Assessing the Need for a Dietitian in Radiation Oncology

Tracy K. Gosselin, RN, MSN, AOCN®, Linda Gilliard, MS, RD, and Rhonda Tinnen

Nutritional care is an integral component of quality cancer treatment. Patients undergoing cancer therapy are at risk for developing a variety of side effects that impact their intake, absorption, and nutritional status. The issue becomes compounded in newly diagnosed patients who have preexisting poor nutritional status, comorbid diseases, mechanical obstruction, and metabolic abnormalities. Standards related to the role of dietitians are well defined in the literature and by the Joint Commission. The quality improvement project illustrated in this article clearly demonstrated the need for a dietitian in the radiation oncology clinic by using the Patient-Generated Subjective Global Assessment.

At a Glance

- Radiation therapy causes a variety of side effects that impact nutritional status.
- The Patient-Generated Subjective Global Assessment is a screening tool that can be used easily in the clinical setting.
- A dietitian can provide initial and ongoing assessment, intervention, and symptom management recommendations.

About 60% of patients with cancer receive radiation therapy at some point in their treatment course. The acute side effects of therapy are related to the site being treated and can include dysphagia, taste changes, pain, xerostomia, mucositis, nausea and vomiting, diarrhea, and the appearance of anorexia or cachexia. Those side effects can impede the ingestion and absorption of food, therefore negatively impacting a patient’s nutritional status.

Impaired nutritional status affects quality of life, frequency of emergency room visits and hospitalizations, treatment interruptions, and ultimately, morbidity and mortality of the patient (Bosaeus, Daneryd, Svanberg, & Lundholm, 2001; Dewys et al., 1980; Grosvenor, Bulcavage, & Chlebowski, 1989; Ottery, 1996; Ravasco, Monteiro-Grillo, Vidal, & Camilo, 2003). Dewys et al. reported the effects of weight loss on the prognosis of more than 3,000 patients with 12 different tumor types. Weight loss was found to be an independent predictor of shorter survival in the majority of tumor categories, even in patients with a favorable performance status. Bosaeus et al. studied the effect of dietary intake and resting energy expenditure on weight status in patients with advanced tumors and found that hypermetabolism and continued weight loss were associated with decreased survival. Involuntary weight loss greater than 5% of total weight in one month or more than 1%-2% per week is an indicator of malnutrition (Beaver, Matheny, Roberts, & Myers, 2001).

To date, nursing intervention with education and support has been the only nutritional approach in most outpatient settings to deter further weight loss in patients. Understanding the role that nutrition plays in the management of cancer and ensuring that patients with cancer receive adequate nutrition are essential components of quality care. Nursing intervention alone is often inadequate in addressing weight loss because of lack of time, education, and resources. Timely and persistent intervention from a trained nutrition professional is essential in the outpatient setting. Patients feel better emotionally and physically and are more in control of their situation after having a nutrition consultation (Schiller et al., 1998).

Literature Review

Because dietary issues can arise, increase, and persist throughout all stages of cancer care, screening is important before, during, and after treatment with referrals to a dietitian if warranted. In a study of 50 patients with head and neck cancer receiving radiation therapy, 44% had eating difficulties...
before treatment, with the most common issues being difficulty
chewing, swallowing, and pain (Larsson, Hedelin, Johansson, &
Athlin, 2005). The percentage of patients with eating difficulties
during treatment increased to 80% at the third week and 100%
by the end of radiation therapy. Twelve months after radiation,
88% of patients had persistent eating difficulties. The incidence
of dietary issues corresponded with a mean weight loss of 3.5%
at the third week and 6.8% by the end of radiation therapy. Mean
weight loss of 17.4% at 12 months after treatment indicates that
difficulties persist well after the completion of radiation therapy.
The findings stress the need for early intervention and long-term
follow-up care in patients with head and neck cancer.

