



Clinical Practice Guidance for Cancer Nurses

Nutrition in people with cancer



European Oncology Nursing Society

NutriCaNurse Project

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This document gives guidance about nutrition for adult people with cancer and is aimed at cancer nurses. The recommendations are based on the available evidence where possible and on best practice guidance. There are several areas, however, where there is a lack of evidence and further research is needed – these are highlighted in the text. Although all reasonable care has been taken in the preparation, production and presentation of this guidance, EONS cannot accept responsibility or liability whatsoever for errors or omissions in the materials, and all participants are advised to use their professional judgement when using the information in their clinical practice.

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I Introduction

The aim of this booklet is to provide guidance regarding the knowledge, skills and competencies in nutrition for nurses who care for adult people with cancer and to support their work in clinical practice.

Malnutrition affects more than 50% of cancer patients and is present in more than 80% of patients with advanced disease or metastases (1). Regardless of the cancer type, the overall prevalence of malnutrition is about 40% (2). Neoplastic diseases represent the second leading cause of death globally and the number of new cases is expected to rise significantly over the next decades (3). Malnutrition is a major cause of both morbidity and mortality (3, 5, 6) and could be caused by both the illness and the treatment (7). Therefore, it is important to establish early on nutritional interventions to prevent or minimise situations that can affect the nutritional status of people with cancer (3). Malnutrition is associated with poorer prognosis, quality of life and survival (8). It has been estimated that up to 10 to 20% of cancer patients die due to consequences of malnutrition rather than for the tumor itself (3). A well-nourished cancer patient has better tolerance of treatment, better quality of life, fewer side effects/toxicities related to cancer treatment and, thereby, enhanced adherence to treatments (3, 6).

While cancer is often associated with weight loss, there are an increasing number of patients beginning cancer treatment who are already overweight or clinically obese or who have complications associated with weight gain and treatment (5, 9). A patient might be obese but also suffer from malnutrition during treatment. Moreover, cancer survivors who are overweight or obese may be at greater risk of developing other diseases and secondary cancers (10, 11). Therefore, it is important for cancer nurses to be aware, carefully assess the nutritional status of an overweight patient, screen for malnutrition and provide advice regarding healthy lifestyle if appropriate from the moment cancer treatment is initiated.

The detection and treatment of malnutrition is a multidisciplinary challenge. The European Society for Clinical Nutrition and Metabolism (ESPEN <https://www.espen.org/>) has addressed the importance of multidisciplinary teams working together to ensure timely identification of malnutrition by screening and planning the best possible interventions and follow-up care throughout the cancer care continuum (3, 4). Nutrition is an essential component of supportive, rehabilitative and palliative care (12). In the multidisciplinary team, cancer nurses play an important and often varied role in caring for individuals with cancer and beyond to provide the best possible care (13).

Cancer nurses frequently interact with patients from diagnosis through to follow-up after treatment, generally spending more time with them than most other healthcare professionals (14). Therefore, cancer nurses have good opportunities to provide information and advice to people with cancer and answer questions that may arise throughout the treatment process and after it (14). Moreover, cancer nurses focus on a holistic, person-centred approach and promote self-management. Nurses are also ideally placed to have an essential role in the early detection and screening of malnutrition. Thus, nutritional care needs to be seen as part of holistic cancer nursing practice. According to the European Federation of the Associations of Dietitians (EFAD <http://www.efad.org/en-us/home/>), by working closely with nurses, dietitians can educate them to react appropriately to difficult nutrition-related questions, work in tandem with them to tailor nutritional care to individual needs and encourage nurses to participate in nutrition research.

General Nutrition Advice

Many individuals with cancer will not require major dietary changes during their cancer treatment. Patients often need simple nutritional advice and nurses are in a great place to support them with appropriate self-care advice.

Highlights for cancer nursing practice

- Nutritional care is a fundamental aspect of cancer nursing practice.
 - Malnutrition is very common in people with cancer and can occur in all phases of the cancer trajectory.
 - Malnutrition can have a significant impact on the clinical outcomes of cancer treatments.
 - Malnutrition is associated with the quality of life of people with cancer.
 - Early detection and care of malnutrition can promote recovery and improve prognosis.
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- Assess the nutritional needs of all patients.
 - Provide general healthy eating lifestyle and food safety advice for all patients.
 - Identify the risk and signs of malnutrition.
 - Identify those patients who require assistance with feeding.
 - Support the patient and carer involved in the care and provide information to increase the self-management abilities of the patient.

II Terminology

The ESPEN guidelines on malnutrition among cancer patients, including a definition of malnutrition, were updated in 2017 and 2021 (3, 4). Subsequently, the Global Leadership Initiative on Malnutrition (GLIM) recommendations on criteria for the diagnosis of malnutrition including phenotypic and etiologic criteria (15, Box 2) were published in 2019. It is recommended that the etiologic criteria should be used to guide interventions and anticipate outcomes. This supports classification of malnutrition into four etiology-related diagnostic categories. The GLIM criteria is based on a consensus scheme for diagnosing malnutrition in adults in clinical settings on a global scale. Malnutrition often involves cancer cachexia (Box 1). Cancer anorexia cachexia syndrome (CACS) is a common, multifactorial syndrome that can affect up to 80% of people with cancer, at any weight, especially those with advanced stages of disease (16).

Cancer-related weight loss is likely to be multi-factorial. It may include at least three specific and overlapping clinical syndromes: malnutrition, cachexia and sarcopenia. Malnutrition is a nutritional imbalance leading to negative effects on weight and function. Cachexia is the presence of an inflammatory syndrome whilst sarcopenia is the loss of muscle mass, power and function (17).

Box 1. Definition of disease-associated malnutrition and cachexia (4, p. 1188)

Definition of disease-associated malnutrition (ESPEN)

“A condition that results from the activation of systemic inflammation by an underlying disease. The inflammatory response causes anorexia and tissue breakdown that can, in turn, result in significant loss of body weight, alterations in body composition, and declining physical function. The negative energy balance and skeletal muscle loss is driven by a combination of inadequate food intake and metabolic derangements which may be host- or tumor derived.”

Definition of cachexia (ESPEN)

“Cachexia is a multifactorial wasting syndrome characterized by involuntary weight loss with ongoing loss of skeletal muscle mass with or without loss of fat mass; such wasting cannot be reversed by conventional nutrition care and may lead to functional impairment.”

