



**Evidence Based Practice
Guidelines for the Nutritional
Management of Patients
Receiving Radiation Therapy**



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Supplement

Evidence Based Practice Guidelines for the Nutritional Management of Patients Receiving Radiation Therapy

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Evidence based practice guidelines for the nutritional management of patients receiving radiation therapy

FOREWORD

These guidelines were developed following the publication of the *Evidence based guidelines for the nutritional management of cancer cachexia*. In workshops conducted around the country, many dietitians identified the need for guidelines on the management of malnutrition occurring with anticancer treatments. We have focused on radiation therapy treatment (patients may also be undergoing synchronous or sequential chemotherapy) for these guidelines as there have been several recent randomised controlled trials (RCTs) which have evaluated nutrition intervention. Studies evaluating the

nutritional management of patients receiving chemotherapy alone are not included as there are no recently published RCTs. The older evidence does not demonstrate benefits with respect to survival or tumour response; however, the ability to draw conclusions is difficult due to study design limitations.¹ When published nutrition RCTs in patients receiving chemotherapy become available these can be included in future reviews of these guidelines, and hence they will become broader guidelines for the nutritional management of patients receiving radiation therapy and/or chemotherapy treatment.

NHMRC levels of evidence (1999)

Level I	Evidence obtained from a systematic review of all relevant randomised controlled trials
Level II	Evidence obtained from at least one properly designed randomised controlled trial
Level III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)
Level III-2	Evidence obtained from comparative studies with concurrent control and allocation not randomised (cohort studies), case-control studies, or interrupted time series with a control group
Level III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel group
Level IV	Evidence obtained from case studies, either post-test or pre- and post-test.

NHMRC grades of recommendation (2005)

Level A	Body of evidence can be trusted to guide practice
Level B	Body of evidence can be trusted to guide practice in most situations
Level C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
Level D	Body of evidence is weak and recommendation(s) must be applied with caution.

EXECUTIVE SUMMARY

A Steering Committee of dietitians with clinical and research expertise has developed *Evidence based practice guidelines for the nutritional management of patients receiving radiation therapy*. The purpose of these guidelines is to provide dietitians in Australia and New Zealand with a summary of evidence based clinical questions related to the dietetic management of adult patients with cancer undergoing radiation therapy.

Key clinical questions have been developed for the stages of the Nutrition Care Process as described below:²

- Appropriate access to nutrition care
(nutrition screening; nutrition assessment; collection of evidence)
- Quality nutrition care—nutrition diagnosis, nutrition intervention
(establishing goals; prescription and implementation)
- Nutrition monitoring and evaluation—outcomes
(measuring and evaluating outcomes).

This best available evidence is presented and used as a basis for providing recommendations about clinical practice. The strength of the evidence was assessed using the level of evidence rating system recommended by the NHMRC publication, *A Guide to the Development, Implementation and Evaluation of Clinical Practice Guidelines* (1999).³

These guidelines have undergone peer and expert review in the form of several workshops to Australian and New Zealand dietitians and targeted stakeholder and expert

evaluation. These guidelines have been presented to a multidisciplinary audience including oncologists, surgeons, nurses, pharmacists, radiation therapists and speech pathologists attending the Australia and New Zealand Head and Neck Society and Clinical Oncological Society of Australia conferences in 2007. These guidelines have been endorsed by the Dietitians Association of Australia (DAA) and are available on the DAA website.

These guidelines provide the best available evidence and can be used as a framework to aid decision-making. However, they should be followed subject to the health professionals' judgement in each individual case and ideally used as part of a multidisciplinary approach.

The *Evidence based practice guidelines for the nutritional management of patients receiving radiation therapy* is intended to be reviewed every 3 years by the Steering Committee to ensure they remain current. The next review date is 2010. Subsequent reviews will include any published nutrition randomised controlled trials conducted in patients receiving chemotherapy resulting in a broadening of the guidelines to cover the nutritional management of patients receiving radiation therapy and/or chemotherapy. There may be the option to combine these guidelines with the cachexia guidelines to result in one broad set of nutrition and cancer guidelines. These guidelines will be available on the DAA website (<http://www.daa.asn.au>), in the Guidelines section, and will include extra information, e.g. full methodology, and will include future updates to the guidelines.

