Greetings from Sussex Cancer Centre

Nutritional Challenges in Cancer Care Continuum

Primary Prevention
Secondary Prevention

Diagnosis - Prehabilitation

Treatment – Surgery Chemotherapy Radiotherapy Hormonal Therapy Targeted /Immunotherapy

Rehabilitation - Living with and beyond

Long Term Consequences- **Late Effects**

Palliative Care – Enhanced Supportive Care
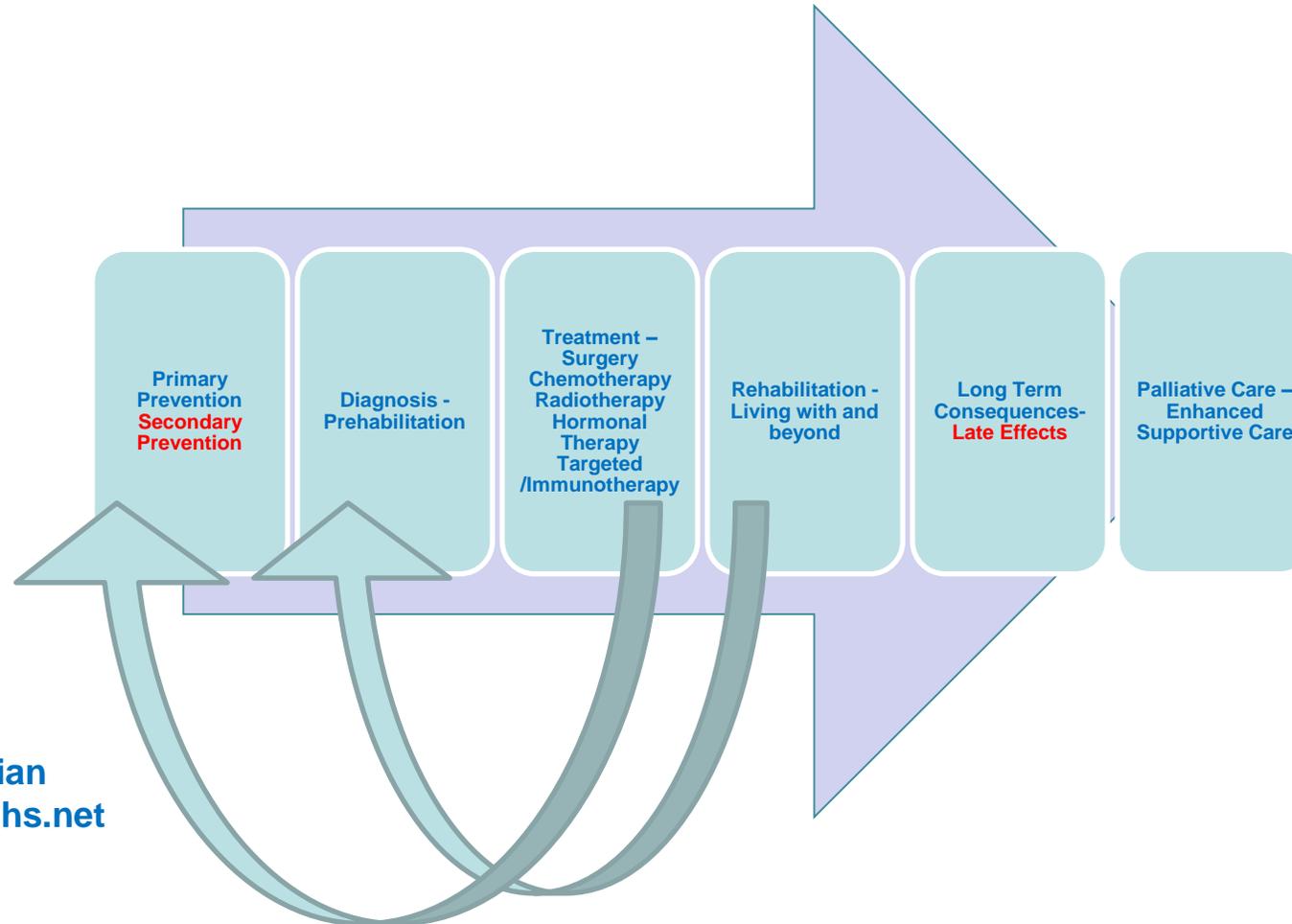
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Background

- 20% to 70% of cancer patients experience malnutrition

- Consequences of malnutrition
  - can negatively affect decision to offer treatment
  - ↓ tolerance and response to treatment
  - ↑ risk of complications
  - ↓ quality of life
  - ↓ survival
  - impairs physical functioning

