Supplementary Materials

1. Supplementary Tables

Table S1. Data collection timeline

Parameter	From patient records (closest measurement to referral)	From dietitian during ward round
Demographics	X	
Medical information	X	
Serum biochemistry	X	
Anthropometric data		X
Malnutrition screening	X	
Quality of Life		X
Performance status		X

Table S2. UCLH Nutrition Screening Tool

UCLH Nutrition Screening Tool
All patients to be weighed and screened within 24 hours of admission then weekly.
Please circle a score for each category in the relevant column.

	Adm	Wk 1	Wk 2	Wk3	Wk4	Wk5	Wk6	Wk7
Date: **Time:**								
Weight: (please state reason if unable to weigh patient by either scales and hoist)								
Height:								
BMI:								
Appetite								
Normal for patient	0	0	0	0	0	0	0	0
Reduced	3	3	3	3	3	3	3	3
Minimal	5	5	5	5	5	5	5	5
Neurological / psychological status								
Fully orientated	0	0	0	0	0	0	0	0
Confused	3	3	3	3	3	3	3	3
Unconscious	5	5	5	5	5	5	5	5
Physical Appearance								
Appears appropriate weight or overweight	0	0	0	0	0	0	0	0
Appears thin	2	2	2	2	2	2	2	2
Appears emaciated	4	4	4	4	4	4	4	4
Weight Loss								
No weight loss	0	0	0	0	0	0	0	0
Gradual over several months	2	2	2	2	2	2	2	2
Rapid over several weeks	5	5	5	5	5	5	5	5
Unable to score	2	2	2	2	2	2	2	2
Intake								
Manages most of 3 meals a day or equivalent	0	0	0	0	0	0	0	0
Poor intake leaving > half meals offered	3	3	3	3	3	3	3	3
Receiving parenteral or enteral nutrition	3	3	3	3	3	3	3	3
Total score:								
Sign & print name:								
Referred to dietitian: Yes/No (sign)								

Please see reverse for appropriate actions and create an individualised patient care plan

	Actions
Score 0-2 Low risk	**ROUTINE CLINICAL CARE** **Referral to the dietitian is not required** • Weigh and screen patient weekly and document • Ensure that help and advice on appropriate menu choices is provided should the patient require a Kosher, Halal, Caribbean, vegetarian, soft or puree diet

Score 3 – 6 Medium risk	**OBSERVE**
	Referral to the dietitian is not required
	
	• Weigh and screen patient weekly and document.
	• **For any patients on parenteral or enteral nutrition, please ensure that the dietitian is informed**
	• Check that any symptoms affecting food intake are adequately controlled, e.g. nausea, vomiting, constipation or abdominal pain
	• Check patient:
	    o Can reach food/feed self /use utensils/cut up food
	    o Can chew (check dentures)/swallow
	    o Has adequate mouth care
	    o Is positioned correctly for eating and drinking
	• Encourage patient to choose ☺ foods from menu.
	• If assistance with feeding is required inform catering staff of need for **red tray/ red jug.**
	• Offer Full Fat Milk/ soups between meals.
	• Offer the Snack Menu where available for more choice.
	• Commence food record charts.

Score 7 or more High risk	**TREAT** **Refer to dietitian** • **Refer to the dietitian and commence food record charts for 2-3 days** • Encourage patient to choose ☺ foods from menu. • If assistance with feeding is required inform catering staff of need for red tray/ red jug. • Offer Full Fat Milk/ soups between meals. • Offer the Snack Menu where available for more choice.

Table S3. Agreement among categorical variables of nutritional status with Cohen's kappa.

Variable	Kappa	P-value
PG-SGA categories		
NST categories	-0.147	0.292
Weight loss% categories	0.022	0.820
BMI categories	-0.027	0.898
NST categories		
Weight loss % categories	0.007	0.929
BMI categories	-0.090	0.510

BMI = Body Mass Index, Kappa=Cohen's Kappa agreement coefficient, NST = Nutritional screening tool, PG-SGA = Patient Generated Subjective Global Assessment

Table S4. Spearman correlations between variables. Only correlations with p<0.05 are presented.