EVIDENCE BASED PRACTICE GUIDELINE FRAMEWORK

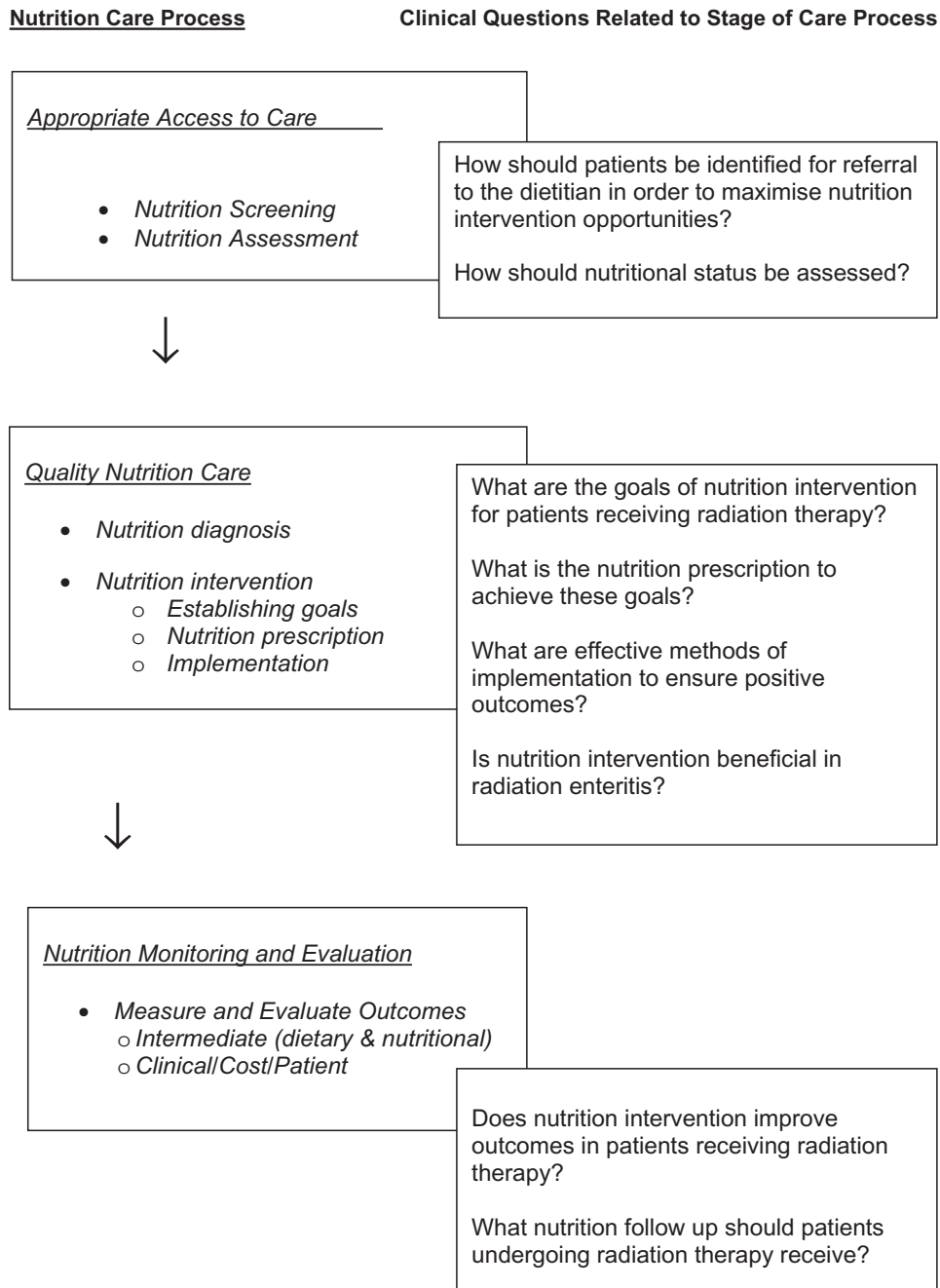


Figure 1 Framework for the development of Evidence based practice guidelines for the nutritional management of patients receiving radiation therapy (adapted from Lacey and Prichett² and Hakel-Smith and Lewis⁴).

SUMMARY OF EVIDENCE BASED RECOMMENDATIONS

The clinical questions and evidence based recommendations are listed under headings based on the nutrition care process. Full details of the evidence based statements are listed on pages S10–S15.

Appropriate access to care

Nutrition screening

Clinical question

How should patients be identified for referral to the dietitian (and/or nutrition support) in order to maximise nutrition intervention opportunities?

Evidence based recommendations

All patients receiving radiation therapy to the gastrointestinal tract (GIT) or head and neck area should be referred to the dietitian (and/or nutrition support).

NHMRC grade of recommendation: B

Patients receiving radiation therapy to the oesophageal or head and neck area should be referred prior to commencement of radiation therapy for consideration of a prophylactic gastrostomy/jejunostomy. Other patients at nutritional risk can be identified using a nutrition screening tool which has been validated in patients receiving radiation therapy (e.g. Malnutrition Screening Tool).⁵

NHMRC grade of recommendation: C

Nutrition assessment

Clinical question

How should nutritional status be assessed?

Evidence based recommendation

Validated nutrition assessment tools (e.g. scored Patient Generated-Subjective Global Assessment (PG-SGA)⁶ or Subjective Global Assessment (SGA)⁷ should be used to assess the nutritional status of patients receiving radiation therapy.

NHMRC grade of recommendation: B

Quality nutrition care

Nutrition intervention

Clinical question

What are the goals of nutrition intervention for patients receiving radiation therapy?

Evidence based recommendation

Aim to minimise weight loss and maintain quality of life and symptom management in patients receiving radiation therapy.

NHMRC grade of recommendation: C

Clinical question

What is the nutrition prescription to achieve these goals?

Evidence based recommendation

Aim for energy and protein intakes of at least 125 kJ/kg/day and 1.2 g protein/kg/day in patients receiving radiation therapy. Patients should have their weight and food/energy intake monitored regularly to determine whether their energy requirements are being met.

NHMRC grade of recommendation: C

Clinical question

What are effective methods of implementation to ensure positive outcomes?

Evidence based recommendations

Dietary counselling and/or supplements are effective methods of nutrition intervention, and frequent (at least fortnightly) dietitian contact improves outcomes in patients receiving radiation therapy.

NHMRC grade of recommendation: A

Currently there is no clear evidence to identify patients who would benefit from a prophylactic gastrostomy/jejunostomy.

However, there is some evidence to support that certain oesophageal and head and neck cancer patients and/or those undergoing chemo-radiation would benefit from a prophylactic gastrostomy/jejunostomy. Identify patients who may require a prophylactic gastrostomy/jejunostomy and advocate for placement prior to treatment. For patients not tolerating adequate intake orally, nutrition support using tube feeding can help minimise weight loss.

NHMRC grade of recommendation: C

Clinical question

Is nutrition intervention beneficial in preventing or treating radiation enteritis?

Evidence based recommendations

Currently there is no clear evidence for the management of radiation enteritis due to the small number of studies and varied study designs. There is some evidence, however, supporting individualised dietary counselling.

Nutrition monitoring and evaluation

Clinical question

Does nutrition intervention improve intermediate (dietary and nutritional) outcomes in patients receiving radiation therapy?

Evidence based recommendations

Regular nutrition intervention (dietary counselling and/or supplements) improves energy and protein intake and nutritional status during radiation therapy.

NHMRC grade of recommendation: A

Nasogastric tube (NGT) and percutaneous endoscopic gastrostomy (PEG) feeding are effective in achieving higher protein and energy intakes and weight maintenance in head and neck cancer patients undergoing radiation therapy compared with oral intake alone. The method of feeding (NGT vs PEG) should therefore reflect the anticipated length of feeding required.

NHMRC grade of recommendation: B

Clinical question

Does nutrition intervention improve cost outcomes in patients receiving radiation therapy?

Evidence based recommendation

Nutrition intervention reduces treatment breaks and unplanned hospital admissions resulting in decreased costs compared with usual care.

NHMRC grade of recommendation: C

Clinical question

Does nutrition intervention improve patient-centred outcomes in patients receiving radiation therapy?

Evidence based recommendations

Nutrition intervention (dietary counselling and/or supplements) during and post radiation therapy improves patient-centred outcomes (quality of life, physical function and patient satisfaction).

NHMRC grade of recommendation: B

Nutrition support via gastrostomy/jejunostomy for head and neck cancer patients during radiation therapy improves patient-centred outcomes (quality of life) compared with oral diet alone.

NHMRC grade of recommendation: C

Clinical question

What nutrition follow up should patients undergoing radiation therapy receive?

Evidence based recommendations

In the short term, nutrition follow up is recommended for approximately six weeks post radiation therapy. In the long term, a minimum of six-month follow up is recommended for patients who require alternative feeding during radiation therapy. Oral rehabilitation and preventing gastrostomy/jejunostomy dependency, as well as managing late side-effects impacting on nutritional status, should be considered.