- 10-20% of deaths can be attributed to malnutrition rather than to the cancer

Santarpia et al.J Cachexia Sarcopenia Muscle 2011, Arends et al. Clinical Nutrition 2017

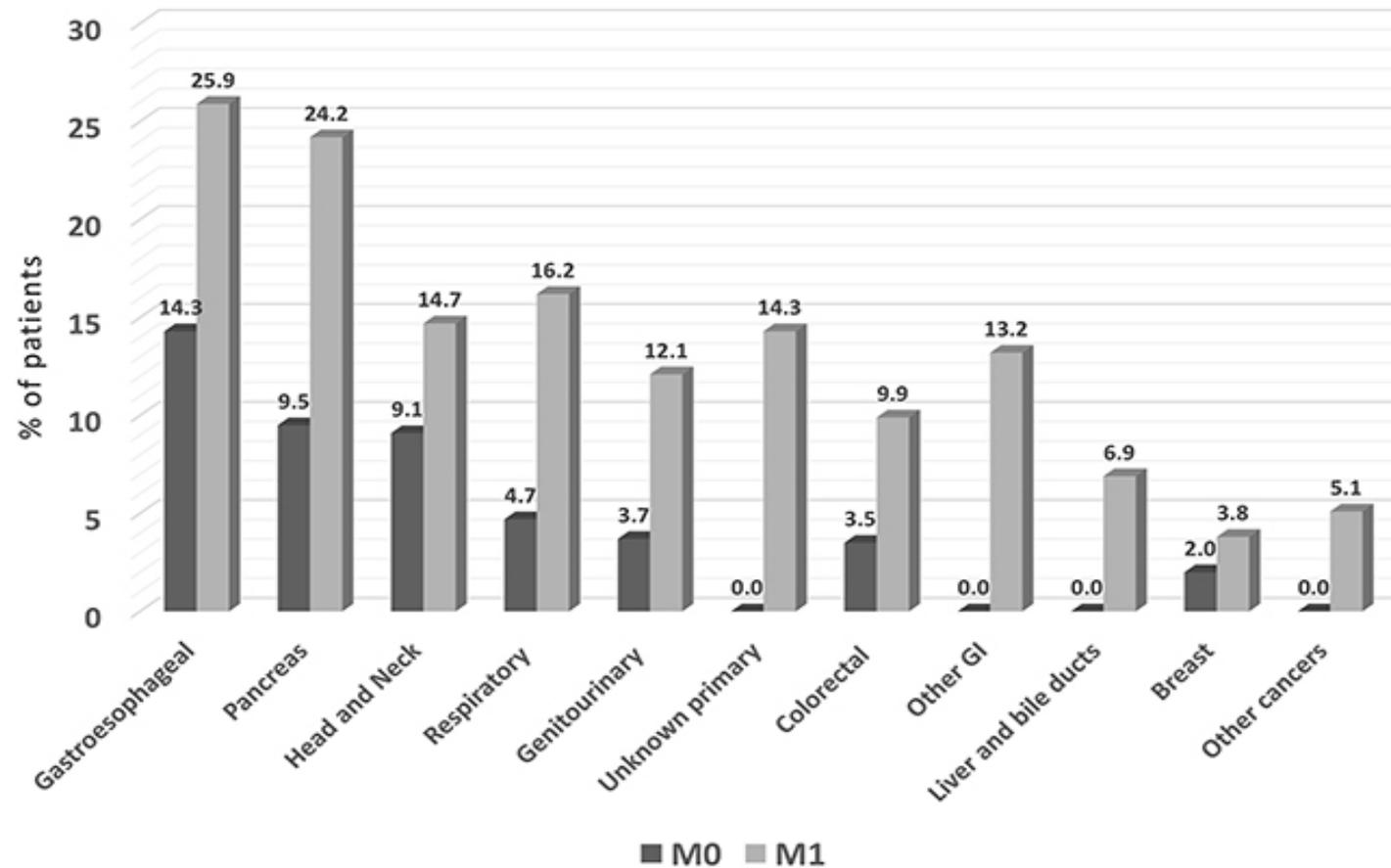# Changing demographics

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Metastatic Disease

Treatments focus on controlling cancer growth and relieving symptoms

Treatment can occur over years- treated as a chronic condition

