit plan of action for patients who are identified as at malnutrition risk – see Figure 3 and Figure 4.

3.4 The malnutrition screening tool and result should be incorporated into standard processes, e.g., nursing admission forms, or electronic health records.

3.5 Fidelity to the malnutrition screening tool used should be measured locally and made available for internal and external audit.

Note:
Fidelity is the degree to which the malnutrition screening tool is delivered exactly as set out and intended by those who developed it.

The following are responsible for implementation of recommendation 3:

- Each Hospital Nutrition and Hydration Steering Committee should decide whether to use either MST or MUST across all hospital wards (one tool per hospital), in conjunction with Clinical Nurse Managers and the Dietitian Manager.
- The multidisciplinary team informed by clinical nutrition experts, such as dietitians, should decide if a disease-specific or area-specific malnutrition screening tool is more appropriate taking into consideration benefits and harms.
- CNMs should perform spot checks to ensure fidelity to the malnutrition screening tool used on the ward.
- Hospital Nutrition and Hydration Steering Committees should monitor fidelity to the screening tool hospital-wide, as part of the nutrition audit process.

3.2 Key question and evidence statements: oral nutrition support

3.2.1 Key question 4 for oral nutrition support

See Appendix 4 for full PICO/S format.

Key question 4	What are the indications for, and outcome benefits of using oral nutrition support, on mortality, hospital readmissions, length of hospital stay, complications/morbidity, quality of life, nutritional status and functional status in malnourished adult hospitalised patients, or those at risk of malnutrition? What is the cost–effectiveness and net budget impact of using oral nutrition support in hospital?

Notes:

i. Adult: This refers to a patient admitted to an adult ward in hospital. In Irish hospitals this could mean patients 16 years of age or older. More often, this means patients who are 18 years of age or older.

ii. Oral Nutrition Support includes:

- Food fortification - food fortified with protein, carbohydrate and/or fat (with or without minerals or vitamins);
- The provision of oral nutritional supplements (ONS) (products used in oral nutrition support given with the aim to increase nutritional intake) as extra nutrition to regular meals;
- Changing meal patterns, the provision of additional snacks and/or the provision of dietary advice to patients on how to increase overall nutritional intake.

3.2.2 Evidence summary

Sources of evidence used for this section of the National Clinical Guideline (NCG) include HRB-CICER evidence tables (see Annex 2), NICE CG32 (NICE, 2006a), NICE evidence tables (NICE, 2006b), evidence update (NICE, 2013a) and surveillance review data (NICE, 2017). NICE CG32 recommendations for oral nutrition support were formally adapted for this guideline. Comparisons of adapted recommendations are made with current published national guidelines, and with international guidelines that were identified through a systematic search (see Section 2.8 on guideline methodology).

3.2.2.1 Issues to consider when reviewing the evidence

All studies have been influenced by some fundamental issues relating to research in the area of nutrition support. This includes, but is not limited to:

- Varying definitions of malnutrition used.
- Various screening tools used to determine malnutrition risk with differing sensitivities and specificities across different patient populations and healthcare settings.
- Differences in care pathways used across and within settings for patients identified at risk of malnutrition.
- The ethics of not providing nutrition support to patients who cannot maintain their nutritional status. It is often not feasible or ethical to have a ‘no nutrition’ control group. Hence, control groups used for oral nutrition support studies may have different baseline intakes which can impact on outcomes measured.

Methodological problems in nutrition-related studies noted by NICE CG32 (2006) are relevant, notably:

- Significant heterogeneity in the clinical and nutritional outcomes reported.
- Lack of information on the period prior to intervention, particularly regarding nutritional status and dietary intake parameters.
- Weak characterisation of patient populations in terms of clinical diagnoses and clinical background.

- Lack of information and wide variation on the actual amount of nutrition received during intervention. Studies that do not outline whether intervention dose was achieved should be interpreted with caution. Inadequate dosing will reduce effectiveness of therapies being tested.
- Potential confounding factors when reporting outcomes in small trials. Small sample sizes can result in insufficient power to determine a true effect.
- Confining studies to acute care makes generalisation of conclusions difficult and may miss out on later outcome effects. Study periods are often too short to determine a true effect.

3.2.2.2 Oral nutrition support clinical outcomes from HRB-CICER evidence tables

General indications for oral nutrition support

An update of the evidence tables based on NICE CG32 was undertaken by HRB-CICER on behalf of the GDG to identify studies on clinical and cost-effectiveness of oral nutrition support for the outcomes of mortality, nutritional status and functional status, hospital readmissions, length of hospital stay, complications/morbidity, and quality of life, in malnourished adult hospitalised patients, or those at risk of malnutrition. Nine clinical publications were identified, including three systematic reviews and six randomised controlled trials (RCTs). HRB-CICER evidence tables (see Annex 2) were reviewed by the GDG.

The Cochrane review by Baldwin et al (2016) included 41 RCTs that aimed to improve nutritional intake in adults at risk of malnutrition in any healthcare setting, using one or more supportive interventions. This high-quality systematic review included the following interventions: changes to the organisation of nutritional care (13 trials), changes to the feeding environment (5 trials), modification of meal profile or pattern (12 trials), supplementation of meals (10 trials) and home meal delivery systems (1 trial). Approximately one-third of the studies (15 trials) were based in the hospital setting. The quality of evidence reported was moderate to very low, with risk of bias unclear in the majority. There was a high risk of heterogeneity among trials. It is noteworthy that this Cochrane review excluded all trials of individualised nutrition support including dietary counselling (that is, where the individual was required to understand and act upon specific nutritional advice), or individually prescribed oral nutritional supplements (ONS). Food-based or ONS interventions were included only when provided as an institution-led intervention. This must be considered when interpreting results.

Evidence from Baldwin et al (2016):

- Supportive interventions to improve nutritional care resulted in minimal weight gain.
- A lower risk of all-cause mortality for supportive interventions from mainly hospital-based trials was noted based on moderate quality evidence. The risk ratio (RR) for all-cause mortality was 0.78 (95% confidence interval (CI) 0.66 to 0.92); P = 0.004).
- Ten of the 15 hospital trials considered length of stay (LOS). Five of these were included in a meta-analysis (very low-quality evidence) and failed to demonstrate a significant effect.
- Three of the 41 trials reported adverse events with ONS (very low-quality evidence), citing gastrointestinal intolerance or discontinuation due to patient refusal or taste issues.

A systematic review by Bally et al (2016) looked at the effects of oral nutrition support strategies in 20 randomised controlled trials (RCTs) and enteral tube feeding in two studies, on outcomes in medical inpatients with malnutrition, or at risk of malnutrition. Oral nutrition support included dietary advice, food fortification and use of ONS. The quality of the studies included was low overall, with risk of bias unclear for the majority and high heterogeneity across studies.

Evidence from Bally et al (2016):

- There was no significant difference between intervention and control groups for the primary outcome of mortality (22 RCTs).
- Sub-group analyses showed no difference in LOS or healthcare associated infections (HAI) secondary outcomes.
- Sub-group analyses by intervention type demonstrated that intervention significantly improved weight, and intakes of protein and energy.
- Non-elective readmissions were significantly decreased by the intervention (20.5% vs 29.6%; risk ratio, 0.71; 95% CI, 0.57-0.87).

A second high-quality Cochrane systematic review by Feinberg et al (2017) included 244 RCTs in hospitalised patients at malnutrition risk, examining outcome effects of ONS (55 trials), general nutrition support (9 studies), fortified food (2 studies), and mixed experimental interventions (12 trials). The remaining 166 trials looked at parenteral nutrition and enteral tube feeding. The level of evidence was low and all studies were considered to be at high risk of bias.

Evidence from Feinberg et al. (2017) - oral nutrition support trials only:

- There was no statistically significant difference between intervention and control groups for the primary outcome of mortality or serious adverse events.
- Weight and BMI at the end of the intervention did not differ significantly from controls.

Of the six RCTs identified in the evidence tables (see Annex 2), two involved the use of ONS (Deutz et al., 2016; Huynh et al., 2015), two involved fortified food (Munk et al., 2014; Stelten et al., 2015), one involved an individualised nutrition care plan with dietary advice (Cano-Torres et al., 2017), and one was a multifaceted approach encompassing malnutrition screening, provision of ONS and identifying patients who needed feeding assistance (Schultz et al., 2014). The majority of studies had a high or unclear risk of bias and were of low to acceptable quality. The study by Deutz et al (2016) used high protein ONS that contained beta-hydroxy-beta-methylbutyrate (HMB) in the intervention group. It is not possible to determine whether results were influenced by the HMB component.

Evidence from RCTs identified by HRB-CICER:

- There was no significant difference in the composite primary outcome of death or non-elective readmission within 90 days, comparing two servings of a specialised ONS versus placebo in over 65 year old medical malnourished inpatients (Deutz et al., 2016). Supplements (intervention and placebo) were continued for 90 days following discharge.
- Looking at 90 day mortality as an individual outcome, mortality was significantly lower in the ONS intervention group (4.8% versus 9.7%, p=0.018) (Deutz et al., 2016).
- There was an increase in body weight at day 30 following discharge and improved odds of better nutritional status at 90 days in the ONS intervention group (Deutz et al., 2016).
- A significant weight gain (2.6% versus 1.4%, p=0.0025) was reported at 4 weeks in a multicentre RCT comparing ONS plus dietary counselling, with dietary counselling alone in malnourished patients in hospital or following discharge, in favour of the supplemented group (Huynh et al., 2015).
- Consumption of protein-supplemented hospital food was associated with a significant increase in the number of patients reaching over 75% of their protein requirements compared with those on the standard hospital diet (Munk et al., 2014). Length of hospital stay was similar for both groups.

- Provision of an ad libitum protein-enriched bread and drinking yoghurt led to significantly higher protein intakes when assessed after three days of intervention (as determined by weighed food intakes and mealtime observations), and a significantly higher mean protein intake compared to controls, in a single-blind RCT by Stelten et al (2015).
- There was an association shown between providing an individualised care plan to meet energy and protein requirements, using dietary assessment and dietary advice, and a lower average length of hospital stay (6.4 days versus 8.4 days, p=0.03). The six month mortality rate was similar in both groups (Cano-Torres et al., 2017).
- There was no association shown between a multifaceted intervention and outcomes (% weight change, absolute weight change; change in BMI), after one week (Schultz et al., 2014).

Oral nutrition support in patients with dysphagia
The HRB-CICER evidence tables do not address oral nutrition support in patients with dysphagia separately. No evidence pertaining specifically to dysphagia arose during the review.

Oral nutrition support in surgical patients
The HRB-CICER evidence tables do not look specifically at surgical hospitalised patients as a separate group. Surgical patients were included in two of the systematic reviews identified (Baldwin et al., 2016; Feinberg et al., 2017), but not in the third systematic review (Bally et al., 2016). One of the systematic reviews did subgroup meta-analyses on ONS in gastroenterological surgery patients (10 studies), transplant patients (1 study) and orthopaedic patients (4 studies) – no benefits or harms were identified for any of the outcomes tested. Surgical inpatients were included in three of the six RCTs identified (Huynh et al., 2015; Munk et al., 2014; Schultz et al., 2014). These RCTs did not consider surgical patients separately in sub group analyses. Overall results are outlined above.

In summary
HRB-CICER evidence tables show outcome benefits such as weight increase and improved macronutrient intakes, although weight benefits are not consistent throughout. Mortality and morbidity benefits are unclear. Effects of oral nutrition support on LOS are inconsistent. Functional and quality of life effects of nutritional interventions continue to be lacking in the current literature. Overall consensus from the GDG was that the HRB-CICER evidence tables did not provide sufficient evidence to generate new recommendations, nor did the evidence identified conflict in principle with NICE CG32 (NICE, 2006a) recommendations on oral nutrition support. The GDG adapted the NICE CG32 (NICE, 2006a) recommendations using the formal ADAPTE process as described in Section 2.

3.2.2.3 NICE Clinical Guideline evidence and adaptation of NICE recommendations

General indications for oral nutrition support and outcome effects
A meta-analysis of 40 RCTs across all care settings, performed for NICE CG32 (NICE, 2006a) concluded that use of oral nutritional supplements was associated with statistically significant increases in weight (reported in 22 studies), and significant reductions in mortality (reported in 25 studies) and clinical complications (reported in 9 studies). This meta-analysis on the outcome effects of oral nutrition support versus standard care in malnourished patients, found insufficient evidence to make recommendations for individual settings. Hence, patients from all settings were included, assuming that any benefits demonstrated would occur regardless of the setting for the intervention. In contrast the HRB-CICER evidence tables (see Annex 2) summarised and presented evidence on the effectiveness of oral nutrition support in the acute care setting only. Disease-specific studies are included in the NICE meta-analyses (NICE, 2006a), for example, patients post-caesarean and gynaecological surgery. This was not the case in the HRB-CICER evidence tables (2017) and a meta-analysis was not conducted.

These differences may partly explain why results from our systematic review do not fully reflect the strength of the evidence found from the NICE meta-analysis (2006a), particularly regarding mortality and morbidity. The methodological problems in nutrition research mentioned above may also have played a role. See NICE CG32 (NICE, 2006b) appendices for related tables of evidence and reference details.

A reduction in LOS (reported in 14 studies) was not demonstrated by the NICE meta-analysis for NICE CG32 (NICE, 2006a) – although issues that may have impacted on interpretation of results were mentioned for four of these studies. The evidence update in 2013 (NICE, 2013a) and surveillance review in 2017 (NICE, 2017) provide some additional support for the impact of oral nutrition support on LOS. RCTs in colorectal surgical patients (Sharma et al., 2013), burns patients (Ostadrahimi et al., 2016), and hip fracture patients (Myint et al., 2013) showed reduced mean or median LOS in intervention groups. HRB-CICER evidence tables (see Annex 2) demonstrated mixed results for LOS effects. A systematic review of the cost-effectiveness of using standard ONS in the hospital setting (Elia et al., 2016) was identified by both HRB-CICER and the NICE 2017 surveillance review (NICE, 2017). A secondary outcome from this review indicated a significantly shorter mean or median LOS ($p = 0.039$) in favour of the intervention in 10 of the 12 studies examined.

The GDG altered recommendation 9 (see 3.2.8) in the general indications for oral nutrition support during the adaptation process to align with scope of this NCG and to add clarity.

Oral nutrition support in patients with dysphagia

Texture modification is a common intervention for dysphagia (swallowing impairment). There is a known link between the presence of dysphagia and compromised nutritional status (NICE, 2006a). For NICE CG32 (NICE, 2006a), because of a lack of RCTs guiding options in this area, a specialist subgroup of speech and language therapists (SLTs) with a special interest in dysphagia developed recommendations, which were agreed by informal consensus with NICE guideline developers.

The NCG GDG considered and formally adapted NICE CG32 dysphagia-related oral nutrition support recommendations. A consensus was reached to change the NICE wording ‘stable’ in recommendation 15 to ‘clinically stable’ to add clarity. Based on consultation feedback the word ‘dysphagia’ was added to recommendation 4, for the purpose of providing consistency in terminology used in this NCG. The adapted NICE guidelines (NICE, 2006a) that pertain to oral nutrition support in patients with dysphagia are listed below (see 3.2.8), along with good practice points generated by this GDG and the inpatient malnutrition and dysphagia risk care pathway – see Figure 5.

Oral nutrition support in surgical patients

The majority of the evidence identified by NICE CG32 (NICE, 2006a) concerned post-operative oral nutrition support (mainly as oral nutritional supplements). Statistically significant improvements in nutritional status were demonstrated from several of the studies reviewed and significant reductions in adverse outcomes in supplemented groups were also shown. In abdominal surgery patients, early feeding was associated with a higher incidence of vomiting. Anastomotic dehiscence, intra-abdominal abscess incidence, wound infections, pneumonia and death were unaffected by early feeding (<24 hours after surgery). An additional RCT identified in the 2017 surveillance review (NICE, 2017) on postoperative colorectal surgical patients demonstrated a significantly higher energy intake and a significantly shorter median LOS in the group supplemented with low volume, high energy ONS compared to a standard post-operative diet (Sharma et al., 2013).

When adapting NICE CG32 (NICE, 2006a), the GDG made a decision to omit the recommendation specific to post-caesarean and gynaecological surgical patients as this was considered area-specific and outside the scope of the current NCG. The other NICE recommendations specific to oral nutrition support and surgery were considered relevant, evidence-based, acceptable, feasible and applicable to the Irish context.

3.2.3 Comparison of adapted NICE recommendations with other national guidelines

General indications for oral nutrition support

The Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) recommends that for patients identified as at risk of malnutrition, a patient-centred plan should be developed and implemented and promotes the use of oral nutrition support in these patients. This policy supports the importance of improved energy and protein provision from hospital food as standard, while delivering micronutrient needs, by providing minimum nutritional standards for the regular hospital diet, the energy dense diet and commonly prescribed therapeutic diets. According to this policy, the regular hospital diet should provide a minimum of 2100-2400kcal and 90g protein per patient per day. As described in the Food Nutrition and Hydration Policy for Adults in Acute Hospitals (HSE, 2018b), good liaison between Food Service Staff/Healthcare Catering departments and Dietetic departments is paramount for the delivery of a suitable fortified menu to patients in Irish hospitals. The policy outlines the nutrition standard for mineral and vitamin intakes based on European Food Safety Authority (EFSA) and the US Institute of Medicine (IOM) recommendations as described in the report by the Scientific Committee of the Food Safety Authority of Ireland (FSAI) (FSAI, 2018).

The National Wound Management Guidelines (HSE, 2018a) highlight the importance of adequate protein, energy, vitamins and minerals in wound healing and the adverse effects of inadequate dietary provision and poor nutritional status on the healing process. The known link between malnutrition and pressure ulcer development is emphasised. Indications for nutrition support are in keeping with NICE CG32 (NICE, 2006a). Oral nutrition support is recommended as fortified foods and/or high energy and protein oral nutritional supplements for patients with established deficiency and pressure ulcers, when nutritional requirements cannot be achieved by dietary intake. In the absence of nutritional deficiency, routine prescribing of oral nutritional supplements for all patient groups for the prevention of pressure ulcer development is not recommended. The guideline supports supplementation with micronutrients when there is concern over adequacy but does not recommend routine supplementation beyond normal requirements in the absence of deficiency. Recommendations are largely in line with NICE CG32 (NICE 2006a) adapted guidelines below.

Oral nutrition support in patients with dysphagia

In 2018, the HSE endorsed the implementation of the International Dysphagia Diet Standardisation Initiative (IDDSI) Framework (IDDSI, 2017). This global standard is applicable across the age spectrum and to all healthcare settings. The framework (see Appendix 15) is underpinned by a systematic review examining the impact of fluid thickness and food texture on swallowing behaviour (Steele et al., 2015). The dysphagia diet framework consists of a continuum of eight levels (0-7). Detailed descriptors and simple measurements are available for all levels on the IDDSI website (http://iddsi.org/framework/). The Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) gives key recommendations that incorporate the framework used by IDDSI and that outline minimum standards for the provision of textured-modified diets and thickened liquids to hospitalised adults with dysphagia. The NICE recommendations pertaining to dysphagia (NICE, 2006a) complement the IDDSI framework (IDDSI, 2017) and the Food, Nutrition and Hydration Policy (HSE, 2018).

Oral nutrition support in surgical patients

Fasting guidelines are described in the HSE Elective Surgery Programme Model of Care (HSE, 2011), and the Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b). Recommendations from the policy include minimising fasting restrictions related to investigations and surgical procedures and promoting the use of carbohydrate-rich drinks before elective surgery. These support the recommendations and good practice points in this NCG.

3.2.4 Comparison of adapted NICE recommendations with other international guidelines

General indications for oral nutrition support

Three guidelines were identified between March 2017 and December 2018 by the European Society for Clinical Nutrition and Metabolism (ESPEN) that concern populations relevant to this NCG. Two relate to medical patients and one relates to surgical patients. ESPEN uses a standard approach to guideline development (Bischoff et al., 2015), that includes a grading system similar to that used in NICE CG32 (NICE, 2006a).

ESPEN nutrition support guidelines for 'polymorbid' internal medicine patients, that is, they have two or more chronic health conditions (Gomes et al., 2017), outline recommendations for the nutritional management of medical inpatients with multiple comorbidities. Both ESPEN (Gomes at al., 2017) and NICE (2006a) guidelines give a high-grade recommendation (grade A) for the use of oral nutrition support in patients who are malnourished or at risk of malnutrition and recommend the use of food fortification for these patients (grade B). In addition, and similar to NICE (2006a), these guidelines also recommend ensuring micronutrient adequacy, and supplementing micronutrients when inadequate intake is suspected. Early nutrition support (within 48hr of hospital admission) is recommended by ESPEN to decrease the risk of sarcopenia in patients with multiple co-morbidities (Gomes et al., 2017).

ESPEN produced guidelines to prevent and/or treat malnutrition and dehydration in older persons (Volkert et al., 2019) across the continuum of care. Supportive therapies outlined include nursing interventions, education and nutrition counselling by qualified dietitians, food modification and fortification, as well as ONS. Ensuring micronutrient adequacy is recommended and attention to hydration status is highlighted. High-grade recommendations (grade A) are given for ONS interventions in hospitalised older adults with malnutrition or at risk of malnutrition, and older patients with hip fracture post-operatively (Volkert et al., 2019).

Oral nutrition support in patients with dysphagia

Assessment, treatment and follow up by an experienced SLT is recommended by ESPEN (Volkert et al., 2019) for older adults who show signs of dysphagia, in consultation with a dietitian to ensure nutrition and hydration adequacy. The importance of a medication review is also highlighted for patients with dysphagia. This emphasises the multidisciplinary team approach needed to ensure that patients meet their nutritional requirements if started on a texture-modified diet. This is in alignment with recommendations and good practice points in the current NCG.

Oral nutrition support in surgical patients

ESPEN guidelines for clinical nutrition in surgery (Weimann et al., 2017) focus on the nutritional aspects of the Enhanced Recovery After Surgery (ERAS) concept. ESPEN makes several key recommendations for surgical patients that concern fasting and oral nutrition support relevant to this NCG. These fasting recommendations are in agreement with the European Society of Anaesthesiologists guidelines on peri-operative fasting in adults and children (Smith et al., 2011). Keeping fasting to a minimum and continuing dietary intake after surgery without interruption is promoted by ESPEN (Weimann et al., 2017). Oral pre-

operative carbohydrate treatment is recommended (instead of overnight fasting) the night before and two hours before surgery (Weimann et al., 2017). A high-grade (grade A) recommendation is made for the pre-operative use of ONS in malnourished cancer patients and in patients with a high nutritional and clinical risk, for example, elderly patients with sarcopenia (Weimann et al., 2017).

Good practice points with strong consensus from the ESPEN (Weimann et al., 2017) concern peri-operative oral nutrition support in patients who are malnourished or at high risk of malnutrition and in patients with an anticipated fast of more than five days peri-operatively. ESPEN (Weimann et al., 2017) also recommends that ONS should be commenced in patients prior to hospital admission once identified to be malnourished or at risk of malnutrition. ESPEN promotes regular assessment of nutritional status and continued nutrition support, including dietary counselling by a qualified healthcare professional, after discharge for patients who receive peri-operative nutrition support, but cannot meet their nutritional requirements without support.

Adapted recommendations from NICE (2006a) and related good practice points in this NCG are largely supported by the recommendations and good practice points made by ESPEN (Weimann et al., 2017).

3.2.5 Discharge planning and adapted recommendations

The British Association of Enteral and Parenteral Nutrition (BAPEN) highlight the cyclical relationship between malnutrition, poor clinical outcomes and increased resource use known as the 'malnutrition carousel' (BAPEN, 2016). Oral nutrition support attempts to interrupt this cycle. Readmission rates may be significantly reduced with appropriate oral nutrition support (Bally et al., 2016).

NICE (2006a) gives a general recommendation on when oral nutrition support should be stopped (adapted recommendation 10 below). The ideal duration of oral nutrition support provision is largely unknown (Gomes et al., 2017), but is likely influenced by patient-specific and condition-dependent factors and should be based on ongoing monitoring (Ukleja et al., 2018). Several international guidelines recommend the continuation of oral nutrition support post-discharge for patients who are malnourished or at risk of malnutrition (Gomes et al., 2017; Weimann et al., 2017; Wischmeyer et al., 2018). A multidisciplinary team approach to decision-making is recommended (Dietitians Association of Australia (DAA), 2009; NICE 2006; Gomes et al., 2017; Ukleja et al., 2018). The Food Nutrition and Hydration Policy for Adults in Acute Hospitals (HSE, 2018b) also supports the multidisciplinary approach and gives recommendations for discharging patients to the community. An outline of nutrition-related information should be included in the discharge plan and the GP letter. This supports the good practice points outlined in this NCG.

Changes to the reimbursement system for standard ONS have recently been introduced by the Primary Care Reimbursement Service (PCRS). The guidance used was developed independently of the current guideline development process and does not affect the use of ONS in acute care settings but may influence discharge planning processes. As this came to light towards the end of the NCG development process, the impact of the changes on the acute sector, both in terms of cost and clinical outcomes could not be assessed. Details are available at: https://www.hse.ie/eng/about/who/cspd/ncps/medicines-management/oral-nutritional-supplements.

3.2.6 Oral nutrition support summary

- The HRB-CICER evidence tables largely support the overall guidance given by NICE in CG32 (NICE, 2006a) for the use of oral nutrition support.
- The 2017 surveillance review of NICE CG32 (NICE, 2017) also supports the original NICE (2006a) recommendations for oral nutrition support.
- The adapted NICE recommendations are in keeping with other international recommendations from ESPEN (Gomes et al., 2017; Volkert at al., 2018), and HSE National guidelines (HSE, 2018a), and policy (HSE, 2018b).
- Adapted NICE (2006a) recommendations on indications for oral nutrition support are presented below, accompanied by good practice points generated by this GDG.

3.2.7 Other considerations

Hydration in hospitalised patients

Hydration needs in hospitalised patients are not specifically covered by this NCG, but are considered in the Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) which includes minimum standards for oral hydration provision. The policy document does not cover intravenous (or parenteral) hydration. The GDG recognises the importance of hydration and its management in hospitalised patients and supports recommendations in the policy document. A guideline developed by NICE (NICE, 2013b) offers best practice advice on the care of hospitalised patients over 16 years who are receiving intravenous fluid therapy. The GDG considered this to be a useful and rigorously developed guideline.

Oral nutrition support in patients who are overweight or obese

Oral nutrition support in patients who are overweight or obese was not considered separately in this report. The National Wound Management Guidelines (HSE, 2018a) give separate recommendations for care of the obese patient with or at risk of developing a pressure ulcer. Providing adequate nutrition support and ensuring access to appropriate bariatric equipment is highlighted (HSE, 2018a). A recent observational study (Agarwal et al., 2018) found that one-in-three non-critically ill malnourished obese adults had poor food intake in hospital and were the least likely to receive nutrition support. In this study, malnourished patients across all BMI categories had longer LOS, but this was longest in obese class III category patients. Malnourished obese patients had the highest proportion of 30 day and 90 day in-hospital mortality. Coding for malnutrition occurred significantly less often, in malnourished patients who were overweight or obese. International guidelines on nutrition support in hospitalised adult patients with obesity (Choban et al., 2013) recommend that all patients, including those with a high BMI, should be screened for malnutrition risk, and those identified at risk should be assessed, and considered for nutrition support as appropriate. The recommendations in this NCG are applicable to all hospitalised patients who are malnourished or at risk of malnutrition regardless of BMI category.