Box 2. Criteria for the diagnosis of malnutrition

Etiology-related diagnosis categories	The top five GLIM criteria for malnutrition
<ul style="list-style-type: none">• <i>Malnutrition related to chronic disease with inflammation</i>• <i>Malnutrition related to chronic disease with minimal or no perceived inflammation</i>• <i>Malnutrition related to acute disease or injury with severe inflammation</i>• <i>Malnutrition related to starvation including hunger/food shortage associated with socioeconomic or environmental factors</i>	<ul style="list-style-type: none">• <i>Unintentional weight loss</i>• <i>Low body mass index (BMI)</i>• <i>Reduced muscle mass</i>• <i>Reduced food intake</i>• <i>Assimilation and disease burden/inflammation</i>

Highlights for cancer nursing practice - terminology

- Malnutrition is a nutritional imbalance leading to negative effects on weight and function.
 - Cancer-related weight loss may include malnutrition, cachexia and sarcopenia.
 - GLIM-criteria provides basis for a diagnosis of malnutrition.
 - The etiologic criteria should be used to guide interventions and anticipate outcomes.
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- Know the etiology that can lead to malnutrition.
 - Assess, monitor and document the information on the nutrition status of your patients.

III Causes and consequences of malnutrition

Malnutrition is a very common (3), underestimated and multifactorial condition which can occur at any stage of the disease (2). The presence of reduced food intake and metabolic derangements is consistently acknowledged (3, 18). Malnutrition often involves cancer cachexia, which is characterised by progressive muscle wasting that cannot be completely reversed by conventional nutritional support. The condition is often accompanied by anorexia, reduced food intake, metabolic abnormalities and fatigue, as well as impaired immune and physical function which then negatively affects the condition of the patient (8). Thus, cachectic patients are all malnourished yet not all malnourished patients are also cachectic (19).

Malnutrition in people with cancer is caused by multiple factors (Table 1). The treatments for cancer involve combinations of systemic treatments such as chemotherapy and immunotherapeutic, radiotherapeutic, or surgical regimens. These are known to produce symptoms that limit nutritional intake and eating and affect the digestive processes, and can thereby, have a profound impact on the nutritional status of the patient (19, 21). Eating is also a social activity with psychological relevance for people; anorexia and weight loss can become a distressing factor for patients and their closest ones (18).

Table 1. Causes of malnutrition (3, 7, 18, 19, 21)

Causes of malnutrition
Inadequate nutritional intake due to disease or treatment-related nutrition-impact symptoms, such as: fatigue, dry mouth (xerostomia) or mouth ulcers/lesions, difficulty chewing, thick saliva, dysphagia, radiotherapy/chemotherapy-induced mucositis, abdominal pain, nausea, vomiting, taste alterations, deterioration in smell and appetite, early satiety, constipation, and diarrhoea due to infections or malabsorption.
Taste changes - altered food preferences/food avoidance/food aversion
Oesophagitis
Acute or chronic radiation enteritis
Increased energy and protein needs
Local effects such as tissue infiltration or physical obstruction and pain
Alterations in absorption and metabolism of nutrients, resting energy expenditure (REE) and impaired organ function
Pro-inflammatory cytokines and hormones produced by the tumour or body in reaction to tumour (a systemic inflammation syndrome)
Emotional and psychological changes causing food aversion and reduced food intake
Decreased physical activity
Social isolation
Psychological stress or illness
Loss of income

Malnutrition is a major cause of morbidity and mortality (3, 5, 6, 22, 53) and associated with poorer prognosis and decreased quality of life (3). Malnutrition can have a significant adverse impact on clinical, patient-centred and financial outcomes such as toxicities and length of stay (24). Negative outcomes may also be driven by inadequate food intake, decreased physical activity and catabolic derangements (3). Malnutrition can alter the anti-cancer effects of various treatments (6) (Table 2).

Table 2. Consequences of malnutrition in people affected by cancer (3, 6, 22, 24, 25)

Consequences of malnutrition
Increased toxicity of treatments
Treatment reductions or interruptions
Impaired physical performance
Prolonged length of hospital stay
Increased morbidity and mortality
Slow wound healing
Decreased quality of life
Fatigue

Highlights for cancer nursing practice - causes and consequences of malnutrition

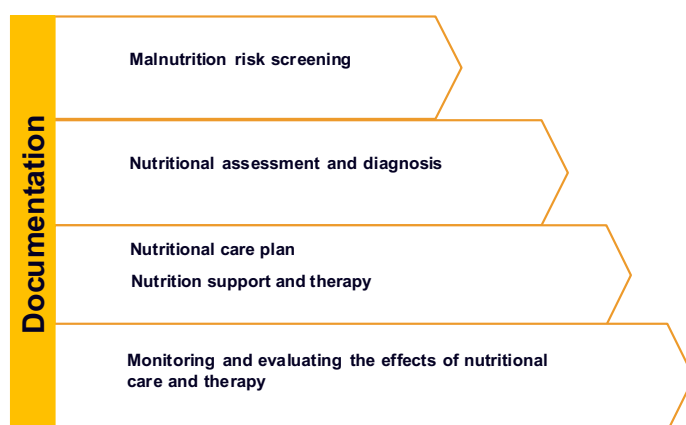
- Malnutrition and problems related to eating are caused by multiple factors and by both the illness and the treatment.
 - Malnutrition can have many consequences, some of which can be prevented.
- Note that cachectic patients are all malnourished yet not all malnourished patients are cachectic.
 - Advise the patient and carer on the risk of malnutrition.
 - Provide education and support for the patient to prevent and self-manage problems with nutrition.
 - Ask patient's opinion about eating, possible problems and what they think is causing the problems.
 - Map the social context and identify who could support patient at home if needed.
 - Prevent eating becoming a stress factor for the patient and his/her closest ones.
 - Note that with some cancer patients (i.e. breast cancer) the treatment increases appetite and many patients can have challenges in maintaining a healthy body weight. Provide information about healthy diet and exercise from the beginning of those treatments (see chapter VI).

IV Screening and assessment of malnutrition in people with cancer

The nutrition care process (Figure 1) can be described as a four-step process, from screening and assessment of malnutrition to interventions, monitoring and evaluation. The care process can be adapted to different care settings. It is the multidisciplinary team's responsibility to ensure that patients' nutrition needs are met and to deliver individualised, high quality care (Box 3). Nutritional assessment should be systematic with standardised assessment tools and undertaken in all patients in all healthcare settings. Person-centred nutritional screening, assessment and guidance are important elements of nursing practice when supporting people with cancer and beyond.