Malnutrition rates in metastatic cancer

Overt malnutrition by cancer site and stage

Increasing older population

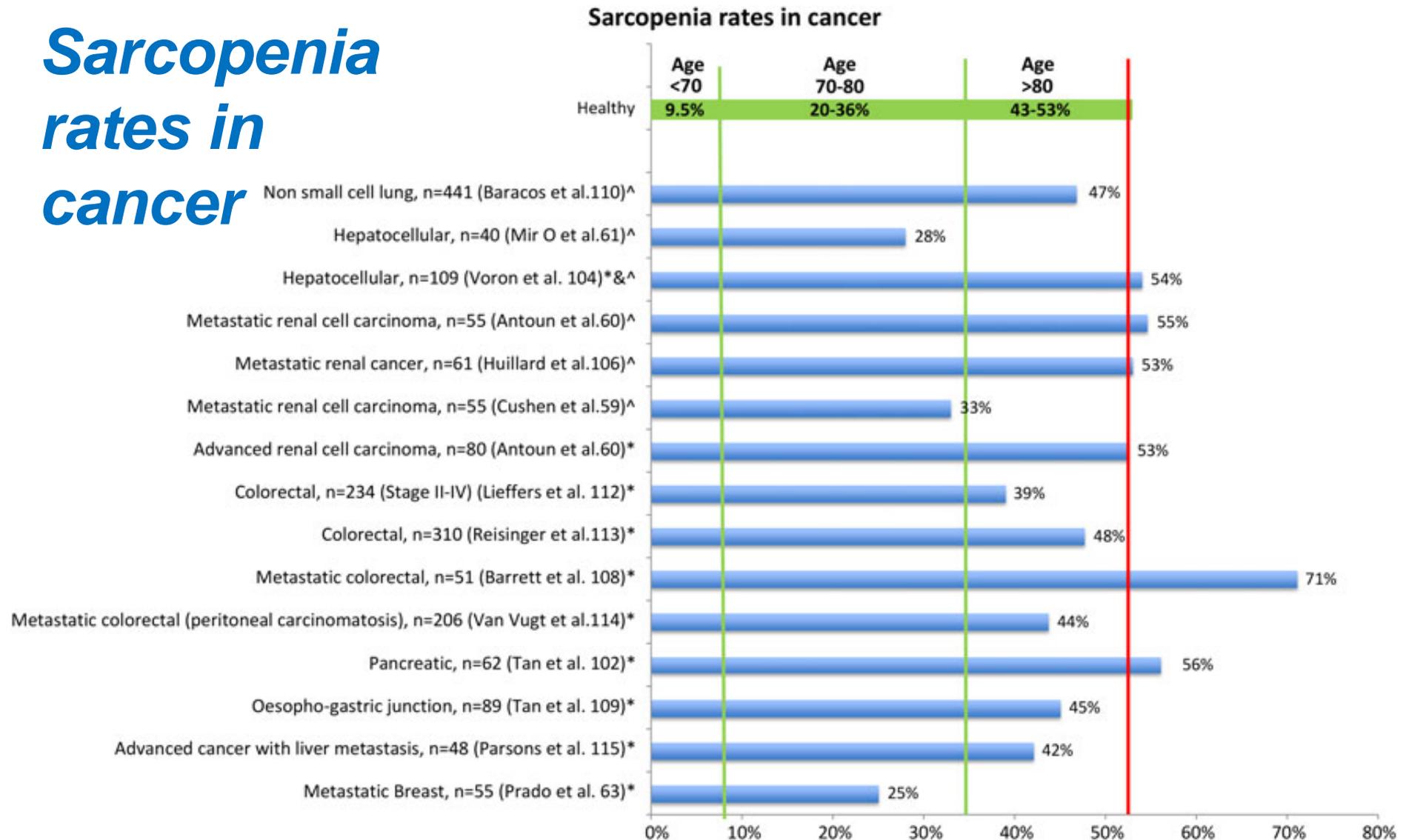**- 53% of all new cancers are aged 50-74**
- 36% are older people age 75+

Cancer Research UK

- Older adults increased risk of sarcopenia (Age & Aging 2018, Muscle loss; The new malnutrition challenge in clinical practice 2018)