Ethical considerations and oral nutrition support in palliative care

This NCG does not give specific recommendations on ethical issues relating to oral nutrition support provision. In keeping with NICE CG32 (NICE, 2006a), the GDG understands that nutrition support may not always be appropriate and that any decision to withhold or withdraw nutrition support should be considered in the context of Irish policies and legislation. The National Consent Policy (HSE, 2014) and the Assisted Decision-Making (Capacity) Act (2015) should be considered when patients need support with decisions. An advance healthcare directive may also need to be considered. This may designate authority to a healthcare representative to interpret the will and preferences of the directive-maker and consent or refuse treatment based on their known will and preferences (Irish Hospice Foundation, 2016).

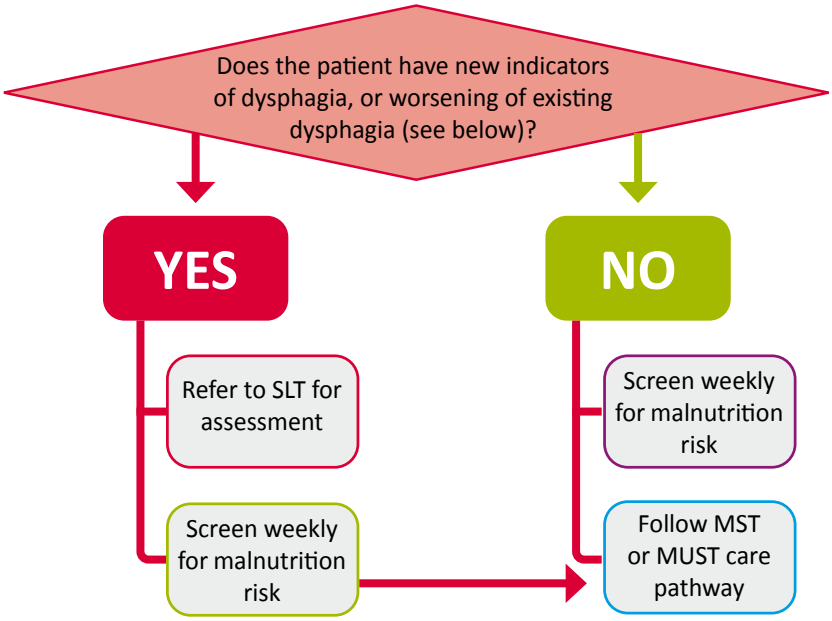
Other useful resources for clinical practice include:

- An Irish Hospice Foundation guideline on: Palliative care for the person with dementia guidance document 4: management of hydration and nutrition (Irish Hospice Foundation, 2016).
- An Irish Nutrition and Dietetic Institute (INDI) resource on: Nutrition and dementia: a practical guide when caring for a person with dementia (INDI, 2016).
- An ESPEN guideline on: Ethical aspects of artificial nutrition and hydration (Druml et al., 2016).

Ethical considerations are particularly important when making decisions on enteral tube feeding and parenteral nutrition and should be included in any future guideline on these modes of nutrition support.

Pharmaconutrients, immunonutrition and disease-specific ONS

Oral nutrition support using non-standard ONS was not the focus of this guideline, or the HRB-CICER update (2017) of evidence tables from NICE CG32 on oral nutrition support. Non-standard ONS contain specific nutrients that may have effects over and above their nutritional effects, for example, effects on the immune system. Hence, recommendations are not made on specific dietary constituents (other than standard macronutrients and micronutrients). Research on ONS that contain specific nutrients (such as glutamine, arginine, n-3 fatty acids), featured in the NICE 2017 surveillance report (NICE, 2017), but no changes in recommendations were advised. Other international guidelines describe similar research and include recommendations that apply to specific patient groups (Arends et al., 2016; Arends et al., 2017; Gomes at al., 2017; Weimann et al., 2017; Wischmeyer et al., 2018). National guidelines also include recommendations (HSE, 2018a) on ONS containing arginine for Grade 3 and above pressure ulcers.
The clinical application of non-standard ONS warrants further consideration and research and could be considered in future updates of this NCG.



Obvious dysphagia indicators
(adapted from NICE, 2006a)

- Difficult, painful chewing or swallowing
- Regurgitation of undigested food
- Difficulty controlling food or liquid in the mouth
- Drooling
- Hoarse voice
- Coughing or choking before, during or after swallowing
- Globus sensation
- Nasal regurgitation
- Feeling of obstruction
- Unintentional weight loss – for example, in people with dementia

Less obvious dysphagia indicators
(adapted from NICE, 2006a)

- Change in respiration pattern
- Unexplained temperature spikes
- Wet voice quality
- Tongue fasciculation (may be indicative of motor neurone disease)
- Xerostomia
- Heartburn
- Change in eating habits – for example, eating slowly or avoiding social occasions
- Frequent throat clearing
- Recurrent chest infections
- Atypical chest pain

Key: SLT: Speech and Language Therapist; MST: Malnutrition Screening Tool; MUST: Malnutrition Universal Screening Tool.

Figure 5. Inpatient malnutrition risk and dysphagia pathway

3.2.8 Recommendations for oral nutrition support

3.2.8.1 General indications for oral nutrition support

Recommendation 4
Healthcare professionals should consider using oral, enteral or parenteral nutrition support, alone or in combination, for people who are either malnourished or at risk of malnutrition. Potential swallowing problems (dysphagia) should be taken into account.

Grade of recommendation: D (GPP)

Recommendation 5
Healthcare professionals should ensure that people having nutrition support, and their carers, are kept fully informed about their treatment. They should also have access to appropriate information and be given the opportunity to discuss diagnosis and treatment options.

Grade of recommendation: D (GPP)

Recommendation 6
Healthcare professionals should consider oral nutrition support to improve nutritional intake for people who can swallow safely and are malnourished or at risk of malnutrition.

Grade of recommendation: A

Recommendation 7
Healthcare professionals should ensure that the overall nutrient intake of oral nutrition support offered contains a balanced mixture of protein, energy, fibre, electrolytes, vitamins and minerals.

Grade of recommendation: D (GPP)

Recommendation 8
If there is concern about the adequacy of micronutrient intake, a complete oral multivitamin and mineral supplement providing standard requirements, should be considered by healthcare professionals with the relevant skills and training in nutrition support who are able to determine the nutritional adequacy of a patient's dietary intake.

Grade of recommendation: D (GPP)

Recommendation 9
The prescription should be reviewed according to the person's progress, and care should be taken when:

- using food fortification which tends to supplement energy and/or protein without adequate micronutrients and minerals
- using supplements that meet full energy and protein needs, as they may not provide adequate micronutrients and minerals.

Grade of recommendation: D (GPP)

Recommendation 10
Oral nutrition support should be stopped when the patient is established on adequate oral intake from normal food.

Grade of recommendation: D (GPP)

Notes:

i. Recommendation 4: The word 'dysphagia' was added to provide consistency in terminology used.

ii. Recommendation 8 – addition of 'standard requirements' in place of 'the reference nutrient intake for all vitamins and trace elements'.

iii. Recommendation 9: 'Prescription' here refers to food fortifying agents and oral nutritional supplements. The GDG removed the reference to 'feeds' from second bullet point as out of scope, replaced the word 'nitrogen' with the word 'protein' and removed 'when only used in a supplementary role' to make this point clearer.

iv. Recommendation 10: The term 'normal food' refers to 'oral diet', i.e. regular hospital diet or therapeutic diets (meals and snacks); if dysphagia is present – see Recommendations 11-15.

Good practice points for implementation of recommendations 4 to 10

4.1 Oral nutrition support should commence without delay in patients identified as at risk of malnutrition in accordance with the locally agreed nutrition care pathway, before nutrition assessment if necessary – see Figure 3 for care pathway and Figure 4 for treatment options.

4.2 Once a nutrition assessment is completed, the patient-specific nutrition care plan should be implemented.

4.3 Goals of the nutrition care plan should be re-evaluated based on monitoring a patient's clinical and nutritional progress.

4.4 A range of oral nutrition support options should be available in each hospital.

4.5 Local hospital guidelines on management of refeeding syndrome should be used in conjunction with the nutrition care pathways outlined in this guideline.

4.6 Local policy should be followed for management of patients with complex nutritional requirements, for example, requiring enteral tube feeding or parenteral nutrition in addition to oral nutrition support.

4.7 Supervision and assistance at mealtimes should be provided when required regardless of malnutrition risk.

5.1 A Food Nutrition and Hydration Information leaflet should be available to all admitted patients (see Appendix 10).

6.1 Oral nutritional supplements (ONS) should only be used in the context of evidence-based pathways, such as Figures 3 and 4.

6.2 Food intake records (semi-quantitative) should be commenced on patients identified as at risk of malnutrition while awaiting nutrition assessment, to monitor nutritional intake.

6.3 Designated healthcare professionals with the necessary knowledge and expertise should chart ONS on hospital wards to ensure patients are offered the correct types and volume of ONS in a timely manner.

8.1 Micronutrient supplementation, where indicated, should be in line with individual requirements, using the local hospital formulary, and taking into consideration possible interactions with other treatments, as well as the expected duration of therapy.

10.1 Reassessment by a dietitian is needed to determine if/when a patient's oral diet is meeting nutritional needs.

10.2 As outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) (Section 2.2, recommendation 38), the discharge plan/letter should include information on nutritional status, dietary requirements, requirement for oral nutritional supplements and/or thickening agents including type, amount and duration required post-discharge, and follow-up arrangements.

10.3 As outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) (Section 2.2, recommendation 39), a summary of the patient's nutritional status, including the most recent nutrition screening result and BMI (if appropriate), and individualised nutrition care plan (if appropriate) should be included in the medical discharge letter to the GP.

The following are responsible for implementation of recommendation 4 to 10:

- Medical, nursing and dietetic members of the multidisciplinary team are responsible for commencing oral nutrition support if indicated in accordance with the nutrition treatment care pathway.
- All multidisciplinary team members, particularly doctors, nurses and dietitians, are responsible for considering refeeding syndrome risk.
- The multidisciplinary team, particularly medical, nursing, dietetic, SLT (for patients with dysphagia) and pharmacy members, are responsible for monitoring patients on oral nutrition support.
- The nurse is responsible for completing food intake records, unless the patient is capable and willing to do this.
- The dietitian has the necessary knowledge and expertise to chart ONS on hospital wards, if charting is consistent with local policy and procedures under the governance of the Hospital's Drug and Therapeutics Committee.
- The dietitian has the necessary skills and training to assess adequacy of energy, protein and micronutrient intake in patients on, or being considered for, oral nutrition support, or for the discontinuation of support.
- When a general micronutrient supplement is indicated, the multidisciplinary team (medical doctor, pharmacist, dietitian, +/- SLT +/- specialist nurse) should consider the most appropriate product, dose, method of administration and duration of therapy.
- The dietitian is responsible for documenting nutrition assessment results and the resulting nutrition care plan in the medical chart or electronic health record.
- The nurse is responsible for documenting the nutrition plan in nursing notes.
- The ward Clinical Nurse Manager (CNM) is responsible for ensuring ward supplies of the Food Nutrition and Hydration Patient Information Leaflet.
- The ward CNM in collaboration with the dietitian and/or pharmacist is responsible for ensuring adequate ward supplies of oral nutritional supplements.
- Healthcare catering/food service staff in collaboration with dietetic staff are responsible for organising a menu that incorporates food fortification for patients if indicated.
- The discharging medical doctor is responsible for including nutritional data in the discharge letter to the GP, and for prescribing oral nutritional supplements on discharge prescription if required.
- The dietitian is responsible for recommending dietetic follow-up of nutritional care for patients who have been assessed and commenced on oral nutrition support.

3.2.8.2 Oral nutrition support in patients with dysphagia

Recommendation 11
People who present with any obvious or less obvious indicators of dysphagia listed in Table 3 should be referred to healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders.

Grade of recommendation: D (GPP)

Table 3. Indicators of dysphagia

Obvious indicators of dysphagia	Less obvious indicators of dysphagia
- Difficult, painful chewing or swallowing - Regurgitation of undigested food - Difficulty controlling food or liquid in the mouth - Drooling - Hoarse voice - Coughing or choking before, during or after swallowing - Globus sensation - Nasal regurgitation - Feeling of obstruction - Unintentional weight loss - for example, in people with dementia	- Change in respiration pattern - Unexplained temperature spikes - Wet voice quality - Tongue fasciculation (may be indicative of motor neurone disease) - Xerostomia - Heartburn - Change in eating habits - for example, eating slowly or avoiding social occasions - Frequent throat clearing - Recurrent chest infections - Atypical chest pain

Recommendation 12
Healthcare professionals should recognise that people with acute and chronic neurological conditions and those who have undergone surgery or radiotherapy to the upper aero-digestive tract are at high risk of developing dysphagia.

Grade of recommendation: D (GPP)

Recommendation 13
When managing people with dysphagia, healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders should consider:

- the risks and benefits of modified oral nutrition support and/or enteral tube feeding
- the factors listed in Table 4.

Grade of recommendation: D (GPP)

Table 4. Factors to be considered before modification of nutrition support and hydration in people with dysphagia

- Recurrent chest infections - Mobility - Dependency on others for assistance to eat - Perceived palatability and appearance of food or drink - Level of alertness - Compromised physiology	- Poor oral hygiene - Compromised medical status - Metabolic and nutritional requirements - Vulnerability (for example, immunocompromised) - Comorbidities - Prognosis

Recommendation 14
People with dysphagia should have a drug review to ascertain if the current drug formulation, route and timing of administration remains appropriate and is without contraindications for the feeding regimen or swallowing process.

Grade of recommendation: D (GPP)

Recommendation 15
Healthcare professionals with relevant skills and training in the diagnosis, assessment and management of swallowing disorders should regularly monitor and reassess people with dysphagia who are having modified food and liquid until they are clinically stable.

Grade of recommendation: D (GPP)

Notes:

i. Table 4: 'Prognosis' was considered by the GDG to be another important factor to consider.

ii. Recommendation 15: The word 'clinically' was added by the GDG to add clarity.

Good practice points for implementation of recommendations 11 to 15

11.1 Patients with new or worsening indicators for oropharyngeal dysphagia should be referred to a speech and language therapist (SLT) for assessment.

11.2 Patients with new indicators for dysphagia who are identified to be at risk of malnutrition should be referred to a dietitian for nutrition assessment.

11.3 Oral nutritional supplements prescribed must be in line with current recommendations for safe swallowing.

14.1 Patients with new indicators for dysphagia should be referred to a clinical pharmacist for a regular review of their medication until they are clinically stable.

15.1 Medical staff, nursing staff, SLTs, dietitians, healthcare assistants, food service/catering managers, chefs and food service support staff should ensure that appropriate modified texture diets and oral nutrition support are provided to patients with dysphagia identified as at risk of malnutrition, using effective communication channels and referral pathways (see Figure 5 for sample malnutrition risk and dysphagia pathway). See Section 5 of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

15.2 Texture modified diets should be prepared according to the relevant standard (Section 5.2) in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

The following are responsible for implementation of recommendation 11 to 15:

- Speech and language therapists have the relevant skills and training to diagnose, assess and manage patients with swallowing disorders.
- Gastroenterologists are responsible for assessment, diagnosis and management of oesophageal dysphagia.
- The medical team in liaison with a clinical pharmacist is responsible for ascertaining if the current drug formulation, route and timing of administration are appropriate.
- Pharmacists have the relevant knowledge and expertise to advise on drug formulation, route and timing of administration.

- SLTs should reassess patients with new indicators for dysphagia or worsening of existing dysphagia until clinically stable.
- CNMs and nurses ensure that patients on modified texture diets receive the correct meal and fluid consistency.
- Food service/catering departments, in liaison with dietetic and SLT departments, should ensure texture modified diets provided comply with the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

3.2.8.3 Oral nutrition support in surgical patients

Recommendation 16
Peri-operative oral nutrition support should be considered for surgical patients who can swallow safely and are malnourished.

Grade of recommendation: B

Recommendation 17
Healthcare professionals should consider giving post-abdominal surgery patients who can swallow safely, and in whom there are no specific concerns about gut function or integrity, some oral intake within 24 hours of surgery. The patient should be monitored carefully for any signs of nausea or vomiting.

Grade of recommendation: A

Good practice points for implementation of recommendations 16 to 17

16.1 An evidence-based fasting policy/procedure/protocol/guideline (PPPG) should be available in all hospitals.

16.2 Fasting for tests, therapies and procedures should be kept to a minimum, as specified in Section 2, recommendation 26, of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

16.3 Consider use of oral pre-operative carbohydrate treatment pre-surgery if implementing an Enhanced Recovery After Surgery (ERAS) programme, as specified in Section 2, recommendation 27, of the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b).

17.1 Audit of fasting times and procedures should be considered at ward and hospital levels.

17.3 Patients with expected or unexpected delays in returning to oral diet, for example, for five days or more, should be referred to the dietitian for nutrition assessment and possible alternative route of nutrition support until established on oral diet.

The following are responsible for implementation of recommendation 16 to 17:

- Nutrition and Hydration Steering Committees are responsible for developing a fasting Policies/Procedures/Protocols/Guidelines (PPPG) for each hospital with input from the relevant key stakeholders.
- The multidisciplinary team is responsible for implementing agreed fasting PPPG within the particular patient populations under their care.
- The multidisciplinary team is responsible for implementing ERAS protocols if used in a hospital.

- The CNM or Clinical Nurse Specialist in liaison with the dietitian and/or pharmacist ensures an adequate ward supply of oral pre-operative carbohydrate supplements, if used in the context of an ERAS programme.
- Surgical teams or ward nurses, depending on local referral pathways, are responsible for referring patients to the dietitian, if there is a delay in returning to PO diet, for example, for five days or more.

3.3 Nutrition education and training in the acute care setting

3.3.1 Support for nutrition education and training in the acute care setting

- Lack of nutrition education and training among all staff groups was identified by the Council of Europe as a key barrier to optimal nutritional care provision to patients in hospitals (Beck et al, 2001). One of ten key characteristics of good nutritional care outlined by the Council of Europe Alliance (Council of Europe, 2003) promotes regular training on nutritional care and management for all hospital staff.
- More recently a web-based survey of curriculum developers at 310 medical schools in 31 European countries was carried out (Eglseer, 2019). A total of 26 (8.4%) medical schools across 12 European countries completed the survey. Results showed that malnutrition screening for older adults was included in only nine (35%) medical school undergraduate curricula.
- The HIQA Report of the review of nutrition and hydration care in public acute hospitals (HIQA, 2016), showed that less than 50% of the hospitals inspected kept training records and that the approach to training was unorganised and inconsistent. Inclusion of specific audit metrics for nutrition and hydration in national data collection systems was encouraged. A standardised nutrition training programme for staff was highlighted as an opportunity to improve practice.
- The Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (HSE, 2018b) recommends that each local hospital identifies the education and training requirements of healthcare workers that enable implementation of the Policy.
- NICE also recognises the importance of staff training on the nutritional care of hospitalised adults (NICE, 2006a), and recommends that training should cover:
  - Nutritional needs and indications for nutrition support (including malnutrition screening).
  - Options for nutrition support (including oral nutrition support).
  - Ethical and legal concepts relating to screening and interventions for malnutrition.
  - Potential risks and benefits of nutrition support.
  - When and where to seek advice on malnutrition prevention and treatment.
- Training relating to specific nutrition screening tools for malnutrition risk should outline core components that cannot be altered, and should consider practical application issues, as well as provide clarity on interpretation of more ambiguous parameters.

While this NCG did not systematically review the literature pertaining to nutrition education and training for healthcare staff, a recent systematic review on this topic was identified (Marples et al., 2017) by the GDG. Different training strategies were assessed for impact on the knowledge, attitudes and practice of learners and the effect of these on patient outcomes. Twenty-four studies were identified, of which nine were in the acute setting. Although much of the evidence was of poor quality with high risk of bias, the review concluded that training may improve nutrition knowledge, attitudes and practice and suggested that a combination of strategies is more likely to be effective. No patient outcome data were available.

3.3.2 Training resources previously developed or currently available

- A nutrition education programme incorporating use of a malnutrition screening tool (MUST) was developed for healthcare professionals in an Irish community setting (Kennelly, 2010). The education programme was integrated into a community dietetics service. Improved nutritional knowledge among participants and management of malnourished patients in the community was reported.
- The Life-Long-Learning (LLL) programme in clinical nutrition and metabolism was developed and is managed by the European Society for Clinical Nutrition and Metabolism (ESPEN) (http://www.lllnutrition.com). This is a structured education programme for medical doctors. Live courses and on-line modules are provided on different topics, including screening for risk of malnutrition and nutrition support interventions. These are available in Ireland.
- The Quality Improvement Division of the HSE developed a guide on malnutrition screening using MUST (HSE, 2016). This is supported by an education module that is available on HSELanD on the MUST tool (www.hse.ie). This education module was developed by the British Association for Parenteral and Enteral Nutrition (BAPEN) and adapted for use in the Irish Healthcare setting.

In summary

Education and training to prevent, identify and treat patients at risk of malnutrition is recognised as key to tackling malnutrition in the acute care setting. The approach to education and training is inconsistent and does not reach all groups of healthcare workers, although HSE resources and LLL courses are currently available to hospital staff. A structured approach to nutrition education in Irish hospitals using a range of education strategies is essential to promote optimal nutritional care for patients. Integrating NICE content recommendations into the model of education for healthcare professionals successfully implemented in the Irish community setting, can inform development of a national framework for nutrition education in the Irish healthcare sector. See 3.4 for an overview of a proposed framework for education and training to support this NCG.

3.4 Proposed education and training framework for the acute care setting

Background

A framework for education and training is proposed in 3.4.2 below. This was developed on behalf of the GDG with input from GDG members, BIA subgroup, and international experts with experience in implementing screening programmes for malnutrition risk. The GDG acknowledges that undergraduate nutrition education is of paramount importance, but this was considered to be outside the remit and resources for developing this NCG. The GDG strongly encourages undergraduate/training programmes for medical, nursing, health and social care professions and food service staff, to include nutrition modules as a matter of urgency.

Although there exists preliminary data that indicates future potential use of sonic or mechanical measuring devices that could facilitate self-screening in community settings (Elia, 2019), it is not currently considered viable for hospital inpatient populations without significant further development and adaptations to enable its use for non-ambulatory and more acutely ill inpatient populations. Whereas this area will certainly pave the way for faster and possibly more cost-effective screening methods in routine practice in the future, it is not available or suitable for use within the context of the current guideline.

Screening for malnutrition risk training is predicated on implementation responsibilities outlined in 3.1.11 Hospital nurses are primarily responsible for malnutrition screening. Healthcare assistants and nursing

students with the appropriate knowledge and skills may also carry out malnutrition screening under nursing supervision. Train-the-trainers programmes on nutrition screening for malnutrition risk delivered initially by dietitians, will empower nursing staff to train other nurses and healthcare assistants and to take ownership of screening for malnutrition risk in acute care. This is a key component of the framework outlined below. Ongoing training is likely to be absorbed into the work of dietitians and nurses.

To minimise disruption to hospital staff, times for training have been kept to a minimum. A blended learning approach is employed, including use of webinars and ward-based training where necessary, to facilitate staff to engage in learning with minimum impact on patient care. To this end, annual refresher sessions for malnutrition screening are purposefully short. Training workshops for new staff will be included in protected times for education, such as induction programmes and existing courses already organised locally for hospital staff.

Specific dysphagia-related education and training is not included in this framework, other than as it pertains to this guideline, that is, as an indicator and consideration for the provision of oral nutrition support. Education and training resources to support national implementation of the International Dysphagia Diet Standardisation Initiative (IDDSI) framework have been developed and are available on the Share Centre for HSELanD. IDDSI does not address dysphagia management in its totality, rather terminology and testing methods.

Overview

Figure 6 outlines the proposed framework for education and training developed to support the implementation of this national clinical guideline.

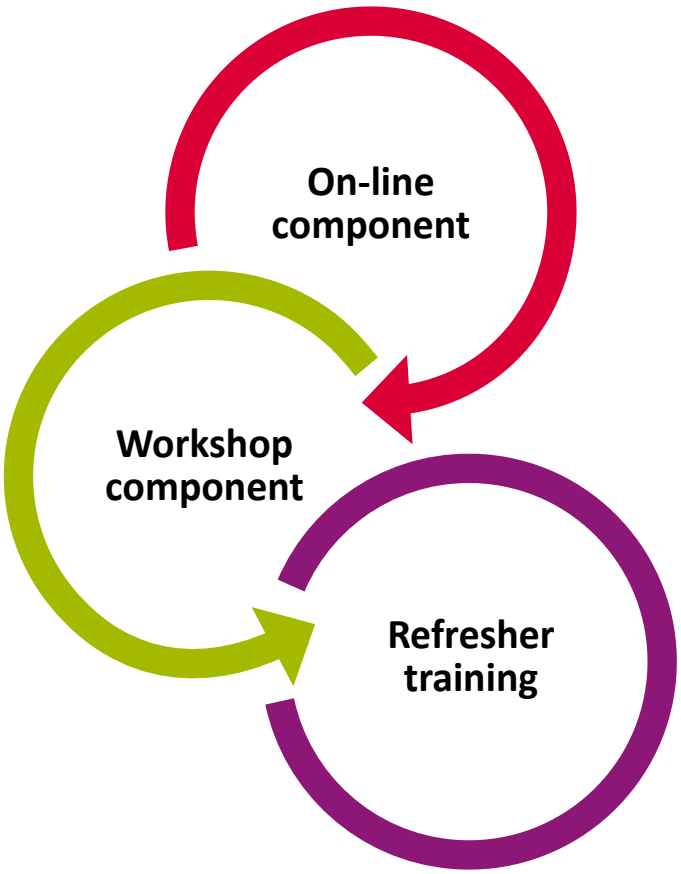


Figure 6. Proposed framework for education and training

The **theoretical** component of the framework will be delivered using an on-line module and a webinar, as follows:

- A 45 minute Malnutrition Module that includes:
  - o an updated version of the HSELanD Malnutrition Universal Screening Tool (MUST) training programme (developed by the BAPEN and adapted to the Irish Setting by the HSE Quality Improvement Division), plus
  - o content from the UCD (University College Dublin) and RCQPS (Research Collaborative in Quality and Patient Safety) collaborative project.
- A 30 minute Oral Nutrition Support Webinar that addresses treatment of malnutrition and malnutrition risk.

The **practical** component will be provided in-hospital using workshops, including:

- Malnutrition screening workshop (30 minutes).
- Regular diet workshop (30 minutes).
- Energy dense diet workshop (30 minutes).

The **implementation will be supported** by annual refresher sessions on malnutrition screening at ward level. Although education on all aspects of the framework is desirable for many multi-disciplines, see Table 10 for components of the framework that are essential for each profession considered key to NCG implementation. Specific dysphagia-related education and training is not considered here.

Table 10. Framework components considered essential for different healthcare staff key to implementation

	Doctors	**Nurses**	**HCAs**	**Food Service/Catering**				
				Chefs	Managers	Officers	Supervisors	Assistants
E-learning Malnutrition module (45 minutes)	**X**	**X**	*					
Webinar Oral nutrition support (30 minutes)	**X**	**X**	**X**		**X**	**X**	**X**	**X**
Workshop Malnutrition screening (30 minutes)		**X**	*					
Workshop Regular diet (30 minutes)				**X**	**X**	**X**	**X**	
Workshop Energy dense diet (30 minutes)				**X**	**X**	**X**	**X**	
Ward based (annual refresher) Practical malnutrition screening sessions (15 minutes)		**X**	*					

Key:
HCAs - Healthcare Assistants; X – considered essential education and training; *Whether HCAs require training on malnutrition and malnutrition screening will depend on local policy – the costing of this framework is based on training all nursing staff, rather than a mixture of nursing and HCA staff.