NHMRC grade of recommendation: D

1: INTRODUCTION AND BACKGROUND

1.1 Purpose and scope

The purpose of these guidelines is to provide dietitians in Australia and New Zealand with a summary of evidence based clinical questions related to the dietetic management of adult patients with cancer undergoing radiation therapy. For patients with cancer cachexia (clinical signs of anorexia, muscle wasting and weight loss of $\geq 5\%$ over six months not attributable to inadequate intake alone) refer to the publication, *Evidence based guidelines for the nutritional management of cancer cachexia*.⁸ Weight loss due to mechanical obstruction or radiation therapy side-effects, which would be expected to resolve once the obstruction is bypassed/removed or treatment ceased, should not be classified as cachexia and is covered by these radiation therapy guidelines.

The *Evidence based practice guidelines for the nutritional management of patients receiving radiation therapy* are focused on cancer types and patient populations at risk of unintentional weight loss. Radiation therapy is unique in that it takes a couple of weeks for side-effects to develop, they peak about two-thirds of the way through treatment and can continue for several weeks after the completion of radiation treatment. As outlined in these guidelines, all patients should be screened for nutritional risk to identify any individuals experiencing problems. Some patients may currently be well nourished but because they are undergoing treatment which is likely to result in nutritional problems it is recommended they receive an assessment by the dietitian. These guidelines therefore may not directly apply to patients who are generally not at nutritional risk, i.e. breast or prostate cancer. For these patients, nutritional goals during treatment should be firstly to maintain weight (prevent weight gain) and eat a healthy, well-balanced diet with additional strategies for managing symptoms of treatment as appropriate.⁹ After completing treatment, cancer survivors should aim to maintain a healthy weight and lifestyle.⁹ The World Cancer Research Fund (WCRF)¹⁰ report recommends that all cancer survivors receive nutritional care from an appropriately trained professional (physician and/or qualified nutrition professional) if able to do so, and unless otherwise advised, aim to follow the recommendations for diet, healthy weight and physical activity. The guidelines also state that the evidence does not support the use of high-dose supplements of micronutrients as a means of improving outcomes in people with a diagnosis of cancer.¹⁰ There is some evidence (NHMRC grade of recommendation: C) for the use of fish oil such as eicosapentaenoic acid (EPA) in patients experiencing cancer cachexia. For further details refer to the publication, *Evidence based guidelines for the nutritional management of cancer cachexia*.⁸ There is no evidence that patients receiving radiation therapy without any indication of cancer cachexia would benefit from EPA supplementation. Useful resources for people with cancer are included in Appendix I.

The goal of the nutritional management of patients receiving radiation therapy is to improve dietary intake and main-

tain quality of life and physical function. It is not anticipated that nutrition therapy will impact on tumour response or survival (level I evidence,¹¹ level IV evidence¹²) although the evidence is conflicting (level IV evidence¹³⁻¹⁴). Future research in this area should measure loco-regional control and mortality as outcomes.

The goals and outcomes of nutrition intervention will be dependent on the diagnosis and prognosis of the patient. For patients with end-stage disease the desired outcome is to maximise patient comfort and quality of life. The dietitian should liaise with patient/family/carers and the medical team to determine the level of intervention required. For comfort measures refer to the DAA paper: *Nutrition priorities in palliative care of oncology patients*.¹⁵

Dentition, symptom and pain management should be managed by the multidisciplinary team, e.g. dentists, nurses and speech pathologists. Patients experiencing dysphagia and/or salivary dysfunction need to receive review and follow up with the speech pathologist as required, which are not specifically detailed in these guidelines. The role of exercise and pharmacological agents on outcomes in patients receiving radiation therapy are also beyond the scope of these guidelines.

Patients who cannot manage adequate dietary intake may require tube feeding depending on their prognosis and in consultation with the patient, their carers and medical team. It is important to consider any potential complications of tube feeding. Numerous level IV studies have reported success rates of $\geq 97\%$ for percutaneous endoscopic gastrostomy (PEG) placement in head and neck cancer patients (level IV¹⁶⁻²⁰). Minor complications from PEG placement range from 4% to 22% (level IV (n = 92),²¹ level IV (n = 79),²² respectively) with the minor complications being site infection, site bleeding, leaking, cellulitis, PEG obstruction and extrusion. Major complications range from 0 to 8% (level IV (n = 277),²³ level IV (n = 79),²² respectively), where the complications were necrosis, abscess and PEG site metastasis. Procedure-related mortality was 0–1% (level IV (n = 277),²³ level IV (n = 118),¹⁷ respectively).

Literature searches for tube feeding in cancer primarily resulted in reports for head and neck cancer, with a small number for oesophageal cancer. Therefore, some of the recommendations are specific for head and neck cancer due to the lack of evidence for other patient groups. The enteral formulas used in the studies, when specified, were standard formulas (4.2 kJ/mL, 16–17% of energy from protein \pm fibre).

Patients with comorbidities must be managed in the context of their comorbidities, and nutritional management should be individualised and subject to the health professional's judgement in each individual case. In these guidelines, *prophylactic* gastrostomy/jejunostomy refers to using a gastrostomy/jejunostomy for patients who currently do not require tube feeding and are well nourished, but are anticipated to require it during treatment. Patients who present as malnourished should receive appropriate nutrition intervention, whether this is through counselling, supplements or tube feeding.

1.2 Consultation process

A Steering Committee of dietitians with clinical and research expertise in the nutritional management of patients receiving radiation therapy and evidence based guideline development was convened in 2006. The committee produced the first draft of the clinical practice guidelines in March 2007. The draft was modelled on other guidelines developed for the nutritional management of disease. A statistician was consulted to clarify issues related to levels of evidence and incorporation of evidence from post-hoc analyses of randomised trials. In particular consultation was required on systematic reviews and guidelines which incorporated a range of studies with varying levels of evidence. For example, the systematic review by Trotti *et al.*²⁴ included some RCTs investigating mucositis treatment (level II studies) but most of the studies reported weight loss as a 'by-product' of the main investigation and therefore are observational studies (level IV) which has implications depending on the clinical question to be answered.

A workshop of dietitians was convened at the Queensland Professional Development Day (23 March 2007) to consider the draft guidelines and provide peer review. The 15 participants evaluated the guidelines and provided feedback using the evaluation form provided.

Participant feedback from the workshop and consumer feedback, which was arranged through the Queensland Cancer Council, were incorporated into a second draft. These draft guidelines were then distributed to all previous workshop participants, DAA oncology experts, the DAA oncology interest group, international dietitians who had expressed an interest in participation, oncologists, nurses, speech pathologists and other professionals working in the area of cancer for targeted peer and expert evaluation and feedback. This draft was also presented and evaluated at a workshop for oncology dietitians in Auckland, New Zealand in June 2007. These guidelines have been presented to a multidisciplinary audience including oncologists, surgeons, nurses, pharmacists, radiation therapists and speech pathologists attending the Australia and New Zealand Head and Neck Society and Clinical Oncological Society of Australia conferences in 2007. Participant feedback from the workshop and peer and expert review (40 evaluations) were incorporated into a third draft. Participant feedback was incorporated into the final document, which was submitted to the DAA Practice Advisory Committee and the DAA Board for endorsement.