- Eat more slowly, consume smaller meals, eat fewer snacks

- Age related changes in taste, smell, sight and hearing

- More chewing and swallowing problems

- Functional issues-access, preparation of food

- Psychological problems-depression
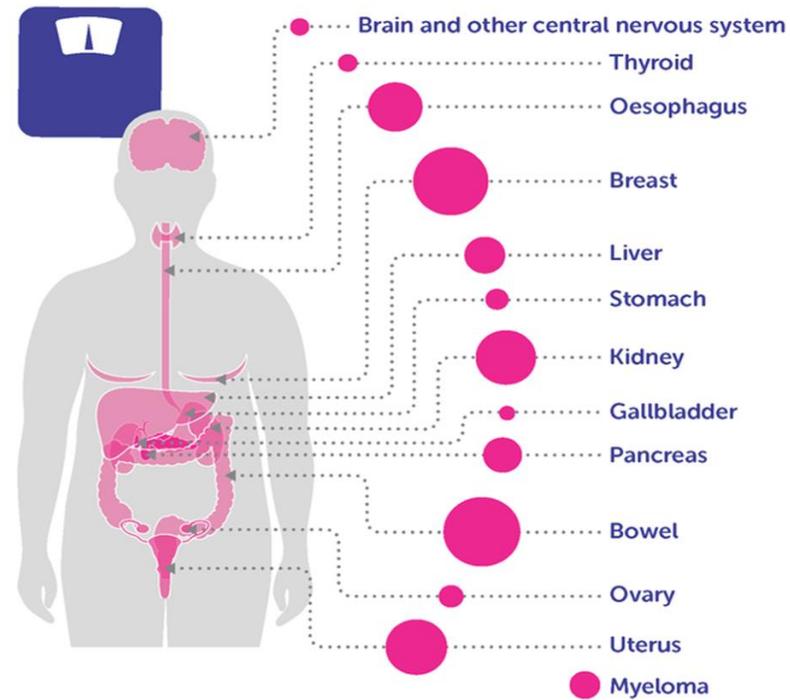
- Social effects of living /eating alone

Robinson et al. Journal of Aging, Research 2012

Sarcopenia rates in cancer

Sarcopenia rates in cancer

	Age <70	Age 70-80	Age >80
Healthy	9.5%	20-36%	43-53%

- Non small cell lung, n=441 (Baracos et al.110)^ — 47%
- Hepatocellular, n=40 (Mir O et al.61)^ — 28%
- Hepatocellular, n=109 (Voron et al. 104)*&^ — 54%
- Metastatic renal cell carcinoma, n=55 (Antoun et al.60)^ — 55%
- Metastatic renal cancer, n=61 (Huillard et al.106)^ — 53%
- Metastatic renal cell carcinoma, n=55 (Cushen et al.59)^ — 33%
- Advanced renal cell carcinoma, n=80 (Antoun et al.60)* — 53%
- Colorectal, n=234 (Stage II-IV) (Lieffers et al. 112)* — 39%
- Colorectal, n=310 (Reisinger et al.113)* — 48%
- Metastatic colorectal, n=51 (Barrett et al. 108)* — 71%
- Metastatic colorectal (peritoneal carcinomatosis), n=206 (Van Vugt et al.114)* — 44%
- Pancreatic, n=62 (Tan et al. 102)* — 56%
- Oesopho-gastric junction, n=89 (Tan et al. 109)* — 45%
- Advanced cancer with liver metastasis, n=48 (Parsons et al. 115)* — 42%
- Metastatic Breast, n=55 (Prado et al. 63)* — 25%