Isenring, Capra, and Bauer (2004) investigated the impact of
early intensive nutrition therapy on outcome end points (e.g.,
body weight, nutritional status), quality of life, and physical
function compared to the usual nutrition intervention provided
to patients receiving radiation therapy to the gastrointestinal
or head and neck areas. Sixty patients were randomized to
the nutrition intervention group or the control group. The
intervention group received an individualized assessment
by the dietitian within the first four days of treatment and
then weekly during radiation therapy. The control group was
provided general education materials by the nurses with no
individualization or nutrition advice. Over a 12-week period,
the intervention group had statistically significant smaller
deteriorations in weight (p < 0.001), nutritional status (p = 0.02),
and quality of life (p = 0.009) compared to the control group.
Clinical differences in fat-free mass were observed but did
not reach statistical significance. To further investigate actual
dietary intake in the population, Isenring, Bauer, and Capra
(2007) compared the intake of 54 patients who received either
nutrition intervention or usual care. A diet history was obtained
at baseline and at 4, 8, and 12 weeks after starting radiation
therapy. The caloric (p = 0.05) and protein (p < 0.001) intake
in the nutrition intervention group was significantly higher
than the control group. At eight weeks, the intervention group
had more patients who were well nourished and fewer who
were malnourished than the control group. The intervention
group also had a smaller decrease and faster recovery in quality
of life and physical function. Intensive nutritional counseling
minimized the reduction in dietary intake that typically is seen
in patients with head and neck and gastrointestinal cancers
receiving radiation therapy.

Ravasco et al. (2005b) examined the effectiveness of nutri-
tion intervention in patients with head and neck cancer receiv-
ing radiation therapy in a prospective randomized trial. The
study investigated whether nutrition counseling or intake of
nutritional supplements affected oral intake, nutritional status,
and quality of life during and three months after radiation
therapy. Seventy-five patients were divided into three groups:
patients receiving intensive diet counseling with a dietitian, pa-
ients drinking two nutritional supplements each day, and the
control group continuing their usual diet. The diet-counseling
group was able to increase and maintain caloric intake (p ≤ 0.05) during and three months after treatment. The nutritional
supplement group increased caloric intake during treatments
but was unable to maintain that intake three months after
treatment. The control group had decreased intake of calories
and protein during and after treatment. Patients with diet
counseling were able to improve their nutritional status (p < 0.05), quality of life (p < 0.003), and symptom-induced morbidity
(p < 0.001) at three months after treatment. Similar results
were found in a related randomized trial of patients with col-
orectal cancer (Ravasco et al., 2005a). Therefore, long-term
follow-up with a dedicated dietitian was more beneficial to
patients’ nutritional outcomes than the intake of nutritional
supplements.

Research has shown that aggressive nutritional screening
and early intervention in patients undergoing cancer treat-
ment improves caloric intake, hydration, treatment tolerance,
and quality of life (Isenring et al., 2007; Ravasco et al., 2005b).
Initial and ongoing nutritional assessment allows for identifica-
tion of patients at high risk for poor nutritional status and its
associated complications. Incorporation of a dedicated dietitian
in the oncology team may ensure that dietary interventions
continue during the patient’s course of treatment and that
nutritional goals are met. The American Dietetic Association,
Association of Community Cancer Centers, Joint Commission,
and National Comprehensive Cancer Network have established
standards and guidelines in oncology to help guide and regulate
intervention.

Dietitians may or may not be available for patient consulta-
tion depending on the practice setting; therefore, healthcare
professionals must be aware of community resources and dif-
ferent approaches to incorporate into practice to help meet
patient care needs. Clinical pathways were developed in the
1990s, and Odelli et al. (2005) reviewed the use of a nutritional
pathway and its associated positive outcomes in patients receiv-
ing chemoradiation. Wood (2005) also described the impact of
guidelines in clinical practice and the dietitian’s role as part of
the multidisciplinary clinic team. Screening, assessment, inter-
vention, and education for patients and staff all must be featured
components when building a multidisciplinary program. Effec-
tive programs are proactive and include standardized screening
tools, an integrated algorithmic approach, and a dietitian leader
with expertise and a full range of educational resources (Ottery,
Bender, & Kasenic, 2002). Input from frontline staff and mem-
ers of the multidisciplinary team also are critical to successful
program outcomes.

The scored Patient-Generated Subjective Global Assessment
(PG-SGA) is a tool that can be used in everyday practice to as-
sess the nutritional needs of patients with cancer (Ottery et al.,
2002) (see Figure 1). The PG-SGA quantifies a nutrition risk
score based on a combination of known prognostic indicators of
weight loss, performance status, and symptoms that limit fluid
and food intake. Patients have been found to lose less weight dur-
ing treatment when aggressive symptom management strategies
are implemented using the tool, and having a dedicated dietitian
on staff can facilitate those interventions. However, because of
cost concerns, facilities may want to consider adding a part-time
dietitian until the patient volume warrants a full-time position.

