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Developing a Nutritional Pathway for Cancer Patients

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Cancer is predicted to be the leading cause of death worldwide by the end of this century.[1] Nutrition is an independent predictive factor for shorter survival and around 20% to 40% of cancer deaths are a consequence of malnutrition.[2, 3] Poor nutritional status is manifested by involuntary weight loss, affecting 50% to 80% of patients,[4] and this depletion is mainly from muscle mass (MM), which may occur from curative to palliative stage and often co-exists with obesity.[5]

Depletion of MM negatively influences physical function and strength;[6] this is known as sarcopenia.[4] Overlapping with sarcopenia is cancer cachexia, a multifactorial syndrome characterised by a severe loss of skeletal MM, with or without loss of fat mass, that is irreversible by conventional nutritional support.[7]

Nutrition optimisation process

Providing high-quality nutritional care means doing the right thing, at the right time, in the right way, for the right person, and achieving the best possible results.[8] To achieve this consistently, care pathways – a standardised set of processes applied to a group of clients with a similar condition – are recommended.[8]

Creation of a pathway

Standardisation and clear documentation in care pathways provide a mechanism for delivering efficient and effective care. In designing a care pathway, it is important to understand its key components (**Figure 1**).[9, 10] A quality improvement (QI) approach to test the pathway, support implementation, and monitor outcomes is recommended.[9] The Plan-Do-Study-Act (PDSA) QI model is simple and frequently adopted in NHS settings.

Creation of a nutrition care pathway

A standardised nutrition pathway should include four distinct, but interconnected steps, as shown in **Figure 2**.[8]

Although each step builds on the previous one, the nutrition process is not linear. Critical thinking and problem solving will frequently require that dietitians revisit previous steps to reassess, add, or revise nutrition intervention strategies and outcomes.[8]

Example of a nutrition pathway

Care pathways are typically in the form of a flowchart or process map (**Figure 3**).[9] Utilising professional judgement, dietitians may discharge a patient when it is determined that no further nutrition support is needed but can readmit a patient into the pathway if needed.

The evidence supporting the cancer nutrition pathway

Nutritional intervention aims to identify and treat malnutrition, maintaining or improving MM, and intervene to address nutritional disturbances that affect recovery and survival.[11] Nutrition and oncology societies recommend screening for malnutrition risk at diagnosis, during and after treatment.[11, 12] Recommended tools are the 'Malnutrition Universal Screening Tool' ('MUST') to screen for malnutrition and SARC-F to screen for sarcopenia. Assessments for muscle include hand dynamometer, calf circumference, walking tests and sit to stand tests.[13, 14] For diagnosis, the global leadership initiative on malnutrition (GLIM) comprising phenotypic and etiologic criteria is recommended.[15]

The evidence for nutrition recommendations – key nutrients

Protein

Animal-based proteins, known as high quality proteins, should represent the majority of cancer patients' protein intake during active treatment. The increased circulating amino acids released from high quality proteins following meals stimulates muscle protein synthesis – anabolism.[16] Any other treatment for low MM in cancer may fail without an adequate quantity and quality of protein.[17] The timing of protein intake is also important; an equal distribution per meal enhances anabolism in young adults.[18]

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β-hydroxy β-methylbutyrate (HMB)

HMB is a metabolite of leucine and is found naturally in low levels in the diet.[19] Studies suggest that HMB stimulates muscle synthesis, and decreases muscle breakdown, which is the main mechanism for MM loss in cancer.[20] Therapeutic doses with efficacy are 3 g/day, an impractical amount to be obtained from diet alone and supplementation is essential.[21] A recent systematic review showed HMB benefits in MM synthesis, muscle function, hospitalisation, cancer related toxicity, tumour response and survival.[22]

Vitamin D

Low levels of vitamin D are high amongst cancer patients, with deficiency prevalence reported to vary between 14-92%.[23, 24] A meta-analysis of 44,165 patients with different tumours has shown that high vitamin D levels were associated with better overall survival and progression-free survival.[25]

Achieving nutrition adequacy

Oral nutrition supplements (ONS) are recommended when food intake is inadequate to support individual's needs.[13, 17] ONS contain high quality amino acids like leucine, and some will have a higher protein content with leucine, HMB and vitamin D to support MM anabolism and minimise breakdown.[21] The literature reports the increased and significant clinical benefits of ONS in reference to hospital readmissions, hospital length of stay (LOS), response to treatments, MM, weight loss and clinical outcomes.[26-29] Preoperative use of ONS prior to upper GI cancer resection in 200 patients from Australia led to lower weight loss, and to lower LOS in the group of patients who received ONS for >2 weeks.[29] Post-discharge intake of ONS for 3 months plus dietary advice in patients at nutritional risk following colorectal cancer surgery reduced skeletal muscle loss and sarcopenia, and improved chemotherapy tolerance.[28]

The pathway implementation process

The inclusion of an executive-level champion to guide the design and implementation process will facilitate adoption of the pathway.[10] Integrated care systems (ICS) provide the perfect executive champions for a clinical pathway. Their regular clinical meetings attended by primary care networks and medical teams are the perfect forum to discuss and support clinical pathways. Each ICS is aligned to an allied health professionals (AHP) council that is composed of the AHP leads for all the NHS providers within the ICS. When planning your pathway development, contact the AHP council to gain entrance to the relevant ICS meetings for a collaborative approach.