Proceedings of Nutrition Society, Ryan et al 2016

Increasing overweight-obese population

OVERWEIGHT AND OBESITY IS THE UK'S **BIGGEST CAUSE OF CANCER AFTER SMOKING**

- Brain and other central nervous system
- Thyroid
- Oesophagus
- Breast
- Liver
- Stomach
- Kidney
- Gallbladder
- Pancreas
- Bowel
- Ovary
- Uterus
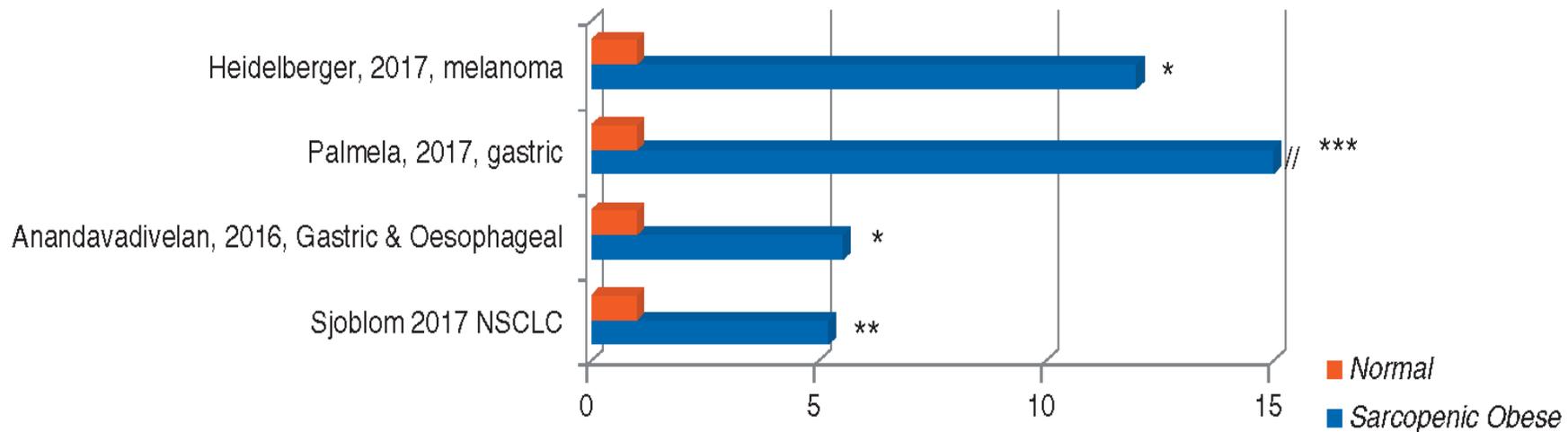- Myeloma

Larger circles indicate more UK cancer cases

Circle size here is not relative to other infographics based on Brown et al 2018.
Source: Brown et al, British Journal of Cancer, 2018

Sarcopenic obesity-impact on survival

SARCOPENIC OBESITY
Multivariate odds ratio for chemotherapy dose limiting toxicity

Heidelberger, 2017, melanoma *
Palmela, 2017, gastric ***
Anandavadivelan, 2016, Gastric & Oesophageal *
Sjoblom 2017 NSCLC **

■ Normal
■ Sarcopenic Obese

Multivariate P<0.05*, P<0.005**, P<0.0005***

Baracos. Annals of Oncology 2018

Malnutrition, cachexia , sacropenia all associated with poorer outcomes

Anorexia and limited food intake

Anorexia is associated with poor food intake by:

- Altered CNS appetite signals with symptoms resulting from cancer or its treatments (nausea, diarrhea, pain)

- Physical limitations to food intake and use (mouth ulcers, GI obstruction)

Precachexia and cachexia

With cachexia, anorexia and weight loss are worsened by:

- Catabolic drivers (inflammatory cytokines) that further reduce nutrient intake and increase metabolic needs

Sarcopenia

Sarcopenia ensues as:

- Body reserves are depleted

- Lean body mass, mostly muscle, is lost

Arends et al. Clinical Nutrition 2017

Diagnostic Symptoms

Suspected Cancer: recognition and referral NICE guideline NG12 July 2017

Oesophageal
- dysphagia
- weight loss
- reflux -dyspepsia
- nausea-vomiting

Lung
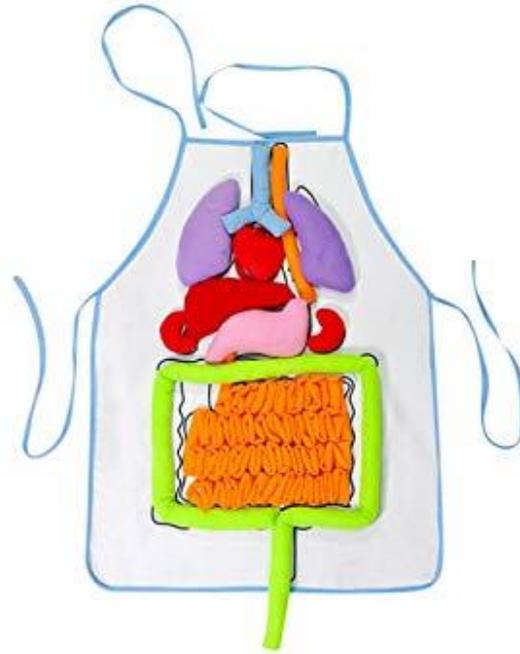- weight loss
- appetite loss

Stomach
- dysphagia
- reflux-dyspepsia
- weight loss

Pancreatic
- diarrhoea
- nausea-vomiting
- new onset diabetes

Colorectal
- weight loss
- iron-deficiency anaemia
- change in bowel habit

Ovarian
- ascites
- persistent bloating
- feeling full and/or loss of appetite
- weight loss
- change in bowel habit