Not all persons with cancer need to be referred to a dietitian. However, significant unintentional weight loss and specific cancer types such as head and neck cancer indicate a prompt dietetic referral, more detailed nutritional assessment and implementation of an individual nutritional care plan (54). The nutrition assessment tools support the identification of people with cancer who would benefit from the support of nutrition specialists. In cancer centres, there is a need to ensure the timely access to nutrition specialists for people with cancer.

Figure 1. Nutrition care process (Adapted from Cederholm et al. 2017 ⁽²⁶⁾)



Accurate assessment of malnutrition potentially prevents both undertreatment and overtreatment of malnutrition (27). Nutritional screening is used to determine the risk of malnutrition. It provides preliminary information and is different from nutritional assessment, which then enables the actual diagnosis of malnutrition and can be done using the GLIM criteria. Nutritional assessment includes cause, severity and type of malnutrition (26, Box 4). Patients should have their weight measured and recorded at each hospital appointment so that BMI can be monitored and the percentage of unintentional weight loss ascertained (54). There are tools available to assess the risk of malnutrition and to use in monitoring the nutritional status of the patient (Table 3). In the table, the original patient group for which the tool was developed is mentioned. However, these tools can also be used in other care settings such as outpatient clinics. In Box 5, some practical tips are provided for a quick assessment. Optimal hydration during cancer treatment also requires assessment and preplanning of needs (55).

Table 3. Examples of screening tools ^(27, 28, 29, 30, 60)

Instrument	Designed for
Patient-Generated Subjective Global Assessment (PG-SGA)*	People with cancer
Nutritional Risk Screening (NRS-2002)**	Hospitalized patients
Mini Nutritional Assessment (MNA)***	Elderly people
Malnutrition Universal Screening Tool (MUST)****	Adult patients in the community
Short Nutritional Assessment Questionnaire (SNAQ)*****	Hospitalized patient

* Jager-Wittenaar & Ottery 2017, ** Bozzetti et al. 2012, ***Gioulbasanis et al. 2011,**** Boléo-Tomé et al. 2011, *****Kruizenga et al. 2005

Box 3. Multidisciplinary approach ^(3, 4)

The ESPEN guidelines recommend an MDT approach to include:

Screen all patients with cancer for nutritional risk early in their course of care, regardless of body mass index and weight history; regularly rescreen nutritional status.

Increase nutrition assessment to include measures of anorexia, body composition, inflammatory biomarkers, resting energy expenditure (REE), and physical function.

Box 4. Nutritional assessment ^(3, 4, 26)

The assessment domains

- 1) Cause, severity and type of malnutrition
- 2) Assessment of nutritional intake versus nutritional requirements, and nutrition impact symptoms present
- 3) Assessment of body weight, body area and body composition
- 4) Assessment of muscle mass and function; immune, and cognitive function/psychosocial factors

Box 5. Practical tips on quick assessment of risks for malnutrition

Ask

Are you eating well?

Are you drinking enough fluids?

Have you lost weight without trying?

Has your appetite changed?

Do you have problems in eating?

Is it a new problem?

Do you have difficulties in swallowing?

Do you have taste changes?

Do you have nausea or pain when eating?

Have you experienced any psychological impact (e.g. depression, fatigue)?

Observe

Is jewelry or watch falling off?

Are clothes fitting loosely?

Does the patient have dry mouth and thin skin?

Is the patient often languid, tired or cold?



Highlights for cancer nursing practice – screening and assessment of malnutrition

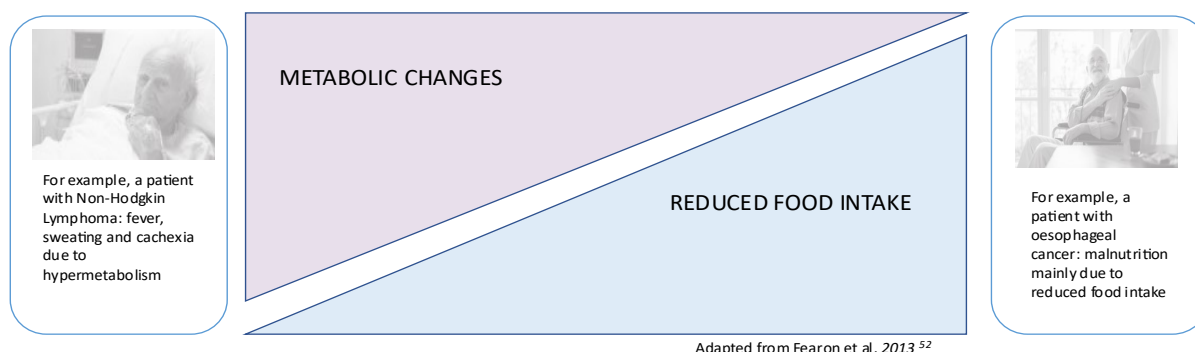
- Person-centred nutritional screening, assessment and guidance are important elements of nursing practice.
- Nutritional assessment should be undertaken in all cancer patients in all health and social care settings.
- Note that regardless of what instrument, a holistic assessment is crucial.
- Choose a validated instrument based on the care units' protocol to assess the risk of malnutrition.
- Ask the patients to have their weight measured and recorded at each hospital appointment.
- Act proactively in the MDT and refer to more specialist services; medical oncologist, dietitian, physiotherapist, psychotherapist, social worker and others based on individual needs of the patient to avoid bigger problems.
- When possible, use the same tool in monitoring the nutritional status of the patient.

V Treatment principles of malnutrition

People with cancer require nutritional support to prevent and treat malnutrition, improve treatment efficacy, reduce the adverse effects of anti-cancer treatments and improve quality of life (3). Comprehensive treatment of cancer cachexia requires a multi-targeted and multidisciplinary approach aimed at evaluating the objective signs and relieving the symptoms with a primary goal of meeting the physiological and psychological needs of the patient (12). It is important in nursing practice to establish an approach that can proactively support patients' nutritional needs throughout the cancer care continuum (9). Managing malnutrition will assist in maintaining tolerance to treatment and enhancing quality of life for patients and carers. It is important for cancer nurses to recognise how patients feel, physically and emotionally, while they are living with cancer. Malnutrition can have a significant effect on their recovery and ability to carry out normal daily functions, as well as on their interpersonal relationships (54). Person-centred guidance is one of the key elements of cancer nursing practice (9). The aim of psychosocial interventions in nursing practice is to reduce the emotional burden associated with cancer and to empower people with cancer and their closest ones.