The goal of the present performance improvement project
was to use the PG-SGA to evaluate the degree and number of
patients at nutritional risk while undergoing radiation therapy.
The finding that a significant number of patients were at risk
could justify the employment of a dedicated dietitian in the
radiation therapy department rather than having a dietitian by
appointment only one half-day per week.
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 ______ pounds.
I am about ______ feet ______ tall.

One month ago I weighed about ______ pounds.
Six months ago I weighed about ______ pounds.

During the past two weeks my weight has:

- decreased
- not changed
- increased

Box 1

2. Food Intake

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

- unchanged
- more than usual
- less than usual

I am now taking:

- normal food but less than normal amount
- very little of anything
- only tube feedings or only nutrition by vein
- little solid food
- only liquids
- only nutritional supplements

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 problem eating
- no appetite, did not feel like eating
- mouth sores
- things taste funny or have no taste
- problems swallowing
- pain; where
- other (e.g., depression, money, dental problems)
- vomiting
- diarrhea
- dry mouth
- smells bother me
- feel full quickly
- fatigue
- constipation
- nausea

Box 3

4. Activities and Function

Over the past month, I would generally rate my activity as:

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

Box 4

Worksheet 1—Scoring Weight (Wt) Loss

To determine score, use 1 month wt data if available. Use 6 month data only if there is no 1 month wt data. Use point below to score wt change and add one extra point if patient has lost wt during the past 2 months.

<table>
<thead>
<tr>
<th>Wt loss in 1 month</th>
<th>Points</th>
<th>Wt loss in 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% or greater</td>
<td>4</td>
<td>20% or greater</td>
</tr>
<tr>
<td>5%–9.9%</td>
<td>3</td>
<td>10%–19.9%</td>
</tr>
<tr>
<td>3%–4.9%</td>
<td>2</td>
<td>6%–9.9%</td>
</tr>
<tr>
<td>2%–2.9%</td>
<td>1</td>
<td>2%–5.9%</td>
</tr>
<tr>
<td>0%–1.9%</td>
<td>0</td>
<td>0%–1.9%</td>
</tr>
</tbody>
</table>

Numerical score from Worksheet 1

Box 3

Worksheet 2—Disease and its relation to nutritional requirements

All relevant diagnoses (specify)

Box 5

Additive Score of the Boxes 1–4

Numerical score from Worksheet 2

Box 6

5. Worksheet 3—Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein and 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 hours
- 72 hours
- > 72 hours

Corticosteroids

- No corticosteroids
- Low dose (< 10 mg prednisone equivalents/day)
- Moderate dose (≥ 10 and < 30 mg prednisone equivalents/day)
- High dose steroid (≥ 30 mg prednisone equivalents/day)

Numerical score from Worksheet 3

Box 7

Figure 1. Scored Patient-Generated Subjective Global Assessment

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### 7. Worksheet 4—Physical Exam

Physical exam includes a subject evaluation of 3 aspects of body composition: fat, muscle, and fluid status. Because 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, 3+ = severe.

#### Muscle Status:
- **temples (temporalis muscle)**: O 1+ 2+ 3+
- **clavicles (pectoralis and deltoids)**: O 1+ 2+ 3+
- **shoulders (deltoids)**: O 1+ 2+ 3+
- **interosseous muscles**: O 1+ 2+ 3+
- **scapula (latissimus dorsi, traperius, deltoids)**: O 1+ 2+ 3+
- **thigh (quadriceps)**: O 1+ 2+ 3+
- **calf (gastrocnemius)**: O 1+ 2+ 3+

**Global muscle status rating**: O 1+ 2+ 3+

#### Fluid Status:
- **ankle edema**: O 1+ 2+ 3+
- **sacral edema**: O 1+ 2+ 3+
- **ascites**: O 1+ 2+ 3+

**Global fluid status rating**: O 1+ 2+ 3+

#### Fat Status:
- **orbital fat pads**: O 1+ 2+ 3+
- **triceps skin fold**: O 1+ 2+ 3+
- **fat overlying lower ribs**: O 1+ 2+ 3+