The following professions / grades are included in the costs for training (See Annex 3: BIA):

- Doctors [Interns]
- Nurses [including Staff Nurses, Clinical Nurse Managers, Advanced Nurse Practitioners, Clinical Nurse Specialists, Clinical Nurse Instructors, Tutors and Practice Development]
- Healthcare Assistants [including Healthcare Assistants, Nurse's Aide and Attendant Aide]
- Food Service (Catering) staff [including Food Service/Catering Manager, Food Service/ Catering Officer, Food Service/Catering Supervisor, Chefs, and Head of Food Service/Catering and Food Service/Catering Assistants].

Some key assumptions underpinning the framework

- The time required to deliver training on the scale described here is unlikely to be found within the existing system within the first year of implementation. It is, therefore, assumed that all components of the education and training framework are additional to the current model. The cost associated with the development and delivery of education and training to healthcare staff is therefore considered as additional - see Budget Impact Analysis (BIA) – see section 3.7.
- Costs associated with the release of staff for education and training are considered to be opportunity costs. These costs will not be a cost to the system, but rather a diversion of staff from other activities.
- Naas General Hospital experience was used as a base case regarding training needs for introduction of screening for malnutrition risk and treatment pathway. This was combined with expert opinion from the GDG and international experts.
- It is assumed that 50% of the current nursing workforce in acute hospitals has received initial training on malnutrition screening (and treatment) based on the HIQA report (2016). It is, therefore, estimated that 50% of nursing staff need initial training on malnutrition screening, practical training and the oral nutrition support webinar.
- It is assumed that nurses rather than Healthcare Assistants (HCAs) implement malnutrition screening. This will depend on local hospital policy. Therefore, costs are based on training nursing staff rather than HCA staff.
- It is assumed that 50% of existing HCAs will have had some training on oral nutrition support in their local hospital. Therefore, the time cost associated with completing the oral nutrition support webinar is based on 50% of existing HCA staff and 100% of new HCA staff.
- The malnutrition and oral nutrition support on-line/webinar times were estimated based on experience from similar projects. These include:
    - HSELand MUST training programme (developed by BAPEN and adapted for use in the Irish setting).
    - A collaborative project between UCD (university College Dublin) and RCQPS (Research Collaborative in Quality and Patient Safety) to develop a web-based education intervention for GPs, community nurses and multi-disciplines.
- Regular diet and Energy Dense diet workshop times were based on expertise from the HSE Food Nutrition and Hydration Policy development group.
- Medical training is based on educating new interns only.
- Undergraduate training and education is not included in this framework.

Development of framework components

The associated costs with each of the framework components are presented in Annex 3: Budget Impact Analysis, as initial or introductory costs, that is, the cost of introducing education and training to current staff, and maintenance costs, that is, yearly costs of educating and training new staff based on staff turnover rates for the various relevant professions.

It must be reiterated that improving nutrition education in undergraduate/ training programmes for the relevant disciplines would partially offset the costs outlined.

- The Malnutrition module requires content development. This module will cover the background to malnutrition including incidence and its impact (clinical, social, and economic). It will also cover nutrition screening for malnutrition risk, concentrating on the tools recommended in this NCG.
- The Oral Nutrition Support webinar requires content development. It is anticipated that the webinar would be created to be uploaded without costs onto the Share Centre on HSELanD. This webinar will give a brief background on malnutrition and will cover indications for oral nutrition support, options, risks and benefits and the pathways outlined in this NCG (See Figures 3, 4 and 5 in Sections 3.1 and 3.2).
- The annual refresher sessions on malnutrition screening (15 minutes) will not need content development and can be an update based on the malnutrition screening workshop, or peer-to-peer observations of performing malnutrition screening and interpreting results.
- Face-to-face workshop training requires content development for Nurses (malnutrition screening workshop) and for Food Service staff (regular and energy dense workshops). Healthcare Assistants may also require training on malnutrition screening depending on local hospital policy.

Face-to-face workshops

Training Nurses

The malnutrition screening workshop will be delivered in-hospital and is expected to last 30 minutes. Initial training will be required for approximately 50% of current nursing workforce and will be delivered by dietitians at ward level, and through existing organised courses, where possible. The workshop will also be available to all new nurses starting in hospitals each year, preferably at induction. It will be delivered by trained nursing staff/educators through “train the trainers”, with assistance from dietitians as needed.

The annual malnutrition screening refresher sessions will be delivered at ward level. These should be led by trained nursing staff/educators with assistance from dietitians if needed. These sessions are expected to last 15 minutes each and are for all nursing staff.

Training Healthcare Assistants (HCAs)

Local hospital Nutrition and Hydration Steering Committees and Nursing Departments will determine whether HCA staff implement malnutrition screening and consequently require training on malnutrition screening. Trained HCAs who take on this role will perform malnutrition screening under the supervision of nursing staff.

The current proposed framework is based on malnutrition screening being carried out by nurses – requiring nurses only to be trained. If HCAs take on some of this role, this will reduce the cost of providing malnutrition screening training and overall training and education costs to support this NCG.

Healthcare assistants play a significant role in providing oral nutrition support and this is supported in the framework through access to the oral nutrition support webinar – see Table 10.

Training Food Service/Catering Staff
The Regular Diet workshop and the Energy Dense Diet workshop will be delivered in-hospital. These will be led by a dietitian. They are expected to last 30 minutes each. These will be available to all new Food Service Staff (other than Food Service/Catering Assistants) starting in hospitals each year.

Food Service/Catering Assistants have a role in the provision of nutrition and hydration to patients in hospitals. Their involvement in the provision of oral nutrition support is acknowledged by the GDG. This role will be best supported by completing the oral nutrition support webinar – see Table 10.

3.5 Other considerations (at local level) that could support introduction of screening for malnutrition risk

- When introducing screening a checking process could be used, followed by feedback meetings once every three to four months to reinforce practice and allow nurses to learn from each other.
- Nurses (or HCAs) newly trained could be 'buddied' with previously trained nurses (or HCAs) with more experience in using the malnutrition screening tool and implementation of the associated pathway.
- Short (5-10 minutes) refreshers could be given at ward level, for instance at nursing hand-over time in the morning, if:
    - the ward Clinical Nurse Manager identifies any issues, or
    - requested by nursing staff on the ward, or
    - there is an increasing rate of inappropriate referrals to dietetic departments.
- An oral nutrition support overview tailored to the local hospital, could be included in induction training, or other organised training particularly for new Medical Interns, Nurses, Healthcare Assistants and Food Service Staff (including Catering Assistants). This could include oral nutritional supplement tasting, and any hospital-specific organisational processes for providing oral nutrition support.
- While not considered essential training, Food Service/Catering Assistants may also benefit from access to the regular and energy dense diet workshops, for example, at induction.

3.6 Audit of screening for malnutrition risk

Essential audit criteria relating to this NCG are outlined in Appendix 11. The 'Sample Self-Assessment Tool' accompanying this NCG (see Appendix 10 for list of supporting tools), provides questions on malnutrition screening tool(s) to support Hospital Nutrition and Hydration Steering Committees to conduct/oversee audit. This includes measuring fidelity to the screening tool, that is, the degree to which the malnutrition screening tool is delivered exactly as set out and intended by those who developed it.

It is assumed that a sample of 30% of adult acute hospital beds will be audited every year. In Annex 3 this is costed for both dietetic and nursing staff performing audits. This will be decided at local Hospital Nutrition and Hydration Steering Committee level.

3.7 Summary budget impact analysis

Overview

This Budget Impact Analysis (BIA) looks at the resource impact of full implementation of this National Clinical Guideline in the Republic of Ireland. The methodology is outlined in Section 3 of Annex 3 and the detailed assumptions regarding current and proposed activities and unit costs are provided in Appendices A and B of Annex 3. Details of calculations used to determine cost savings and the underlying evidence base are provided in Appendix C of Annex 3. See Table 11 below for BIA summary.

Key findings relating to costs

Based on best available data regarding current practice and the costs associated with full implementation of the recommendations within the guideline, the annual additional cost associated with full implementation of the guideline, excluding opportunity costs associated with releasing in-hospital training of staff, is €3.744 million. Most of these costs are related to additional staff resource required to a) ensure screening of all inpatients by nursing staff (€0.637 million) and b) provide nutrition assessment, (dietary counselling) and follow up by dietitians (€2.881 million). These were subjected to variations in the assumptions within a series of univariate sensitivity analyses, which are shown in the appendices. If opportunity costs of staff undertaking recommended education and training are included, overall costs are €4.517 million. Although the resources for staff undertaking education are significant when viewed nationally, these are opportunity costs, that is, diverting staff members from their usual activities to complete the training. This does not represent an actual cash cost to the HSE. This cost may be realised through efficiencies and flexibility in rostering, and direct staff replacement may not be required, although it is recognised that the time required to deliver training on the scale described, is unlikely to be found within the existing system within the first year of implementation. See Annex 3 for details.

Key findings relating to benefits

This guideline confines screening implementation to the inpatient population, in which savings arise from defraying much of the additional healthcare costs associated with malnutrition incurred in acute care settings. Whereas malnutrition on admission develops in the community and is unaffected by the implementation of screening programmes in the acute sector, savings are derived from reduction in LOS, based on evidence from systematic reviews and meta analyses indicating average percentage savings of 12.2% in overall hospital costs and 13.9% in LOS (Elia, 2016). For the purposes of this BIA, the latter have been used and is equivalent to 1.15 bed days saving per additional patient identified and treated, given the average LOS in the relevant inpatient population subjected to nutrition screening is 8.3 days (see Appendix in Annex 3, HIPE 2017 data). Net savings achieved in the model are savings in principle rather than savings in practice, since they arise from monetising reductions on average LOS in treated patients. The budget impact analysis indicates that the implementation of this guideline has the potential to deliver significant improvements in bed capacity, releasing an estimated 31,750 bed days, which, when monetised using the average bed day cost of €879, equates to €27.9million, producing a potential net saving of €24.2million.

Apart from the direct cost implications estimated in the BIA, it is important to note that there are significant outcome benefits from correction of nutritional deficits using oral nutrition support in hospitalised patients, such as reduced morbidity including reduced infectious complications and improved wound healing, outlined in Section 2.1.

Conclusions

The full implementation of this guideline produces a potential net cost saving, based on reducing LOS of malnourished patients by an average of 13.9% when treated. A key assumption in the model is that patients with medium and high-risk scores for malnutrition have a longer LOS compared with non-malnourished patients (1.3 x LOS) (Elia, 2005). See Annex 3 for detailed BIA including model used and underpinning assumptions.

Table 11. Summary of budget impact

Recommendation with significant resource impact		
	Annualised cost initial year of implementation €000	**Annual maintenance costs Y2, Y3 €000**
Nutrition Screening	€637	n/a
Nutrition Assessment & Follow up	€2,881	n/a
Treatment	€175	n/a
Implementation tools (design)	€2	Nil
Education and training - Development and trainer costs - *Opportunity cost of staff undertaking training*	 €49 *€773*	 €63 *€319*
Audit	n/a	€23
Total costs - *opportunity costs excluded*	**€3,744**	
Reduced length of inpatient	€27,954	
Reduced outpatient visits	n/a	
Reduced GP visits	n/a	
Total potential saving - *opportunity costs excluded*	**€24,210**	

Key: Y = year; n/a = not applicable

Notes:

i. Potential annual savings are derived from monetising the bed days released within the proposed vs the current model. As there is a current unmet need for bed capacity within the system, the released resource is likely to be used by other patients. Thus, potential savings might be termed notional cost savings or even opportunity cost savings. However, to avoid confusion with the costs of implementation, they are referred to throughout as 'potential cost savings'.

ii. Total potential savings are shown without opportunity costs of staff undertaking training, both online (in their own time) and practical. If these opportunity costs (€773k) are included, total costs in year one of full implementation are €4,517k, reducing potential cost savings to €23,437k. As the burden of staff training will be significantly reduced following year one of implementation, the opportunity costs for maintaining the required level of training within the acute care system will be substantially reduced.

iii. As audit is not required until staff training and education has been completed, costs of audit are not included in the first year of implementation but as a recurring cost from year 2 onwards.

4 Appendices

Appendix 1: Guideline Development Group terms of reference

Title: Guideline Development Group (GDG): Nutrition screening and use of oral nutrition support for adults in the acute care setting.

Aim: To develop a National Clinical Guideline on the identification of nutrition risk and the use of oral nutrition support for adult patients admitted to acute hospitals in Ireland.

GDG Membership

Joint-Chairs: Professor John Reynolds and Dr Declan Byrne.
Project Dietitian: Carmel O'Hanlon.
Evidence synthesis team: HRB-CICER.

Members

Patient/patient group (two)
Irish Nutrition and Dietetic Institute (INDI)
Irish Society for Clinical Nutrition and metabolism (IrSPEN)
Nutrition Society (Irish Section)
Medical
Health Economist
Nursing
Hospital Nutrition Steering Group members
Hospital Manager
Pharmacist
Speech and Language Therapists
Catering Manager
Information Technologist
National Dietetic Advisor, HSE Strategic Planning and Transformation
Quality Improvement Division, HSE
HSE Acute Operations
Clinical Specialist Dietitian Resource to Community Funded Schemes (Nutrition) Service Improvement Programme/Primary Care

Role of the GDG Chair

- Agree terms of reference.
- Ensure the guideline is developed using a robust methodology and that each of the stages of the clinical guideline path are addressed.
- Set and agree timelines.
- Encourage broad participation from members in discussion.
- Identify and assign tasks.
- Set agenda of each meeting.
- Agree a process for dealing with conflicts of interest.
- Liaise with the Evidence Synthesis Team.
- End each meeting with a summary of decisions and actions.

Role of GDG members

- Agree timelines for meetings and the clinical guideline development process.
- Convene as required.
- Review existing policies, guidelines, national and international evidence of best practice, relevant scientific and clinical expert opinion pertaining to the clinical guideline area.
- Determine whether to adapt a guideline using the ADAPTE process or develop a new (de novo) clinical guideline, or a combination of both.
- Give consideration to and actively participate in each of the stages of the clinical guideline development pathway.
- Draft clinical guideline with Project Dietitian.
- Consult with relevant interested parties and the public.
- Review and incorporate feedback from consultation process as appropriate.
- Finalise and approve the clinical guideline.
- Develop a plan for implementing the National Clinical Guideline in all Hospital Groups.
- Develop key performance indicators for monitoring implementation in the Hospital Groups.
- Specialist work: Complete a Budget Impact Analysis (BIA) and economic review guided and authored by GDG Health Economist and other GDG expert in economics of malnutrition, seeking support from the evidence synthesis team as needed.

Role of Project Dietitian (PD)

- With the Chair, establish a multidisciplinary Guideline Development Group (GDG) of key stakeholders.
- With the Chair, develop project plan including scope of work.
- Review and adhere to:
    - Standards for Clinical Practice Guidance, NCEC November 2015.
    - National Clinical Guideline Template: full version, NCEC August 2017.
    - Guideline Developers Manual (DOH, 2019).

- Review and utilise where appropriate:
  - The Appraisal of Guidelines for Research and Evaluation II (AGREE II).
  - Guideline Adaptation: A Resource Toolkit, ADAPTE Collaboration 2009.
  - Framework for Endorsement of National Clinical Guidelines, NCEC 2015.
  - Guidance on Developing Key Performance Indicators and Minimum Data Sets to monitor Healthcare Quality, HIQA 2013.
  - Guidance on Budget Impact Analysis of Health Technologies in Ireland, HIQA 2015.
- Circulate the agenda and minutes of each meeting to members.
- Identify and oversee the progress of specific subgroups.
- Lead on drafting the clinical guideline along with GDG members.
- With Chair, liaise with and guide the evidence synthesis team.
- Assist GDG in developing a plan for implementing the National Clinical Guideline in all Hospital Groups.
- Assist GDG in developing key performance indicators to monitor implementation of the National Clinical Guideline in the Hospital Groups.

Reporting arrangements

- The Project Dietitian will liaise throughout the process with:
  - Steering and Clinical Advisory Group for Hospital Food and Nutrition.
  - The National Clinical Effectiveness Committee (NCEC).
  - The National Dietetic Advisor for the HSE.
  - The Project Dietitian for the development of the Hospital Food and Nutrition Policy.
- Draft National Clinical Guideline will be submitted to the Steering and Clinical Advisory Group for Hospital Food and Nutrition for review and sign off, before submitting to the National Clinical Advisor and Group Lead – HSE Acute Operations.
- Once the Steering and Clinical Advisory Group for Hospital Food and Nutrition and the National Clinical Advisor and Group Lead – HSE Acute Operations approve the draft, it will be submitted to the NCEC.
- The Steering and Clinical Advisory Group for Hospital Food and Nutrition and the National Clinical Advisor and Group Lead – HSE Acute Operations must then be informed of amendments requested by the NCEC.
- The GDG/PD will revise the National Clinical Guideline with amendments once approved by the Steering and Clinical Advisory Group for Hospital Food and Nutrition and the National Clinical Advisor and Group Lead – HSE Acute Operations.
- The GDG/PD to obtain approval from the Healthy Eating and Active Living (HEAL) group for the implementation plan which will be implemented by the Nutrition Steering Committees in each hospital within the respective Hospital Groups.

Declaration of interest

All members of the GDG must declare any conflict of interest and must sign the NCEC Declarations of Interests Form and abide by the Conflicts of Interest Policy, NCEC May 2016.

Table 12. GDG subgroups

Subgroup	Members *(alphabetical order)*
Budget Impact Analysis (BIA)	Carmel O'Hanlon, James O'Mahony, Margaret O'Neill, Niamh Rice
Implementation	Elaine Bradley, Sharon Kennelly, Roisin O'Grady, Carmel O'Hanlon, Niamh O'Sullivan, Niamh Rice, Sheila Robinson, Fiona Roulston Additional workshop members: Carmel Beirne, Declan Byrne, Barbara Gillman, Aine Kelly
Malnutrition definition	Clare Corish, Nicola Dervan (INDI), Barbara Gillman, Orla Haughey, Sharon Kennelly, Carmel O'Hanlon
Monitoring and audit	Aine Kelly, Ruth Kilcawley, Anne Nugent, Carmel O'Hanlon, Fiona Roulston
Patient information leaflet	Sheila Bowers, Roisin O'Grady, Carmel O'Hanlon, Niamh O'Sullivan, Sheila Robinson
Systematic review	Clare Corish, Anne Nugent, Carmel O'Hanlon, James O'Mahony, Niamh Rice, Sheila Robinson
Consultation feedback subgroup	Anne Marie Bennett, Declan Byrne, Sheila Bowers, Sharon Dwyer, Barbara Gillman, Ruth Kilcawley, Carmel O'Hanlon, Margaret O'Neill, Sheila Robinson

Note: All GDG members participated in the adaptation process.

Appendix 2: Membership of the National Nutrition Policy and Clinical Guideline Joint Steering and Clinical Advisory Group (JSCAG)

Table 13. Joint Steering and Clinical Advisory Group members

JSCAG membership		
Chair	Carmel Beirne	General Manager, HSE, Acute Operations
Members	Margaret Brennan	HSE, Quality and Patient Safety Lead, Acute Operations
	Dr Declan Byrne	Consultant Geriatrician, St. James's Hospital, Chair of NCG
	Sharon Dwyer (member until 12 June 2018)	General Manager, HSE, Office of the Clinical Director
	Barbara Gillman	Clinical Specialist Renal Dietitian, Mater Misericordiae University Hospital, Project Lead for FNHP
	Sarah O'Brien	HSE, National Lead for Healthy Eating and Active Living Programme
	Carmel O'Hanlon	Clinical Specialist Dietitian, Beaumont Hospital, Project Lead for NCG
	Margaret O'Neill	HSE, National Dietetic Advisor, Strategy Planning and Transformation
Clinical Advisors	Dr Vida Hamilton (from September 2018)	National Clinical Advisor and Group Lead, HSE, Acute Operations
	Dr Colm Henry (until June 2018)	HSE, Chief Clinical Director
	Professor Donal O Shea	HSE, Consultant Endocrinologist, Clinical Lead for Obesity Programme

Key: FNHP – Food Nutrition and Hydration Policy; NCG – National Clinical Guideline.

External Reviewers

Professor Marian de van der Schueren: Professor of Nutrition and Health at HAN University of Applied Sciences; Senior Researcher for the VU University Medical Center, Amsterdam, the Netherlands.

Dr. Angela Vivanti: Advanced Accredited Practicing Dietitian (Adv APD) (Dietitians Association of Australia), Research and Development Dietitian, Department of Nutrition and Dietetics, Princess Alexandra Hospital, Brisbane, Australia; Senior Lecturer, School of Human Movement and Nutrition Studies, University of Queensland.

Conflict of interest declarations
There were no significant conflicts of interest.

Appendix 3: The ADAPTE process

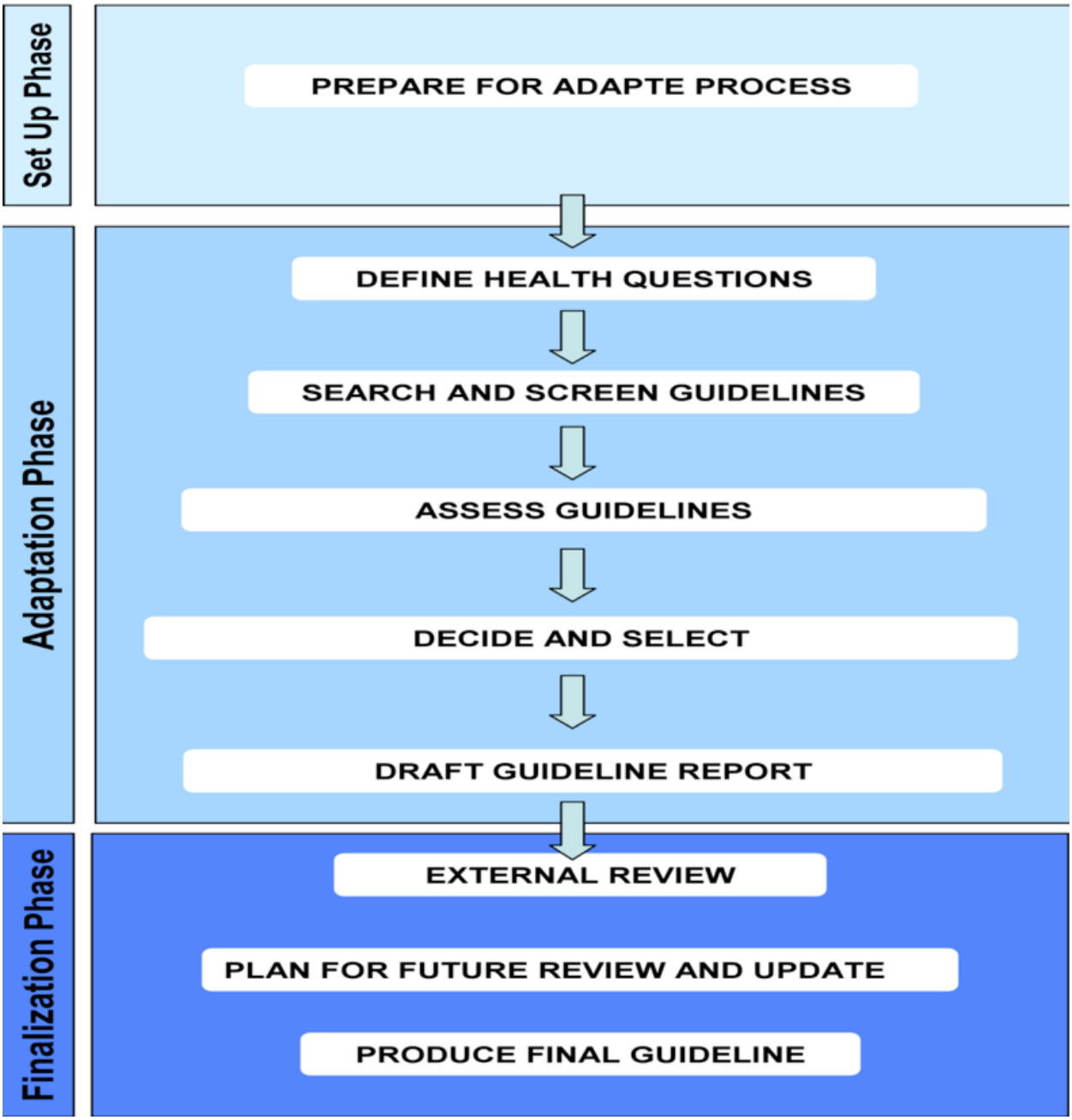


Figure 7. Overview of ADAPTE Process

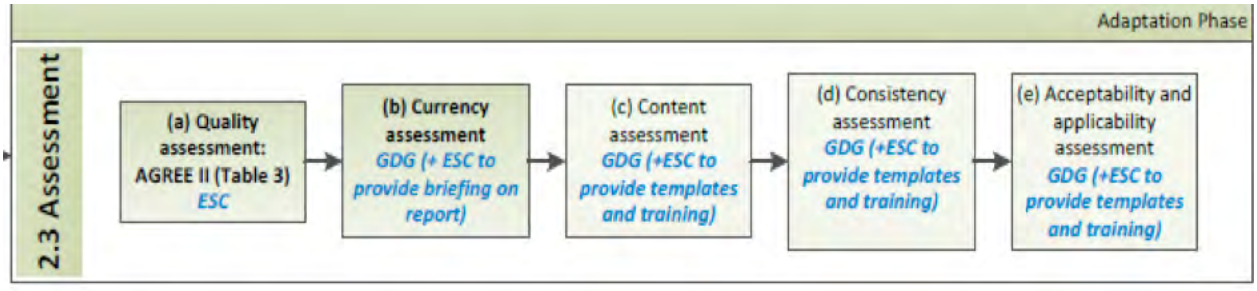


Figure 8. Assessment step in adaptation phase

Figures 7 and 8 were reproduced with permission from the G-I-N Adaptation Working Group

Appendix 4: Clinical questions in PIPOH and PICO/S format

Health questions in PIPOH format that were used for ADAPTE process

These questions were selected for this guideline from an initial 12 questions. They were used when assessing existing international guidelines to determine suitability of a guideline(s) to be formally adapted for the Irish healthcare setting, using the ADAPTE process (see Appendix 3 for overview of this process). These questions informed Recommendations 1 and 2, and 4 to 17 in this guideline, adapted from NICE Clinical Guideline 32.

Nutrition Screening Tool question

HEALTH QUESTION 1
What nutrition screening tool should be used to screen hospitalised adult patients for nutritional risk? Is there a nutrition screening tool that suits all adult age groups in hospital? What training is required to achieve effective nutrition screening in hospitals?

POPULATION
Age
Adult patients (see definitions)
Clinical circumstances
Patients admitted to a hospital ward from time of admission
Gender
Male or female
INTERVENTION
Treatments/care
Nutrition screening using validated screening tool
Follow up
From admission to hospital to discharge
PROFESSIONAL/(PATIENTS)
Providers
Nurses/healthcare assistants/others
Stakeholders
Dept. of Health, HSE, hospitals
Patients
All admitted patients
OUTCOME
Patient outcomes
Patients identified appropriately for risk of malnutrition
System outcomes
Direct and indirect system costs, non-financial resources constraints/consequences
Public health outcomes
Improved outcomes due to prevention and earlier treatment of malnutrition
HEALTH CARE SETTING/CONTEXT
Organisations
Hospitals and additional costs related to hospital episode

Oral nutrition support question

HEALTH QUESTION 2
What are the indications for, and outcome benefits of using oral nutrition support (ONS), on mortality, hospital readmissions, length of hospital stay, complications/ morbidity, quality of life, nutritional status and functional status in malnourished adult hospitalised patients, or those at risk of malnutrition? What is the cost–effectiveness and net budget impact of using oral nutrition support in hospital?