The aim of nutritional interventions is to maintain or improve nutritional intake and mitigate metabolic derangement to maintain skeletal muscle mass and physical function, to reduce the risk of reductions or interruptions of scheduled anticancer treatments, to stabilise weight, minimise symptoms and enhance quality of life (3). The interventions need to be chosen and tailored, weighing the benefits and risks for each individual patient (12). Patients with gastrointestinal tract, head and neck, liver and lung cancers are at the highest risk of malnutrition (3). Understanding of the mechanism behind the malnutrition (4) is needed to plan the treatment (Figure 2). It is imperative that nurses are able to detect disease-related malnutrition early, advise on diet and refer patients for further dietetic support if required (54). Cancer nurses are also in a great position to provide support and tailored information for people with cancer on how to manage nutrition-related challenges in the context of their daily lives.

Figure 2. Example of the mechanism behind malnutrition



Prehabilitation is an approach to malnutrition care. It is a form of multidisciplinary healthcare intervention that enables people with cancer to prepare for treatment through promoting healthy behaviours, including needs-based prescribing of exercise, nutritional and psychological interventions. It is a part of the cancer care continuum which aims to empower people with cancer to maximise resilience to treatment and improve long-term health (32). Support for people with cancer to maintain muscle mass and physical function is other important approach. Therefore, *physical activity* is recommended (3).

Nutritional care should always be accompanied by exercise training (3). Moderate physical exercise guided by professionals is safe in patients with cancer cachexia and is recommended to maintain and improve muscle mass (12). Physical activity and dietary interventions alone or in combination with pharmacological management have shown promising results and may be recommended based upon clinical expertise (33). It is recommended to maintain or increase level of physical activity in cancer patients to support muscle mass, physical function, and metabolic pattern (3). Physical activity may occur in the form of usual daily activities as well as aerobic exercise, resistance training (4) and techniques to increase muscle mass and/or muscle strength. Individualized resistance exercise in addition to aerobic exercise supports to maintain muscle strength and muscle mass. (3).

The interventions in treatment of malnutrition include medical nutrition, nutrition counselling and advice, exercise and control of nutritional impact symptoms (NIS) (3, 4, 18). The treatment of cancer cachexia requires comprehensive treatment with a multi-targeted, and multidisciplinary approach aimed at evaluating the objective signs and relieving the symptoms (12).

Nutritional support

People with cancer should receive appropriate advice on nutrition that is consistent and evidence based (57). The aim of nutritional support is to ensure adequate intake of energy and nutrients by enabling the person with cancer to eat normal food, enjoy eating and participate in meals with others as a component of their normal social life (3).

The main nutrition intervention approaches used with people affected by cancer include nutrition counselling (NC) by a dietitian or other appropriate trained healthcare professional such as nurses; medical nutrition: oral nutrition supplements (ONS); enteral feeding by tube feeding (TF) and parenteral nutrition (PN). Oral Nutritional Supplements (ONS) are sterile liquids, semi-solids or powders, which provide macro and micronutrients. Nurses have frequent and regular contact with patients and often perform the initial nutrition screening, provide general advice, make referral to medical an oncologist or dietitian, and assist in implementing and supporting nutrition and medical recommendations (58). Nurses are also in a good position to identify those people who need to be assisted in eating. Nurses and other healthcare professionals should also be sensitive towards individual and cultural differences, understanding the financial and social factors, and providing the patient with more specific information on what to eat at each stage of the treatment (25).

The first form of nutritional support should be nutrition counselling to help manage symptoms and encourage the intake of better tolerated energy-enriched foods and fluids (3). Both the use of oral nutritional supplements and dietary counselling has been shown to improve appetite and nutritional outcomes of patients undergoing cancer treatments (34). When the appetite improves, the energy and protein intake or meal portions increase leading to improvement or stabilisation in weight. In the treatment of malnutrition in people with cancer, insufficient protein intake is a key feature. In cancer patients with CACS syndrome, ONS may be recommended to improve quality of life, nutritional intake and other aspects of the experience of CACS (33).

The nutritional support in cachexia patients who are able to eat, should be based on dietary counselling, guidance on choosing high-energy, high-protein foods, enriching foods (e.g. by adding fat/oils, protein powder) and use of oral nutritional supplements (12). Nutritional support, particularly immunonutrition supplementation, is likely to reduce infectious complications, morbidity and length of hospital stay without influencing mortality. Immunonutrition refers to modulation of either the activity of the immune system, or modulation of the consequences of activation of the immune system, by nutrients or specific food items. It may be a safe and preferred choice for well-nourished cancer patients undergoing cancer surgery (6).

Recent guidelines recommend a higher range of protein (1–1.5 g/kg/day) because it has potentially beneficial effects for treatment tolerance and efficacy (3, 22). The need for hydration must also be acknowledged. Liquids may and should be taken in between meals to prevent dehydration. (59.) The total energy expenditure (TEE) of cancer patients, if not measured individually, is assumed to be similar to healthy subjects and generally ranging between 25 and 30 kcal/kg/day. In weight-losing patients with insulin resistance, it is recommended to increase the ratio of energy from fat to energy from carbohydrates. This is intended to increase the energy density of the diet and to reduce the glycemic load (3).

At this time, evidence is not yet strong enough to say whether specific nutrients may provide additional benefits to standard nutrition care. Omega-3 fatty acids have been shown to exert less inflammatory stimulus when compared to omega-6 fatty acids, thereby potentially enhancing the anabolic potential of nutrition care. Omega-3-enriched ONS significantly increases the body weight of cancer patients receiving chemotherapy (35). Also, omega-3-enriched ONS have been shown to improve muscle function in patients with lung cancer receiving chemotherapy (36) and may also have a positive effect on survival (37). ESPEN (3) recommend that vitamins and minerals are supplied in amounts approximately equal to the recommended daily allowance and discourage the use of high-dose micronutrients. Vitamin D deficiency might be relevant to optimise protein supplements' effectiveness (22), but more research is needed in this emerging area of nutritional support.