Variable 1	Variable 2	Spearman's rho	p-value	N
KPS Score	Length of stay	-0.448	0.015	29
NST score	MUAMC	-0.426	0.043	23
NST score	Weight on admission	-0.455	0.022	25
NST score	Weight loss in 6months (%)	0.502	0.015	23
TSF	MUAMC	0.727	0.000	27
TSF	BMI on admission	0.531	0.005	26
TSF	Weight on admission	0.469	0.014	27
TSF	Weight loss in 6months (%)	0.425	0.034	25
MAC	BMI on admission	0.553	0.003	26
MAC	Weight on admission	0.683	0.000	27
MAC	MUAMC	0.770	0.000	27
MUAMC	BMI on admission	0.805	0.000	26
MUAMC	Weight on admission	0.830	0.000	27
MUAMC	Weight loss in 6months	0.475	0.017	25
MUAMC	Weight loss in 6months (%)	0.580	0.002	25
HGS	Weight on admission	0.386	0.047	27
HGS	MAC	0.440	0.022	27
HGS	KPS	0.531	0.004	27
Energy/independence	Age	0.525	0.018	20
Pain	HGS	-0.474	0.040	19

BMI = Body Mass Index, HGS = hand grip strength, KPS = Karnofsky Performance Status, MAC = mid arm circumference, MUAMC = mid upper arm muscle circumference, NST = Nutritional screening tool, TSF = tricep skinfold thickness.

Table S5. Cancer cachexia distribution according to type of malignancy, KPS score, metastatic disease, and indication for PN.

	Cancer Cachexia [N(%)]		χ^2 p-value
	No	Yes	
Type of malignancy			
Gynaecological	0 (0.0)	2 (11.1)	0.082
Upper Gastrointestinal	2(25.0)	7 (38.9)	
Lower Gastrointestinal	0 (0.0)	4 (22.2)	
Haematological	4 (50.0)	5 (27.8)	
Other	2 (25.0)	0 (0.0)	
KPS			
<50	3 (37.5)	4 (22.2)	0.418
≥50	5 (62.5)	14 (77.8)	
Metastasis			
No	6 (75.0)	8 (38.9)	0.089
Yes	2 (25.0)	11 (61.1)	
Indication for HPN			
Extensive small bowel mucosal disease	4 (44.4)	8 (38.1)	0.671
Intestinal dysmotility	2 (22.2)	2 (9.5)	
Mechanical obstruction	3 (33.3)	10 (47.6)	
Short bowel syndrome or intestinal fistula	0 (0.0)	1 (4.8)	

Gynaecological: breast, endometrial; Lower gastrointestinal: small bowel, colon, sigmoid; upper gastrointestinal: oesophageal, gastric; haematological: leukaemia, lymphoma, amyloidosis; other: penis, bladder, HPN=Home Parenteral Nutrition, KPS=Karnofsky Performance Status.

Table S6. Metastatic disease distribution according to type of malignancy, KPS score, and indication for PN.

	Metastatic Disease [N (%)]		χ^2 p- value
	No	Yes	
Type of malignancy			
Gynaecological	0 (0.0)	2 (14.3)	0.021
Upper Gastrointestinal	5 (31.3)	6 (42.9)	
Lower Gastrointestinal	0 (0.0)	4 (28.6)	
Haematological	10 (62.5)	1 (7.1)	
Other	1 (6.3)	1 (7.1)	
KPS			
<50	7 (43.8)	2 (14.3)	0.084
≥50	9 (56.3)	12 (85.7)	
Indication for HPN			
Extensive small bowel mucosal disease	11 (68.8)	1 (7.1)	**0.001**
Intestinal dysmotility	3 (18.8)	1 (7.1)	
Mechanical obstruction	2 (12.5)	11 (78.6)	
Short bowel syndrome or intestinal fistula	0 (0.0)	1 (7.1)	

Gynaecological: breast, endometrial; Lower gastrointestinal: small bowel, colon, sigmoid; upper gastrointestinal: oesophageal, gastric; haematological: leukaemia, lymphoma, amyloidosis; other: penis, bladder, HPN=Home Parenteral Nutrition, KPS=Karnofsky Performance Status.

Table S7. NST score distribution according to type of malignancy, KPS score, cachexia, metastatic disease, and indication for PN.