Support from decision to treat

Fit for and After Cancer Therapy – FACT
Macmillan-RCoA-NIHR

Prehabilitation in cancer

Prehabilitation: Actions used to improve your physical & mental health and build up strength before you start treatment.
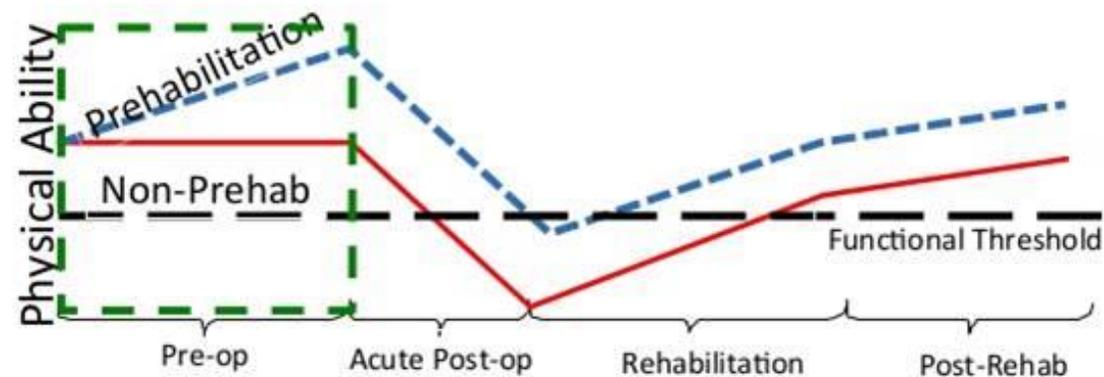
Prehabilitation Evidence and Insight Review Macmillan 2017

Support from decision to treat

Fit for and After Cancer Therapy – FACT
Macmillan-RCoA-NIHR

Prehabilitation-

✓ a process in t...

✓ not ...

...resilience and

...interventions;- physical activity , dietary
support , psychological well being

Guideline Launch
Prehabilitation World Congress in London
2nd July 2019

ESPEN Guideline

ESPEN guidelines on nutrition in cancer patients

Jann Arends [a], Patrick Bachmann [b], Vickie Baracos [c], Nicole Barthelemy [d], Hartmut Bertz [a], Federico Bozzetti [e], Ken Fearon [f, †], Elisabeth Hütterer [g], Elizabeth Isenring [h], Stein Kaasa [i], Zeljko Krznaric [j], Barry Laird [k], Maria Larsson [l], Alessandro Laviano [m], Stefan Mühlebach [n], Maurizio Muscaritoli [m], Line Oldervoll [i, o], Paula Ravasco [p], Tora Solheim [q, r], Florian Strasser [s], Marian de van der Schueren [t, u], Jean-Charles Preiser [v, *]