POPULATION
Age
Adult patients (see definitions)
Clinical circumstances
Patients admitted to a hospital ward who are malnourished or at risk of malnutrition as determined by nutritional screening and/or assessment
Gender
Male or female
INTERVENTION
Treatments/care
Use of oral nutrition support (see definition below)
Follow up
From time of first dietetic review to discharge
PROFESSIONAL/(PATIENTS)
Providers
Dietitians, doctors, nurses, speech and language therapists, Nutrition Support Team, multidisciplinary team
Stakeholders
Dept. of Health, HSE, hospitals
Patients
Hospitalised patients identified as malnourished or being at risk of malnutrition by nutritional screening and/or assessment
OUTCOME
Patient outcomes
Survival, mortality, hospital readmissions, length of hospital stay, complications/ morbidity, quality of life, improved nutritional status
System outcomes
Effect on direct and indirect system costs, and non-financial resources constraints/ consequences
Public health outcomes
Mortality and morbidity as above
HEALTH CARE SETTING/CONTEXT
Organisations
Hospitals and additional costs related to hospital episode

Clinical questions in PICO/S format for systematic review of the literature

The following questions were used to complete a systematic review on the optimal screening tool to detect malnutrition risk (see Annex 1), and to produce evidence tables for oral nutrition support (see Annex 2). Questions 1 to 3 informed Recommendation 3 in this guideline.

Key question 1	What is the diagnostic accuracy of nutrition screening tools (NST) compared with a reference test in assessing the nutritional status of adults at risk of undernutrition in acute settings?
P (Population)	Adult (≥ 16 years, non-pregnant) patients at risk of undernutrition in acute hospital settings admitted to an adult ward or single rooms
I (Intervention)	Nutrition screening tool (NST) - only include if NST was externally validated or if the study is an external validation study using a different population - unmodified - for general hospital population (i.e. not specific risk groups, e.g. cancer patients or for specific age groups)
C (Comparator)	Reference standards - assessment by nutritionally trained professional i.e. trained dietitian, or a clinician who had been nutritionally trained - assessment tools MNA-Full Form or SGA
O (Outcome)	**Primary outcomes:** - sensitivity and specificity - positive predictive values, negative predictive values and likelihood ratios **Secondary outcomes:** - correlations coefficients - area under the curve - kappa
S (Study design)	Cohort, cross-sectional and case-control studies

Key: MNA - Mini Nutritional Assessment-Full Form; NST - Nutrition screening tool for malnutrition risk; SGA - Subjective Global Assessment

Key question 2	What is the accuracy of NSTs in identifying adverse outcomes in adults at risk of malnutrition in acute hospital settings?
P (Population)	Adult (≥ 16 years, non-pregnant) patients at risk of malnutrition in acute hospital settings admitted to an adult ward or single rooms
I (Intervention)	Nutrition screening tool (NST) - only include if NST was externally validated or if the study is an external validation study using a different population - unmodified - for general hospital population (i.e. not specific risk groups e.g. cancer patients)
C (Comparator)	None or other nutritional screening tool that has been externally validated
O (Outcome)	**Primary outcomes:** The accuracy in identifying the clinical outcomes: - length of stay - mortality - (Post-operative) complications (e.g. depression of the immune system, impaired wound healing, and muscle wasting) As measured by: - hazard ratios - odds ratios - relative risks - area under the receiver operator curve **Secondary outcomes:** - sensitivity and specificity - positive predictive values, negative predictive values and likelihood ratios - standardised regression coefficient - correlations
S (Study design)	Cohort, case-control

Key: NST - Nutrition screening tool for malnutrition risk

Key question 3	What is the cost-effectiveness, of using nutrition screening tools for the identification of adult (non-pregnant) patients at-risk of malnutrition in acute settings?
P (Population)	Adult (≥ 16 years, non-pregnant) patients at risk of malnutrition in acute hospital settings admitted to an adult ward or single rooms
I (Intervention)	Nutrition screening tool (NST) - only include if NST was externally validated or if the study is an external validation study using a different population - unmodified - for general hospital population (i.e. not specific risk groups e.g. cancer patients)
C (Comparator)	Usual care or another validated nutrition screening tool
O (Outcome)	**Primary outcomes:** Cost utility analysis: - QALYs - HYE - DALYs Cost-effectiveness analysis: - Cost per unit of effect (cost per LYG) - Effects per unit cost (LYG per Euro spent) **Secondary outcomes:** Any measure of economic outcomes: 1. Resource use - Length of stay (hospital, or ICU/HDU), including percentage differences - Average time taken to conduct - Time taken for dietary assessments and the protocols used (including criteria used within the nutrition screening programme for accessing dietitians). 2. Costs - Implementation costs (including disaggregation by time use and by grade of staff implementing) - Escalation costs - Service utilisation costs - Direct medical costs (e.g. cost of the consultations and subsequent oral nutritional supplements, disaggregate all contributing elements and describe treatment and screening protocols) - Indirect medical costs - Education costs and cost savings - Data on savings dues to reduced complications
S (Study design)	Systematic reviews of economic evaluations, full economic evaluation studies (cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis), costing studies and comparative resource use studies

Key: DALYs - Disability Adjusted Life Years; HDU - High Dependency Unit; HYE - Health Year Equivalent; ICERs - Incremental cost-effectiveness ratio; ICU - intensive care unit; LYG - Life Years Gained; NST - Nutrition screening tool for malnutrition risk; QALYs - Quality-adjusted life years.

Key question 4	What are the indications for, and outcome benefits of using oral nutrition support, on mortality, hospital readmissions, length of hospital stay, complications/ morbidity, quality of life, nutritional status and functional status in malnourished adult hospitalised patients, or those at risk of malnutrition? What is the cost–effectiveness and net budget impact of using oral nutrition support in hospital?
P (Population)	Hospitalised adult patients, who were malnourished or at risk of malnutrition as determined by malnutrition screening and/or nutrition assessment
I (Intervention)	Use of oral nutrition support
C (Comparator)	Usual care
O (Outcome)	Survival, mortality, hospital readmissions, length of hospital stay, complications/ morbidity, quality of life, improved nutritional status; effect on direct and indirect system costs, and non-financial resources constraints/ consequences.

Key: DALYs - Adult - This refers to a patient admitted to an adult ward in hospital. In Irish hospitals this could mean patients 16 years of age or older. More often, this means patients who are 18 years of age or older.

Oral Nutrition Support includes -

i. Food fortification - food fortified with protein, carbohydrate and/or fat (with or without minerals or vitamins);

ii. The provision of oral nutritional supplements (ONS) (products used in oral nutrition support given with the aim to increase nutritional intake) as extra nutrition to regular meals;

iii. Changing meal patterns, the provision of additional snacks and/or the provision of dietary advice to patients on how to increase overall nutrition intake.

Appendix 5: Guideline search strategy

Search strategy for guidelines January 2006 to March 2017

National Clinical Guideline Group	Document	Author
Nutrition screening and use of oral nutrition support for adults in the acute care setting.	**Title: Search for guidelines** **Date: 9 March 2017** **Sources searched**	Paul J Murphy Information Specialist RCSI Royal College of Surgeons in Ireland Library Mercer Street Lower, Dublin 2, Ireland

Table 14. Sources searched

Academy of Nutrition and Dietetics US	Academy of Nutrition and Dietetics. Guidelines at: https://www.andeal.org/category.cfm?cid=14	1
Agency for Healthcare Research and Quality (AHRQ) US Dept Health US	In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	Various: indexed by agency
American Cancer Society US	In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	Various
American College of Gastroenterology	http://gi.org/clinical-guidelines/clinical-guidelines-sortable-list/	1
American Society for Parenteral and Enteral Nutrition ASPEN US	https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Clinical_Guidelines/	Various
American College of Physicians US	Guidelines at: https://www.acponline.org/clinical-information/guidelines	0
American College of Cardiology US	Guidelines at: http://www.acc.org/guidelines	0
American Gastroenterological Association Institute US	Guidelines at http://www.gastro.org/guidelines	Various
Australian Dept Health AUS	Guidelines at: http://www.health.gov.au/internet/main/publishing.nsf/Content/publications-Nutrition	0
Australian and New Zealand Intensive Care Society AUS NZL	Guideline resources at http://www.anzics.com.au/Pages/SandQ-resources.aspx	0
The Association of the Scientific Medical Societies in Germany AWMF: A rbeitsgemeinschaft the W CIENTIFIC M edical F achgesellschaften eV DE	Guidelines at: http://www.awmf.org/en/clinical-practice-guidelines.html Ernährungstherapie – Nutrition Therapy	0

BAPEN: the British Association for Parenteral and Enteral Nutrition UK	http://www.bapen.org.uk/ and http://www.bapen.org.uk/resources-and-education/education-and-guidance/guidelines	0
British Dietetic Association BDA UK	https://www.bda.uk.com/professional/practice/practice_guidance/home	0
DynaMed Plus Evidence Based Summaries	Ebscohost DynaMed subscription	Various
European Society for Clinical Nutrition and Metabolism ESPEN EU	http://www.espen.org/education/espen-guidelines	Various
The Endocrine Society US	Guidelines at: https://www.endocrine.org/search?q=guidelines Available: National Guideline Clearinghouse (NGC). https://www.guideline.gov	1
Haute Authorite de Sante French National Authority for Health (HAS) FR	http://www.has-sante.fr/portail/jcms/c_39085/en/recherche?portlet=c_39085&text=guideline+nutrition&opSearch=&lang=en&portal=c_2566858	0
German Guidelines Portal DE	http://www.leitlinien.de/leitlinien-grundlagen	0
Guidelines International Network INT	http://www.g-i-n.net/ http://www.g-i-n.net/library/international-guidelines-library	Various
MEDLINE PubMed US	Secondary database of publications www.pubmed.gov ((“Guideline” [Publication Type] OR “Guidelines as Topic”[Mesh] OR “Practice Guideline” [Publication Type])) AND ((“nutritional support”[MeSH Terms]) OR (“nutritional support”[Title/Abstract] OR “nutrition support”[Title/Abstract])) Filters: Humans; Adult: 19+ years; Adult: 19-44 years; Aged: 65+ years	Various
National Guideline Clearinghouse US	Agency for Healthcare Research and Quality (AHRQ) US Dept Health https://www.guideline.gov/	Various: indexed by agency
National Institute for Health and Care Excellence (NICE) UK	https://www.nice.org.uk/guidance/published?type=cg	Various
National Guideline Alliance US	In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	Various

Institute for Clinical Systems Improvement US	Guidelines at: https://www.icsi.org/search/?q=guideline	0
National Pressure Ulcer Advisory Panel US	http://www.npuap.org/ In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	1
New Zealand Guidelines Group NZL	http://www.health.govt.nz/about-ministry/ministry-health-websites/new-zealand-guidelines-group	0
Scottish Intercollegiate Guidelines Network UK	http://www.sign.ac.uk/index.html	1
Society Critical Care Medicine US	http://www.sccm.org/Pages/default.aspx	1
Trip Database	Secondary database of publications https://www.tripdatabase.com/	Indexed by agency

Search Strategy for guidelines March 2017 to December 2018

National Clinical Guideline Group	**Document**	**Author**
Nutrition screening and use of oral nutrition support for adults in the acute care setting	**Title: Search for guidelines, updated from March 2017 to Dec 2018** **Date: 24 Jan 2019**	Paul J Murphy Information Specialist RCSI Royal College of Surgeons in Ireland Library Mercer Street Lower, Dublin 2, Ireland

Table 15. Sources searched and guidelines (new or updated) identified

Academy of Nutrition and Dietetics US	Academy of Nutrition and Dietetics. Guidelines at: https://www.andeal.org/category.cfm?cid=14	No relevant updates
Agency for Healthcare Research and Quality (AHRQ) US Dept Health US	In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	Guideline updates ceased in 2018
American Cancer Society US	https://www.cancer.org/content/cancer/en/search.html?q=nutrition+guideline	None relevant
American College of Gastroenterology	http://gi.org/clinical-guidelines/clinical-guidelines-sortable-list/	No relevant updates
American Society for Parenteral and Enteral Nutrition ASPEN US	https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Clinical_Guidelines/	No relevant updates

American College of Physicians US	Guidelines at: https://www.acponline.org/clinical-information/guidelines	None relevant
American College of Cardiology US	Guidelines at: http://www.acc.org/guidelines	None relevant
American Gastroenterological Association Institute US	Guidelines at http://www.gastro.org/guidelines	No relevant updates
Australian Dept Health AUS	Guidelines at: http://www.health.gov.au/internet/main/publishing.nsf/Content/publications-Nutrition	None relevant
Australian and New Zealand Intensive Care Society AUS NZL	https://www.anzics.com.au/?s=guidelines	None relevant
The Association of the Scientific Medical Societies in Germany AWMF: A rbeitsgemeinschaft the W CIENTIFIC M edical F achgesellschaften eV DE	Guidelines at: http://www.awmf.org/en/clinical-practice-guidelines.html Ernährungstherapie – Nutrition Therapy	No relevant updates
BAPEN: the British Association for Parenteral and Enteral Nutrition UK	http://www.bapen.org.uk/ and http://www.bapen.org.uk/resources-and-education/education-and-guidance/guidelines	No relevant updates
British Dietetic Association BDA UK	https://www.bda.uk.com/professional/practice/practice_guidance/home	Member only access
European Society for Clinical Nutrition and Metabolism ESPEN EU	https://www.espen.org/guidelines-home ESPEN guideline on clinical nutrition in the intensive care unit. Pierre Singer, Annika Reintam Blaser, Mette M. Berger et al Clinical Nutrition accepted: 29 August 2018 ESPEN guideline on clinical nutrition and hydration in geriatrics. Dorothee Volkert, Anne Marie Beck, Tommy Cederholm et al Clinical Nutrition accepted: 29 May, 2018 ESPEN guideline clinical nutrition in neurology. Rosa Burgos, Irene Breton, Emanuele Cereda, et al Clinical Nutrition published online: 27 September, 2017 ESPEN guidelines on nutritional support for polymorbid internal medicine patients. Filomena Gomes, Philipp Schuetz, Lisa Bounoure et al Clinical Nutrition published online: July 24, 2017 ESPEN expert group recommendations for action against cancer-related malnutrition. J. Arends, V. Baracos, H. Bertz et al Clinical Nutrition 36 (2017) 1187e1196 ESPEN guideline: Clinical nutrition in surgery Arved Weimann, Marco Braga, Franco Carli et al Clinical Nutrition 36 (2017) 623-650	

	ESPEN guideline: Clinical nutrition in inflammatory bowel disease. Alastair Forbes, Johanna Escher, Xavier Hébuterne et al Clinical Nutrition 36 (2017) 321-347 ESPEN guidelines on definitions and terminology of clinical nutrition. T. Cederholm, R. Barazzoni, P. Austin et al Clinical Nutrition 36 (2017) 149-64 ESPEN guidelines on nutrition in cancer patients Jann Arends, Patrick Bachmann, Vickie Baracos et al Clinical Nutrition 36 (2017) 11–48	
The Endocrine Society US	Guidelines at: https://www.endocrine.org/search?q=guidelines	No relevant updates
Guidelines International Network INT	http://www.g-i-n.net/ http://www.g-i-n.net/library/international-guidelines-library	No relevant updates
National Guideline Clearinghouse US	Agency for Healthcare Research and Quality (AHRQ) US Dept Health https://www.guideline.gov/	Guideline updates ceased in 2018
National Institute for Health and Care Excellence (NICE) UK	https://www.nice.org.uk/guidance/published?type=cg CG32 Surveillance proposal consultation document March 2017 proposed no updated	No relevant updates
National Guideline Alliance US	In: National Guideline Clearinghouse (NGC) / Agency for Healthcare Research and Quality (AHRQ) https://www.guideline.gov	Guideline updates ceased in 2018
Institute for Clinical Systems Improvement US	Guidelines at: https://www.icsi.org/search/?q=guideline	None relevant
National Pressure Ulcer Advisory Panel US	http://www.npuap.org/	No relevant updates
New Zealand Guidelines Group NZL	http://www.health.govt.nz/about-ministry/ministry-health-websites/new-zealand-guidelines-group	None relevant
Scottish Intercollegiate Guidelines Network UK	http://www.sign.ac.uk/index.html	No relevant updates
Society Critical Care Medicine US	http://www.sccm.org/Pages/default.aspx	No relevant updates
Trip Database	Secondary database of publications https://www.tripdatabase.com/	No relevant updates

OVID MEDLINE Nutrition Screening 2017-2018

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily <2014 to January 22, 2019>

Search Strategy:

1 *Malnutrition/ or exp Protein Deficiency/ or exp Nutritional / or exp Nutrition Assessment/ or malnutrition.mp. or undernutrition.mp. or nutritional deficienc*.mp. or nutrition deficienc*.mp. or nutrition depletion.mp. or malnourishment.mp. or underfeeding.mp. or undernourishment. mp. or protein deficienc*.mp. or energy deficienc*.mp. or nutritional risk*.mp. or nutritional .mp. (36305)

2 (screening or screen).mp. or exp Mass Screening/ or Surveys.mp. or Questionnaires/ or (questionnaire* or assessment* or inventory or scale* or checklist or tool or tools).mp. (1372981)

3 Inpatients/ or (patient or patients or inpatient or inpatients).mp. (2089867)

4 (hospitalized or hospitalised).mp. or exp hospitalization/ or exp hospitals/ (125326)

5 (Adult or adults or aged or elderly or geriatric).mp. or exp YOUNG ADULT/ or exp ADULAGT/ or exp ED/ or exp MIDDLE AGED/ or exp "AGED, 80 AND OVER"/ (1787099)

6 1 and 2 and 3 and 4 and 5 (871)

7 (guideline or guidelines or protocol).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (281074)

8 6 and 7 (71)

EMBASE SEARCH QUERY Nutrition Screening 2017-2018 (n=43)

(((‘malnutrition’/exp OR ‘protein deficiency’/exp OR ‘nutritional status’/exp OR ‘nutritional assessment’/exp OR malnutrition:ti,ab OR undernutrition:ti,ab OR malnurishment:ti,ab OR underfeeding:ti,ab OR undernourishment:ti,ab OR ((nutritional NEXT/1 deficiency):ti,ab) OR ((nutrition NEXT/1 deficiency):ti,ab) OR ((nutrition NEXT/1 depletion):ti,ab) OR ((protein NEXT/1 deficiency):ti,ab) OR ((energy NEXT/1 deficiency):ti,ab) OR ((nutritional NEXT/1 risk):ti,ab) OR ((nutritional NEXT/1 status):ti,ab)) AND (‘screening’/exp OR ‘questionnaire’/exp OR screen:ti,ab OR screening:ti,ab OR questionnaire*:ti,ab OR assessment*:ti,ab OR inventory:ti,ab OR scale:ti,ab OR scales:ti,ab OR checklist*:ti,ab OR tool:ti,ab OR tools:ti,ab) AND (‘hospital patient’/mj/exp OR ‘hospital patient’ OR ‘aged hospital patient’/exp OR ‘aged hospital patient’ OR inpatient:ti,ab OR hospitalized:ti,ab OR hospitalised:ti,ab) AND (‘adult’/exp OR ‘aged’/exp OR adult:ti,de OR adults:ti,ab OR aged:ti,ab OR elderly:ti,ab OR geriatric:ti,ab)) AND (‘guideline’/exp OR guideline OR ‘guidelines’/exp OR guidelines OR ‘protocol’/exp OR protocol)) AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND (2017:py OR 2018:py)

Cochrane Library search Nutrition Screening 2017-2018

ID Search

#1 (malnutrition or malnourish* or undernourish* or underfeed* or nutritional near/1 deficiency or nutrition near/1 deficiency):ti,ab,kw (Word variations have been searched)

#2 screen or screening or questionnair* or assessment* or inventor* or scale* or checklist*

#3 patients or inpatients

#4 hospitalized or hospitalised

#5 aged or adult or adults or elderly or geriatric

#6 #1 AND #2 AND #3 AND #4 AND #5

#7 guideline or guidelines or protocol

#8 #6 AND #7

OVID MEDLINE Nutrition Screening 2017-2018

OVID MEDLINE n=5	
13 and 16	5
14 and 15	510013
exp CLINICAL PROTOCOLS/ or protocol.mp.	415318
exp PRACTICE GUIDELINE/ or guideline.mp. or exp GUIDELINE/ or exp GUIDELINE ADHERENCE/	99565
limit 12 to yr="2017 - 2019"	65
8 and 9 and 10 and 11	584
1 or 2 or 3 or 4 or 5 or 6 or 7	1359250
exp malnutrition/ or (malnutrition or malnourish* or undernourish*).mp.	144255
exp patients/ or (hospitalized adj1 patient*).mp. or inpatient*.mp.	172547
exp nutrition therapy/ or exp nutritional status/ or exp nutritional support/ or exp nutrition disorders/ or (nutrition* adj1 support).mp. or (nutrition* adj1 supplement*).mp. or (oral adj1 nutrition*).mp.	440671
((sip adj1 feed*) or (nutrient adj1 drink*)).mp. or snack*.ti,ab. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	6983
((calori* adj1 intake) or (calori* adj1 supplement*) or (vitamin adj1 supplement*) or (mineral adj1 supplement*) or (multivitamin adj1 supplement*) or (protein adj1 supplement*) or (nutrient adj1 supplement*) or (multinutrient adj1 supplement*)).mp.	18638
exp Food/ or exp Dietary Supplements/ or exp Dietary Carbohydrates/	1234705
((formula* adj1 diet*) or (formula* adj1 food*) or (formula* adj1 nutrition) or (enriched adj1 food*) or (enriched adj1 nutrition) or (enriched adj1 diet*) or (food* adj1 fortified) or (food adj1 consistenc*)).mp.	22527
exp Foods, Specialized/ or exp Food, Formulated/ or exp Food, Fortified/	27068
feeding methods/ or exp energy intake/ or (fat adj1 intake).mp. or (energy adj1 intake).mp. or (food adj1 intake).mp. or (protein adj1 intake).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	99622
exp dietary supplements/ or (diet* adj1 supplement*).mp. or exp diet therapy/ or (diet* adj1 intake).mp. or (diet* adj1 advice).mp. or (diet* adj counsel*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	157904

EMBASE search excluding Medline 2017-2019 for oral nutrition support (n=34)

#13 AND #14
34
#14
'practice guideline'/exp OR protocol:ti,ab,de OR guideline:ti,ab,de
890,087
#13
#10 AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND ([adolescent]/lim OR [adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim) AND (2017:py OR 2018:py OR 2019:py)
256
#12
#10 AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND ([adolescent]/lim OR [adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim)
874
#11
#10 AND [embase]/lim NOT ([embase]/lim AND [medline]/lim)
3,003
#10
#6 AND #7 AND #8 AND #9
4,729
#9
'malnutrition'/exp OR malnutrition:de,ti,ab OR malnourish*:de,ti,ab OR undernourish*:de,ti,ab
176,277
#8
'patient'/exp OR 'patients'/exp OR (hospitalized NEAR/1 patient*) OR inpatient*:ti,ab
2,268,286
#7
('nutrition supplement'/exp OR nutritional) AND 'disorder'/exp OR (nutrition* NEXT/1 supplement*) OR (nutrition* NEXT/1 support) OR (oral NEXT/1 nutrition*)
245,268
#6
#1 OR #2 OR #3 OR #4 OR #5
965,247
#5
(sip NEXT/1 feed) OR (nutrient NEXT/1 drink*) OR snack:ti OR snacks:ti
1,555

#4

(vitamin NEXT/1 supplement*) OR (mineral NEXT/1 supplement*) OR (multivitamin NEXT/1 supplement*) OR (protein NEXT/1 supplement*) OR (nutrient NEXT/1 supplement*)

38,512

#3

(formula NEXT/1 diet) OR (formula NEXT/1 nutrition) OR (enriched NEXT/1 food*) OR (enriched NEXT/1 nutrition) OR (enriched NEXT/1 diet) OR (food NEXT/1 consistenc*) OR (foodNEAR/1 fortified) OR (food NEAR/1 formula*)

6,350

#2

'fat intake'/exp OR (energy NEXT/1 supplement*) OR (energy NEXT/1 intake) OR 'caloric intake'/exp OR 'food intake'/exp OR 'protein intake'/exp OR 'dietary fiber'/exp

420,104

#1

'dietary intake'/exp OR 'dietary supplement'/exp OR 'diet'/mj OR 'diet therapy'/exp OR (dietary NEXT/1 intake) OR (diet* NEXT/1 advice) OR (diet* NEXT/1 counsel

SEARCH QUERY EMBASE excluding Medline 2017-2019

((((‘dietary intake’/exp OR ‘dietary supplement’/exp OR ‘diet’/mj OR ‘diet therapy’/exp OR (dietary NEXT/1 intake) OR (diet* NEXT/1 advice) OR (diet* NEXT/1 counsel*)) OR (‘fat intake’/exp OR (energy NEXT/1 supplement*) OR (energy NEXT/1 intake) OR ‘caloric intake’/exp OR ‘food intake’/exp OR ‘protein intake’/exp OR ‘dietary fiber’/exp) OR ((formula NEXT/1 diet) OR (formula NEXT/1 nutrition) OR (enriched NEXT/1 food*) OR (enriched NEXT/1 nutrition) OR (enriched NEXT/1 diet) OR (food NEXT/1 consistenc*) OR (food NEAR/1 fortified) OR (food NEAR/1 formula*)) OR ((vitamin NEXT/1 supplement*) OR (mineral NEXT/1 supplement*) OR (multivitamin NEXT/1 supplement*) OR (protein NEXT/1 supplement*) OR (nutrient NEXT/1 supplement*)) OR ((sip NEXT/1 feed) OR (nutrient NEXT/1 drink*) OR snack:ti OR snacks:ti)) AND ((‘nutrition supplement’/exp OR nutritional) AND ‘disorder’/exp OR (nutrition* NEXT/1 supplement*) OR (nutrition* NEXT/1 support) OR (oral NEXT/1 nutrition*)) AND (‘patient’/exp OR ‘patients’/exp OR (hospitalized NEAR/1 patient*) OR inpatient*:ti,ab) AND (‘malnutrition’/exp OR malnutrition:de,ti,ab OR malnourish*:de,ti,ab OR undernourish*:de,ti,ab)) AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND ([adolescent]/lim OR [adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim) AND (2017:py OR 2018:py OR 2019:py)) AND (‘practice guideline’/exp OR protocol:ti,ab,de OR guideline:ti,ab,de)

Appendix 6: Guideline search results for AGREE II evaluation

Guideline search results January 2006 to March 2017 after screening by GDG

National Clinical Guidelines Group	Document	Author
Nutrition screening and use of oral nutrition support for adults in the acute care setting	**Title: Accepted guidelines resulting from GDG screening of searched guidelines.** **Contents: Table 16**	Paul J Murphy Information Specialist RCSI Royal College of Surgeons in Ireland Library Mercer Street Lower, Dublin 2, Ireland

Table 16. Guidelines screened and accepted by GDG 14th March 2017

	Agency	Citation - reference	Availability - access
1	**American College of Gastroenterology** Nutrition Therapy in the Adult Hospitalised Patient. 2016	ACG Clinical Guideline: Nutrition Therapy in the Adult Hospitalized Patient. McClave SA, DiBaise JK, Mullin GE, Martindale RG. Am J Gastroenterol. 2016 Mar;111(3):315-34; quiz 335. doi: 10.1038/ajg.2016.28. Epub 2016 Mar 8.	JOURNAL ARTICLE http://www.nature.com/ajg/journal/v111/n3/pdf/ajg201628a.pdf
	American Society for Parenteral and Enteral Nutrition ASPEN	https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Clinical_Guidelines/	URLs to original articles and downloaded pdf files
2	ASPEN Clinical Guidelines: Parenteral Nutrition Ordering, Order Review, Compounding, Labeling, and Dispensing 2014	A.S.P.E.N. clinical guidelines: Parenteral nutrition ordering, order review, compounding, labeling, and dispensing. [Review] Boullata JI; Gilbert K; Sacks G; Labossiere RJ; Crill C; Goday P; Kumpf VJ; Mattox TW; Plogsted S; Holcombe B; American Society for Parenteral and Enteral Nutrition. Jpen: Journal of Parenteral & Enteral Nutrition. 38(3):334-77, 2014 Mar-Apr.	JOURNAL ARTICLE http://journals.sagepub.com/doi/pdf/10.1177/0148607114521833
3	ASPEN Clinical guidelines: nutrition support of hospitalized adult patients with obesity 2013	Choban P; Dickerson R; Malone A; Worthington P; Compher C; American Society for Parenteral and Enteral Nutrition. A.S.P.E.N. Clinical guidelines: nutrition support of hospitalized adult patients with obesity. Journal of Parenteral & Enteral Nutrition. 37(6):714-44, 2013 Nov.	JOURNAL ARTICLE http://journals.sagepub.com/doi/pdf/10.1177/0148607113499374