Artificial nutrition

Artificial nutrition is appropriate if patients are unable to eat adequately. The choice between enteral (EN) and parenteral nutrition (PN) is based on whether enteral nutrition is feasible and tolerated. The decision is also based on tumour site and extent, complications, treatment plan and intent, prognosis, patients' overall physical status, age and the duration of the nutritional support (22). Separate routes of feeding may be combined for optimal effects (12). It is important to involve the person with cancer and the multidisciplinary team in the decision making. Patients' preferences on nutrition type need to be acknowledged (25, 12). The risk of refeeding syndrome needs to be acknowledged when artificial nutrition is prescribed to the patient (Box 6).

EN is favoured for people with cancer when oral intake is inadequate or when they are already malnourished; provided that their gastrointestinal tract is functional (3). Enteral tube feeding is indicated in cases of severe dysphagia and inadequate energy intake. Tube feeding should be offered to patients suffering from cachexia only if the lower GI tract is working, otherwise PN is the method of choice (12). Patients appear to prefer a gastrostomy tube (such as a percutaneous endoscopic gastrostomy (PEG) to nasogastric tubes (NT) when possible. In high-risk patients prophylactic tube feeding may maintain nutritional status and avoid interruption of treatment (3). If the patient requires >4 weeks of enteral feeding, a PEG rather than NT is recommended. For patients requiring tube feeding, regular screening for and management of dysphagia is recommended along with encouragement and education of patients on how to maintain their swallowing function (3).

Parenteral nutrition should be supplied by an expert team and tailored to the individual patient's requirements (3, 12). *When oral nutrition remains inadequate despite counselling, oral nutritional supplements and enteral nutrition, parenteral nutrition may be needed.*

The proposed criteria for the escalation in nutritional measures are:

- 1) inadequate food intake (<50% of requirements) is anticipated for more than 10 days due to surgery or chemotherapy (CT)/radiotherapy (RT);
- 2) food intake is less than 50% of the requirement for more than one to two weeks;
- 3) it is anticipated that undernourished patients will not be able to eat/ absorb the adequate amount of nutrients for a long period time, due to treatments, and
- 4) the tumour mass itself impairs oral intake and food progression through the upper GI tract (22).

Box 6. Prevention of refeeding syndrome

If oral food intake has been decreased severely for a prolonged period of time it is necessary to increase nutrition slowly over several days and to take additional precautions to prevent a refeeding syndrome. ⁽³⁸⁾

Nutrition-impact symptom management (NIS)

Identifying nutrition-related symptoms, especially at an early stage during the cancer continuum, facilitates proactive malnutrition prevention (28), promotes recovery and quality of life, and improves prognosis (3). It is important to ensure that all patients with cancer have access to nutritional advice. Cancer nurses are in a great position to provide support and tailored information for people with cancer on how to manage nutrition-related challenges in the context of their daily lives.

People with cancer may develop side effects and treatment-related toxicities that have a negative effect on their ability to eat. Therefore, interventions for patients should be targeted at minimising the side effects related to treatments and finding strategies to improve food intake (25). Common side effects can be alleviated by targeted nursing interventions including nutritional advice, advice on self-management like mouth care, psychosocial support, patient education and coaching (12).

Eating well before, during and after treatment can help people with cancer feel better, stay stronger and alleviate symptoms from side effects of the treatments. Specific adverse effects of treatment include anorexia, early satiety, nausea and mucositis/esophagitis. In Table 4 and Figure 3, specific food and strategy tips are provided to manage symptoms that patients frequently encounter during treatment. The overall goal is to help the patient to manage their symptoms and to ensure calorific and protein nutrition goals (39) are met.

Table 1: The causes and management strategies for Nutrition Impact Symptoms (NIS) in cancer (12, 39, 40, 41, 42, 43, 44, 45, 47)

NIS	Various causes	Medical treatment	Nutritional strategies
Nursing interventions: <ul style="list-style-type: none"> To support and provide advice on how to make eating easier to prevent eating becoming a distressing factor To assist in food intake when needed and to support and advise on mouth care To assess and manage pain and gastrointestinal side-effects of treatments To provide nutritional advice, patient education and psychosocial support to people with cancer and their carers. 			
Loss of appetite (anorexia) Early satiety	Many systemic anticancer treatments (SACT) Radiotherapy (RT) Nausea Constipation Anxiety Cancer cachexia Terminal disease phase	Medications: Corticosteroids Progestins (megestrol acetate & medroxyprogesterone acetate) Nausea: antiemetic Constipation: laxatives ONS ([Medical] Oral Nutrition Supplement)	Eat small, frequent meals which contain energy-/protein-dense foods and fluids Eat small, frequent meals regularly and do not rely on hunger cues Maximise intake when most hungry Consume liquids between meals, and not with meals Eat slowly and chew well Oral nutrition support and appropriate ONS ([Medical] Oral Nutrition Supplement)
Nausea and vomiting (N&V)	SACT RT Constipation Post-surgery Anxiety Sub-acute or acute bowel obstruction	Antiemetics Treat cause – e.g. laxatives, medication alterations (timing, type and dose), bowel obstruction Timing of meals with the nausea medications (when effect is highest) Topical mouth care	Same advice as above Limit exposure to food smells Choose foods that are cool or at room temperature to minimise the smell Avoid any trigger foods

NIS	Various causes	Medical treatment	Nutritional strategies
Taste and flavour changes – can be described as “cardboard”, “metallic”, no taste, increased sensitivity	Very common due to SACT RT (especially head and neck RT patients)	Limited	Add more or less flavour to food Focus on easier-to-eat flavours (may be bland, sweet, tart) Offer different ONS flavours Use plastic cutlery to reduce metallic tastes Choose foods with different textures
Mucositis (inflammation/ulceration in the gastrointestinal system, Candida mucositis infections)	SACT/RT Dry mouth can also lead to oral mucositis	Smoking cessation for smokers Blood glucose check and appropriate treatment Topical mouthcare Topical coating Anti-fungal treatment Pain medication if needed ONS (Oral Nutrition Supplement) EN (enteral nutrition) or PN (parenteral nutrition) in extreme cases	Choose soft, cool or at-room-temperature foods Food texture modification Adequate hydration Avoid spicy and acidic foods as well as crunchy or hard-to-chew foods Incorporate extra moisture by adding sauces or gravies Oral nutrition support and appropriate ONS
Dysphagia	RT Cancer itself Terminal disease phase	Adequate pain assessment and treatment Need assessment of dysphagia care: Oesophageal dilation Oesophageal stent Referral to speech and language therapist	Texture change Liquid thickening powder Oral nutrition support and appropriate ONS prescribing EN – prophylactic / reactive PN in extreme cases