1.3 Methods

1.3.1 Framework

In the development of these guidelines for dietitians, the approach taken has combined the requirement for evidence in answering clinical questions but integrating the evidence into a recognised nutrition model of care (Figure 1). Lacey and Pritchett¹ refer to the Nutrition Care Model; a trigger event which identifies where and how the patient/client is

identified for nutrition care; the nutrition care process which specifies the cycle of essential components of effective care; and the nutrition-related outcomes, which lists the most likely areas to observe results produced by or influenced by nutrition care:

- Appropriate access to nutrition care (*nutrition screening; nutrition assessment; collection of evidence*)
- Quality nutrition care—nutrition diagnosis, nutrition intervention (*establishing goals; prescription and implementation*)
- Nutrition monitoring and evaluation—outcomes (*measuring and evaluating outcomes*).

Although the nutrition care process is common to the nutritional management of many clinical conditions, in these guidelines the questions developed and the outcomes measured are specific to the nutritional management of patients receiving radiation therapy. In areas where radiation therapy-specific data are lacking, results from studies of other groups of patients with cancer have been included, and identified as such.

1.3.2 Literature search

The Cochrane Database of Systematic Reviews, CENTRAL, MEDLINE (via Ovid), EMBASE, CINAHL (Ebscohost) and PubMed databases were searched in March 2006 and repeated in March 2007. Approximately 50 suitable articles relating to nutrition intervention in radiation therapy were identified. Search terms included radiotherapy, radiation therapy, nutrition support, dietary interventions, enteral nutrition, gastrostomy/jejunostomy, clinical and randomised controlled trials. There was no restriction on dates of publication. Non-English, paediatric and case report papers were excluded. Relevant recent articles and articles from other reference lists ($n = 11$) were also added to the list. The search terms and the respective results for each of the databases are available for review. Each article was appraised independently by at least two members of the Steering Committee. Please refer to the web-based version of these guidelines for a more detailed methodology.

1.3.3 Literature critique

This best available evidence is presented and used as a basis for providing recommendations about clinical practice. The strength of the evidence was assessed using the level of evidence rating system recommended by the NHMRC publication, *A Guide to the Development, Implementation and Evaluation of Clinical Practice Guidelines*.³ A table was developed to collate the evidence for screening, assessment, intervention, monitoring and evaluation against key outcome indicators. Levels of evidence, quality of study design, the strength of the effect and relevance to practice were considered in ranking the evidence.

The evidence rating classifications used in the guidelines are as follows:

Level I	Evidence obtained from a systematic review of all relevant randomised controlled trials
Level II	Evidence obtained from at least one properly designed randomised controlled trial
Level III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)
Level III-2	Evidence obtained from comparative studies with concurrent control and allocation not randomised (cohort studies), case-control studies, or interrupted time series with a control group
Level III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel group
Level IV	Evidence obtained from case studies, either post-test or pre- and post-test.

For intervention studies, level I is recommended as the gold standard. Clinical nutrition studies are difficult to complete in a blinded fashion and often the group most likely to benefit from the intervention is excluded for ethical reasons. For these reasons, recommendations based on lower levels of evidence but with strong design quality, strength of effect and relevance are included.

NHMRC Additional Levels of Evidence and Grades of Recommendations for Developers of Guidelines—Pilot Program 2005 were used to assess the body of evidence and provide an indication to the strength of each guideline recommendation.²⁵

The grades of recommendation are:

Level A	Body of evidence can be trusted to guide practice
Level B	Body of evidence can be trusted to guide practice in most situations
Level C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
Level D	Body of evidence is weak and recommendation(s) must be applied with caution.

The five components that are considered in judging the body of evidence are the volume of evidence, consistency of the results, potential clinical impact of the proposed recommendation, the generalisability and applicability of the body of evidence to the Australian health-care context. A recommendation cannot be graded as A or B unless the volume and consistency of the evidence components are both graded A or B.

1.4 Addressing potential barriers and evaluation of guidelines

The guidelines recommend intensive dietary counselling which may include the use of supplements. Patients at high

nutritional risk may require tube feeding. These recommendations have potential resource implications that may include change to staff roles, extra staff and increased use of supplements or tube feeding. Therefore, when using these guidelines the potential organisational and cost barriers need to be considered. A series of workshops will be conducted around Australia by members of the Steering Committee on how to implement the guidelines using worked examples on addressing potential organisational and cost barriers. Prior to the 2010 guideline review, an evaluation of the guidelines and rates of implementation will be conducted among DAA Oncology Interest Group members using a structured questionnaire.

1.5 Review process

The guidelines are intended to be reviewed every 3 years to ensure they remain current and that the evidence is considered in the context of the evolving nature of radiation therapy techniques. Nutrition RCTs conducted in patients receiving chemotherapy published after the original development of these guidelines will be included in the review process and hence it is anticipated that these guidelines will eventually relate to the nutritional management of patients with cancer (therefore combining cachexia and radiation therapy guidelines and possibly including chemotherapy if more papers are published in this area). Responsibility for the review lies with the guideline Steering Committee. Next review date: 2010. The guidelines, including full methodology, are included on the DAA website (<http://www.daa.asn.au>) under the Guidelines section.

1.6 Editorial independence

The guidelines were developed without the assistance of external funding. Where guideline development team members were authors of a published article, other team members of the guideline Steering Committee evaluated the article for levels of evidence. Guideline development team potential conflict of interest declarations for conference attendance includes: J Bauer (Abbott, 2006; Nutricia, 2007; Novartis, 2007) and E Isenring (Nutricia, 2007). S Ash, T Brown, J Hill, K Kaegi, M Reeves and S Thomas did not declare any potential conflict of interest.

2: CLINICAL QUESTIONS AND EVIDENCE BASED STATEMENTS

Appropriate access to care

Nutrition screening and referral

Clinical question

1. How should patients be identified for referral to the dietitian (and/or nutrition support) in order to maximise nutrition intervention strategies?

Recommendation

All patients receiving radiation therapy to the GIT or head and neck area should be referred to the dietitian (and/or nutrition support).

NHMRC grade of recommendation: B

Patients receiving radiation therapy to the oesophageal or head and neck area should be referred prior to commencement of radiation therapy for consideration of a prophylactic gastrostomy/jejunostomy. Other patients at nutritional risk can be identified using a nutrition screening tool which has been validated in patients receiving radiation therapy (e.g. MST).