	NST scores [N (%)]			χ^2 p-value
	Low risk	Medium Risk	High Risk	
Type of malignancy				
Gynaecological	0 (0.0)	1 (25.0)	1 (6.3)	0.623
Upper Gastrointestinal	1 (20.0)	1 (25.0)	6 (37.5)	
Lower Gastrointestinal	0 (0.0)	0 (0.0)	3 (18.8)	
Haematological	3 (60.0)	2 (50.0)	5 (31.3)	
Other	1 (20.0)	0 (0.0)	1 (6.3)	
KPS				
<50	1 (20.0)	1 (25.0)	3 (18.8)	0.962
≥50	4 (80.0)	3 (75.0)	13 (81.3)	
Cancer Cachexia				
No	3 (60.0)	2 (50.0)	2 (14.3)	0.105
Yes	3 (40.0)	2 (50.0)	12 (85.7)	
Metastasis				
No	4 (80.0)	2 (50.0)	7 (43.8)	0.365
Yes	1 (20.0)	2 (50.0)	9 (56.3)	
Indication for HPN				
Extensive small bowel mucosal disease	4 (80.0)	1 (25.0)	5 (31.3)	0.483
Intestinal dysmotility	0 (0.0)	0 (0.0)	2 (12.5)	
Mechanical obstruction	1 (20.0)	3 (75.0)	8 (50.0)	
Short bowel syndrome or intestinal fistula	0 (0.0)	0 (0.0)	1 (6.3)	

Gynaecological: breast, endometrial; Lower gastrointestinal: small bowel, colon, sigmoid; upper gastrointestinal: oesophageal, gastric; haematological: leukaemia, lymphoma, amyloidosis; other: penis, bladder, HPN=Home Parenteral Nutrition, KPS=Karnofsky Performance Status, NST=Nutritional Screening Tool.

Table S8. PG-SGA score distribution according to type of malignancy, KPS score, cachexia, metastatic disease, and indication for PN.

	PG-SGA scores [N (%)]		χ^2 p- value
	Medium Risk	**High Risk**	
Type of malignancy			
Gynaecological	0 (0.0)	1 (5.9)	0.909
Upper Gastrointestinal	2 (28.6)	6 (35.3)	
Lower Gastrointestinal	1 (14.3)	3 (17.6)	
Haematological	3 (42.9)	6 (35.3)	
Other	1 (14.3)	1 (5.9)	
KPS			
<50	2 (28.6)	4 (23.5)	0.795
≥50	5 (71.4)	13 (76.5)	
Cancer Cachexia			
No	2 (28.6)	5 (33.3)	0.823
Yes	5 (71.4)	10 (66.7)	
Metastasis			
No	4 (57.1)	9 (52.9)	0.851
Yes	3 (42.9)	8 (47.1)	
Indication for HPN			
Extensive small bowel mucosal disease	2 (28.6)	6 (35.3)	0.467
Intestinal dysmotility	1 (14.3)	3 (17.6)	
Mechanical obstruction	3 (49.2)	8 (47.1)	
Short bowel syndrome or intestinal fistula	1 (14.3)	0 (0.0)	

Gynaecological: breast, endometrial; Lower gastrointestinal: small bowel, colon, sigmoid; upper gastrointestinal: oesophageal, gastric; haematological: leukaemia, lymphoma, amyloidosis; other: penis, bladder, HPN=Home Parenteral Nutrition, KPS=Karnofsky Performance Status, PG-SGA=Patient Generated Subjective Global Assessment.

Table S9. Factor analysis and structure.

	Questions	Factors				
		1	2	3	4	5
Pain	Have you had pain after eating or drinking?	-0.912				
	Have you had other pain?	-0.875				
	Have you had aches or pains in your muscles or joints?	-0.749				
	Were you able to eat food?	-0.743				
	Have you had nausea/vomiting?	-0.702				
	Have you had trouble taking a short walk outside the house?	-0.685				
Worrying	Have you worried about the future?		-0.897			
	Have you worried about your current health?		-0.848			
	Have you felt bloated?		-0.612			
Walking/ socialising	Have you had trouble taking a long walk?			0.852		
	Were you able to go out to work?			0.684		
	Have you felt you wanted to go out to work?			0.602		
	Were you able to socialise?			0.578		
	Have you needed help with eating, dressing, washing yourself or using the toilet?			0.547		
Energy/ independence	Were you able to feel independent?				0.853	
	Have you felt depressed?				0.674	
	Were you able to cope with daily life?				0.647	
	Were you able to drink fluids?				0.625	
	Have you felt lacking in energy?				0.622	
	Have you felt tired?				0.554	
Activities	Have you had trouble doing strenuous activities, like carrying a heavy shopping bag or suitcase?					0.697
	Were you able to take part in hobbies or leisure activities?					0.688
	Were you able to do shopping?					0.666
	Were you able to exercise?					0.638

Table S10. Quality of Life according to type of malignancy, indication for PN, presence of metastases and cachexia, NST, PG-SGA, KPS and WHO-PS scores.