**Global fat deficit rating**: O 1+ 2+ 3+

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### Worksheet 5—PG-SGA [Patient-Generated Subjective Global Assessment] Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Stage A</th>
<th>Stage B</th>
<th>Stage C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Well nourished</td>
<td>Moderately malnourished ≤ 5% weight loss in 1 month (or 10% in 6 months)</td>
<td>Severely malnourished &gt; 5% weight loss in 1 month (or &gt; 10% in 6 months)</td>
</tr>
<tr>
<td>Nutrient intake</td>
<td>No deficit Or significant recent improvement</td>
<td>Definite decrease in intake</td>
<td>Severe deficit in intake</td>
</tr>
<tr>
<td>Nutrition impact symptoms</td>
<td>None Or significant recent improvement allowing adequate intake</td>
<td>Presence of nutrition impact symptoms (PG-SGA Box 3)</td>
<td>Presence of nutrition impact symptoms (PG-SGA Box 3)</td>
</tr>
<tr>
<td>Functioning</td>
<td>No deficit Or recent improvement</td>
<td>Moderate functional deficit Or recent deterioration</td>
<td>Severe functional deficit Or recent significant deterioration</td>
</tr>
<tr>
<td>Physical exam</td>
<td>No deficit Or chronic deficit but recent improvement</td>
<td>Evidence of mild to moderate loss of muscle mass/SQ fat/muscle tone on palpation</td>
<td>Obvious signs of malnutrition (e.g., severe loss of muscle, SQ tissue, possible edema)</td>
</tr>
</tbody>
</table>

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### Nutritional Triage Recommendation

Additive score is used to define specific nutritional interventions including patient and family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, parenteral triage). 

First time nutrition intervention includes optimal symptom management.

### Triage based on PG-SGA point score

- **0–1**: No intervention required at this time. Reassessment one routine and regular basis during treatment.
- **2–3**: Patient and family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate
- **4–8**: Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptom (Box 3)
- **≥ 9**: Indicates a critical need for improved symptom management and/or intake intervention options

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**Figure 1. Scored Patient-Generated Subjective Global Assessment (Continued)**

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Methods

After initial brainstorming, the nursing staff decided to pursue a performance improvement project related to the nutritional needs of radiation therapy patients. Kubrak and Jensen (2007) and Huhmann and Cunningham (2005) reviewed screening tools, and the PG-SGA was found to be most relevant to the patient population. The tool was designed with a sixth to eighth grade reading level and only takes a few minutes to complete (McMahon & Brown, 2000). The group also developed another tool to document the treatment field site, current and total dose of radiation, additional cancer treatments, chemotherapy agents, and frequency of chemotherapy. An in-service was conducted on the PG-SGA, and the staff selected a week to use the tools during patient treatment checks.

The PG-SGA is a two-page assessment divided into two portions. The first is completed by the patient and includes questions related to weight, food intake, symptoms, activities, and function. The second is the clinician component, which addresses weight loss, disease and nutritional requirements, metabolic demand, and physical examination. Each section is scored and then added together for a total score. The scores fall into one of four ranges (0–1, 2–3, 4–8, and ≥ 9). The total score is used to determine the level of triage needed for the individual. A score of four or higher warrants a referral to the dietitian.

The patients and nurses completed the PG-SGA during the identified week, and comments from the nurses regarding the use of the tool were compiled. Outside benchmarking data were compiled from oncology dietitians contacted nationally through e-mail and via access to an oncology nutrition Listserv.

Results

Of the 88 patients who chose to complete the tool, 66% (n = 58) received radiation therapy alone, whereas 34% (n = 30) received chemotherapy and radiation therapy. A variety of disease sites, including brain, breast, gastrointestinal, gynecologic, head and neck, limb, lung, and prostate, were screened. Patients with head and neck (22%), gastrointestinal (20%), or breast cancer (17%) had the highest incidence of requiring nutrition intervention (see Table 1). Patients with breast cancer were most likely to receive only radiation therapy, whereas 92% of patients with gastrointestinal cancer and 38% of patients with head and neck cancer were treated with chemotherapy and radiation therapy. Fifty-eight percent of patients with a PG-SGA score of four or higher were receiving chemotherapy and radiation therapy. Overall, 60% of patients receiving radiation therapy alone and 83% of patients receiving chemotherapy and radiation therapy scored a risk level of four or higher, suggesting the need for intervention by a dietitian.

Benchmark Data

Thirty-five dietitians responded to an e-mail representing academic medical centers, community-based programs, and independent centers that provided radiation therapy services. Of this number, about 40% of the respondents were at National Cancer Institute-designated programs. The volume treated with radiation at the programs varied from 25–400 patients a day. Allocation of a full-time equivalent (FTE) for a dietitian was based on the number of patients with cancer in the facility and ranged from zero to four FTEs in most facilities with a dietitian on staff. Seven of the 35 radiation therapy departments who responded had a clinic-dedicated nutritionist (1.0 FTE), and another three respondents covered radiation therapy and other outpatient services.