NHMRC grade of recommendation: C

Evidence based statements

All patients receiving radiation therapy to the GIT or head and neck should be referred to the dietitian for nutrition support

Level of evidence
II^{26–29}

Patients receiving radiation therapy to the oesophageal or head and neck area should be referred prior to commencement of radiation therapy for consideration of prophylactic gastrostomy/jejunostomy (for more information on prophylactic PEGs refer to page S11–S12)

IV^{30,34,35,21,37}
III-2^{31,36}
III-3^{32,33}
II²⁴

The Malnutrition Screening Tool (MST) is a valid and reliable tool for identifying nutritional risk when compared with a full nutrition assessment (Subjective Global Assessment (SGA)) in patients receiving radiation therapy

III-3⁵

Nutrition assessment

Clinical question

2. How should nutritional status be assessed?

Recommendation

Validated nutrition assessment tools (e.g. scored PG-SGA, SGA) should be used to assess the nutritional status of patients receiving radiation therapy.

NHMRC grade of recommendation: B

Evidence based statements

Subjective Global Assessment (SGA) is a valid method for assessing nutritional status of patients with cancer

Level of evidence
III-3³⁸

The scored Patient Generated-Subjective Global Assessment (PG-SGA) is a valid method for assessing nutritional status of patients with cancer

III-3^{39–42}

Skinfolds such as Tricep Skinfold (TSF), Mid-arm Muscle Circumference (MAMC) and Corrected Arm Muscle Area (CAMA) can be used to record anthropometric measures over time; however, reliable and valid skinfold measurements are relatively difficult and training is needed. Reference percentile data are available at the population level but not specifically for oncology patients

III-3^{43,44}

Hand grip strength indicates muscle mass and predicts postoperative complications in patients with oral and maxillofacial cancer

III-3⁴⁵

Bioelectrical impedance analysis of total body water is not suitable for use in individuals with cancer but is acceptable when determining differences between groups of patients receiving radiation therapy

III-3²⁷

Using the raw data from bioelectrical impedance analysis, e.g. vector or phase angle analysis, is useful for determining changes in body composition over time

III-3⁴⁶

Quality nutrition care

Nutrition intervention

Clinical question

3. What are the goals of nutrition intervention for patients receiving radiation therapy?

Recommendation

Aim to minimise weight loss and maintain quality of life and symptom management in patients receiving radiation therapy.

NHMRC grade of recommendation: C

Evidence based statements

Weight maintenance leads to beneficial nutritional status, physical function and quality of life outcomes and is an appropriate aim of nutritional support during radiation therapy

Level of evidence
II²⁷

Clinical question

4. What is the nutrition prescription to achieve these goals?

Recommendation

Aim for energy and protein intakes of at least 125 kJ/kg/day and 1.2 g protein/kg/day in patients receiving radiation therapy. Patients should have their weight and food/energy intake monitored regularly to determine whether their energy requirements are being met.

NHMRC grade of recommendation: C

Evidence based statements

Cancer patients undergoing radiation therapy, who maintained weight, consumed a minimum of 125 kJ/kg/day (30 kcal/kg/day) and 1.2 g/kg/day of protein. Attaining a protein intake of 1.5 g/kg/day may be unrealistic for some patients

Level of evidence
III-2²⁶

Resting energy expenditure ranged from 70 to 125 kJ/kg/day (17 to 30 kcal/kg/day) for head and neck cancer patients receiving chemo-radiation

III-3⁴⁷

Resting energy expenditure of cancer patients with solid tumours undergoing anticancer therapies is highly variable, with some patients classified as hypermetabolic, some hypometabolic and some normometabolic

III-2⁴⁸

Clinical question

5. What are effective methods of implementation to ensure positive outcomes?

Recommendations

General:

Dietary counselling and/or supplements are effective methods of nutrition intervention, and frequent (at least fortnightly) dietitian contact improves outcomes in patients receiving radiation therapy.

NHMRC grade of recommendation: A

Tube feeding:

Currently there is no clear evidence to identify patients who would benefit from a prophylactic gastrostomy/jejunostomy. However, there is some evidence to support that certain oesophageal and head and neck cancer patients and/or those undergoing chemo-radiation would benefit from a prophylactic gastrostomy/jejunostomy. Identify patients who may require a prophylactic gastrostomy/jejunostomy and advocate for placement prior to treatment. For patients not tolerating adequate intake orally, nutrition support using tube feeding can help minimise weight loss.

NHMRC grade of recommendation: C

Evidence based statements

General

Nutrition support (dietary counselling and/or supplements) improves dietary intake in patients receiving radiation therapy

Level of evidence

I¹¹
II^{26,28,29,49-51}

Frequent dietitian contact (minimum fortnightly) improves intermediate outcomes in patients receiving radiation therapy to the GIT or head and neck area

II²⁷⁻²⁹

Pretreatment assessment and weekly dietitian review for oesophageal cancer patients receiving chemo-radiation therapy improves nutritional status and treatment tolerance

III-3³²

Tube feeding

Pretreatment PEG insertion results in earlier commencement of nutrition support	IV ³²
• Head and neck cancer patients who undergo chemo-radiation or radiation therapy regimes that induce grade 3–4 mucositis are more likely to require feeding tubes and lose weight	IV ²⁴
• Head and neck cancer patients who undergo synchronous chemo-radiation (instead of radiation therapy or sequential chemotherapy and radiation therapy) experience greater weight loss	III-2 ³⁶ IV ³⁵
• Head and neck cancer patients who present with cancer of the nasopharynx, pharynx or base of tongue, and/or have T4 tumours and/or weight loss at presentation are likely to require tube feeding	III-2 ³¹ IV ^{21,35,37}
• Oesophageal cancer patients presenting with severe nutrition risk factors (severe dysphagia, i.e. puree/fluids only, and/or body mass index < 18 kg/m ² , and/or unintentional weight loss >10%) are likely to require tube feeding	III-3 ³²
• Head and neck cancer patients who undergo preoperative radiation followed by reconstructive surgery with a pectoralis major flap, particularly in the oropharyngeal area, are more likely to require a gastrostomy	III-3 ³³
• Head and neck cancer patients with stage IV disease are more likely to require feeding tubes	IV ^{30,34,37}
• Head and neck cancer patients undergoing combined surgery and radiation therapy have an increased risk of requiring prolonged feeding tubes	IV ³⁷

Clinical question

6. Is nutrition intervention beneficial in preventing or treating radiation enteritis?

Recommendation

Currently there is no clear evidence for the management of radiation enteritis due to the small number of studies and varied study designs. There is some evidence, however, supporting individualised dietary counselling.