4	ASPEN Nutrition Support of Adult Patients With Hyperglycemia 2013	A.S.P.E.N. clinical guidelines: nutrition support of adult patients with hyperglycemia.[Erratum appears in JPEN J Parenter Enteral Nutr. 2014 May;38(4):524] McMahon MM; Nystrom E; Braunschweig C; Miles J; Compher C; Board of Directors; American Society for Parenteral and Enteral Nutrition. Journal of Parenteral & Enteral Nutrition. 37(1):23-36, 2013 Jan.	JOURNAL ARTICLE http://journals.sagepub.com/doi/pdf/10.1177/0148607112452001
5	ASPEN Nutrition Screening, Assessment, and Intervention in Adults 2011	A.S.P.E.N. clinical guidelines: Nutrition screening, assessment, and intervention in adults. Mueller C; Compher C; Ellen DM; American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors. Journal of Parenteral & Enteral Nutrition. 35(1):16-24, 2011 Jan.	JOURNAL ARTICLE http://journals.sagepub.com/doi/pdf/10.1177/0148607110389335
6	ASPEN Clinical Guidelines for the Use of Parenteral and Enteral Nutrition in Adult and Pediatric Patients 2009	Clinical Guidelines for the Use of Parenteral and Enteral Nutrition in Adult and Pediatric Patients, 2009. American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors. Journal of Parenteral and Enteral Nutrition Vol 33, Issue 3, pp. 255 – 259	JOURNAL ARTICLE http://journals.sagepub.com/doi/pdf/10.1177/0148607109333115
7	ASPEN Enteral Nutrition Practice Recommendations - [Endorsed by the American Dietetic Association (ADA), the American Society of Health-System Pharmacists (ASHP) and the Institute for Safe Medication Practices (ISMP)] 2009	Enteral nutrition practice recommendations. Bankhead R; Boullata J; Brantley S; Corkins M; Guenter P; Krenitsky J; Lyman B; Metheny NA; Mueller C; Robbins S; Wessel J; A.S.P.E.N. Board of Directors. Jpen: Journal of Parenteral & Enteral Nutrition. 33(2):122-67, 2009 Mar-Apr.	JOURNAL ARTICLE http://pen.sagepub.com/cgi/rapidpdf/0148607108330314v2
8	**Dietitians Association of Australia** Evidence Based Practice Guidelines for the Nutritional Management of Malnutrition in Adult Patients Across the Continuum of Care 2009	Evidence Based Practice Guidelines for the Nutritional Management of Malnutrition in Adult Patients Across the Continuum of Care Linda Tapsell, Ingrid Hickman, Kristy Parsons Canberra, Australian Capital Territory. Nutrition & Dietetics Volume 66, Issue Supplement s3, pages S1–S34, December 2009	JOURNAL ARTICLE http://onlinelibrary.wiley.com/doi/10.1111/j.1747-0080.2009.01383.x/epdf

9	**French Speaking Society of Clinical Nutrition and Metabolism (SFNEP):** French clinical guidelines on perioperative nutrition. Update of the 1994 consensus conference on perioperative artificial nutrition for elective surgery in adults. 2012	French clinical guidelines on perioperative nutrition. Update of the 1994 consensus conference on perioperative artificial nutrition for elective surgery in adults. Chambrier C, Sztark F; Société Francophone de nutrition clinique et métabolisme (SFNEP); Société française d'anesthésie et réanimation (SFAR). J Visc Surg. 2012 Oct;149(5):e325-36. doi: 10.1016/j.jviscsurg.2012.06.006. Epub 2012 Oct 26.	JOURNAL ARTICLE http://www.sciencedirect.com/science/article/pii/S18787861200077X
	ESPEN European Society for Clinical Nutrition and Metabolism	http://www.espen.org/education/espen-guidelines	
10	ESPEN guideline on ethical aspects of artificial nutrition and hydration 2016	ESPEN guideline on ethical aspects of artificial nutrition and hydration Christiane Druml, Peter E. Ballmer, Wilfred Druml, Frank Oehmichen, Alan Shenkin, Pierre Singer, Peter Soeters, Arved Weimann, Stephan C. Bischoff Clinical Nutrition Volume 35, Issue 3, June 2016, Pages 545–556	JOURNAL ARTICLE http://www.espen.org/files/ESPEN-Guidelines/3__ESPEN_guideline_on_ethical_aspects_of_artificial_nutrition_and_hydration.pdf
	ESPEN Guidelines for adult parenteral nutrition 2009	ESPEN Guidelines for adult parenteral nutrition N.J.M. Cano, M. Aparicio, G. Brunori, J.J. Carrero, B. Cianciaruso, et al Clinical Nutrition 2009; 28:359-479	
	Topic	*ARTICLE URL*	
11	Geriatrics	http://espen.info/documents/0909/Geriatrics.pdf	
12	Home parenteral	http://espen.info/documents/0909/HomeParenteralNutritioninadults.pdf	
13	Surgery	http://espen.info/documents/0909/Surgery.pdf	
	ESPEN Guidelines on adult enteral nutrition 2006	ESPEN Guidelines on adult enteral nutrition H. Lochs, L. Valentini, T. Schütz, S.P. Allison, P. et al Clinical Nutrition 2006;25:177-360	
14	Geriatrics	http://espen.info/documents/ENGeriatrics.pdf	
15	Surgery	http://espen.info/documents/ENSurgery.pdf	
	NICE National Institute for Care and Health Excellence	https://www.nice.org.uk/guidance/published?type=cg	

16	Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition 2006	Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition Clinical guideline [CG32] Published date: February 2006	GUIDELINE DOCUMENT 2006: https://www.nice.org.uk/guidance/cg32 EVIDENCE UPDATE 2013: https://www.nice.org.uk/guidance/cg32/evidence/evidence-update-194887261 REVIEW DECISION 2011: https://www.nice.org.uk/guidance/cg32/evidence/review-decision-2011-546204349 SURVEILLANCE REVIEW DECISION 2014: https://www.nice.org.uk/guidance/cg32/evidence/surveillance-review-decision-2014-546205645
17	Intravenous fluid therapy in adults in hospital 2013	Intravenous fluid therapy in adults in hospital. London (UK):National Institute for Health and Care Excellence(NICE); 2013 Dec. 36 p. (Clinical guideline; no. 174). Last Updated: 2016	GUIDELINE DOCUMENT https://www.nice.org.uk/guidance/cg174
18	Nutrition Support in Adults Quality Standard 2012 (Standard not guideline)	Nutrition support in adults Quality standard [QS24] Published date: November 2012	QUALITY STANDARD DOCUMENT https://www.nice.org.uk/guidance/qs24

Appendix 7: Evidence grading systems used in this NCG

Grading system used by NICE for Clinical Guideline 32

The grading system used by NICE was maintained in those recommendations that were adapted from NICE CG32. A limitation to using a classification system that is based only on the level of evidence, such as this one, is that it does not consider the importance of the recommendation in changing practice and improving patient care (NICE, 2006a). This grading system is used for Recommendations 1 and 2, and 4 to 17, inclusive.

Table 17. Level of evidence and grade of recommendation used by NICE (NICE, 2006a)

Level of evidence	Type of evidence used by NICE Clinical Guideline 32
1++	High-quality meta-analysis, systematic reviews
1+	Well-conducted meta-analysis, systematic reviews of RCTs, or RCTs with a low risk of bias
1-	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2++	High-quality systematic reviews of case-control or cohort studies High-quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal
2+	Well-conducted case-control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
2-	Case-control or cohort studies with a high risk of confounding bias, or chance and a significant risk that the relationship is not causal
3	Non-analytic studies (for example, case reports, case series)
4	Expert opinion

Grade of recommendations	Evidence
A	• At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population, or • A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results • Evidence drawn from a NICE technology appraisal
B	• A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results, or • Extrapolated evidence from studies rated as 1++ or 1+
C	• A body or evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results, or • Extrapolated evidence from studies rated as mmas 2++
D	• Evidence level 3 or 4, or • Extrapolated evidence from studies rated mmas 2+, or • Formal consensus
D (GPP)	A good practice point (GPP) is a recommendation for best practice based on the experience of the GDG

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The GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach

- GRADE categorises the certainty in evidence as high, moderate, low or very low (see Table 18).
- GRADE categorises the strength of evidence as either strong, or weak/conditional. This reflects the extent to which a guideline panel is confident that desirable effects of an intervention outweigh undesirable effects, or vice versa, across the range of patients for whom the recommendation is intended.
- The GRADE approach is used for Recommendation 3.

Table 18. Quality of evidence using GRADE approach *(adapted from 'A manual for guideline developers', Department of Health, 2019)*

Quality level	Definition
High	The GDG is very confident that the true effect lies close to that of the estimate of the effect.
Moderate	The GDG is moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	The GDG confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very low	The GDG has very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

Appendix 8: Consultation report

Table 19. Key stakeholders for consultation

HSE Acute Operations and HSE Strategic Planning and Transformation
Association of Occupational Therapists of Ireland (AOTI)
Catering Management Association of Ireland (CMAI)
Clinical Strategy and Programmes Division (CSP), HSE
Department of Health's Healthy Ireland Team
Healthy Eating and Active Living Programme (HEAL) Implementation Group
Health Information and Quality Authority (HIQA)
Hospital Group Chief Executive Officers (CEOs)
Hospital Nutrition and Hydration Steering Committees through Hospital Group CEOs
Hospital Pharmacists Association of Ireland (HPAI)
Irish Association of Speech and Language Therapists (IASLT)
Irish Nutrition and Dietetic Institute (INDI)
Irish Society for Clinical Nutrition and Metabolism (IrSPEN)
National Health and Social Care Professions (HSCP) Office
National Patient Forum
National Patient Safety Office (NPSO)
Nutrition Society (Irish Section)
Office of the Nursing and Midwifery Services Director (ONMSD)
Pharmaceutical Society of Ireland (PSI)
Quality Assurance and Verification Division (QAVD), HSE
Quality Improvement Division (QID), HSE

Consultation Process:

- Key consultation stakeholders were agreed by the Chair(s) and GDG.
- External reviewers were agreed by the Chair(s) and GDG.
- A feedback form was developed and was forwarded to all key stakeholders (Table 19) and external reviewers along with guideline and supporting documents (other than Budget Impact Analysis).
- A timeframe of three weeks was given for feedback – late feedback was facilitated.
- A GDG Feedback Subgroup (see Appendix 1) reviewed collated feedback results by conference call meeting and afterwards through email. Amendments to the guideline were agreed and were incorporated into the guideline.

Results:

- Two external reviewers, thirteen organisations, one nutrition company and two individuals provided feedback on the guideline.
- Most common areas of feedback can be categorised as: education and training issues, resource issues, formatting issues, summary document requested, suggested changes to details in specific sections.
- External reviewers gave detailed feedback on supporting documents and the main guideline document such as terminology, Section 3.0 issues, additional audit criteria, clarification on screening in 16 to 18 year olds, additional references suggested.

Appendix 9: Implementation plan and logic model

Strategic aim

The overarching objective of this implementation plan is to provide a framework for the identification of malnutrition risk and its management through effective use of oral nutrition support interventions for adult inpatients in the acute care setting. The logic model demonstrates the context for the plan, the inputs, activities and outcomes associated with implementing nutrition screening for malnutrition risk and appropriate use of oral nutrition support in the acute care setting.

Facilitators and barriers

To inform the implementation plan the GDG contacted seven international experts with experience in implementing organisational, regional or national screening programmes for risk of malnutrition. Experts from Australia, the Netherlands, New Zealand, Northern Ireland, and the United Kingdom were approached for feedback. Feedback on facilitators and barriers to implementation was requested. These are reported below (see Table 20), as factors that promote implementation and are organised into four main areas.

Table 20. Expert feedback on factors that promote implementation of screening for risk of malnutrition

Implementation influences	Factors that promote implementation
Screening tool characteristics	• The ease with which a NST can be applied. • A shorter time to perform and record screening for malnutrition risk. • Involving hospital staff in addition to nurses and doctors, to assist in the screening for malnutrition risk process. • Using on-line tools to aid calculations may facilitate implementation. • Improving compliance in completing documentation by involving staff responsible for using the NST in the design of a recording template. • Using a similar tool nationally, or internationally, to facilitate research and evaluation, and the sharing of experience. • Choosing an evidence-based tool that is valid and reliable with a clear care pathway. • Devising care pathways that recommend nutritional intervention(s) without delay while awaiting nutrition assessment. • Choosing an NST that has accessible and easy supporting documentation and education tools already available. • Choosing an NST with a scoring system that allows for prioritisation. • Choosing an NST that crosses all healthcare settings.
Outer setting	• Making screening for malnutrition risk on admission mandatory through national government action. • Supporting screening for malnutrition risk through regional or national policy. • Monitoring screening for malnutrition risk through inspections by acute care regulating or accreditation bodies. • Developing national key performance indicators (KPIs) to facilitate compliance and reporting of screening for malnutrition risk.

	• Coding for malnutrition (e.g. monthly) by hospitals. • Identifying national implementation leads - medical, nursing and dietetic. • Initiating national malnutrition risk prevalence audits and malnutrition-awareness days. • Developing a national communications plan for dissemination, implementation and audit of malnutrition screening practices. • Developing national training and education resources to support screening for malnutrition risk and associated care pathways.
Inner setting	• Embedding screening into nursing admission processes. • Providing local in-hospital training and education to support screening for malnutrition risk and associated care pathways. • Using quality improvement methodology, e.g. Plan Do Study Act (PDSA) cycles of change. • Auditing malnutrition risk prevalence to promote implementation readiness. • Developing a local implementation plan and audit system. • Outlining a local communications plan on dissemination, implementation and audit of malnutrition screening practices. • Organising automatic e-referral to the dietitian through the electronic health record system, for patients identified as at risk of malnutrition.
Characteristics of individuals	• Identifying individual staff members on each ward to act as ward champions for screening for malnutrition risk and related issues. • Identifying an organisational implementation lead. • Increasing awareness of malnutrition risks among healthcare staff and clarity on roles and responsibilities in managing nutritional care. • Empowering healthcare staff, particularly nursing staff, to take ownership of their role in the nutrition care pathway.

This feedback was used by the GDG when developing this guideline and the associated implementation plan, for example:

- Two screening tools that are evidence-based, and cross healthcare settings are recommended in this guideline.
- Screening tools recommended are quick and easy to use and both use a clear scoring system to help prioritisation. A link to the toolkit supporting one of the tools is provided in Appendix 10.
- Three pathways to aid implementation (Figures 3, 4 and 5) at local hospital level are provided.
- A national education and training framework is provided. This empowers nurses to take on the screening process through a 'train-the-trainers' approach.
- Increasing awareness through, for example, annual malnutrition awareness days is included in the implementation plan.
- A link to a quality improvement tool which uses PDSA cycles is included in Appendix 10.
- Sharing of staff experiences with examples of good practice is recommended in the implementation plan.

- Roles and responsibilities are included in this implementation appendix.
- A communications and dissemination plan is provided.
- A local audit overview with essential and desirable audit criteria is provided in Appendix 11, and forms part of the implementation plan. A self-assessment tool is provided to facilitate this (see Appendix 10 for list of tools).
- National KPIs are outlined in Appendix 11.

The implementation plan

The implementation plan included here aligns recommendations with actions required to achieve their implementation and assigns responsibilities for actions within a specified timeframe. Expected outcomes and how these can be verified are outlined. A dissemination and communication plan is provided.

Roles and responsibilities

Implementation responsibilities must be seen in the context of the overall roles and responsibilities of each profession and healthcare worker. Specific roles and responsibilities are already outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospital (FNHP) (2018b) for:

- Hospital Chief Executive Officer/ General Manager
- Food Service Staff (Ward Catering Staff)
- Chef
- Multidisciplinary Team
- Kitchen Attendant
- Doctor
- Dietitian Manager
- Clinical Nurse Manager
- Dietitian
- Registered Nurse
- Speech and Language Therapist (SLT)
- Healthcare Assistant
- Occupational Therapist
- Food Service/ Catering Manager
- All clinical staff

Roles and responsibilities listed in the FNHP (HSE, 2918b) were not amended by the GDG, with the exception of SLT. In the context of this NCG, SLT GDG members amended their role to include managing patients with dysphagia identified with malnutrition or at risk of malnutrition. This is consistent with recommendations in the NCG and supplements the responsibilities outlined in the FNHP (HSE, 2018b). Responsibilities include:

- SLTs are responsible for assessment and management of patients identified with Feeding, Eating, Drinking and Swallowing (FEDS) difficulties. This involves investigation of causes of FEDS and their impact on nutrition.
- SLTs have a role in the treatment of patients with dysphagia who are malnourished, or at risk of malnutrition. Intervention may include:
    - objective assessment of swallow physiology (e.g. videofluoroscopy, FEES)
    - provision of restorative swallowing rehabilitation
    - recommendations for appropriate food and fluid consistencies
    - advice in relation to safe swallowing guidelines
    - provision of appropriate equipment for feeding/drinking, and
    - education of patient, family and staff.

- SLTs liaise closely with team members including dietitians, food service/catering and nursing staff in acute hospitals re: modified consistency diet and fluids and safe swallowing strategies for the patient during mealtimes.
- SLTs contribute to multidisciplinary team decision making on provision of supplemental or alternative non-oral nutrition and hydration if required for the patient. This might include progression from non-oral nutrition and hydration back to some or full oral nutrition in a safe way, if appropriate for the patient.
- SLTs liaise closely with the medical team for the management of patients who are 'risk feeding' (that is, at risk of aspiration when eating and drinking orally, but oral intake has been deemed the most appropriate management pathway for the patient).

The GDG recognises that the Hospital Pharmacist also has an important role in oral nutrition support, especially with regard to patients with dysphagia or swallowing difficulties, and with regard to the sourcing and supply of specialised oral nutritional supplements.

The vital role of the Hospital Nutrition and Steering Committee in implementation is acknowledged by the GDG and features strongly in the following implementation plan. The Committee's membership, roles and responsibilities are outlined in the Food Nutrition and Hydration Policy for Adult Patients in Acute Hospital (FNHP) (2018b).

Logic Model for National Clinical Guideline: Nutrition screening (NS) and use of oral nutrition support for adults in acute care setting

Monitoring and Evaluation 1. National audit using audit criteria from NCG 2. Hospital Nutrition and Hydration Steering Committees - self-assessment/local audit 3. National implementation oversight by Chief Clinical Officer

Situational Analysis

- Malnutrition risk prevalence in adults on admission to Irish hospitals: 28-32% (75% high risk) - BAPEN Nutrition Screening Surveys 2010 and 2011
- Malnutrition costs in Ireland: 1.42billion euro per annum, 10% of annual healthcare budget
- HIQA audit of hospitals 2016:
  - √ 1 in 5 did not use NS in any area
  - √ NS was used in 40-50% of admitted patients (median)
  - √ Key recommendation: NS for all patients admitted
- HSE Service Plan prioritises nutrition
- HSE Food Nutrition and Hydration Policy (FNHP) 2018, supports NS and oral nutrition support
- HSE Wound Management Guidelines 2018 support NS and oral nutrition support
- International Dysphagia Diet Standardisation Initiative (IDDSI) Framework is endorsed for implementation by HSE
- An estimated 2200 oral nutritional supplements are used daily in relevant adult inpatients (80% of total purchased by Irish hospitals)
- Lack of formal nutrition support teams in adult hospitals

Inputs

- Guideline Development Group
- HRB-CICER
- NCEC
- CES
- HSE
  - Acute Operations
  - Strategic Planning and Transformation
  - Chief Clinical Officer
  - National HSCP Office
  - National Clinical Programme leads
  - QI, QPS leads
  - Digital Communications
- NICE
- Joint Steering and Clinical Advisory Group
- Hospital Nutrition and Hydration Steering Committees
- HIQA
- Implementation teams – National and local
- Patient experience surveys (HSE)
- Hospital/ward champions
- Professional bodies and organisations
- Patient groups/representatives
- Additional resources per BIA through service planning process
- Clinical governance in hospitals including reporting processes facilitating accountability
- IDDSI implementation teams

Activities/Outputs

Communications:

- Develop and deliver a communication and dissemination plan for NCG, including launch
- Develop set of tools for hospitals to aid guideline implementation and disseminate via HSE website

Training:

- Develop and implement a framework for training and education, to include NS and oral nutrition support, for use in all hospitals (for MDT including Food Service staff and HCAs)

Audit and data:

- Develop and implement a set of audit criteria for local hospital self-assessment tool (complete annually) and national audit
- Develop and use data collection and reporting mechanisms
- Nutrition measured in nursing metrics

Delivery:

- Implement inpatient pathways/ algorithms for screening for malnutrition risk and use of oral nutrition support
- Align discharge process with FNHP
- Formal Nutrition Support Team role is considered in adult hospitals

Short-Term Outcomes

Implementation Outcomes:

- Systems in place to audit NS and include % screened and accuracy in tool completion
- Increased awareness/knowledge of staff on malnutrition risk prevention and treatment
- All hospital staff appropriately using NS and oral nutrition support as per NCG

Service Outcomes:

- 100% of hospitals have NCG care pathways in place
- Nutrition screening takes place within 24hr in 60% of all admissions year 1; 70% in year 2; >80% year 3
- 100% of patients identified at risk commence on a treatment pathway immediately
- 100% of patients with new indicators for dysphagia are referred to SLT
- Reduced length of stay

Client Outcomes:

- Improved patient experience
- Reduced weight loss during hospital admission
- Slower decline in, or maintenance of, functional status in malnutrition risk patients, e.g. frailty markers, grip strength

Long-Term Outcomes

Implementation Outcomes:

- Systems and processes in place to ensure fidelity to guideline
- Integration of guideline into care delivery, including admission processes
- Nutrition and Hydration Steering Committees in each hospital ensuring sustainability of guideline
- Data systems in place to identify prevalence of malnutrition

Service Outcomes:

- All wards and all staff in all hospitals are using guideline to support clinical decisions
- Improved cost effectiveness of nutritional management, including reduction in length of stay
- Improved integration of care across acute and community settings

Client Outcomes:

- Improved patient experience relating to nutritional care
- Less complications associated with malnutrition, e.g. delayed wound healing, HCAI (Healthcare Associated Infections)
- More likely to maintain functional status during admission

Evidence 1. National Clinical Guideline (NCG) 2. Food Nutrition and Hydration Policy 3. NICE Clinical Guideline 32 4. HIQA Review of the Nutrition and Hydration Care in Public Acute Hospitals 2016 5. BAPEN Nutrition Screening Surveys 2010 and 2011 6. HRB-CICER systematic 7. MalNutrition in the Elderly Knowledge Hub - MaNuEL

Implementation plan

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
Screening for risk of malnutrition: **1 + 2 + 3**	**Enabler** Malnutrition awareness has improved.	Develop a high level communications strategy designed to ensure that all staff and patients are aware of the risks of malnutrition and the importance of early detection and treatment.	Guideline Development Group, HSE Communications,	✔			**Outcome** • Communications strategy re malnutrition risk screening and treatment in place in all local hospitals. • Improved malnutrition awareness among staff and patients. • System in place to share implementation experiences and learning between sites. **Verification** • Self-assessment by local Hospital Nutrition and Hydration Steering Committees in year 2. • Patient satisfaction survey results reported in year 2. • HSE communications mechanism. • Food Nutrition and Hydration Information leaflet is available for all hospital inpatients.
		Develop a communication plan aimed at raising / maintaining a high level of awareness of malnutrition risks, including as a minimum: • Annual malnutrition awareness days targeted at both patients and staff. • Reporting system in place to report % of patients at malnutrition risk to Hospital Management annually.	Hospital Nutrition and Hydration Steering Committees.		✔ ✔ ✔		
		Implement communications strategy to maintain high levels of engagement and feedback, e.g.: • Perform patient satisfaction surveys – utilise existing surveys. • Put in place a staff feedback mechanism. • Share positive staff and patient stories. • Share learning across hospitals and support champions. • Contribute to the Food Nutrition and Hydration Information leaflet nutrition for hospital inpatients.	Nutrition and Hydration Steering Committees. Nutrition and Hydration Steering Committees. Nutrition and Hydration Steering Committees. HSE Communications. Hospital Staff. HSE Communications. Guideline Development Group in co-operation with the Food Nutrition and Hydration Policy development group.	✔ ✔	✔ ✔ ✔ ✔		

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
	Enabler Hospital Nutrition Steering Committees provide a hospital-level infrastructure to oversee implementation of malnutrition screening and include MDT representatives.	Provide strong leadership on the local implementation of National Clinical Guideline and put in place mechanisms to ensure implementation, to include as a minimum: • Develop inpatient pathway for screening for malnutrition risk. • Provide guidance on screening tool fidelity - 'core' aspects that cannot be changed, care pathway aspects that are flexible to individual service contexts • Adapt and implement inpatient pathway for screening for malnutrition risk.	Hospital Nutrition and Hydration Steering Committees. Guideline Development Group. Guideline Development Group. Hospital Nutrition and Hydration Steering Committees.	✔ ✔ ✔	 ✔	 	**Outcome** • Pathway for nutrition screening available to and used in all hospitals. • Core components of screening tool available to and used in all hospitals. **Verification** Self-assessment by Hospital Nutrition and Hydration Steering Committees reported in year 2.
	Enablers • Screening for risk of malnutrition is already recommended by HSE in Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals. • HIQA 'Review of nutrition and hydration care in public acute hospitals' captured baseline data on nutrition screening and recording of nutritional parameters (e.g. weight, and height).	Ensure systems are in place to monitor and improve screening rates for malnutrition risk and to ensure that treatment is commenced immediately. Systems to include at a minimum: • Perform screening for malnutrition risk on admission. • Assess ward screening rate weekly. • Report % screened for malnutrition risk hospital wide on a 6 monthly basis. • Assess and report fidelity to tool and treatment plan at individual ward and Hospital level on a yearly basis at least. Compare screening rates with recommendations from National Clinical Guideline years 1, 2 and 3 post-implementation. Agree process for national audit of screening programme implementation.	Hospital Nutrition and Hydration Steering Committees Ward Nurse +/- assisstance from HCA. Ward CNM. Nurse Managers and ward CNMs. Hospital Nutrition and Hydration Steering Committees. Hospital Nutrition and Hydration Steering Committees. HSE National implementation oversight by Chief Clinical Officer - to include audit of malnutrition screening rates.	✔ ✔	 ✔ ✔ ✔ ✔	 ✔	**Outcome** • All hospitals commence nutrition screening for admitted patients on admission and weekly thereafter. • Screening rates are established and reported to Hospital Management 6 monthly. **Verification** • Fidelity to screening tool and treatment pathway assessed annually by Local Hospital Nutrition and Hydration Steering Committees for Hospital level. • HSE Chief Clinical Officer to oversee implementation – with KPI development on malnutrition risk screening.