Pathway implementation will require a communication and training plan for operation, as well as a system for monitoring consistency to the new care pathway protocols. When rolling out a care pathway, provide staff with clear information on any changes to existing processes and protocols.[9] Ensure that supervisors can clearly communicate this information and revisit often with staff, especially during the first three to six months of implementation.

To ensure a successful implementation plan, ask the following questions:[9, 10]

- ✓ What are the key changes within the care pathway?
- ✓ Who will be responsible for which steps within the protocol?
- ✓ What additional resources are needed (staff, technology)?
- ✓ What training is needed for staff?
- ✓ Will clients be affected? If so, how, and when will this be communicated to them?
- ✓ How and when will you inform staff about changes, progress, or other outcomes?

Once implemented, identify process and outcome metrics that monitor performance. Some of these will naturally be aligned with treatment targets, while others may focus more on adherence to newly established protocols.[10] Establish a process for regular monitoring, routine review, and ensure at least annually to review pathways against new guidelines.[10]

Conclusion

Clinical pathways provide a mechanism for delivering more efficient and effective care, through standardisation and clear documentation. They can provide better experiences for the patient through promotion of best practices and coordinated care, improve staff capacity through clearly established guidance and support in clinical decision-making.

Care pathways have shown positive effect on clinical outcomes and reducing costs. Nevertheless, it must not be forgotten that the overall goal of improved and consistent high quality of care should be the primary focus of pathways.