Evidence based statements

There is no clear evidence for specific dietary modifications (e.g. elemental diets, etc.) in the nutritional management or prevention of radiation enteritis	<i>Level of evidence</i> III ³³
Symptom-induced morbidity is lower in colorectal cancer patients receiving preoperative chemo-radiation therapy who receive dietary counselling compared with usual care	II ²⁸

Nutrition monitoring and evaluation

Intermediate outcomes

Clinical question

7. Does nutrition intervention improve **intermediate (dietary and nutritional) outcomes** in patients receiving radiation therapy?

Recommendation

General:

Regular nutrition intervention (dietary counselling and/or supplements) improves energy and protein intake and nutritional status during radiation therapy.

NHMRC grade of recommendation: A

Tube feeding:

NGT and PEG feeding are effective in achieving higher protein and energy intakes and weight maintenance in head and neck cancer patients undergoing radiation therapy compared with oral intake alone. The method of feeding (NGT vs PEG) should therefore reflect the anticipated length of feeding required.

NHMRC grade of recommendation: B

Evidence based statements

<i>General</i>	<i>Level of evidence</i>
Supplements improve total energy intake in radiation therapy patients	I ¹¹ II ^{27–29}
Both dietary counselling and supplements increase protein and energy intake during radiation therapy compared with ad lib diet, with dietary counselling producing greater benefits in the medium term (three months post radiation therapy) than simply providing supplements	II ^{28,29}
Early and intensive nutrition intervention minimises weight loss and deterioration in nutritional status	II ²⁷

Both dietary counselling and supplements improve energy intake and protein intake during radiation therapy. Dietary counselling based on regular foods was of similar or higher benefit. Supplements alone were not as effective as dietary counselling	II ^{28,29}
Both dietary counselling and supplements improve nutritional status in patients by the end of radiation therapy. Dietary counselling improves or maintains nutritional status better than supplements or ad lib diet at three months post radiation therapy	II ^{28,29}
Nutrition intervention leads to improved dietary energy and protein intake when compared with standard practice	II ²⁶
Supplements increase energy and protein intake compared with no nutritional supplements, but does not lead to weight gain	II ⁴⁹
Patients who receive supplements during radiation therapy gain weight compared with usual care (without supplements)	II ⁵⁴
Supplements + dietary counselling increases energy and protein intake compared with no dietary counselling	II ⁵⁰
Intensive nutrition intervention in oesophageal cancer patients receiving chemo-radiation therapy minimises weight loss compared with standard care	III-3 ³²
<i>Tube feeding</i>	
Tube-fed head and neck cancer patients maintain higher energy and protein intake during radiation therapy compared with patients consuming oral nutrition	II ⁵⁵
Nasogastric feeding in Stage III–IV head and neck cancer patients undergoing radiation therapy achieves higher energy and protein intakes than patients consuming an oral diet	II ⁵⁶
PEG-fed patients with advanced head and neck cancer experience less weight loss at the end of a course of radiation therapy versus oral diet	III-2 ⁵⁷
Patients with cancer of the oesophagus receiving nasogastric feeding have significantly less weight loss during chemo-radiation compared with a standard oral diet	III-2 ⁵⁸
Patients with head and neck cancer increased or maintained their weight with prophylactic tube feeding	IV ⁵⁹
NGT and PEG feeding are equally effective in preserving weight in head and neck cancer patients undergoing radiation therapy	III-2 ⁶⁰
Oropharyngeal cancer patients given pretreatment PEGs have significantly less weight loss at the end of radiation therapy compared with oral diet	III-3 ⁶¹
Weight loss during treatment of head and neck cancer will be lower if tube feeding is commenced prior to treatment, rather than the non-elective commencement during treatment	IV ^{21,30,62} III-3 ⁶³
Stage IV head and neck cancer patients undergoing twice daily radiation therapy or chemo-radiation with prophylactic PEGs have significantly less weight loss compared with oral diet	IV ¹²
Head and neck cancer patients given pretreatment tube feeding have significantly less severe weight loss during treatment compared with oral diet	IV ²¹
NGT and PEG feeding are equally effective in preserving weight in head and neck cancer patients undergoing twice daily radiation therapy + chemotherapy, although NGT feeding leads to more mechanical failure and aspiration pneumonia	IV ⁶⁴

Cost outcomes

Clinical question

8. Does nutrition intervention improve **cost outcomes** in patients receiving radiation therapy?

Recommendation

Nutrition intervention reduces treatment breaks and unplanned hospital admissions resulting in decreased costs compared with usual care.

NHMRC grade of recommendation: C

Evidence based statements

Level of evidence

General

Patients who receive supplements during radiation therapy are less likely to have interruptions to radiation therapy compared with usual care (without supplements) in T3 and 4 head and neck cancer II⁵⁴

Patients with oesophageal cancer receiving chemo-radiation therapy who receive intensive nutrition intervention have less unplanned hospital admissions, reduced length of stay for unplanned hospital admissions and are more likely to complete planned radiation dose III-3³²

Tube feeding

Upper gastrointestinal cancer patients receiving tube feeding have a decreased requirement for re-hospitalisation compared with those not receiving tube feeding III-2⁶⁵

Oropharyngeal cancer patients given pretreatment PEGs have significantly fewer hospital admissions for dehydration during radiation therapy III-3⁶¹

Unplanned treatment breaks are not significantly different in prophylactic PEGs versus oral diet IV¹²

Unplanned treatment breaks are lower in head and neck cancer patients who commenced nutrition support before treatment or during the first week of radiation therapy and chemotherapy, compared with oral diet alone IV⁶⁶

Stage IV head and neck cancer patients undergoing twice daily radiation therapy or chemo-radiation with prophylactic PEGs have significantly fewer hospital admissions for malnutrition or dehydration IV¹²

Oesophageal cancer patients given a pretreatment PEG are significantly more likely to reach target chemo-radiation dose IV¹³

Patient-centred outcomes

Clinical question

9. Does nutrition intervention improve **patient-centred outcomes** in patients receiving radiation therapy?

Recommendation

General:

Nutrition intervention (dietary counselling and/or supplements) during and post radiation therapy improves patient-centred outcomes (quality of life, physical function and patient satisfaction).

NHMRC grade of recommendation: B

Tube feeding:

Nutrition support via gastrostomy/jejunostomy for head and neck cancer patients during radiation therapy improves patient-centred outcomes (quality of life) compared with oral diet alone.