NIS	Various causes	Medical treatment	Nutritional strategies
Constipation	<p>Opiate-based analgesia</p> <p>Specific 5HT₃-receptor antagonist such as ondansetron can cause constipation (41)</p> <p>Some chemotherapy (e.g. vinca alkaloids)</p> <p>Peritoneal disease</p>	Laxatives/stool softeners	<p>Increase fibre (gradual introduction)</p> <p>Adequate hydration</p> <p>(Optimise physical activity)</p>
Diarrhoea	<p>SACT</p> <p>Pelvic/abdominal RT</p> <p>Immunotherapy-induced colitis</p> <p>Malabsorption (steatorrhoea)</p> <p>Bile acid diarrhoea (BAD)</p> <p>Faecal loading with overflow</p> <p>Existing condition – IBD/IBS</p> <p>Infection (neutropenia)</p>	<p>Medications:</p> <p>Anti-diarrhoeal (e.g. loperamide, codeine phosphate)</p> <p>Corticosteroids</p> <p>Pancreatic enzymes replacement therapy (PERT), (pancreatic enzymes are medical products, p.o. [per os])</p> <p>Bile acid sequestrant (group of resins used to bind certain components of bile in the gastrointestinal tract, p.o.)</p> <p>Other:</p> <p>SACT/RT dose reduction</p> <p>Antibiotics in case of bowel infection</p> <p>If immunotherapy-induced colitis check MDT guidelines for (42)</p>	<p>Optimising medications/bile acid sequestrant/PERT optimisation and timing</p> <p>Low fibre diets are not indicated in most cases including pelvic RT</p> <p>Fibre manipulation e.g. increase soluble fibre foods</p> <p>Support if previous IBS/IBD diagnosis</p> <p>Food diary</p> <p>Low-lactose trial (usually transient)</p> <p>Adequate hydration/ isotonic drinks (if indicated)</p> <p>Limit trigger foods – may include caffeine, alcohol, sorbitol</p> <p>Low fat diet if indicated and appropriate for BAD</p>
Hyperglycaemia	<p>Uncontrolled diabetes</p> <p>Undiagnosed diabetes</p> <p>Steroid-induced hyperglycemia/diabetes</p> <p>SACT, TKI</p>	Appropriate hypoglycemic medications	<p>Traditional “diabetic diet” usually not appropriate in these cases</p> <p>Carbohydrate awareness may help</p> <p>Appropriate guidance on hypoglycemia management if at risk</p> <p>Education and referral to diabetic counsellor when needed</p>

NIS	Various causes	Medical treatment	Nutritional strategies
Pain	Disease location Surgery RT Constipation	Adequate analgesia Treat cause	Assess pain and administer pain relief before meals if pain with eating/drinking Pain itself can cause anorexia so reassure patient adequate pain control can improve intake
Depression and/or anxiety	Diagnosis Treatments Disease progression Previously existing condition	Medications Appropriate therapy	Realistic nutrition goals Self-care through eating and drinking Optimise nutrition intake to meet person-specific needs

Frontline cancer nurses, who are involved in the direct provision of patient care, have a great opportunity to provide manageable and practical tips on nutrition. Often this can be enough to support appetite, nutritional status and prevent malnutrition in people with cancer (Figure 3). Through support and education, the cancer nurse can have a major impact on the patient's self-management regarding nutrition.

Figure 3. Practical 'food first' oral nutrition support tips ⁽⁴⁷⁾

Ideas to Boost Oral Intake (energy and protein)

If you're having... vegetables, mashed potatoes, beans or sauces

Add...

- Oil
- Whole milk or fortified milk
- Oil-based spread
- Cheese
- Egg (hard-boiled or added when making savoury sauces)

If you're having... snacks

- Nuts and seeds
- Fruit loaf with spread
- Wholemeal toast with nut butter and sliced banana
- Full-fat natural yoghurt with seeds and/or dried fruit
- Granola
- Nut bars
- Vegetable sticks or wholemeal pitta bread with houmous or guacamole
- An open sandwich or bagel with scrambled egg, tuna or salmon

If you're having... salads - Add...

- Avocado slices, nuts, seeds and pulses
- Oil-based dressings
- Oily fish, cooked lean meat or poultry
- Houmous
- New potatoes
- Hard-boiled egg
- A serving of bread (ideally wholemeal) with spread

If you're having... sandwiches, toast or crackers

Add...

- A thick layer of cream cheese, cottage cheese, nut butter or houmous
- A filling of sliced avocado and tuna or chicken

If you're having... puddings or breakfast cereals

Add...

- Nuts or seeds
- Dried fruit
- Banana
- Whole milk or fortified milk
- Greek or natural yoghurt

If you're having... casseroles, meat dishes or soups

Add...

- Lentils or beans
- Rice, noodles or pasta (ideally brown or whole wheat)
- More lean meat, fish or meat alternatives like tofu
- More oil when cooking
- Greek yoghurt or crème fraîche before serving
- A serving of bread (ideally wholemeal) or potatoes with spread

Cancer survivors

Cancer-related nutritional problems can have long-term clinical outcomes. Cancer is often associated with weight loss, however, there are an increasing number of patients beginning cancer treatment who are overweight or obese (5). It is important to note that malnutrition can occur at any weight and is often not noticed until more apparent in individuals of a higher weight (10).

Obesity, which is highly prevalent in some cancer patients and survivors, can also affect clinical outcomes during treatment by masking malnutrition and may be a risk factor for cancer recurrence and poorer survival in some cancers (39). However, overweight individuals are often diagnosed later when their cancer has further progressed so further research is needed on the link between weight and cancer outcomes.

Thus, it is important to identify those patients who may have challenges with regard to weight gain and comorbidities related to obesity already in the treatment phase of their care. The coaching of lifestyles such as healthy diet and exercise need to begin early (10).