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
	Prevention and treatment of malnutrition education: • Enabler: undergraduate education for dietetic and nursing staff. • Barrier: not on medical undergraduate curriculum – but post-graduate opportunities. • Barrier: Deficit in education programmes for Food Service/ Catering staff – local hospital dependent. • Barrier: no standardised education and training framework for prevention and treatment of malnutrition in acute care.	Develop a national standardised education and training framework for acute care setting to support this guideline. To target MDT and Food Service Staff. Education programme to include at a minimum (NICE 2006a): • nutritional needs and indications for nutrition support • options for nutrition support (oral, enteral and parenteral) • ethical and legal concepts • potential risks and benefits of oral nutrition support • when and where to seek expert advice on screening and appropriate use of oral nutrition support.	Guideline Development Group to develop proposed framework.	✔			**Outcome** • Improved knowledge and competencies for nursing staff, healthcare assistants, and food service/catering staff on malnutrition prevention and treatment. **Verification** • Self-assessment by local Hospital Nutrition and Hydration Steering Committees annually. • Nursing staff +/- Healthcare Assistant staff training records available for audit.
		Framework to include on-site hospital training to support National Clinical Guideline implementation for Nursing staff +/- Healthcare Assistants on use of the malnutrition screening tool. Include existing training resources, such as: • MUST tool on www.hse.ie/eng/staff/pcrs/online-services/musttool.pdf, • HSELanD e-learning module on MUST for staff on www.hse.ie.	Hospital Nutrition and Hydration Steering Committees. Hospital Dietetic Departments. Nurse Educators trained in use of malnutrition screening tool. Nurses who completed a 'train the trainers' programme.	✔			
		Develop strategies for incentivising improvements (e.g. local nutrition awards).	Hospital Nutrition and Hydration Steering Committees.		✔		
	Barrier: Potential impact on resource requirements as outlined in BIA, e.g. for nursing and dietetic staff.	Assess and address resource implications for screening and treatment of malnutrition risk. Local Hospital management and Hospital Group management to include financial resource requirements as part of the annual estimates process / service plan.	Local Hospital Managers. Hospital Group Managers.	✔ ✔	✔	✔	**Outcome** • Resources are secured for implementation at local hospital and Hospital Group level. **Verification** • Inclusion in service plan • Reporting by local Hospital management and Hospital Group management.

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
Oral nutrition support - general indications 4 to 10	**Enabler** Hospital Nutrition and Hydration Steering Committees exist and include MDT representatives.	Provide strong leadership on the local implementation of National Clinical Guideline recommendations, which includes: • Develop an inpatient care pathway for use of oral nutrition support. • Implement inpatient pathway for use of oral nutrition support.	Nutrition and Hydration Steering Committees. Clinical MDTs. Dietetic Departments. Guideline Development Group. Nutrition and Hydration Steering Committees. Clinical MDTs. Dietetic Departments.	✔ ✔ ✔			**Outcomes** Inpatient pathway for malnutrition screening and use of oral nutrition support is available to all Hospital staff. **Verification** Self-assessment by local Hospital Nutrition and Hydration Steering Committees annually.
	Enabler Local hospital and HSE resources exist to support use of oral nutrition support.	Hospital staff to utilise existing resources, which include: • Local hospital resources such as patient information leaflets on oral nutrition support. • HSE resources already available at www.hse/nutritionsupports • Food Nutrition and Hydration Information leaflet for hospital inpatients • Food Nutrition and Hydration Policy toolkit https://www.hse.ie/eng/about/who/acute-hospitals-division/food-nutrition-and-hydration-policy-for-adult-patients/	Hospital Dietetic Departments. Clinical Nurse Managers to ensure adequate ward supplies of Food Nutrition and Hydration Information leaflet.	✔ ✔			**Outcomes** • Diet sheets and patient information leaflets available as per local practice. • Nutrition resources available on HSE website. • Food Nutrition and Hydration Information leaflet available on all hospital wards. **Verification** Dietetic Departments. HSE website with supporting tools available to hospital staff.
	Barrier Potential impact on resource requirements as outlined in BIA, e.g. for nursing and dietetic staff.	Hospital staff to utilise existing implementation tools developed for the 'HSE Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals' to identify and develop strategies for reducing hospital food waste. Assess and address catering resource implications for use of oral nutrition support. Local Hospital management and Hospital Group management to include financial resource requirements as part of the annual estimates process.	Hospital Nutrition and Hydration Steering Committees. Local Hospital Managers. Hospital Group Managers.	✔	✔		**Outcome** • Reduction in food waste. • Better value for money for hospital catering with high nutritional value. **Verification** • Inclusion in local Hospital and Hospital Group service plans, where required. • Hospital food service staff training records available for audit. • Hospital Nutrition and Hydration Steering Committee minutes concerning discussions on impact on food service/catering department.

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
		Monitor impact on food service/ catering time and receive feedback from food service staff to assess if there are any increases in resource requirements as a result of guideline implementation. Provide on-site hospital training to support National Clinical Guideline implementation for food service staff on food fortification and modified texture diets.	Food Service/Catering Managers. Hospital Managers. Dietetic Departments Speech and language Therapy Departments	 ✔	✔		
Oral nutrition support in patients with dysphagia 11-15	**Barrier** Resources – Speech and Language Therapist (SLT) staffing – not yet clear what impact this will have until implementation.	• Monitor impact to assess if there are any increases in resource requirements as a result of guideline implementation – using statistical activity and service impact as assessed by SLT Managers. • Assess and address SLT resource implications for use of oral nutrition support. Local Hospital management and Hospital Group management to include financial resource requirements as part of the annual estimates process.	Local Hospitals/Hospital Group Managers. SLT Managers.		✔		**Outcome** • Guideline is feasible and does not over-burden SLT resources. **Verification** • SLT Managers. • Inclusion in local Hospital and Hospital Group service plans, where required.
	Barrier Resources – dysphagia related equipment – not yet clear what impact the guideline will have on this until implementation.	Provide list of necessary basic equipment that should be available in acute hospitals. Impact to be monitored to see if there are any increases in dysphagia equipment requirements as a result of guideline implementation.	Guideline Development Group. Hospital Nutrition and Hydration Steering Committees. SLT Managers.	✔	 ✔		**Outcome** Necessary dysphagia-related equipment in place across hospitals **Verification** • Local Hospital Nutrition and Hydration Steering Committees. • SLT Managers.
	Barrier Access to more specialised equipment, e.g. FEES, VFU – not yet clear what impact guideline will have on this until implementation.	SLT Managers and Hospital Managers to decide on how this equipment can be accessed for patients when required. Impact to be monitored to see if there are any increases in resource requirements as a result of guideline implementation.	SLT Managers, Hospital Managers and Hospital Group Managers. SLT Managers. Hospital Nutrition and Hydration Steering Committees.	✔	 ✔		**Outcome** • Access to specialised equipment in place across hospitals **Verification** • Hospital Nutrition and Hydration Steering Committees to report on impact in year 2.

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
Oral nutrition support in surgical patients: 16 + 17	**Enabler** Fasting policies already exist in some hospitals.	• Develop fasting policy or implement existing fasting policy and audit implementation in all hospitals. • Monitor implementation to ensure fasting times for tests, therapies and procedures do not regularly exceed those specified in the policy.	Local Hospital Nutrition and Hydration Steering Committees. Medical/Surgical Teams. Ward nursing staff.	✔	✔	✔	**Outcome** Local fasting policies available and in use in all hospitals. **Verification** • Hospital Nutrition and Hydration Steering Committees monitor compliance with fasting policy. • MDT ward round/ clinical handover notes.
Discharge process	**Enabler** Discharge recommendations are already provided in the HSE Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals.	Align guideline with discharge recommendations from the HSE Food, Nutrition and Hydration Policy for Adult Patients in Acute Hospitals 2018. Update discharge plan to include information on the following: • Nutritional status • Dietary requirements • Assistance with feeding • Requirements for oral nutrition supplements including type, amount and duration required for post discharge. • Arrangements for follow-up. Ensure medical discharge letter for GP includes: • Summary of the patient's nutritional status – including malnutrition screening results or BMI (if appropriate) • Individualised nutrition care plan (if appropriate). Audit discharge plans and discharge letters as part of local hospital self-assessment.	Guideline Development Group Discharging doctor. Discharging nurse. Hospital dietitian if patient is under the care of a dietitian. Hospital Nutrition and Hydration Committees. Discharging doctor. Hospital Nutrition and Hydration Steering Committees.	✔ ✔ ✔ ✔	✔	✔	**Outcome** • Nutritional information is included in discharge planning and this is reflected in discharge letter. • Improved integration of care across acute and community settings. **Verification** Self-assessment by Hospital Nutrition and Hydration Steering Committees annually.

Guideline recommendation or number(s)	Implementations enablers/ barriers/gaps	Action/intervention/task to implement recommendation	Lead responsibility for delivery of the action	Timeframe for completion			Expected outcome and verification
				Year 1	Year 2	Year 3	
All	**Enabler** Monitoring and evaluation processes already exist.	Develop a monitoring and evaluation plan to assess implementation, service and client outcomes of guideline. Develop audit criteria. Conduct local audits. Conduct national audit.	Hospital Nutrition and Hydration Steering Committees. Guideline Development Group. Hospital Nutrition and Hydration Steering Committees. HSE National oversight by Chief Clinical Officer – with KPI development on malnutrition risk screening.	✔ ✔	 ✔	 ✔	**Outcome** • Self-assessment tool is available to and in use in all hospitals. • Audit criteria are available to and in use in all hospitals. **Verification** • Self assessment by Hospital Nutrition and Hydration Steering Committees annually. • National KPI audit results.

Implementation of overall guideline

Implementation team:

- Local governance and implementation lie with local Hospital Nutrition and Hydration Steering Committees.
- The national oversight of this guideline sits with the Chief Clinical Officer (CCO).
- National KPI development for screening for risk of malnutrition will enhance implementation of this NCG.

From the National Food, Nutrition and Hydration Policy (Part B):

5.4.1.2 The governance structure for the Nutrition and Hydration Steering Committee should be established at individual hospital level with a direct reporting structure within the Hospitals' Quality, Safety and Risk Programme/Committee to ensure the following:

- Clear ownership and accountability for nutritional care at a corporate level.
- Leadership to support delivery of patient nutritional care having regard to the strategic priorities for the hospital.
- Performance with delivery of nutritional care is effectively managed.
- A multidisciplinary approach which values delivery of high-quality nutritional care.

5.4.1.3 The role of the committee is to:

- Direct and support a comprehensive programme of nutrition and hydration care across all services in the hospital.
- Ensure that all patients admitted to hospital receive high-quality nutrition and hydration care.

5.4.1.6 Operational recommendations: To ensure that a nutrition and hydration committee is functioning effectively, it is recommended that:

- Committees should meet at least 4 times annually.
- The chair of the committee should rotate at least every 2 years.
- The chair should provide an annual report for the hospital board of management summarising key achievements and other service improvements.

Appendix V Membership of a Nutrition and Hydration Steering Committee: a Consultant, Catering/Catering Support Services, Dietitians, Nursing, Occupational Therapy, Patient Representative/Patient Voice, Pharmacy, Quality and Patient Safety, Senior Management, Speech and Language Therapy.

Dissemination and communication plan:

- Tools: see next section.
- Key stakeholders to receive draft guideline for feedback, followed by final guideline.
- Communicate with professional organisations, service users and colleges to ensure awareness.
- Submit article(s) to Health Matters on malnutrition prevention and treatment.
- Empower local Hospital Nutrition Steering Committees to disseminate guidelines in their respective hospitals.
- Launch guidelines.
- Develop and promote staff and patient stories, e.g. using video clips/ HSELanD articles/other.
- Develop repository of positive patient and staff stories available in central location, e.g. HSE nutrition hub.
- Patient information leaflet that includes nutrition screening available in all hospitals.
- Incorporate guideline into existing hospital resources.
- Network with HSE Communications teams and structures.

Implementation tools: (see Appendix 10)

- Pathways supporting this guideline, that is, NCG Figures 3, 4 and 5 - available for download and print at: https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/
- Patient information leaflet which includes questions pertinent to this NCG – see Appendix 10.
- Self-assessment tool (for local hospitals) with key audit criteria accessible at: https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/
- List of necessary basic equipment for malnutrition screening and oral nutrition support in patients with dysphagia – see Table 23 in Appendix 11.
- Suite of QI tools for structured approach to screening introduction www.hse.ie/eng/staff/pcrs/online-services/musttool.pdf
- Suite of oral nutrition support tools on www.hse.ie/nutritionsupports
- MUST tool and toolkit developed by BAPEN and accessible at: www.hse.ie/eng/staff/pcrs/online-services/musttool.pdf
- HSELanD e-learning module on MUST for staff on www.hse.ie

Appendix 10: Supporting tools

Tools to support implementation of the NCG

- Pathways supporting this guideline, that is, NCG Figures 3, 4 and 5 - available for download and print at: https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/.
- Four 'Food Nutrition and Hydration Patient Information Leaflets' are available, depending on food production methods used in a hospital. All four leaflets include information on screening for malnutrition risk and the importance of nutrition for hospitalised patients. The four versions are accessible through the toolkit below. An example of the leaflet is accessible at: https://www.hse.ie/eng/about/who/acute-hospitals-division/food-nutrition-and-hydration-policy-for-adult-patients/patient-leaflet-hospital-food-cook-fresh
- Sample self-assessment tool for local audit with key audit criteria is accessible at: https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/
- A detailed toolkit developed for the Food Nutrition and Hydration Policy for adult patients in the acute care setting are relevant to this NCG and are accessible at: https://www.hse.ie/eng/about/who/acute-hospitals-division/food-nutrition-and-hydration-policy-for-adult-patients/
- Malnutrition Universal Screening Tool (MUST) toolkit developed by BAPEN is accessible at: www.hse.ie/eng/staff/pcrs/online-services/musttool.pdf. This includes the MUST tool, a BMI scoring chart, a weight loss scoring chart, and an alternative measurements section with accompanying tables.
- Suite of QI tools for structured approach to malnutrition screening tool introduction included in the MUST tool document is accessible at: www.hse.ie/eng/staff/pcrs/online-services/musttool.pdf
- A suite of oral nutrition support tools and pathways developed for primary care relevant to this guideline is accessible at www.hse.ie/nutritionsupports. This includes 'Making the most of every bite' diet sheet and cookbook, 'How to use oral nutritional supplements', 'When illness reduces your appetite'.
- HSELanD e-learning module on MUST for staff on Share Centre for HSELanD accessed through www.hse.ie
- Service User Version of National Clinical Guideline is accessible at: https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/
- Education and training resources pertaining to dysphagia, to support national implementation of the International Dysphagia Diet Standardisation Initiative (IDDSI) framework are available on the Share Centre for HSELanD accessed through www.hse.ie

Appendix 11: Monitoring and audit

Background

The Report of the review of nutrition and hydration care in public acute hospitals (HIQA, 2016) highlighted audit as a key area for improvement with regard to nutritional and hydration care for patients admitted to acute hospitals. Parameters recommended include the audit of compliance with nutrition screening for malnutrition risk, recording of patients' weight and survey of patients' satisfaction. The findings of the National Patient Experience Survey (NPES) (HSE, 2018c) highlight the need to improve hospital food and nutrition across all acute hospital services in Ireland. Nutrition screening for malnutrition risk is included as a quality improvement initiative for acute care. The Healthy Ireland Framework (DOH, 2013) also includes monitoring, reporting and evaluation as a key theme to drive achievement of targets.

Monitoring is a systematic process of gathering information and tracking over time and seeks to continuously measure compliance (DOH, 2019). Audit is a means of measuring this compliance. Audit criteria are measurable statements of what should be happening with explicit and quantifiable performance levels (HSE, 2013).

National and local audit criteria are specified (see Table 21 and Table 22). Key Performance Indicators (KPIs) for national use are outlined (Table 24). Essential audit criteria as agreed by the GDG are highlighted for local audits and can be viewed as a minimum set of audit criteria that should be included in local audit mechanisms. The remainder are considered desirable audit criteria for local audit. Table 23 outlines equipment needed for screening for malnutrition risk and the provision of oral nutrition support on hospital wards.

Overview

- Participation in international audits, such as Nutrition Day, is encouraged. Nutrition Day is a worldwide initiative to increase awareness of malnutrition risk in healthcare institutions through an annual one-day cross-sectional audit. Benchmarking practices against other sites, and against previous year results in a single site, may help drive meaningful improvements. For more details see https://www.nutritionday.org/en/about-nday/what-is-nutritionday/index.html.
- National oversight of this NCG currently lies with the Chief Clinical Officer. Oversight should incorporate the development and implementation of KPIs, as outlined in this section. National audit criteria (see Table 21) should be included in any future national audits in the area of nutrition and hydration in acute care.
- Local Hospital Nutrition and Hydration Steering Committees are responsible for overseeing local audit. A yearly audit (beginning year 2 of implementation), using the sample self-assessment tool provided (see Appendix 10 for tools and links), is recommended. This should include assessing fidelity to the malnutrition risk screening tool in use, on a sample of 30% of hospital beds – see section 3.6 for more details.
- Malnutrition risk screening rates should be monitored on an ongoing basis at ward level by ward Clinical Nurse Managers. Nurse Managers should report screening rates to Hospital Management on a six-monthly basis.

Table 21. National audit criteria

Recommendation	Potential Audit Criteria
1	• Total number of nurses, nursing students and/or other healthcare workers per year, who received education and training on malnutrition screening.
2	• Percentage of admitted patients screened for malnutrition within 24 hours of admission. • Percentage of patients re-screened weekly.
3	• Percentage fidelity to malnutrition screening tool. • Percentage of patients at risk of malnutrition referred to a dietitian as a result of screening. • Percentage of patients commenced on the appropriate nutrition care pathway before dietetic assessment. • Submission of audit data for inclusion in national data collection, for example, for Nutrition Week.
Communication	• Policy on malnutrition screening is accessible for use. • Procedure in place to communicate malnutrition screening audit results to management and staff. • Availability of the Food Nutrition and Hydration Information leaflet for all hospital inpatients. • Inclusion of questions on nutrition screening for malnutrition risk and treatment pathway for malnutrition risk in patient satisfaction surveys. • Anthropometry and most recent malnutrition screening score in discharge letters.

Note: Fidelity refers to the degree to which the malnutrition screening tool is delivered exactly as set out and intended by those who developed it.

Table 22. Local audit criteria (✓ indicates essential audit criteria; remainder are desirable)

Recommendation	Potential Audit Criteria
Nutrition Screening 1	✓ Total number of nursing staff, nursing students and/or other healthcare workers who received education and training on malnutrition screening on an annual basis. • Number of staff trained to be malnutrition screening trainers. • Total number of staff each trainer trains per year. • Percentage of nursing staff who have completed MUST training on HSEland (if MUST is used). ✓ Malnutrition screening training records are accessible for audit.
Nutrition Screening 2	✓ Total number/percentage of patients weighed on admission. • Total number/percentage of patients with height measured on admission. • Inclusion of weight and height recording in hospital admission policy. ✓ Percentage of admitted patients screened for malnutrition risk within 24 hours of admission.

	• Percentage of inpatients identified at risk of malnutrition. • Total number/percentage of patients weighed weekly per ward. ✓ Total number/percentage of patients re-screened weekly per ward. ✓ Anthropometry equipment available on all wards (see Table 23 below). ✓ Procedure in place for maintenance of measuring equipment, including calibration of weighing scale. • Procedure in place for reporting of damaged measuring equipment.
Nutrition Screening 3	✓ Percentage fidelity to malnutrition screening tool. • Time taken to complete malnutrition screen. ✓ Malnutrition screening is documented and signed by nursing staff. ✓ Percentage of patients at risk of malnutrition referred to dietitian as a result of screening. • Number of admitted patients referred to dietitian for risk of malnutrition. • Percentage of patients commenced on each component of nutrition treatment pathway per ward: - appropriate menu - oral nutritional supplement provision as per local policy - supervision/feeding assistance at mealtimes - food and fluid record. ✓ Percentage of patients at risk of malnutrition assessed by dietitian during admission. ✓ Median time between dietitian referral and assessment. • Percentage of patients at risk of malnutrition referred to dietitian but discharged before seen. • Proportion of patients at risk of malnutrition diagnosed with malnutrition after nutrition assessment by dietitian.
Oral Nutrition Support 4 to 10	✓ Inpatient care pathway for identification and treatment of malnutrition risk accessible for use. ✓ Education of hospital staff, for example, doctors, nurses, health and social care professionals, healthcare assistants, chefs and food service/catering staff on the prevention and treatment of malnutrition and modified texture diets, for example, formal presentations, annual malnutrition awareness days ✓ Knowledge and skills update for catering staff in the area of food fortification. ✓ Hospital wards have access to: - dietetic service for management of patients at risk of malnutrition - speech and language therapy service for management of dysphagia - food fortification, such as Energy Dense diet - high protein/energy menu (per minimum standards for 'Regular Hospital Diet') - oral nutritional supplements (ONS).

	✓ Impact on catering resources, e.g. department statistics, staff feedback to catering manager. • Food waste – see Food Nutrition and Hydration Policy for Adult Patients in the Acute Care Setting (HSE, 2018b) for further guidance. • Oral nutritional supplementation (ONS) waste. • ONS stock rotation system in place. ✓ Discharge planning and discharge letters to GP to include: - nutritional status summary including most recent malnutrition screening result - nutrition support details (if applicable) - follow-up arrangements (if positive screening result).
Oral Nutrition Support 11 to 15	✓ Impact on SLT resources, e.g. department statistics, staff feedback to SLT manager. ✓ Impact on requirement for dysphagia equipment – see Table 22 below. ✓ Access to specialist dysphagia equipment such as VFU and FEES. • Systems in place to provide modified texture diets.
Oral Nutrition Support 16 to 17	✓ A hospital fasting policy/procedure/protocol/guideline (PPPG) on fasting times for tests, therapies and procedures is accessible on all wards. ✓ Fasting for tests, therapies and procedures comply with the hospital's fasting PPPG.
Communication	✓ A process for communication is in place to ensure staff awareness of malnutrition risks. ✓ Availability of Food Nutrition and Hydration Information leaflet for hospital inpatients. ✓ Inclusion of questions on nutrition screening and treatment in patient satisfaction surveys. ✓ Referral pathway between nursing and dietetics is defined. ✓ Percentage of patients satisfied with their nutritional care. ✓ Follow-up plan for those who are discharged prior to dietetic consult/ following dietetic consult. ✓ Hospital PPPG on malnutrition screening is accessible on all wards. ✓ Procedure in place to communicate nutrition screening audit results to management and staff.

Key: MUST - Malnutrition Universal Screening Tool; ONS – oral nutritional supplements; PPPG - policy/ procedure/protocol/guideline; VFU – videofluoroscopy; FEES - Fiberoptic endoscopic evaluation of swallowing.

Note: Fidelity refers to the degree to which the malnutrition screening tool is delivered exactly as set out and intended by those who developed it.

Table 23. Equipment needed for malnutrition screening and provision of oral nutrition support in hospitals

For malnutrition screening	**For oral nutrition support in dysphagia**
Medically approved weighing equipment: - Stand-on scales - Chair scales - Access to hoist or bed weighing scales	Specialised cups: - Kapi-cups / cut-out cups - Dysphagia cups (green mugs) - Provale cups
Height measuring equipment: - Stadiometer - Measuring tape (for ulna length, knee height, or mid upper arm circumference)	Specialised cutlery: - Maroon spoons - Weighted or foam cutlery
For oral nutritional supplements	Other: - Clothing protectors such as bibs or aprons - Dycem mats - Small and large plate guards - Access to VFU and FEES
Cold storage or refrigeration facilities on wards	

Key: VFU – videofluoroscopy; FEES - Fiberoptic endoscopic evaluation of swallowing.

Note: Access to thickening agent is also needed.

Table 24. National KPIs

KPI number	**Key Performance Indicator**
KPI 1	Percentage of admitted patients screened for malnutrition within 24 hours of admission, for example: • 60% of all admissions year 1 post-implementation • 70% in year 2 • >80% year 3.
KPI 2	Percentage of patients identified at risk of malnutrition commenced on nutrition care pathway (per local PPPG) without delay (on same day) . • 100% of those identified at risk.

Appendix 12: Evidence-to-decision framework for recommendation 3

Recommendation Evidence-to-Decision Tool: Nutrition screening for risk of malnutrition recommendation 3

	Criteria	Judgements	Research evidence	Additional considerations
Problem	**Is there a problem priority?**	o No o Problem no o Uncertain o Probably yes **X Yes** o Varies	**Known:** 1. Nutrition Screening Surveys (BAPEN, 2010 and 2011): • Malnutrition risk prevalence of 28-32% in adults admitted to Irish Hospitals. • Of these 75% were at high risk. 2. Cost of malnutrition in Ireland (Rice and Normand, 2012): • Estimated at 1.42billion per annum. • Equivalent to 10% of annual Healthcare budget. 3. HIQA Review of Nutrition and Hydration Care in Public Acute Hospitals report 2016: • 21% of hospitals had not implemented screening in any area. • In hospitals that were using nutrition screening - large variation in practice. • Key recommendation: nutrition screening for all patients admitted to hospital. **Unknown:** Which Nutrition Screening Tool (NST) should be used to identify malnutrition risk and to predict adverse outcomes in hospitalised adult patients.	Intervention improves outcome –malnutrition screening allows for earlier intervention. International guidelines recommend malnutrition screening for inpatients, for example, NICE Clinical Guideline 32; American College of Gastroenterology Nutrition Therapy in the Adult Hospitalized Patient 2016; ASPEN Nutrition Screening, Assessment, and Intervention in Adults 2011; Dietitians Association of Australia Evidence Based Practice Guidelines for the Nutritional Management of Malnutrition in Adult Patients Across the Continuum of Care 2009; ESPEN Guideline: Clinical Nutrition in Surgery 2017. HSE Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals - recommends screening for malnutrition risk. A systematic review published in 2014 by Van Bokhorst-de van der Schueren, et al., recommended against development of new tools. MaNuEL review of validity of malnutrition screening tools 2018 for older adults – insufficient evidence to make recommendations based on current validation evidence alone. This guideline was prioritised for development by the NCEC.

<table>
<tr><th></th><th>Criteria</th><th>Judgements</th><th>Research evidence</th><th>Additional considerations</th></tr>
<tr>
<td rowspan="5">Benefits & harms of the options</td>
<td>What is the overall certainty of this evidence?</td>
<td>o No included studies
X Very low
o Low
o Moderate
o High</td>
<td rowspan="5">The relative importance of values of the main outcomes of interest:
<table>
<tr><th>Outcome</th><th>Relative importance</th><th>Certainty of the evidence (GRADE)</th></tr>
<tr><td>1. What is the diagnostic accuracy of NSTs?
2. What is the accuracy of NSTs in identifying adverse outcomes?
3. What is the cost-effectiveness of using NSTs?</td><td>Nutrition screening programmes are key to the prevention and treatment of malnutrition and malnutrition-related adverse outcomes.</td><td>Very low</td></tr>
</table>
Key: NST – Nutrition screening tool for risk of malnutrition

See Tables of Evidence from HRB-CICER systematic review - Annex 1

Summary of findings:
• Cost effectiveness data was absent from the literature.
• The majority of the literature identified in the systematic review pertained to MUST and NRS-2002 – although studies were of very low quality. Both tools were represented in diagnostic results and across all outcome results. MST studies identified did not assess ability to predict any of the outcomes that were being evaluated.
• All malnutrition screening tools examined had a broad range of sensitivities and specificities – no single tool performed significantly better at diagnosing malnutrition risk or at predicting outcome.
• There was a very low certainty of evidence that one tool is better than another from a diagnostic perspective or from an outcome prediction perspective in any of the outcomes selected.</td>
<td rowspan="5">MaNuEL scoring system to rate malnutrition screening tools in older adults 2018 – Hospitals:
• MNA-SF V1 rated 26
• MST rated 26
• MUST rated 21
• NRS-2002 rated 24

Van Bokhorst-de van der Schueren, et al., 2014:
• MST - possibly has fair validity in determining malnutrition risk in hospitalised adults including elderly, but performed poorly in predicting clinical outcome.
• MUST and NRS-2002 had fair to good predictive validity in half of studies.