NHMRC grade of recommendation: C

Evidence based statements

Level of evidence

General

Dietary counselling improves global quality of life immediately and three months post radiation therapy compared with supplements alone II^{28,29}

Dietary counselling and supplements improve functional quality of life immediately post radiation therapy compared with ad lib diet II^{28,29}

Symptom induced morbidity is lower in patients receiving dietary counselling compared with usual care II^{28,29}

Both dietary counselling and supplements improve quality of life during radiation therapy. Dietary counselling based on regular foods was of similar or higher benefit. Supplements alone were not as effective as dietary counselling II^{28,29}

Early and intensive nutrition intervention minimises deterioration in global quality of life and physical function	II ²⁷
Early and intensive nutrition intervention leads to greater patient satisfaction than usual care during radiation therapy	II ⁶⁷
<i>Tube feeding</i>	
Patients with advanced head and neck cancer maintain quality of life with gastrostomy/jejunostomy feeding during radiation therapy, whereas quality of life decreased significantly in the oral diet group	III-2 ⁵⁷
Patients with advanced head and neck cancer given a gastrostomy/jejunostomy within two weeks of commencing radiation therapy have significantly better quality of life in the domains of work, appetite and strength compared with oral diet, but not in the domains of pain or satisfaction	III-2 ⁶⁸

Clinical question

10. What nutrition follow up should patients undergoing radiation therapy receive?

Recommendation

In the short term, nutrition follow up is recommended for approximately six weeks post radiation therapy. In the long term, a minimum of six-month follow up is recommended for patients who require alternative feeding during radiation therapy. Oral rehabilitation and preventing gastrostomy/jejunostomy dependency, as well as managing late side-effects impacting on nutritional status, should be considered.

NHMRC grade of recommendation: D

Evidence based statements

Level of evidence

Patients receiving weekly/fortnightly nutrition intervention (dietary counselling with or without supplements) for approximately six weeks post completion of radiation therapy demonstrated improved outcomes (dietary intake, nutritional status, quality of life and patient satisfaction) compared with patients receiving usual care	II ²⁷
Implementation of nutritional guidelines, including follow up, is more likely if a dietitian is part of the multidisciplinary team	IV ⁵⁹
Alternative feeding can be required up to 6–12 months post chemo-radiation therapy for Stage III–IV oropharyngeal cancer	IV ⁶⁹
Alternative feeding can be required for a mean of 32 months in head and neck cancer survivors due to dysphagia	IV ⁷⁰
Alternative feeding was shown to be required by 66% of head and neck cancer patients at three months post chemo-radiation, improving to 31% at six months, but still persisting in 6% at 24 months	IV ³⁴

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APPENDIX I: ONCOLOGY NUTRITION RESOURCES

For practitioners

The Clinical Guide to Oncology Nutrition, 2nd edn. Chicago, IL, USA: Oncology Nutrition Dietetic Practice Group, American Dietetic Association, 2006.

For patients

The Cancer Council Australia	http://www.cancer.org.au	Understanding radiation therapy http://www.cancer.org.au/file/Aboutcancer/understandingradiotherapy.pdf
ACT Cancer Council NSW Cancer Council	http://www.actcancer.org http://www.nswcc.org.au/	After your cancer treatment: a guide for eating well and being active—an information sheet for people who have survived cancer, their families and friends http://www.nswcc.org.au/html/patientsfamiliesfriends/livingwithcancer/aftercancer_treatment/downloads/afteryour_cancertreatment.pdf Food and Cancer —a guide to nutrition for people with cancer http://www.nswcc.org.au/html/patientsfamiliesfriends/livingwithcancer/foodandcancer/downloads/foodandcancer.pdf Understanding radiation therapy http://www.cancercouncil.com.au/html/patientsfamiliesfriends/livingwithcancer/radiotherapy/downloads/understanding_radiotherapy.pdf
NT Cancer Council QLD Cancer Council	http://www.cancercouncilnt.com.au/ http://www.cancerqld.org.au/	Understanding nutrition http://www.cancerqld.org.au/pdf/UnderstandingNutrition.pdf Understanding radiation therapy http://www.cancerqld.org.au/pdf/UnderstandingRadiationTherapy.pdf
SA Cancer Council	http://www.cancersa.org.au/	Health eating and physical activity for adults http://www.cancersa.org.au/cms_resources/documents/Resources/Nutrition/Brochure_Adult_Healthyeating.pdf Nutrition for people having cancer http://www.cancersa.org.au/cms_resources/documents/Resources/Coping%20with%20cancer/Nutrition_during_cancer_treatment_April2005.pdf
Tasmania Cancer Council Victoria Cancer Council	http://www.cancertas.org.au/ http://www.cancervic.org.au/	http://www.cancervic.org.au/cancer1/patients/eating/nutrition_exercise.pdf http://www.cancervic.org.au/cancer1/patients/radiationtherapy/ap404_coping_radio.pdf
WA Cancer Council	http://www.cancerwa.asn.au/	

APPENDIX II: THE MALNUTRITION SCREENING TOOL[©]

Have you lost weight recently without trying?

If no 0

If unsure 2

If yes, how much weight (kg) have you lost?

0.5–5.0 1

>5.0–10.0 2

>10.0–15.0 3

>15.0 4

Unsure 2

Have you been eating poorly because of a decreased appetite?

No 0

Yes 1

If score 0 or 1 not at risk of malnutrition

score ≥ 2 at risk of malnutrition

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APPENDIX III: THE PATIENT GENERATED SUBJECTIVE GLOBAL ASSESSMENT (PG-SGA)

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Patient ID Information

History (Boxes 1-4 are designed to be completed by the patient.)

1. Weight (See Worksheet 1)

In summary of my current and recent weight:

I currently weigh about _____ kg
I am about _____ cm tall

One month ago I weighed about _____ kg
Six months ago I weighed about _____ kg

During the past two weeks my weight has:
 decreased ⁽¹⁾ not changed ⁽⁰⁾ increased ⁽⁰⁾

Box 1

2. Food Intake: As compared to my normal intake, I would rate my food intake during the past month as:

unchanged ⁽⁰⁾
 more than usual ⁽⁰⁾
 less than usual ⁽¹⁾

I am now taking:

normal food but less than normal amount ⁽¹⁾
 little solid food ⁽²⁾
 only liquids ⁽³⁾
 only nutritional supplements ⁽³⁾
 very little of anything ⁽⁴⁾
 only tube feedings or only nutrition by vein ⁽⁰⁾