Highlights for cancer nursing practice - treatment principles of malnutrition

- The main interventions include medical nutrition (ONS, EN, PN), nutrition counselling and advice, exercise and control of nutritional impact symptoms (NIS).
 - Common side effects caused by the treatment can be alleviated by targeted nursing interventions including non-pharmacological interventions, psychosocial support, patient education and coaching.
 - Oral over enteral and enteral over parenteral feeding is recommended.
 - Enteral nutrition is favoured for people with cancer, if their gastrointestinal tract is functional. However, parenteral nutrition may be needed if oral nutrition remains inadequate despite counselling, oral nutritional supplements and enteral nutrition.
 - Ongoing person-centred guidance remains an important element of nursing practice when supporting people after cancer treatment.
-
- Use a nursing approach that can proactively support patients' nutritional needs throughout the cancer care continuum.
 - Make sure you know the history of your patients; for example, diabetes and other comorbidities that can have an impact and need to be recognised in the care plan.
 - Map patient's nutritional habits before and during the treatment and cancer.
 - Recognise how patients feel, physically and emotionally, because it can have an impact on their eating, their nutritional status and development of malnutrition.
 - If problems exist, think about what could be the causes, support patient's involvement, find solutions together with the patient and motivate him/her for self-management.
 - Create a plan together with the patient and MDT.
 - Help the patient in eating when needed.
 - Advise the patient on how to improve fluid intake.
 - Include nutritional advice in discharge education, collaborate with primary and community care service providers and refer to social services and home care (i.e. meals at home) when needed.
 - Provide support and tailored information on how to manage nutrition-related challenges in the context of patients' daily lives.
 - Support and motivate patients to be physically active.

VI Nutrition recommendations to help people with cancer, in treatment and beyond, to eat well

As mentioned, appropriate and effective nutritional counselling, education and guidance are needed throughout the cancer continuum (39). Whilst malnutrition during cancer treatments is common, many patients tolerate treatment well and can eat “normally”. For others, malnutrition can be prevented or treated. People with cancer may require advice and support to eat well.

Nutritional strategies and diets that potentially allow better management of cancer have been widely investigated, however, few researchers have reached conclusive results (22). Being diagnosed with cancer may prompt an individual patient to make dietary changes, often called a “teachable moment” (48). Today, there are many popular diets that people living with cancer might be interested in, such as the isocaloric ketogenic diet (49). While some promising results have been reported (49), overall, these diets do not appear to be well adhered to and the benefits are not clear, with risks like malnutrition and treatment delays possible. Therefore, healthcare professionals should be aware of the mixed evidence for the effectiveness, tolerability and safety of ketogenic and other restrictive diets (49, 50). Furthermore, cancer nurses should refer patients who wish to try them to oncology specialist dietitians for specialist advice and monitoring.

Cancer survivors

Following treatment and throughout survivorship, people living with and beyond cancer are at risk of not following national nutrition guidelines for cancer survivors, which can affect recurrence and survival (39). Health promotion initiatives aimed at improving the well-being of people who have survived cancer are now essential to decrease comorbidities and improve quality of life (QoL). Therefore, dietary recommendations should include guidance on healthy eating for people who have survived cancer (10). Moreover, particular attention needs to be paid to long-term dietary advice in acknowledgement of the improved effectiveness of cancer treatment and the chronic nature of the condition (9). There is a growing interest in the potential of lifestyle factors, such as diet quality, as a way of reducing the late and long-term effects of cancer and its treatments (48). However, strong evidence on specific diets is still lacking.

Cancer survivors have not only an increased risk of secondary malignancies but also a higher incidence of comorbidities compared to the general population. To date, only little or no difference has been found between dietary intervention and risk of mortality or secondary malignancies. Thus, in promoting lifestyle behaviours, it is difficult to unravel the contributions of individual components to overall health and well-being and further research is needed (10).

Those who have survived cancer could potentially benefit from modifying their behaviour adherence to the recommendations for cancer prevention. ESPEN, WCRF and the European Code Against Cancer have similar advice including increasing fibre, more plant-based eating, avoiding processed meats and eating less red meat, limiting sugary drinks (10).

Box 8. ESPEN recommendations for cancer survivors ⁽³⁾

The ESPEN guidelines recommend

- Engagement in regular physical activity,
- Maintaining a healthy weight (BMI 18.5-25 kg/m²), and
- A healthy lifestyle with a diet based on vegetables, fruits and whole grains and low in saturated fat, red meat and alcohol.

Here are some key points related to nutrition and diet for cancer survivors:

Take action to maintain a healthy body weight: Remain physically active and have a healthy diet.

Have a healthy diet: Eat plenty of whole grains, pulses, vegetables and fruits. Limit high-calorie foods (foods high in sugar or fat) and avoid sugary drinks. Avoid processed meat, limit red meat and foods high in salt.