NRS-2002 – is specific for hospitals only and was designed to identify patients that are likely to benefit from nutritional intervention, rather than to assess malnutrition risk.

MUST is used in Nursing Homes in Ireland – can use across care settings.

HIQA 2016 Review of nutrition and hydration care in public acute hospitals: in the hospitals that used a nutrition screening tool:
• 65% used MUST
• 20% used MST
• 5% used MNA-SF
• NRS-2002 not used

False positive results may cause undue stress to patients and families, if a misdiagnosis of malnutrition risk is made. This may resonate with patients and families as being a sign of neglect. Patient focus group work for another project on oral nutritional supplements may investigate this further.</td>
</tr>
<tr>
<td>Is there important uncertainty about how much people value the main outcomes?</td>
<td>o Important uncertainty or variability
o Possibly important uncertainty or variability
X Probably no important uncertainty of variability
o No important uncertainty of variability
o No known undesirable</td>
</tr>
<tr>
<td>Are the desirable anticipated effects large?</td>
<td>o No
o Probably no
o Uncertain
o Probably yes
X Yes
o Varies</td>
</tr>
<tr>
<td>Are the undesirable anticipated effects small?</td>
<td>o o No
o Probably no
o Uncertain
X Probably yes
o Yes
o Varies</td>
</tr>
<tr>
<td>Are the desirable effects large relative to undesirable effects?</td>
<td>o o No
o Probably no
o Uncertain
o Probably yes
X Yes
o Varies</td>
</tr>
</table>

	Criteria	Judgements	Research evidence	Additional considerations
Resource use	**Are the resources required small?**	o No o Problem no o Uncertain o Probably yes o Yes **X Varies**	MUST: quick and simple, training needed. MST: quick and easy to use, less training needed. Training resource required for both. Will impact on nursing time, HCA time, dietetic time (for patients identified at risk).	MUST and MST are the most frequently used NSTs in Irish Hospitals (HIQA 2016). NRS-2002 – not used. Education/training module on MUST already on HSELanD. Impact on resources will be higher for hospitals that do not already use screening for malnutrition risk.
	Is the incremental cost small relative to the net benefits?	o No o Problem no o Uncertain **X Probably yes** o Yes o Varies	No cost effectiveness evidence was identified in the current HRB-CICER systematic review. The Budget Impact Analysis (BIA) for the National Clinical Guideline outlines the extra resources needed to implement the guideline effectively. NICE conducted a budget impact analysis of implementing CG32. NICE calculated the potential savings (based on a 10% reduction in malnutrition in hospital) at £71,000 per 100,000 patients, highlighting that the benefits achieved by earlier detection and treatment of patients would more than pay for the costs of implementing screening throughout the healthcare system. A more detailed assessment conducted by the National Institute for Health Research (NIHR, 2015) has confirmed these findings, but has identified greater potential for savings, exceeding £170,000 per 100,000 population. Training costs are uncertain.	The cost of malnutrition in Ireland is estimated to be 1.42billion euro per annum (10% of healthcare budget). Earlier intervention should help prevent as well as treat malnutrition - potentially reducing LOS and readmission rates. Length of hospital stay is estimated to be 30% longer in malnourished compared with well-nourished patients (Elia and Russell, 2009).
Equity	**What would be the impact on health inequities?**	o Increased o Probably increased o Uncertain o Probably reduced **X Reduced** o Varies	According to the HIQA report (2016) 1 in 5 hospitals were not screening for malnutrition risk in any clinical area. The report demonstrated a wide variation in use of malnutrition screening between hospitals and within hospitals. A hospital-wide malnutrition screening programme across all hospitals in Ireland – will improve current inequity in the identification (and therefore treatment) of malnutrition risk in hospitalised patients.	

	Criteria	Judgements	Research evidence	Additional considerations
Acceptability	**Are the resources required small?**	o No o Problem no o Uncertain **X Probably yes** o Yes o Varies		A key recommendation from the HIQA report in 2016 is that 'all patients admitted to hospital should be screened for the risk of malnutrition'. Screening for malnutrition risk is recommended in the HSE Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals. HSE National Wound Management Guideline (2018) recommends malnutrition screening for all patients at risk or with a wound or pressure ulcer. A wound management tool that includes an MST score is being tried in community and hospitals. MUST is already used in residential care.
Feasibility	**Is the option feasible to implement?**	o No o Problem no o Uncertain o Probably yes **X Yes** o Varies	Nutrition screening is already taking place in many Irish Hospitals as per HIQA report 2016, although this report demonstrates that there was a large variation in practice, with 0-82% of hospitals screening for malnutrition within 24hr of admission. Current tools in use (HIQA, 2016): • 65% used MUST. • 20% used MST.	MUST and MST are both being used currently. An implementation plan is included in the National Clinical Guideline. The BIA section of the National Clinical Guideline outlines the additional resources needed for effective implementation.

Recommendation					
Balance of consequences	Undesirable consequences clearly outweigh desirable consequences in most settings	Undesirable consequences probably outweigh desirable consequences in most settings	The balance between desirable and undesirable consequences is closely balanced or uncertain	Desirable consequences probably outweigh undesirable consequences in most settings	Desirable consequences clearly outweigh undesirable consequences in most settings
In favour of nutrition screening using MUST or MST	o	o	o	o	X
Type of recommendation		We recommend against offering this option	We suggest not recommending offering this option	We suggest offering this option	We recommend offering this option
		o	o	o	X

Recommendation	Use a validated screening tool, e.g. Malnutrition Screening Tool (MST) or Malnutrition Universal Screening Tool (MUST), to screen for malnutrition risk in all adults admitted to acute hospitals. If one of the validated tools from Table 2 is currently being used, there is no need to change practice. **Table 2. Malnutrition Screening Tools**
Justification	The need to screen for malnutrition risk is an essential step in the prevention and treatment of malnutrition in patients admitted to Irish hospitals. The most appropriate nutrition screening tool to use for general medical and surgical ward patients is unclear and is the subject of the current systematic review. While the majority of the literature found was associated with MUST and NRS-2002, the overall quality of studies was very low. No ideal nutrition screening tool was identified in the review. In Irish hospitals that were using a nutrition screening tool, HIQA reported that MUST was used in 65% and MST in 20%, while NRS-2002 was not being used (HIQA, 2016). Both MUST and MST are also used in the community setting - MUST in residential care and MST in relation to wound management. NRS-2002 is only applicable to the hospital setting. Given that over 65 year olds use 53.3% of total hospital in-patient care (Health Information Paper 2015/2016 Trends and Priorities to Assist Service Planning 2016), and that MST scores well in older adults compared to other tools, (using a new scoring system developed by the MalNutrition in the ELderly Knowledge Hub – MaNuEL - to rate malnutrition screening tools in older adults), MST is also recommended. MUST is already supported by an education module on HSELanD, while less training is required for MST. Considering the scale of malnutrition risk in hospitalised patients in Ireland, the vast negative impact this has on patients and families, and the significant impact of malnutrition and malnutrition risk on healthcare resources, a strong recommendation was made in favour of nutrition screening for malnutrition risk in acute care settings. Considering the very low certainty of evidence from the HRB-CICER systematic review (2018), the current experience with malnutrition screening tools in Irish hospitals, and after an assessment of the benefits and harms, practicality and feasibility, MST and MUST were selected as the recommended malnutrition screening tools of choice.
Subgroup considerations none	Not applicable.
Implementation considerations	Resource implications will have an impact on successful implementation, particularly in hospitals not already using screening for malnutrition risk. Training and education for all hospital staff involved in the provision of nutrition and hydration is needed on malnutrition prevention and treatment. Specific training is required for malnutrition screening and correct use of screening tool and associated care pathway.
Monitoring and evaluation	The % of patients screened for malnutrition risk should be monitored by all hospitals – see implementation plan. Fidelity to screening tool should also be measured.
Research possibilities	Further research on existing malnutrition screening tools is needed and associated care pathways. Outcome effects of malnutrition nutrition screening programmes should also be studied.

Table 2. Malnutrition Screening Tools	
MNA-SF	Mini Nutritional Assessment – Short Form (for older adults, e.g. >60years)
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NRS-2002	Nutrition Risk Score 2002

Appendix 13: Criteria for diagnosing malnutrition

Table 25. Global Leadership Initiative on Malnutrition (GLIM) phenotypic and aetiologic criteria for the diagnosis of malnutrition (Cederholm et al., 2018; Jensen et al., 2018).

Phenotypic Criteria			**Aetiologic Criteria**	
Unintended weight loss (%)	**Low body mass index (kg/m2)**	**Reduced muscle mass**	**Reduced food intake or absorption**	**Inflammation**
>5% within 6 m or >10% beyond 6 m	<20 if <70 y or <22 if ≥70 y	Using validated body composition measuring technique	≤50% of energy requirement for >1 w, or Any reduction for >2 w, or Any chronic GI condition that adversely impacts on absorption	Acute disease/ injury or Chronic disease/ condition- related

Key: m, month, w, week, y, year; GI - gastrointestinal.

Notes:

i. Validated body composition measurement technique: for example, fat-free or lean body mass measurement by anthropometry, physical examination, BIA, CT, DXA or MRI. Functional assessment measures, such as hand-grip strength, can be used as indicators of impaired muscle strength.

ii. Chronic gastrointestinal (GI) symptoms: for example dysphagia, nausea, vomiting, diarrhoea, constipation or abdominal pain.

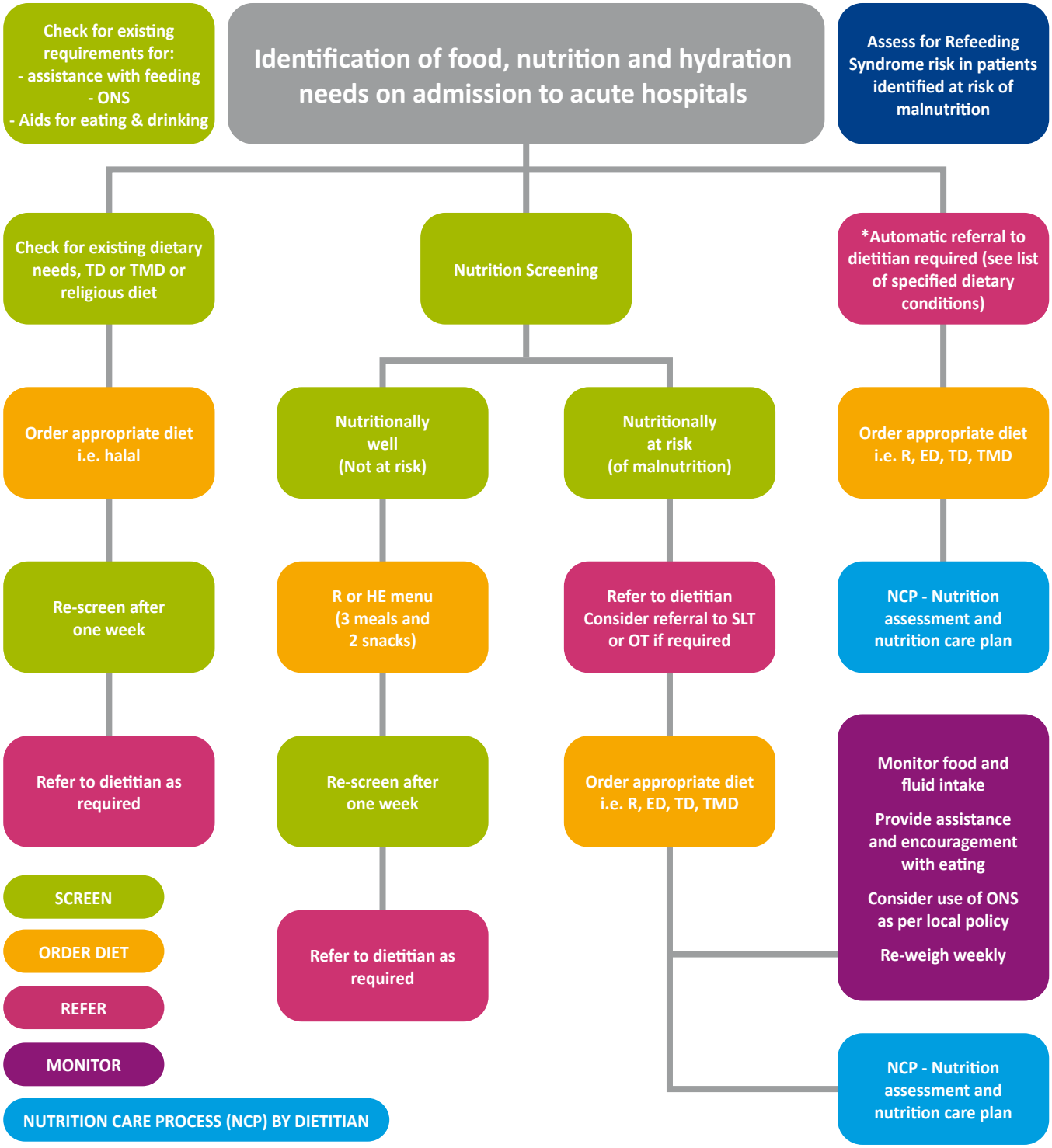
iii. Inflammation: C-reactive protein may be used as a biochemical indicator of inflammation.

- Reproduced with permission from Professor Cederholm, Professor Jensen, and Espen Journals.
- Require one phenotypic and one aetiologic criterion to diagnose malnutrition with this approach.

Nutrition Care Process (NCP)

- For details of indicators for the diagnosis of specific categories of malnutrition used in the international Nutrition Care Process developed by the American Academy of Nutrition and Dietetics (AND) – see Table 1 in White et al, (2012), pp. 278.
- For details on the 4 Steps of the Nutrition Care Process Model with distinguishing characteristics – see Figure 1 in Swan et al, (2017), pp. 2-5.
- For details on the critical thinking task for each NCP step – see Figure 4 on page 6 of Swan et al, (2017), pp. 6.

Appendix 14: HSE Food Nutrition and Hydration Policy algorithm



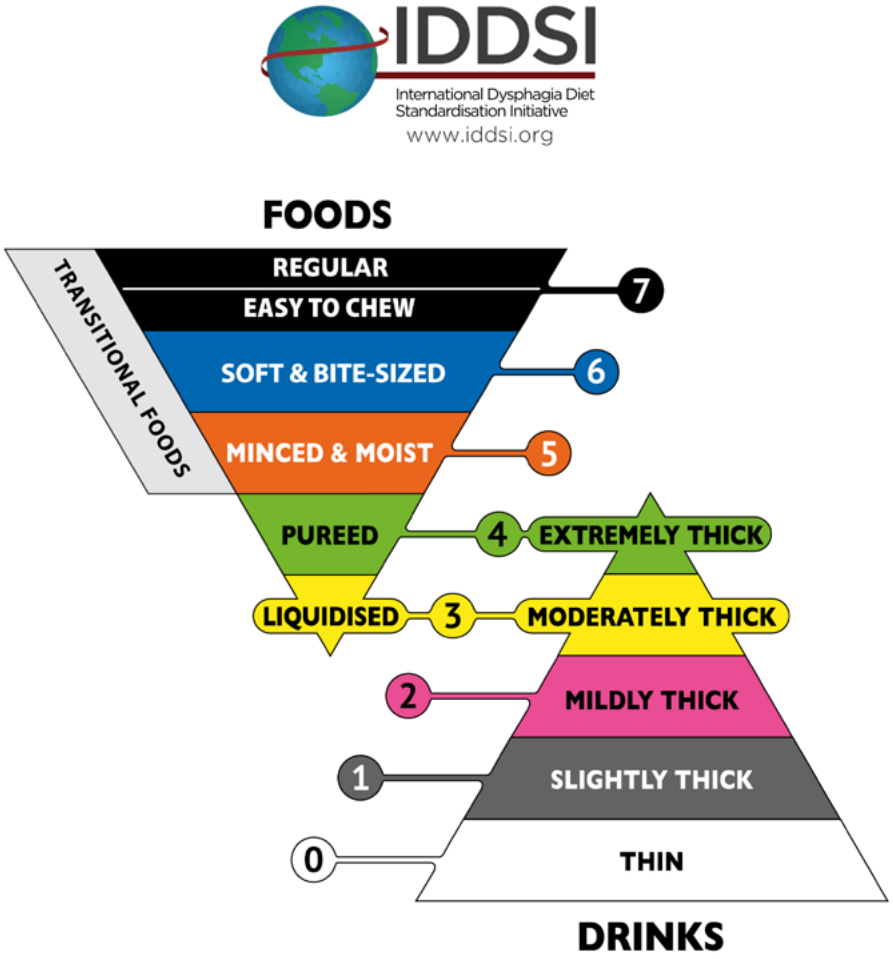
Hospital Menus Available:
Regular menu (R): 2,100 - 2,400 kcals, 90g protein, Regular High Energy (RHE) 2,800 kcals
Energy Dense (ED): 2,100 kcals, 90g protein, energy dense, smaller portions, fortified
Healthy Eating (HE): Suitable for diabetics, cardioprotective and nutritionally well with good appetite
Therapeutic Diets (TD): including renal, gluten free, low fibre, no added salt
Texture Modified Diets (TMD): including soft and bite-sized, minced & moist, pureed & liquidised
Cultural, ethnic or religious diets

ONS:
oral nutritional supplement.
SLT:
speech and language therapist.
OT:
occupational therapist.

Figure 9. Care pathway for identification of food, nutrition and hydration need on admission to acute hospitals

Reproduced with permission from the HSE Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals (2018b).

Appendix 15: International Dysphagia Diet Standardisation Initiative (IDDSI) Framework



Copyright: The International Dysphagia Diet Standardisation Initiative 2016
@ https://iddsi.org/framework/

The IDDSI Framework and Descriptors are licensed under the Creative Commons Attribution-ShareAlike International 4.0 Licence https://creativecommons.org/licenses/by-sa/4.0/legalcode.

Attribution is NOT PERMITTED for derivative works incorporating any alterations to the IDDSI Framework that extend beyond language translation.

Supplementary Notice: Modification of the diagrams or descriptors within the IDDSI Framework is DISCOURAGED and NOT RECOMMENDED. Alterations to elements of the IDDSI framework may lead to confusion and errors in diet texture or drink selection for patients with dysphagia. Such errors have previously been associated with adverse events including choking and death.

Figure 10. International Dysphagia Diet Standardisation Initiative (IDDSI) Framework

The IDDSI Framework and descriptors are licensed under the creative commons attribution sharealike 4.0 License 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/framwork/. Attribution is NOT PERMITTTED for derivative works incorporating any alterations to the IDDSI Framework that extend beyond language translation.

Appendix 16: Economic assessment

- Systematic review of the economic evidence relevant to this National Clinical Guideline (NCG) was completed by Health Research Board (HRB)-Collaboration in Ireland for Clinical Effectiveness Reviews (CICER) on behalf of the GDG.
- Economic evidence review summary was completed by Dr. James O'Mahony.

Introduction

In 2017 and 2018, the HRB-CICER undertook update of evidence tables and a systematic review of the economic evidence with the following aims:

1. To determine the cost-effectiveness of using nutrition screening tools for the identification of adult patients at risk of malnutrition in acute settings. See Section 3.1 and Annex 1 for PICOS research question.
2. To identify studies that assessed if oral nutrition support administered during hospitalisation produces cost-effective outcomes and savings. See Section 3.2 and Annex 2 for PICO research question.

Methods

Nutrition screening (for malnutrition risk) cost-effectiveness systematic review search strategy

Electronic databases searched included from June 2008 until June 2018:

- Medline
- Embase
- Web of Science
- CINAHL
- Cochrane Library.

In addition:

- Manual checking of reference lists.

Systematic reviews of economic evaluations, full economic evaluation studies (cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis), costing studies and comparative resource-use studies. See Annex 1 for further details of search parameters used in the systematic review.

Oral nutrition support cost-effectiveness systematic review search strategies

Electronic databases searched from January 2013 to July 2017:

- OvidSP: Embase and Medline
- Health Economic Evaluation Database
- Cochrane Library (including the National Health Service Economic Evaluations Database, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials and Database of Abstracts of Reviews and Effects).

Other sources:

- The Cost-Effectiveness Analysis Registry.
- Reference lists of included papers.
- Discussions with experts.

See Annex 2 for further details on search parameters used in the systematic review.

Economic literature review results

- No studies were identified by HRB-CICER that met the eligibility criteria for cost-effectiveness of nutrition screening for risk of malnutrition.
- For HRB-CICER tables of evidence relating to cost-effectiveness of oral nutrition support – see Annex 2. Two systematic reviews of economic evaluations were identified (Elia et al., 2016; Milte et al., 2013) – see brief descriptions below.

Elia et al (2016)

This systematic review on the cost and cost-effectiveness of using standard oral nutritional supplements (ONS) in the hospital setting identified nine publications that met inclusion criteria. One of these contained 11 cost-analyses of controlled cohort studies. Twelve of the 14 individual studies identified in the 9 publications, demonstrated a net cost-saving in favour of ONS by a mean of 12.2%. There was substantial variation in quality between studies and at least a moderate risk of bias.

Milte et al (2013)

This systematic review aimed to identify the cost-effectiveness of using protein and energy supplementation to treat adults with and at risk of malnutrition. A total of 16 studies were identified that met inclusion criteria. Of note, only six of these defined participants as malnourished, with an unspecified nutritional status in the other 10 studies. Two concerned malnourished patients and were specific to the hospital setting. One of the hospital studies had an ICER that approached the Australian willingness-to-pay threshold. A cost-benefit analysis in the other hospital study resulted in savings of over €200 per patient in abdominal surgery patients receiving two cartons of ONS per day during their hospitalisation, through a reduced length of stay. Four cost-effectiveness studies that included hospitalised patients, and where nutritional status was not specified, reported a range of findings from incremental cost-effectiveness ratio (ICERS) of US$0.01 per additional kilocalorie consumed to €76.10 per one day reduction in length of stay using ONS. Studies included were of varying quality with high heterogeneity.

Economic evidence review summary

The 2006 NICE assessment of nutrition support for adults details the reasons why interventions to identify and treat malnutrition are expected to be cost-effective. This is largely due to anticipated reductions in length of stay, reduced reliance on parenteral feeding and reduced associated complications [NICE 2006]. The 2006 assessment found only a small amount of relevant applied cost-effectiveness literature on the cost-effectiveness of nutrition screening and oral nutrition support. Regarding the benefits of nutrition support, the existing literature was found to be small, quite heterogeneous in terms of patient settings and study designs. While the evidence from the nutrition support literature was not of high quality, its findings did not contradict expectations that nutrition support would likely lead to better outcomes and lower care costs.

The 2006 NICE assessment used a cost-effectiveness model to complement the trial and observational evidence regarding the cost-effectiveness of nutrition screening. The conclusions of this simulation analysis reflected expectations that screening is likely to be cost-effective. The analysis indicated that nutrition screening might not necessarily lead to reduced care costs, as this typically depended on achieving short hospital stays. It was noted that this might not necessarily be achieved, especially in older patients.

NICE published an evidence surveillance summary in 2017 to update findings on the costs and cost-effectiveness of malnutrition and interventions to both prevent and treat it [NICE 2017]. The surveillance summary report noted a very large cost of malnutrition in England, which amounted to approximately 15% of total health and social care spending. It noted that much of this arose in older adults in institutional settings, largely due to poor nutrition prior to their admission.

Within the context of high costs of malnutrition, the surveillance summary noted estimates of substantial cost-savings when nutrition screening guidelines were correctly implemented. The estimates indicate that the costs of screening and providing additional nutrition support are more than outweighed by treatment cost-savings in otherwise malnourished patients. The conclusion of the evidence review was that there are good grounds to support the ongoing implementation of NICE's nutrition screening and nutrition support in the English NHS setting.

The review of published evidence on the cost-effectiveness of oral nutrition supports in 2017 surveillance update indicates an expanded evidence base relative to the 2006 NICE assessment. The more recently published evidence provided further indications that oral nutrition support is likely to be effective and cost-saving. While there was lack of prospective randomised controlled trial (RCT) evidence on the cost-effectiveness of oral nutrition support, the indications from retrospective analyses of a number RCTs were favourable. The surveillance review indicated that the new evidence did not contradict the previous recommendations of the 2006 guidance.

The Health Research Board (HRB) Collaboration in Ireland for Clinical Effectiveness Reviews (CICER) report published in late 2017 identified and quality appraised the available evidence on the clinical and cost-effectiveness of oral nutrition support for adults in a hospitalised setting [HRB-CICER 2017] – see Annex 2. That analysis identified two published systematic reviews of the cost-effectiveness of economic evaluations, both of which were judged to be low quality, (based on SIGN criteria). While the reviewed evidence in Elia et al [2016] indicates that oral nutrition support is estimated to be cost-saving in many of the reviewed studies, the level of certainty in the reported studies varied from being statistically significant in some cases, to non-significant in others. The second of the two reviews assessed by HRB-CICER reported on a range of outcomes, many of which are less relevant to a consideration of the net health economic benefits of oral nutrition support.

Elia et al, one of the reviews considered by HRB-CICER, assessed the cost-effectiveness literature regarding ONS supplementation [Elia 2016]. That review notes the heterogeneity of study designs used to estimate the effect of ONS on healthcare costs. One notable paper included in their review was a 2012 NICE costing study that appraised a screen and treat approach to ONS supplementation using a model based analysis [NICE 2012]. That report found that the costs of both screening and ONS supplementation were more than outweighed by reduced costs resulting from shorter hospital stays. Elia et al, caution against extrapolating results from some of the studies included in their review for a number of reasons [Elia 2016]. One is that much of the evidence included in the review originates from the UK and the authors note that the effectiveness of nutrition support will be context dependent and it would be mistaken to believe that quantitatively similar benefits could be achieved in other health systems. Elia

et al, was judged to be low quality, (based on SIGN criteria) in the evidence tables by HRB-CICER. They caution that most studies were not primarily designed for the assessment of costs and cost-effectiveness, and so had to rely on retrospective analyses of data not gathered for the purposes of cost analysis.

Rice et al [2016] apply estimates of length of stay reductions from Elia et al to estimates of the prevalence of malnutrition among adults within the Irish hospital system to estimate the potential benefit from increased ONS use. Their analysis shows that while malnutrition has a prevalence of less than 5% in the Irish population, this proportion is much higher in those admitted to hospital. Furthermore, their analysis indicates that malnourished patients represent a disproportionately large part of the inpatient population at any one point in time due to their longer length of stay. Rice et al conclude that additional use of ONS could save the Irish health system approximately 4% of its bed days if length of stay could be reduced in accordance with review evidence observed elsewhere. Accordingly, Rice et al represents a combination of published literature today most relevant to ONS supports adapted to an Irish setting. While more detail could be achieved with modelling assessment that uses further risk group disaggregation, Rice et al represents a useful outline of the broad health resource benefits that could accrue to the Irish health service of standardised and consistently implemented malnutrition prevention.

The summary BIA is in section 3.7 of this report. The full BIA is available in Annex 3.

Economic review references

Clyne B, O'Neill M, Carty P, Tyner B, Smith SM, Ryan M. (2017) Clinical and cost-effectiveness of oral nutrition support interventions in hospitalised adults – evidence tables. Dublin: HRB-CICER, Health Information Quality Authority.