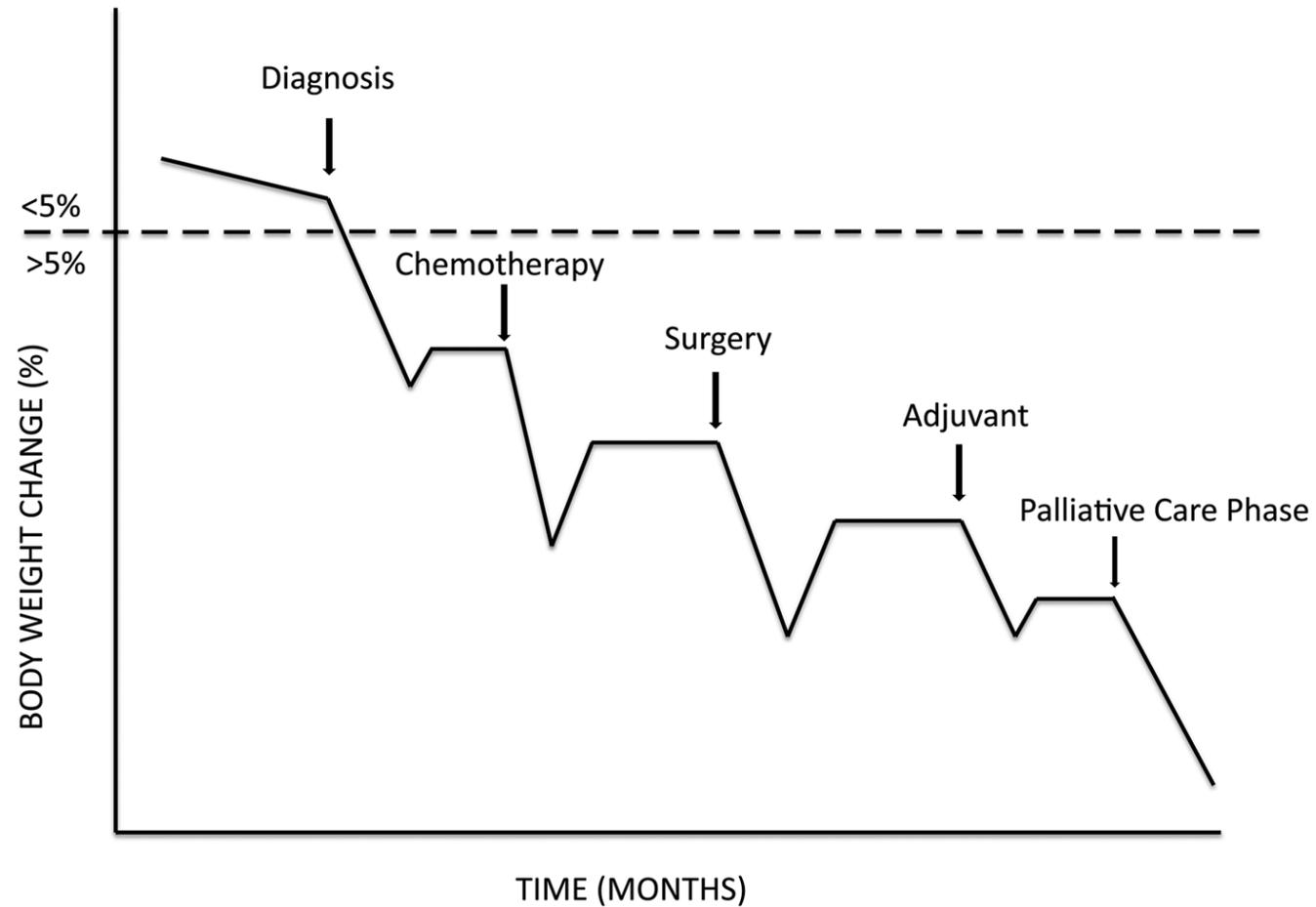| Screening and assessment |
|---|
| Starting with diagnosis, evaluate :   **(STRONG)**
     - nutritional intake, weight change, BMI
     - use validated screening tool (NRS 2002, MUST,MST,MNA) |
| If screening detects risk, regularly assess objectively and quantitatively:
     - nutritional intake
     - nutrition impact symptoms   **(STRONG)**
     - muscle mass
     - physical performance
     - degree of systemic inflammation |

Screen at -
- In patient and out patient visits
- At various stages along the pathway