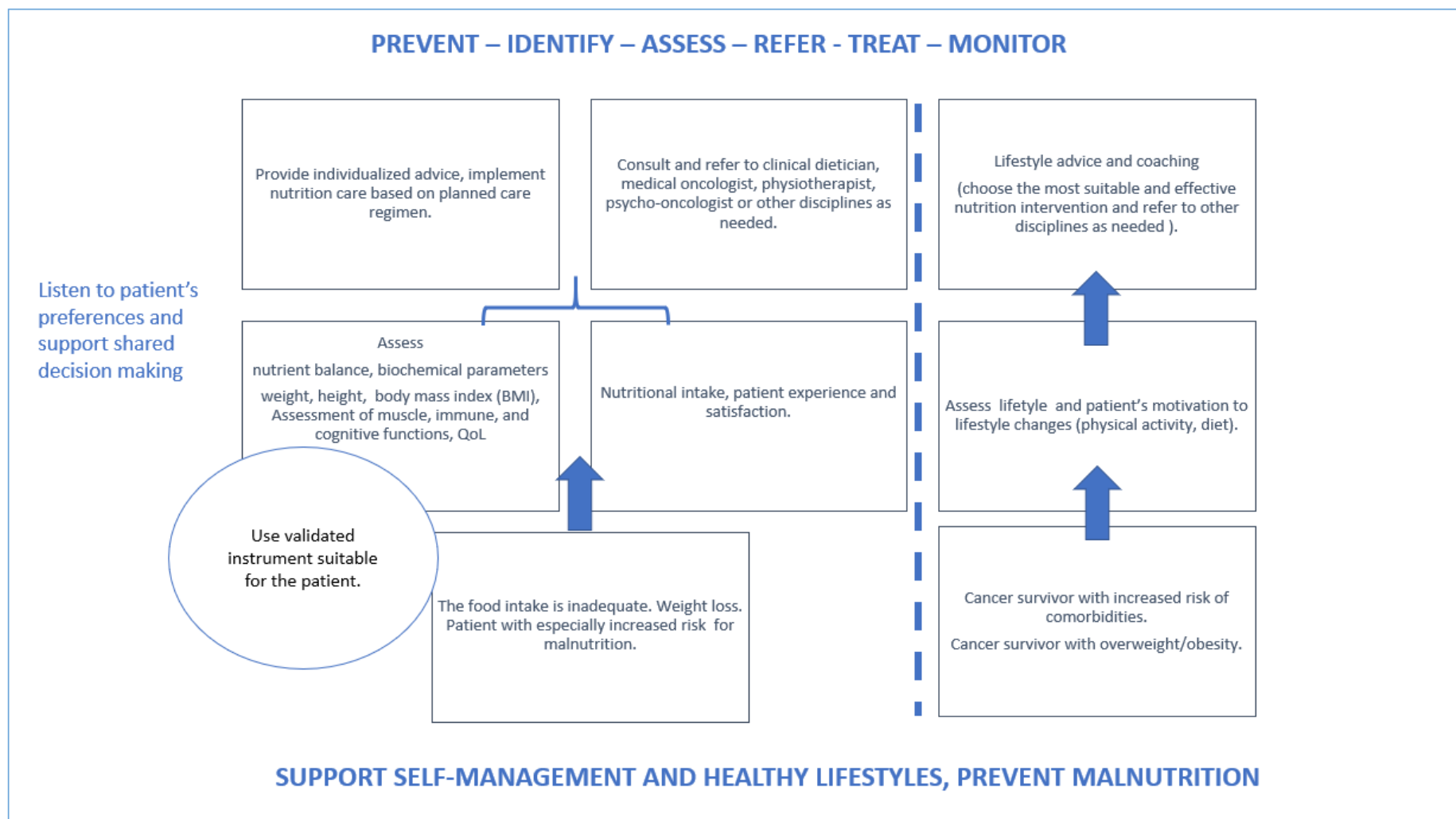
If you drink alcohol of any type, limit your intake. Not drinking alcohol is better for cancer prevention.

Many cancer survivors are at high risk of other chronic conditions (10) such as heart disease, therefore the recommendations on the amounts and types of fat, protein and carbohydrate to reduce cardiovascular disease risk are also appropriate for cancer survivors, especially if they are at or above their recommended body weight (51). Cancer survivors should maintain a healthy diet characterised by a high intake of fruits, vegetables, legumes, nuts and seeds and avoid processed and fast foods (51). Dietary supplements should only be considered in the case of nutrient deficiency (52). Cancer survivors should be encouraged to include foods that are rich in omega-3 fatty acids in the diet as this is associated with a lower risk of cardiovascular diseases and a lower overall mortality rate. The best choices for protein requirements are foods that are low in saturated fat and foods that are rich in essential nutrients, phytochemicals and fibre such as vegetables, fruits, whole grains, and legumes should form the majority of carbohydrate in the diet (51). Should a person have consequences of cancer treatment that might mean they struggle to implement these changes (such as stoma formation) they may benefit from a referral to a dietitian.

Highlights for cancer nursing practice - nutrition recommendations for people with cancer, in treatment and beyond for eating well

- Cancer survivors should maintain a healthy diet characterised by a high intake of fruits, vegetables, legumes, nuts and seeds and avoid processed and fast foods.
- Recognise that many patients tolerate treatment well and can eat “normally”.
- To change lifestyle is not easy and it can put pressure on the patient.
- Coach the patient together with dietitian in respect of their habits and find what are the achievable goals for the patient.
- Give people with cancer advice and support to eat well during treatments.
- Advise people who have survived cancer to follow the general recommendations for cancer prevention such as the European Code Against Cancer.

Figure 4. A framework on nursing practice in nutrition of people with cancer



This image shows a full page of blank handwriting practice paper. It features multiple sets of horizontal lines spaced evenly down the page. Each set typically consists of three lines: a top line, a middle baseline, and a bottom line, providing a guide for letter height and placement. The paper is otherwise completely empty, with no margins, text, or other markings.

American Cancer Society's recommendations for healthy nutrition
<https://www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention/guidelines.html>

ESMO cancer cachexia in adult patients: ESMO Clinical Practice Guidelines
[https://www.esmoopen.com/article/S2059-7029\(21\)00049-1/fulltext](https://www.esmoopen.com/article/S2059-7029(21)00049-1/fulltext)

ESPEN Guidelines on nutrition in cancer patients
<https://www.espen.info/wp/wordpress/wp-content/uploads/2016/11/ESPEN-cancer-guidelines-2016-final-published.pdf>

European Code Against Cancer
<https://www.europeancancerleagues.org/cancer-prevention-the-european-code-against-cancer/>

Macmillan Cancer Support
<https://www.macmillan.org.uk>

World Cancer Research Fund
<https://www.wcrf.org/> / <https://www.wcrf-uk.org/uk/here-help/eat-well-during-cancer/common-cancer-side-effects>

World Cancer Research Fund
<https://www.wcrf-uk.org/uk/preventing-cancer/cancer-prevention-recommendations>

Abbreviations

BAD	Bile acid diarrhoea
BMI	Body Mass Index
CACS	Cancer anorexia cachexia syndrome
EFAD	European Federation of the Association of Dietitians
EN	Enteral nutrition
EONS	European Oncology Nursing Society
ESPEN	European Society for Clinical Nutrition and Metabolism
GLIM	Global Leadership Initiative on Malnutrition
MDT	Multidisciplinary team
MNA	Mini Nutritional Assessment
MUST	Malnutrition Universal Screening Tool
NIS	Nutritional Impact Symptoms
NRS-2002	Nutritional Risk Screening
ONS	Oral Nutrition Supplements (ready-to-drink liquids or powders that can be prepared as drinks. Most commonly used as a supplement to normal foods.)
PERT	Pancreatic enzymes replacement therapy
PG-SGA	Patient-Generated Subjective Global Assessment
PN	Parenteral Nutrition
QoL	Quality of Life
REE	Resting Energy Expenditure
RT	Radiotherapy
SACT	Systemic AntiCancer Treatments
SNAQ	Short Nutritional Assessment Questionnaire

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