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National Institute for Health and Care Excellence (NICE). (2017) Appendix A: Summary of evidence from surveillance. https://www.nice.org.uk/guidance/cg32/evidence/appendix-a-summary-of-evidence-from-surveillance-pdf-4540429694

Rice N, Nugent A, Byrne D, Normand C. (2016) Potential of earlier detection and treatment of disease related malnutrition with oral nutrition supplements to release acute care bed capacity. *Irish Medical Journal*, Jun 10.

Tyner B, Clyne B, O'Neill M, Philips M, Marshall L, Smith SM, Ryan M. (2018) Systematic review of nutritional screening tools for adult patients in acute hospital settings. Cork: HRB-CICER, Health Information Quality Authority.

Appendix 17: Glossary of terms and abbreviations

Definitions within the context of this document

Adaptation: Adaptation is the systematic approach to considering the use and/or modification of (a) guideline(s) produced in one cultural and organisational setting for application in a different context (ADAPTE Collaboration, 2009).

Adult: This refers to a patient admitted to an adult ward in Hospital. In Irish Hospitals this could mean patients 16 years of age or older. More often, this means patients who are 18 years of age or older.

Advanced care directive: An advance healthcare directive is an expression made by a person who has capacity (in writing, to include voice, video recording and speech recognition technologies) of their will and preferences concerning treatment decisions (including nutrition support) in the context of an anticipated deterioration of their condition with loss of decision-making capacity to make these decisions and communicate them to others (IHF, 2016).

Aero-digestive tract: The combined organs and tissues of the respiratory tract and the upper part of the digestive tract (including the lips, mouth, tongue, nose, throat, vocal cords, and part of the oesophagus and windpipe).

Appraisal of Guidelines, Research and Evaluation (AGREE): An international collaboration of researchers and policy makers whose aim is to improve the quality and effectiveness of clinical practice guidelines (http://www.agreecollaboration.org). The AGREE II tool, developed by the group, is designed to assess the quality of clinical guidelines.

Anthropometry: The measurement of the human body - includes weight, height and measurement of body composition.

Audit: Audit is another means of measuring if compliance with the NCEC National Clinical Guideline has occurred. It can occur at any level, local, regional or national and is measured using agreed audit criteria (DOH, 2019).

Audit criteria: Audit criteria are derived from the key recommendations. Audit criteria should include descriptions or operational definitions on how criteria should be measured (DOH, 2019), to allow:

- assessment of guideline implementation
- meaningful comparison of performance across different settings
- measurement across process or outcome measures of care.

Barriers: Factors which hinder the implementation process and reduce the probability of successful implementation (NCEC, 2018).

Beta-hydroxy-beta-methylbutyrate (HMB): An active metabolite of the amino acid leucine found naturally in the diet at very low levels. HMB is involved in regulating muscle metabolism.

Blinding (masking): Keeping the study participants, caregivers, researchers and outcome assessors unaware about the interventions to which the participants have been allocated in a study.

Body Mass Index (BMI): BMI is a simple index of weight-for-height. It is defined as a person's weight in kilograms divided by the square of their height in meters.

Budget Impact Analysis (BIA): A budget impact analysis refers to an analysis of the added financial impact of implementing a new clinical guideline for a finite period and addresses the affordability of the recommendations.

Cachexia: A complex metabolic syndrome associated with underlying illness and characterized by loss of muscle mass with or without loss of fat mass. The prominent feature of cachexia in adults is weight loss. It is characterized by weight loss, reduced BMI and reduced muscle mass and function in combination with an underlying disease that displays biochemical indices of on-going elevated inflammatory activity (Cederholm et al., 2017).

Case-control study: Comparative observational study in which the investigator selects individuals who have experienced an event (for example, developed a disease) and others who have not (controls), and then collects data to determine previous exposure to a possible cause (NICE, 2006a).

Clinical guidelines: Clinical guidelines are systematically developed statements, based on a thorough evaluation of the evidence, to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances, across the entire clinical spectrum. Clinical guidelines endorsed by the Minister will be titled 'NCEC National Clinical Guidelines' (DOH, 2019).

Clinical question: In guideline development, this term refers to the questions about treatment and care that are formulated to guide the development of evidence-based recommendations.

Cluster: A closely grouped series of events or cases of a disease or other related health phenomena with well-defined distribution patterns, in relation to time or place or both. Alternatively, a grouped unit for randomisation (NICE, 2006a).

Cochrane library: A regularly updated electronic collection of evidence-based medicine databases, including the Cochrane Database of Systematic Reviews.

Cohen's kappa coefficient (κ): measures agreement between the NST and reference test values. A kappa value can range from -1 to 1.

Cohort study: A retrospective or prospective follow-up study. Groups of individuals to be followed up are defined on the basis of presence or absence of exposure to a suspected risk factor or intervention. A cohort study can be comparative, in which case two or more groups are selected on the basis of differences in their exposure to the agent of interest (NICE, 2006a).

Co-morbidity: Co-existence of more than one disease or an additional disease (other than that being studied or treated) in an individual.

Confidence interval: A range of values for an unknown population parameter with a stated 'confidence (conventionally 95%) that it contains the true value. The interval is calculated from sample data, and generally straddles the sample estimate. The 'confidence' value means that if the method used to calculate the interval is repeated many times, then that proportion of intervals will actually contain the true value.

Confounding: In a study, confounding occurs when the effect of an intervention on an outcome is distorted as a result of an association between the population or intervention or outcome and another factor (the 'confounding variable') that can influence the outcome independently of the intervention under study.

Consensus methods: Techniques that aim to reach an agreement on a particular issue. In the development of clinical guidelines, consensus methods may be used where there is a lack of strong research evidence on a particular topic. Expert consensus methods will aim to reach agreement between experts in a particular field.

Consultation: The process that allows stakeholders and individuals to comment on draft NCG guidance and other documents so their views can be taken into account when producing the final version.

Control group: A group of patients recruited into a study that receives no treatment, a treatment of known effect, or a placebo (dummy treatment) - in order to provide a comparison for a group receiving an experimental treatment, such as a new drug.

Cost-benefit analysis: A type of economic evaluation where both costs and benefits of healthcare treatment are measured in the same monetary units. If benefits exceed costs, the evaluation would recommend providing the treatment.

Cost-effectiveness model: An explicit mathematical framework, which is used to represent clinical decision problems and incorporate evidence from a variety of sources in order to estimate the costs and health outcomes.

Cost-utility analysis: A form of cost-effectiveness analysis in which the units of effectiveness are quality-adjusted life-years (QALYs).

Cross-sectional study: The observation of a defined set of people at a single point in time or time period – a snapshot.

Delphi: A formal consensus method (see Consensus methods above).

Dietary advice (dietary counselling): Advice provided by a qualified healthcare worker e.g. a dietitian, to modify the quantity, texture and/or proportions of food ingested.

Dysphagia: Any impairment of eating, drinking and swallowing.

Economic evaluation: Comparative analysis of alternative health strategies (interventions or programmes) in terms of both their costs and consequences.

Enablers or facilitators: Enablers or facilitators are factors which increase the probability of successful implementation.

Energy Dense hospital diet: The Energy Dense hospital diet as outlined in the Food Nutrition and Hydration Policy (FNHP) (HSE, 2018b), incorporates 3 fortified reduced portion size main meals, additional dessert with evening meal and 2 snacks, with high protein milk provided at all meals. This should provide approximately 2100kcal and 90g protein per day per patient per day.

Enteral tube feeding/enteral nutrition: Use of a tube to deliver a feed directly into the stomach or gut.

Evidence table: A table summarising the results of a collection of studies which, taken together, represent the evidence supporting a particular recommendation or series of recommendations in a guideline.

Evidence to Decision (EtD) frameworks: Frameworks that help GDGs use evidence in a structured and transparent way to inform decisions and arising recommendations. The frameworks include three main sections i.e., formulating the question, assessing the evidence and additional considerations for each criterion (DOH, 2019). EtD frameworks for clinical recommendations include 12 criteria that must be considered by guideline developers.

External validity: The degree to which the results of an observation, study or review in a particular clinical practice setting are likely to hold true when applied to other settings.

Fasciculation: or muscle twitch, is a small, local, involuntary muscle contraction and relaxation.

Fidelity: The degree to which an evidence-based intervention is delivered exactly as set out and intended by those who developed it (NCEC, 2018).

Global Leadership Initiative on Malnutrition (GLIM): Convened in January 2016, GLIM has engaged several of the clinical nutrition societies with global reach to achieve global consensus on the identification and endorsement of criteria for the diagnosis of malnutrition in clinical settings.

Globus sensation: is the feeling of having a 'lump' in the throat.

Gold standard: A method, procedure or measurement that is widely accepted as being the best available.

Good Practice Point (GPP): Recommended good practice based on the clinical experience of the Guideline Development Group.

Grading of Recommendations Assessment, Development and Evaluation (GRADE): is an approach to assess the quality of a body of evidence, and to develop and report recommendations. GRADE categorises the certainty in evidence as high, moderate, low or very low.

Grey literature: Reports that are unpublished or have limited distribution, and are not included in the common bibliographic retrieval systems.

Healthcare-associated infection (HCAI): A healthcare-associated infection is an infection that is acquired after contact with the healthcare services. This is most frequently after treatment in a hospital, but can also happen after treatment in outpatient clinics, nursing homes and other healthcare settings. Healthcare-associated infections that are picked up in hospital are also known as "hospital-acquired infections" (HSE).

Health economics: The study of the allocation of scarce resources among alternative healthcare treatments. Health economists are concerned with both increasing the average level of health in the population and improving the distribution of health.

Health related quality of life: A combination of an individual's physical, mental and social well-being; not merely the absence of disease.

Health year equivalent: The conjectured number of years lived in perfect health that could be regarded as equivalent to the precise number of years spent in a specific imperfect state of health.

Heterogeneity: The term is used in meta-analyses and systematic reviews when the results or estimates of effects of treatment from separate studies seem to be very different – in terms of the size of treatment effects or even to the extent that some indicate beneficial and others suggest adverse treatment effects. Such results may occur as a result of differences between studies in terms of the patient populations, outcome measures, definition of variables or duration of follow-up.

Home parenteral nutrition: Parenteral nutrition in the community setting.

Incremental cost-effectiveness ratio (ICER): The difference in the mean costs in the population of interest divided by the differences in the mean outcomes in the population of interest.

Information and communications technology (ICT): ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT) but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums.

Implementation: This is the carrying out of specific planned, intentional activities undertaken with the aim of making evidence-informed policies and practices work better for people. It can be thought of as the 'how' as well as the 'what' (DOH, 2018).

Implementation plan: This comprises of a list of key activities, responsibilities, assumptions, resource requirements, risks and other information required to achieve the desired outcomes from guidelines (DOH, 2018).

International Dysphagia Diet Standardisation Initiative (IDDSI): The IDDSI is a global standard with terminology and definitions to describe texture modified foods and thickened liquids used for individuals with dysphagia of all ages, in all care settings, and for all cultures.

Intervention: Healthcare action intended to benefit the patient, for example, drug treatment, surgical procedure, psychological therapy.

Key performance indicators: Performance indicators are specific and measurable elements of practice that can be used to assess quality of care. Indicators are quantitative measures of structures, processes or outcomes that may be correlated with the quality of care delivered by the healthcare system (DOH, 2019).

Length of stay: The total number of days a participant stays in hospital.

Life-years gained: Average years of life gained per person as a result of the intervention.

Logic Model: A logic model is a graphical depiction of an intervention's Theory of Change, describing connections between the intervention's context, inputs, outputs, and outcomes. It also provides some information on evidence underpinning the intervention and the associated monitoring and evaluation processes (DOH, 2018).

Longitudinal study: A study of the same group of people at more than one point in time.

Meta-analysis: Statistical procedure used to amalgamate the results of two or more independent studies to establish a single quantitative estimate of a treatment effect.

Monitoring: Monitoring can be defined as a systematic process of gathering information and tracking over time. Monitoring provides a verification of progress towards achievement of objectives and goals (DOH, 2019).

Macronutrients: Nutrients that are used or can be used to supply energy to the body: carbohydrate, protein and fat.

Malnutrition: Malnutrition (undernutrition form) is a state of nutrition in which a deficiency of energy, protein and other nutrients causes measurable adverse effects on body structure and function and clinical outcome. Reduced food intake or reduced nutrient absorption, combined with acute or chronic inflammation, leading to altered body composition and diminished function, characterises malnutrition associated with disease or injury (adapted from Elia, 2003; Cederholm et al., 2018; Jensen et al., 2018).

MaNuEL: The Joint Action Malnutrition in the Elderly Knowledge Hub (MaNuEL) is part of the Strategic Research Agenda of the Joint Programming Initiative "A Healthy Diet for a Healthy Life". It brings together 22 research groups from 7 countries. The researchers work together to build better research capacity on malnutrition in the elderly across Europe.

Micronutrients: Essential nutrients required by the body in small quantities: vitamins, minerals and trace elements.

Micronutrient deficiency: Micronutrient deficiency occurs when there is a deficit of one or more micronutrient/s compared to requirements (Cederholm et al., 2017).

Nutrition assessment: Nutrition assessment should be performed in all subjects identified as being at risk by nutrition screening for risk of malnutrition, and will give the basis for the diagnosis decision, as well as for further actions including nutritional treatment (Cederholm et al., 2017). It is a comprehensive approach to diagnosing nutritional problems that uses a combination of medical, nutritional and medication histories; physical examination; anthropometric measurements; and laboratory data (Mueller et al., 2011).

Nutritional care: Nutritional care is an overarching term to describe the form of nutrition, nutrient delivery and the system of education that is required for meal service or to treat any nutrition-related condition in both preventive nutrition and clinical nutrition (Cederholm et al., 2017).

Nutrition care plan: A nutrition care plan is developed by a dietitian outlining the individual nutritional interventions and outcomes to be monitored. The nutrition intervention chosen is directed to the root cause of the nutrition problem identified by nutrition assessment and is aimed at alleviating the signs and symptoms of the problem (HSE, 2018b).

Nutrition care process (NCP): The NCP is a systematic method of recording nutrition care that provides a framework for critical thinking and decision-making in the dietetic management of patients and includes a diagnosis of malnutrition.

Nutrition Focused Physical Examination (NFPE): This is a methodical head-to-toe examination of a patient's physical appearance and function to help determine nutritional status by uncovering signs of malnutrition, nutrient deficiencies and excesses. This forms part of the nutrition care process (NCP).

Nutrition screening: In this document nutrition screening refers to malnutrition risk screening. This is a rapid process performed to identify subjects at nutritional risk and should be performed using an appropriate validated tool in all subjects that come in contact with healthcare services (Cederholm et al., 2017).

Nutrition support: The provision of nutrients and any necessary adjunctive therapeutic agents to patients orally and/or enterally by administration into the stomach or intestine and/or by intravenous infusion (parenterally) for the purpose of improving or maintaining a patient's nutrition status (NICE, 2006a).

Nutrition support team: A nutrition support team is a multi-disciplinary team of physicians, dietitians, nurses and pharmacists. Other relevant professionals may also be part of this team, e.g. physiotherapist and speech and language therapists (Cederholm et al., 2017).

Observational study: Retrospective or prospective study in which the investigator observes the natural course of events with or without control groups; for example, cohort studies and case–control studies.

Odds ratio: An odds ratio (OR) is a measure of association between an exposure and an outcome

Older adults: Subjects aged 65 years and over.

Operating costs: Ongoing costs (excludes capital costs).

Opportunity cost: The monetisation of the time that staff will be diverted from their usual activities to complete education and training (in context of this guideline). This is not an actual cash cost to the HSE. This cost may be realised through efficiencies and flexibility in rostering, and direct staff replacement may not be required.

Oral Nutrition Support: The modification of food and fluid by: fortifying food with protein, carbohydrate and/or fat (with or without minerals and/or vitamins); the provision of snacks and/or oral nutritional supplements as extra nutrition to regular meals; changing meal patterns or the provision of dietary advice to patients on how to increase overall nutrition intake by the above (adapted from NICE 2006a).

Oral nutritional supplements (ONS) (standard or non-standard): Products for use in oral nutrition support given with the aim to increase nutritional intake. (NICE, 2006a). They are defined in EU legalisation as "foods for a specific medical purpose" (FSMPs). FSMPs are defined as "specially processed or formulated and intended for the dietary management of patients including infants, to be used under medical supervision".

- Standard ONS are described as commercially available products – usually ready-to-consume liquids or semi-solids that provide a mixture of macronutrients and micronutrients (Elia, 2016).
- Non-standard ONS include disease-specific formulas adapted to the needs of patients with specific diseases, digestive or metabolic disorders (Elia, 2016). Non-standard ONS may contain nutrients that have specific additional effects, e.g. on the immune system.

Oropharyngeal dysphagia: This is the term used to describe a feeding, eating, drinking and swallowing disorder usually resulting from a neurological or physical impairment of the oral, pharyngeal or oesophageal mechanisms. The normal swallow has 4 phases: oral preparatory, oral, oropharyngeal, and oesophageal. The first three of these together are termed the oropharyngeal phase. The 'normal' swallow needs the respiratory, oral, pharyngeal, laryngeal and oesophageal anatomical structures to function in synchrony, which is dependent upon the motor and sensory nervous system being intact (HSE, 2018b).

Overweight and obesity: Overweight and obesity can be defined as abnormal or excessive fat accumulation that may impair health. Classification of overweight and obesity in adults is achieved through the use of body mass index (BMI) (Cederholm et al., 2017).

Outcome: Measure of the possible results that may stem from exposure to a preventive or therapeutic intervention. Outcome measures may be intermediate endpoints or they can be final endpoints.

P value: The probability that an observed difference could have occurred by chance, assuming that there is in fact no underlying difference between the means of the observations. If the probability is less than 1 in 20, the P value is less than 0.05; a result with a P value of less than 0.05 is conventionally considered to be statistically significant.

Palliative care: Active holistic care of patients with advanced progressive illness, focusing on the management of pain and other symptoms and provision of psychological, social and spiritual support. The goal of palliative care is the achievement of the best quality of life for patients and their families

Parenteral nutrition: Nutrition provided intravenously, typically involving an infusion of amino acids, glucose, fat, vitamins, trace elements and electrolytes.

Peri-operative: The period from admission through surgery until discharge, encompassing pre-operative and post-operative periods. Studies included in this guideline for surgical patients sometimes start or end their intervention outside this period. However, they always include nutrition support during some of the perioperative phase (NICE, 2006a).

Placebo: An inactive and physically identical medication or procedure used as a comparator in controlled clinical trials.

Policies: Policies are written operational statements of intent which help staff make appropriate decisions and take actions, consistent with the aims of the service provider, and in the best interests of service users (HIQA, 2012).

Polymorbidity: Polymorbidity (also known as multi-morbidity) refers to the co-occurrence of at least two chronic health conditions in the same person.

Pressure ulcer: Area of localised tissue damage caused by ischaemia due to pressure, friction, or shear (HSE, 2018a).

Prevalence: The number of people with a particular condition present within a population. It may be expressed as a percentage (per 100 of population) or per thousand or per million of population.

Prognosis: A probable course or outcome of a disease. Prognostic factors are patient or disease characteristics that influence the course. Good prognosis is associated with low rate of undesirable outcomes; poor prognosis is associated with a high rate of undesirable outcomes.

Prospective study: A study in which people are entered into the research and then followed up over a period of time with future events recorded as they happen.

Quality adjusted life years (QALYS): An index of survival that is adjusted to account for the patient's quality of life during this time. QALYs have the advantage of incorporating changes in both quantity (longevity/mortality) and quality (morbidity, psychological, functional, social and other factors) of life. Used to measure benefits in cost-utility analysis.

Randomised controlled trial (RCT): A study in which subjects allocated at random to intervention and control groups are followed-up to establish differences in outcome.

Rapid update: Review of existing guidance carried out sooner than originally planned because new data have become available.

Reference standard: An agreed standard, for example for a test or treatment, against which other interventions can be compared. See 'Gold standard' above.

Refeeding syndrome: Refeeding syndrome refers to biochemical and clinical symptoms and abnormalities caused by shifts in electrolyte and fluid balance in malnourished patients upon recommencement of feeding, both enteral (including oral) and parenteral (IrSPEN, 2013).

Regular hospital diet: The Regular hospital diet as outlined in the FNHP (HSE, 2018b), incorporates 3 main meals and 2 snacks each day and should provide between 2100 and 2400kcal and approximately 90g protein per patient per day.

Relative risk (RR): The number of times more likely or less likely an event is to happen in one group compared with another (calculated as the risk of the event in group A/the risk of the event in group B).

Reliability: The degree of agreement exhibited when a measurement is repeated under identical conditions. Reliability refers to the degree to which the results obtained by a measurement procedure can be replicated.

Resource implication: The likely impact in terms of finance, workforce or other HSE resources.

Retrospective study: A retrospective study deals with the present/ past and does not involve studying future events.

Sarcopenia: Sarcopenia is a syndrome of its own characterized by the progressive and generalised loss of skeletal muscle mass, strength and function (performance) with a consequent risk of adverse outcomes (Cederholm et al., 2017).

Sarcopenic obesity: Sarcopenic obesity is defined as obesity in combination with sarcopenia that occurs for example in older individuals, in those with T2DM, COPD, and in obese patients with malignant disorders and post organ transplantations. Mechanisms include inflammation and/or inactivity induced muscle catabolism in obese patients. The condition can occur at all ages (Cederholm et al., 2017).

Semi-quantitative food record: This is a record of food and fluid intake usually completed at the time of consumption or soon after, where the quantification of food and fluid is estimated rather than weighed, most often using a fraction or percentage estimation of portion sizes consumed.

Sensitivity: The ability of a screening test to accurately identify those who have the disease, that is, the proportion of people with the disease who have a positive test result.

Sensitivity analysis: A statistical method in which the underlying assumptions are altered to test the robustness of the results and conclusions. It quantifies the extent to which changes in an input variable alters the value of an outcome variable.

Specificity: The ability of a screening test to correctly identify those who do not have the disease, that is, the proportion of people without the disease who have a negative test result.

Stadiometer: A stadiometer is a piece of medical equipment used for measuring human height.

Standard: A level or quality or achievement that is acceptable.

Synthesis of evidence: A generic term to describe methods used for summarising (comparing and contrasting) evidence into a clinically meaningful conclusion in order to answer a defined clinical question. This can include systematic review (with or without meta-analysis), qualitative and narrative summaries.

Systematic review: A critical objective appraisal of evidence, conducted according to explicit and reproducible methodology in order to reduce the risk of bias and random errors. A systematic review does not necessarily include a meta-analysis.

Texture Modified Diet: Foods that have been physically altered to change their texture/consistency. Altering food texture has demonstrated a therapeutic benefit for reducing the risk of choking. Within the International Dysphagia Diet Standardisation Initiative framework, there are 5 levels of food textures (Levels 3-7) which include Regular diet (Level 7), Soft Diet (Level 6), Minced & Moist Diet (Level 5), Pureed Diet (Level 4) and Liquidised Diet (Level 3) (HSE, 2018b).

Undernutrition: See malnutrition.

Xerostomia: Defined as dry mouth resulting from reduced or absent saliva flow.

Abbreviations

The following abbreviations are used in this document:

Adv ADP	Advanced Accredited Practicing Dietitian
AND	American Academy of Nutrition and Dietetics
AGREE II	Appraisal of Guidelines for Research and Evaluation
AOTI	Association of Occupational Therapists of Ireland
ASPEN	American Society for Parenteral and Enteral Nutrition
BAPEN	British Association for Parenteral and Enteral Nutrition
BDA	British Dietetic Association
BIA	Budget Impact Analysis
BMI	Body Mass Index
CG	Clinical Guideline
CEO	Chief Executive Officer
CEU	Clinical Effectiveness Unit
CMAI	Catering Management Association of Ireland
CNM	Clinical Nurse Manager
COPD	Chronic Obstructive Pulmonary Disease
CSP	Clinical Strategy and Programmes
DAA	Dietitians Association of Australia
DALY	Disability adjusted life years
DOH	Department of Health
EFAD	European Federation of the Associations of Dietitians
EFSA	European Food Safety Authority
ERAS	Enhanced Recovery After Surgery
ESPEN	European Society for Clinical Nutrition and Metabolism
EtD	Evidence-to-decision
FEES	Fiberoptic endoscopic evaluation of swallowing
FNHP	Food Nutrition and Hydration Policy for Adult Patients in Acute Hospitals
FSAI	Food Safety Authority of Ireland
GDG	Guideine Development Group
G-I-N	Guidelines-International-Network
GLIM	Global Leadership Initiative on Malnutrition
GP	General Practitioner
GPP	Good practice point
GRADE	Grading of recommendations assessment, development and evaluation
HEAL	Healthy Eating and Active Living Programme

HCA	Healthcare Assistant
HCAI	Healthcare associated infection
HDU	High dependency unit
HIQA	Health Information and Quality Authority
HMB	Beta-hydroxy-beta-methylbutyrate
HPAI	Hospital Pharmacists Association of Ireland
HR	Hazard ratio
HRB-CICER	Health Research Board-Collaboration in Ireland for Clinical Effectiveness Reviews
HSCP	National Health and Social Care Professions
HSE	Health Service Executive
HYE	Health year equivalent
IASLT	Irish Association of Speech and Language Therapists
ICER	Incremental cost-effectiveness ratio
ICT	Information and communications technology
ICU	Intensive care unit
IDDSI	International Dysphagia Diet Standardisation Initiative
IHF	Irish Hospice Foundation
INDI	Irish Nutrition and Dietetic Institute
IOM	US Institute of Medicine
IrSPEN	Irish Society for Clinical Nutrition and Metabolism
IT	Information technology
JSCAG	Joint Steering and Clinical Advisory Group
KPI	Key performance indicator
LOS	Length of hospital stay
LYG	Life years gained
MaNuEL	MalNutrition in the ELderly knowledge hub
MNA-FF	Mini Nutritional Assessment – Full Form
MNA-SF	Mini Nutritional Assessment – Short Form
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NHS	National Health Service, UK
NHSO	National Health Sustainability Office
NCP	Nutrition care process
NCG	This National Clinical Guideline
NCEC	National Clinical Effectiveness Committee
NICE	National Institute for Health and Care Excellence

NIHR	National Institute for Health Research
NFPE	Nutrition focused physical examination
NMPD	Nursing and Midwifery Planning and Development
NPSO	National Patient Safety Office
NRI	Nutrition Risk Index
NRS-2002	Nutrition Risk Score 2002
NS	Nutrition screening for malnutrition risk
NST	Nutrition screening tool for malnutrition risk
ONMSD	Office of the Nursing and Midwifery Services Director
ONS	Oral nutritional supplement
OR	Odds ratio
PD	Project Dietitian
PDSA	Plan-Do-Study-Act
PICO/S	Population, Intervention/Exposure, Comparator, Outcome, Study design
PIPOH	Population, Intervention/Exposure, Professionals (Patients), Outcomes, Healthcare setting/context
PSI	Pharmaceutical Society of Ireland
PPPG	Policies, procedures, protocols and guidelines
QALY	Quality-adjusted life years
QID	Quality Improvement Division
QUAD	Quality Assurance and Verification Division
RCSI	Royal College of Surgeons in Ireland
RCT	Randomised controlled trial
RR	Relative risk
SAP	Systems analysis programme
SD	Standard deviation
SGA	Subjective global assessment
SIGN	Scottish Intercollegiate Guidelines Network
SLT	Speech and Language Therapist
SNAQ	Short Nutritional Assessment Questionnaire
TILDA	The Irish Longitudinal Study on Ageing
T2DM	Type 2 Diabetes Mellitus
3-minNS	3-Minute Nutrition Screening tool
UK	United Kingdom
US	United States of America
VFU	Videofluoroscopy

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