	FACT-G	FACT-G PHYSICAL	FACT-G SOCIAL	FACT-G EMOTIONAL	FACT-G FUNCTIONAL	Pain	Worrying	Walking/ Socialising	Energy/ Independence	Activities
Type of malignancy										
Gynaecological	30.0	10.0	24.0	24.0	6.0	1.8	-0.6	0.8	-0.5	-0.9
Upper Gastrointestinal	26.0 (8.4)	9.35 (3.6)	21.9 (7.2)	12.7 (5.8)	12.3 (6.7)	0.3 (0.5)	0.2 (1.1)	-0.2 (0.7)	0.0 (0.8)	0.3 (1.3)
Lower Gastrointestinal	32.1 (11.7)	13.7 (5.7)	25.1 (1.9)	16.3 (2.5)	13.5 (8.2)	-0.2 (1.0)	-0.2 (0.7)	0.2 (0.6)	0.0 (1.4)	0.7 (0.8)
Haematological	24.0 (11.1)	11.1 (7.2)	24.7 (3.0)	14.9 (7.7)	8.3 (6.2)	-0.3 (1.2)	0.1 (0.8)	0.3 (1.4)	-0.2 (1.1)	-0.3 (0.8)
Other	27.7 (13.7)	12.5 (12.0)	14.3 (6.1)	14.5 (6.4)	10.7 (6.6)	-0.6 (0.8)	-0.4 (2.3)	-0.9 (0.4)	0.8 (1.5)	-0.4 (0.2)
p-value	0.766	0.806	0.169	0.514	0.614	0.210	0.893	0.496	0.821	0.422
Metastatic Disease										
No	26.9 (11.0)	12.9 (5.7)	23.7 (4.4)	16.2 (6.4)	10.0 (6.8)	-0.3 (0.9)	-0.2 (1.2)	0.5 (1.2)	0.1 (1.2)	-0.2 (0.9)
Yes	26.4 (8.9)	9.0 (5.5)	22.0 (6.8)	13.2 (5.8)	11.6 (6.5)	0.3 (1.1)	0.2 (0.8)	-0.4 (0.7)	-0.1 (0.8)	0.2 (1.1)
p-value	0.900	0.103	0.477	0.249	0.561	0.197	0.486	0.835	0.527	0.416
Cancer Cachexia										
No	32.2 (10.0)	14.3 (8.1)	20.6 (6.1)	17.4 (4.3)	13.3 (6.7)	-0.5 (1.0)	-0.1 (1.5)	0.3 (1.3)	0.2 (1.1)	-0.6 (0.2)
Yes	24.9 (9.8)	10.2 (4.1)	24.0 (5.4)	14.0 (6.3)	9.8 (6.9)	0.1 (0.9)	0.1 (0.8)	-0.1 (0.9)	0.0 (1.0)	0.2 (1.1)
p-value	0.136	0.130	0.219	0.249	0.316	0.204	0.672	0.445	0.769	0.134
NST										
Low risk	25.4 (7.1)	10.0 (6.0)	22.2 (7.4)	14.4 (7.8)	9.8 (3.6)	-0.5 (0.9)	0.9 (0.9)	0.7 (1.5)	0.1 (0.4)	0.0 (0.7)
Medium risk	28.0 (18.4)	14.7 (12.2)	25.4 (2.0)	17.0 (7.1)	11.0 (11.3)	-1.1	-1.3	0.3	-1.2	-0.9
High risk	28.1 (10.4)	10.7 (5.6)	23.3 (5.7)	14.4 (6.5)	12.1 (7.2)	0.1 (1.1)	-0.1 (0.9)	-0.4 (0.8)	0.3 (1.1)	0.0 (1.2)
p-value	0.884	0.667	0.819	0.877	0.812	0.344	0.075	0.203	0.378	0.764
PG-SGA										
At risk	28.0 (11.1)	14.2 (6.8)	22.0 (7.3)	15.4 (6.2)	11.2 (6.6)	-0.6 (0.7)	-0.4 (1.1)	-0.4 (0.8)	0.6 (1.1)	0.2 (1.4)
Severely malnourished	25.8 (9.8)	9.4 (5.0)	23.5 (5.0)	14.8 (6.3)	9.9 (6.3)	0.2 (1.0)	0.2 (0.9)	0.1 (1.0)	-0.3 (0.8)	-0.1 (0.8)
p-value	0.643	0.075	0.590	0.827	0.673	0.078	0.181	0.265	0.053	0.508
KPS										
<50	20.6 (9.5)	9.3 (3.2)	19.7 (8.9)	11.9 (5.4)	7.7 (4.7)	-0.1 (1.0)	0.3 (0.9)	0.1 (1.4)	-0.3 (0.7)	-0.4 (0.6)
≥50	28.2 (9.5)	11.4 (6.3)	23.7 (4.4)	15.4 (6.3)	11.6 (6.9)	0.0 (1.0)	-0.1 (1.0)	0.0 (0.8)	0.1 (1.1)	0.2 (1.1)
p-value	0.127	0.475	0.164	0.268	0.254	0.855	0.433	0.750	0.354	0.284
WHO-PS										
1	34.7 (11.6)	10.7 (5.7)	25.5 (2.2)	18.0 (2.0)	14.4 (8.4)	0.5 (0.4)	-0.5 (0.8)	-0.6 (0.1)	-0.3 (1.6)	1.1 (1.9)
2	27.5 (9.6.)	11.7 (5.3)	24.3 (3.3)	15.5 (6.8)	11.4 (7.5)	0.0 (1.0)	0.0 (0.9)	0.2 (0.9)	0.0 (1.1)	0.2 (0.9)
3	22.8 (8.7)	10.1 (7.0)	20.1 (7.8)	12.5 (5.9)	8.7 (4.3)	-0.1 (1.1)	0.1 (1.2)	-0.1 (1.2)	0.1 (0.8)	-0.5 (0.5)
p-value	0.178	0.848	0.167	0.351	0.411	0.774	0.697	0.640	0.845	0.068