Box 2

3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply):

no problems eating ⁽⁰⁾
 no appetite, just did not feel like eating ⁽³⁾

<input type="checkbox"/> nausea ⁽¹⁾	<input type="checkbox"/> vomiting ⁽³⁾
<input type="checkbox"/> constipation ⁽¹⁾	<input type="checkbox"/> diarrhea ⁽³⁾
<input type="checkbox"/> mouth sores ⁽²⁾	<input type="checkbox"/> dry mouth ⁽¹⁾
<input type="checkbox"/> things taste funny or have no taste ⁽¹⁾	<input type="checkbox"/> smells bother me ⁽¹⁾
<input type="checkbox"/> problems swallowing ⁽²⁾	<input type="checkbox"/> feel full quickly ⁽¹⁾
<input type="checkbox"/> pain; where? ⁽³⁾ _____	
<input type="checkbox"/> other** ⁽¹⁾ _____	

** Examples: depression, money, or dental problems

Box 3

4. Activities and Function: Over the past month, I would generally rate my activity as:

normal with no limitations ⁽⁰⁾
 not my normal self, but able to be up and about with fairly normal activities ⁽¹⁾
 not feeling up to most things, but in bed or chair less than half the day ⁽²⁾
 able to do little activity and spend most of the day in bed or chair ⁽³⁾
 pretty much bedridden, rarely out of bed ⁽³⁾

Box 4

Additive Score of the Boxes 1-4 A

The remainder of this form will be completed by your doctor, nurse, or therapist. Thank you.

5. Disease and its relation to nutritional requirements (See Worksheet 2)

All relevant diagnoses (specify) _____

Primary disease stage (circle if known or appropriate) I II III IV Other _____

Age _____

Numerical score from Worksheet 2 B

6. Metabolic Demand (See Worksheet 3)

Numerical score from Worksheet 3 C

7. Physical (See Worksheet 4)

Numerical score from Worksheet 4 D

Global Assessment (See Worksheet 5)

Well-nourished or anabolic (SGA-A)
 Moderate or suspected malnutrition (SGA-B)
 Severely malnourished (SGA-C)

Total PG-SGA score
 (Total numerical score of A+B+C+D above)
 (See triage recommendations below)

Clinician Signature _____ RD RN PA MD DO Other ___ Date _____

Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage). First line nutrition intervention includes optimal symptom management.

0-1 No intervention required at this time. Re-assessment on routine and regular basis during treatment.

2-3 Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and laboratory values as appropriate.

4-8 Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms survey (Box 3).

≥ 9 Indicates a critical need for improved symptom management and/or nutrient intervention options.

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Worksheets for PG-SGA Scoring

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Boxes 1-4 of the PG-SGA are designed to be completed by the patient. The PG-SGA numerical score is determined using 1) the parenthetical points noted in boxes 1-4 and 2) the worksheets below for items not marked with parenthetical points. Scores for boxes 1 and 3 are additive within each box and scores for boxes 2 and 4 are based on the highest scored item checked off by the patient.

Worksheet 1 - Scoring Weight (Wt) Loss

To determine score, use 1 month weight data if available. Use 6 month data only if there is no 1 month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point score in Box 1 of the PG-SGA.

Wt loss in 1 month	Points	Wt loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10 -19.9%
3-4.9%	2	6 - 9.9%
2-2.9%	1	2 - 5.9%
0-1.9%	0	0 - 1.9%

Score for Worksheet 1
Record in Box 1

Worksheet 2 - Scoring Criteria for Condition

Score is derived by adding 1 point for each of the conditions listed below that pertain to the patient.

Category	Points
Cancer	1
AIDS	1
Pulmonary or cardiac cachexia	1
Presence of decubitus, open wound, or fistula	1
Presence of trauma	1
Age greater than 65 years	1

Score for Worksheet 2 =
Record in Box B

Worksheet 3 - Scoring Metabolic Stress

Score for metabolic stress is determined by a number of variables known to increase protein & calorie needs. The score is additive so that a patient who has a fever of > 102 degrees (3 points) and is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	>99 and <101	≥101 and <102	≥102
Fever duration	no fever	<72 hrs	72 hrs	> 72 hrs
Corticosteroids	no corticosteroids	low dose (<10mg prednisone equivalents/day)	moderate dose (≥10 and <30mg prednisone equivalents/day)	high dose steroids (≥30mg prednisone equivalents/day)

Score for Worksheet 3 =
Record in Box C

Worksheet 4 - Physical Examination

Physical exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid status. Since this is subjective, each aspect of the exam is rated for degree of deficit. Muscle deficit impacts point score more than fat deficit. Definition of categories: 0 = no deficit, 1+ = mild deficit, 2+ = moderate deficit, 3+ = severe deficit. Rating of deficit in these categories are *not* additive but are used to clinically assess the degree of deficit (or presence of excess fluid).

Fat Stores:

orbital fat pads	0	1+	2+	3+
triceps skin fold	0	1+	2+	3+
fat overlying lower ribs	0	1+	2+	3+
Global fat deficit rating	0	1+	2+	3+

Fluid Status:

ankle edema	0	1+	2+	3+
sacral edema	0	1+	2+	3+
ascites	0	1+	2+	3+
Global fluid status rating	0	1+	2+	3+

Muscle Status:

temples (temporalis muscle)	0	1+	2+	3+
clavicles (pectoralis & deltoids)	0	1+	2+	3+
shoulders (deltoids)	0	1+	2+	3+
intersosseous muscles	0	1+	2+	3+
scapula (latissimus dorsi, trapezius, deltoids)	0	1+	2+	3+
thigh (quadriceps)	0	1+	2+	3+
calf (gastrocnemius)	0	1+	2+	3+
Global muscle status rating	0	1+	2+	3+

Point score for the physical exam is determined by the overall subjective rating of total body deficit.

No deficit	score = 0 points
Mild deficit	score = 1 point
Moderate deficit	score = 2 points
Severe deficit	score = 3 points

Score for Worksheet 4 =
Record in Box D

Worksheet 5 - PG-SGA Global Assessment Categories

Category	Stage A	Stage B	Stage C
	Well-nourished	Moderately malnourished or suspected malnutrition	Severely malnourished
Weight	No wt loss OR Recent non-fluid wt gain	~5% wt loss within 1 month (or 10% in 6 months) OR No wt stabilization or wt gain (i.e., continued wt loss)	> 5% wt loss in 1 month (or >10% in 6 months) OR No wt stabilization or wt gain (i.e., continued wt loss)
Nutrient Intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition Impact Symptoms	None OR Significant recent improvement allowing adequate intake	Presence of nutrition impact symptoms (Box 3 of PG-SGA)	Presence of nutrition impact symptoms (Box 3 of PG-SGA)
Functioning	No deficit OR Significant recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR recent significant deterioration
Physical Exam	No deficit OR Chronic deficit but with recent clinical improvement	Evidence of mild to moderate loss of SQ fat &/or muscle mass &/or muscle tone on palpation	Obvious signs of malnutrition (e.g., severe loss of SQ tissues, possible edema)

Global PG-SGA rating (A, B, or C) =