The dietitian’s role varied in each setting depending on the number of patients and the number of FTEs. The dietitian provided initial assessment, education, nutritional interventions, and symptom management in several settings. Many dietitians worked collaboratively with the radiation therapy team and had screening guidelines in place for patients believed to be at high nutritional risk. An estimated 1,000 dietitians in the United States are dedicated to oncology, with an average of 0.8 FTE in the outpatient setting (S. Lutheringer, personal communication, January 21, 2005).

Table 1. Comparison of Radiation Alone Versus Radiation and Chemotherapy

<table>
<thead>
<tr>
<th>GROUP</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–1a</td>
</tr>
<tr>
<td>Brain (N = 4)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Breast (N = 22)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>6</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Gastrointestinal (N = 13)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Gynecologic (N = 5)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Head and neck (N = 15)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Limb (N = 2)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Lung (N = 7)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Prostate (N = 8)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>1</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
<tr>
<td>Unknown (N = 12)</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>–</td>
</tr>
<tr>
<td>CT/RT</td>
<td>–</td>
</tr>
</tbody>
</table>

- Requires no intervention, but the patient should receive routine reassessment while under treatment
- Requires education by a dietitian, nurse, or other healthcare provider; pharmacologic intervention may be required and patients might need to have blood drawn to assess certain laboratory values.
- Requires intervention by a dietitian in conjunction with a nurse and physician
- Indicates a critical need for improved symptom management and nutrient intervention options

CT/RT—chemotherapy and radiation therapy; RT—radiation therapy
Patient-Generated Subjective Global Assessment

The nursing staff found that the PG-SGA provided accurate, timely, and subjective information, and was easy to score and easy for patients to complete. The drawbacks to the PG-SGA were that some of the body measurement scales were cumbersome. The nurses believed that if a patient scored nine or higher on the first four sections of the screening tool, then body measurements were not necessary because the patient was already at nutritional risk. The nurses also recognized that sometimes they needed to refer to the patient’s charts if the form was completed after they saw the patient.

Data Reporting

After the PG-SGA scores were evaluated, the triage scoring and benchmarking data were presented to the radiation oncology department, the director of nutrition services, the oncology clinical service unit, and other hospital leadership staff. Following the presentations, a position for a dietitian was approved. A job description was written by the director of nutrition and reviewed by the director in radiation therapy. A multidisciplinary team interviewed candidates, and an office for the dietitian was identified in the radiation therapy clinic. Once the dietitian was hired, screening guidelines were developed and implemented, educational tools were updated, and new materials were developed.

In a cross-sectional study, Hartmuller and Desmond (2004) found that patients with cancer ranked tailored information, general information, and dietary issues as the top three areas in which information was needed, whereas nurses believed that tips for the family, tailored information, and general information were most important. Tailored information related to materials that were customized to a specific patient or population, whereas general information included food preparation and symptom management. The study also found that patients ranked coping with side effects as the top area in which they would benefit from written material. Those factors were taken into account during the revision and development of educational materials.

Conclusion

Use of the PG-SGA provided a proactive, simple way to determine the nutritional needs of patients undergoing cancer treatment in a radiation oncology clinic. Radiation centers with a high frequency of treatment to breast, head and neck, and gastrointestinal cancers and patients receiving chemotherapy and radiation therapy likely would have the greatest need for a dietitian on staff.

Based on screening results from the tool and information from other centers, the nursing staff developed a plan to secure necessary nutrition resources for the clinic. The dietitian’s goals for the first year included establishing a screening program for high-risk patients, developing education sessions for staff, updating patient education materials, developing an outcomes database, and initiating programs for patients with cancer that focus on healthful eating. Ongoing evaluation of the dietitian’s role in the care of patients with cancer and the need for outcome measures will help further establish the benefits of early nutrition intervention in cancer treatment.

Author Contact: Tracy K. Gosselin, RN, MSN, AOCN®, can be reached at gosse001@mc.duke.edu, with copy to editor at CJONEditor@ons.org.

References


treatment tolerance, and admission characteristics in oesophageal cancer. *Clinical Oncology, 17*(8), 639–645.


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