Gynaecological: breast, endometrial; Lower gastrointestinal: small bowel, colon, sigmoid; upper gastrointestinal: oesophageal, gastric; haematological: leukaemia, lymphoma, amyloidosis; other: penis, bladder. FACT-G=Functional Assessment of Cancer Therapy: General, NST=Nutritional Screening Tool, PG-SGA-=Patient Generated Subjective Global Assessment, KPS= Karnofsky Performance Status, WHO-PS=World Health Organisation Performance Status
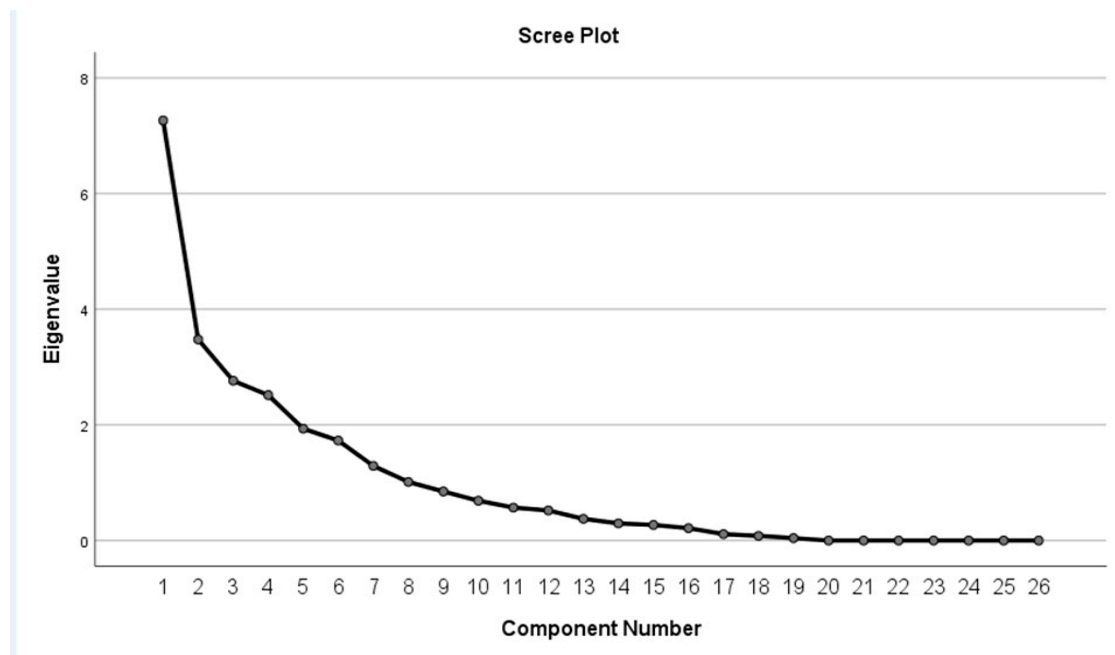
2. Supplementary Figures

Figure S1. Scree plot. The components lie in the X-axis and the corresponding eigenvalues in the Y-axis. The line drop after the fifth component indicates that the factor analysis identified five factors.