Figure 1: Steps for designing a care pathway

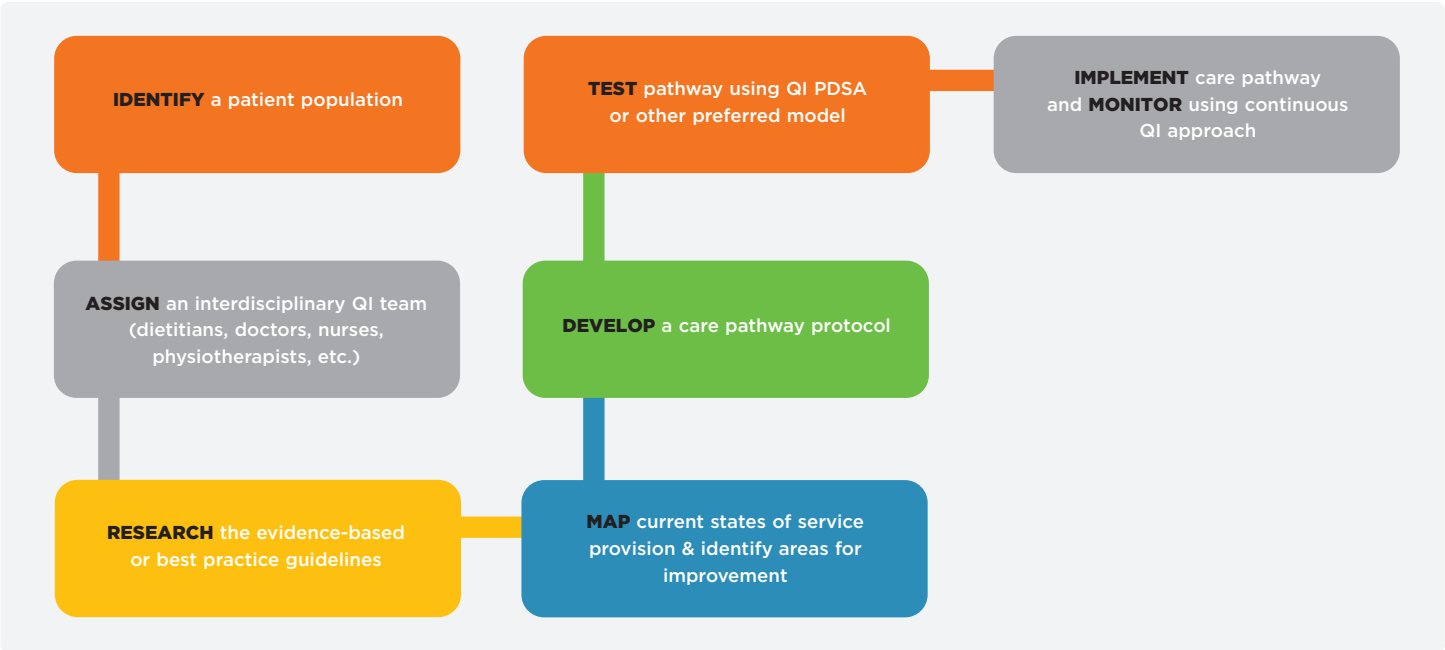
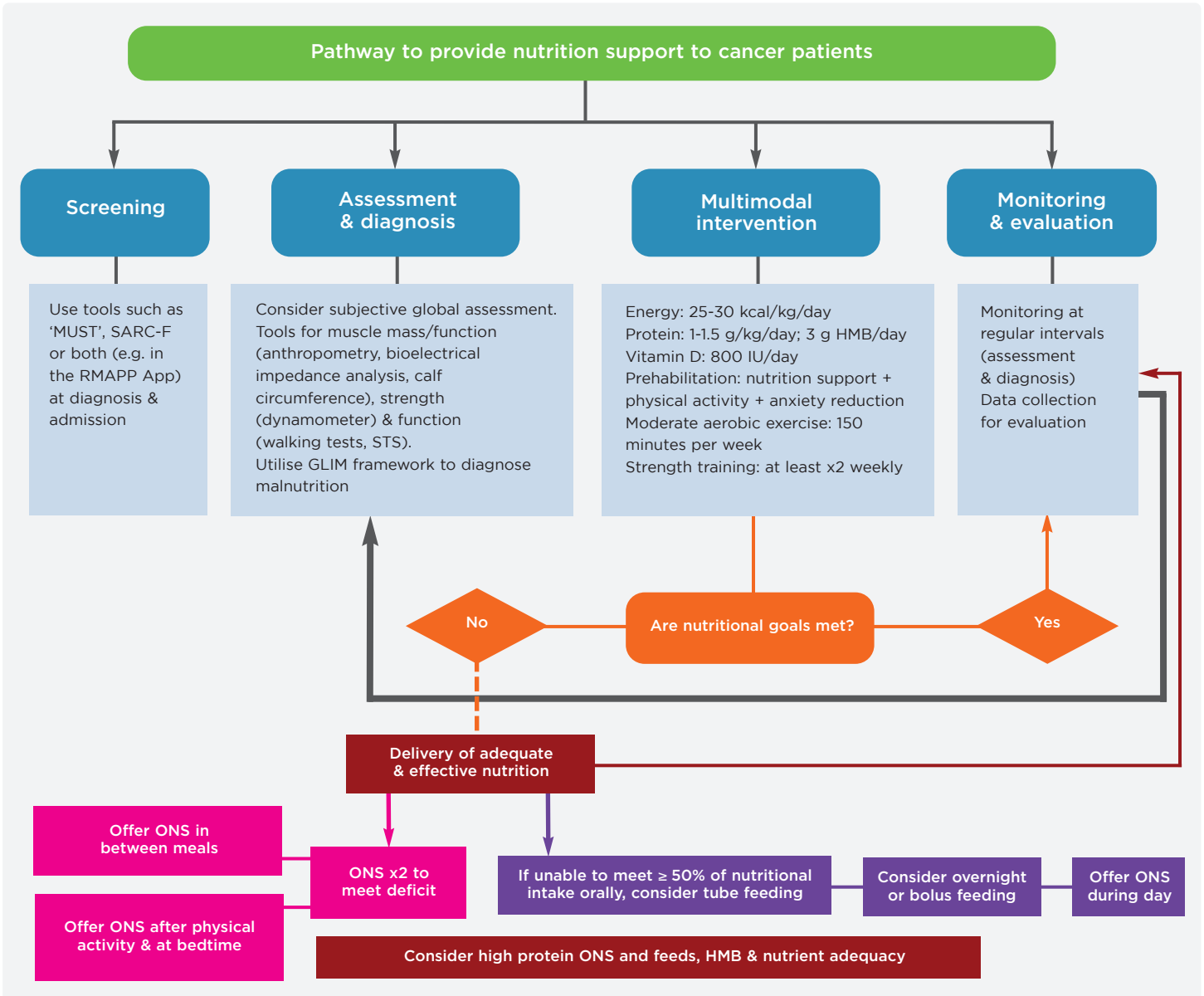


Figure 2: Standardised nutrition pathway – the four distinct steps

Figure 3: Nutrition pathway for cancer patients



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Footnotes: HMB, ß-hydroxy-ß-methylbutyrate. ONS, Oral nutritional supplement. *Vs baseline: Retrospective database review of 283 patients (63% with cancer) with or at risk of malnutrition who received 2 daily servings of Ensure Plus Advance or standard oral nutritional supplements in combination with dietary counselling and exercise for 3- 6 months. Handgrip strength: 6.2 vs. 4.7 kg; p>0.05. ‡In a RCT of 61 patients aged 68 years (median) who consumed study product twice daily for 3 to 4 weeks before and 4 weeks after radical cystectomy as compared to a multivitamin supplement. Δ2/5 higher quality studies showed benefit on body weight with a dose of 3 g/ day of Ca-HMB over 4–24 weeks in patients with cancer. ◇◇1/2 higher quality studies showed benefit on cancer therapy-related toxicity. †Research with 80 healthy women over 65 years of age supplemented with one serving of Ensure Plus Advance daily for 8 weeks. **References:** 1. Ritch CR *et al. J Urol* 2019;201(3):470–477. 2. Cornejo-Pareja I *et al. Nutrients* 2021;13(12):4355. 3. Prado CM *et al. J Cachexia, Sarcopenia Muscle* 2022;13:1623–1641. 4. Berton L *et al. PLoS one* 2015;10(11):e0141757.

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