Laviano et al. Proceedings of the Nutrition Society 2018

Empower patients to self report
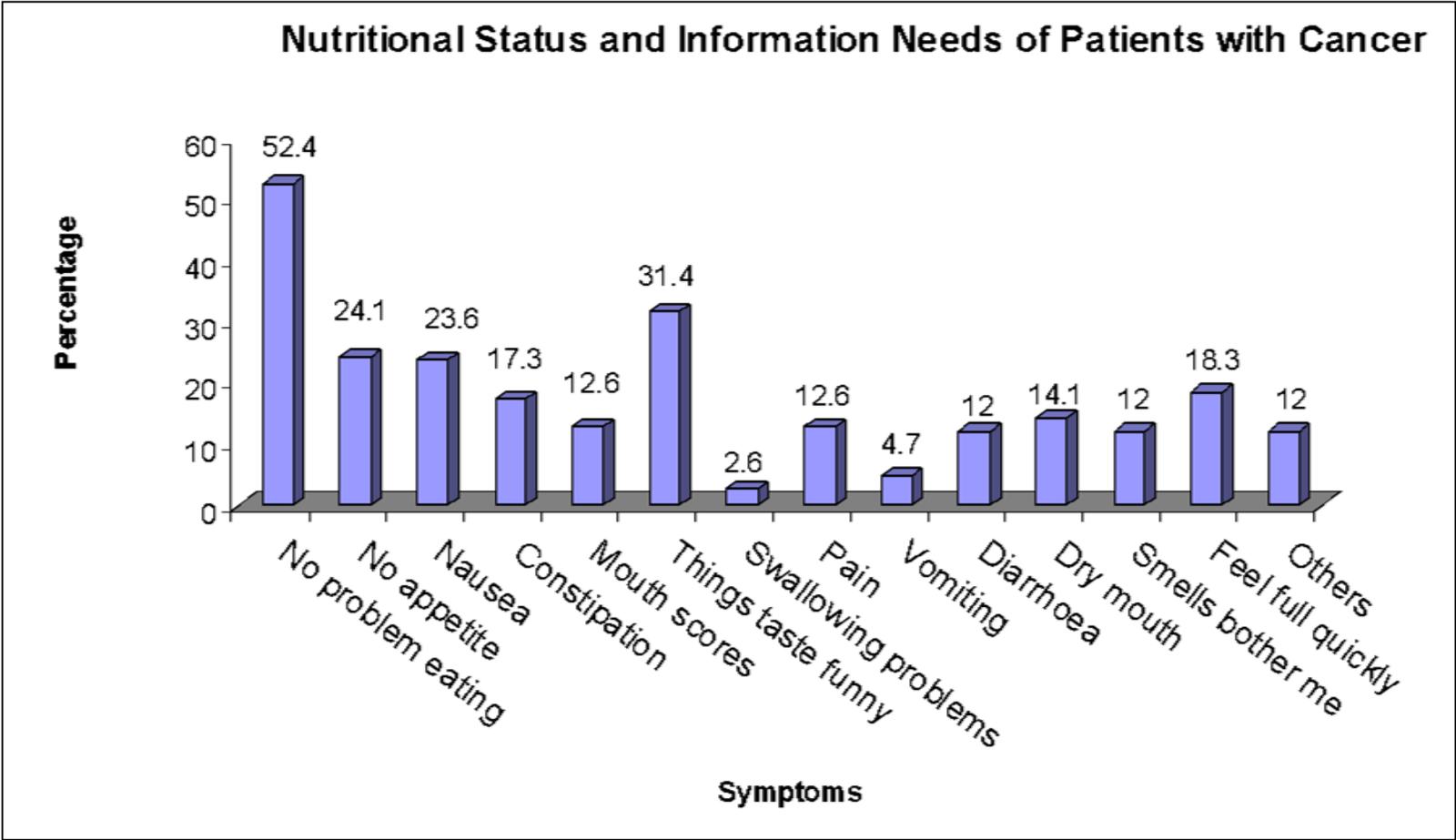
Nutritional interventions

B3-1	Efficacy of nutritional intervention
Recommends nutritional intervention to increase oral intake in cancer patients who are able to eat but are malnourished **(STRONG)** or at risk of malnutrition. This includes dietary advice, the treatment of symptoms and nutrition impact symptoms and offering oral nutritional supplements	

Possible Nutrition Impact Symptoms on the continuum

anorexia	nausea and vomiting	early satiety	anaemia
taste changes	sore mouth	constipation	reflux
bothering smells	fatigue	mechanical obstruction	dry mouth
chewing difficulties	diarrhoea	malabsorption	dysphagia
breathlessness	enzyme insufficiency	living with a stoma	colitis

Nutrition impact symptoms – on treatment assessed by PG-SGA

Nutritional Status and Information Needs of Patients with Cancer

Isenring et al, Nutrition and Cancer 2010

Prevalence and persistence of nutrition impact symptoms

PG-SGA	Baseline n (%) A	n=80 B + C	3 months A	n=68 B + C	12 months A	n=57 B + C
Dysphagia to solids	11 (23.4)	36 (76.7)	6 (24)	19 (76)	7 (33.3)	14 (66.7)
Dysphagia to fluids	5 (19.2)	21 (80.8)	4 (25)	12 (75)	3 (27.3)	8 (72.7)
Pain to solids	9 (26.5)	25 (73.5)	4 (26.7)	11 (73.3)	2 (22.2)	7 (77.8)
Pain to fluids	3 (15)	17 (85)	1 (16.7)	5 (83.3)	0 (0)	4 (100)
Regurgitation of solids	9 (27.3)	24 (72.2)	3 (20)	12 (80)	6 (37.5)	10 (62.5)
Regurgitation of fluids	7 (25.9)	20 (74.1)	2 (18.2)	9 (81.8)	6 (37.5)	10 (62.5)
Heart burn	12 (42.9)	16 (57.1)	6 (35.3)	11 (64.7)	5 (33.3)	10 (66.7)
Acid reflux	12 (34.3)	23 (65.7)	7 (30.4)	16 (69.6)	10 (66,7)	14 (58.3)
Belching	15 (30)	35 (70)	17 (47.2)	19 (52.8)	13 (35.1)	24 (64.9)
Nausea	3 (12)	22 (88)	14 (37.8)	23 (62.2)	8 (36.4)	14 (63.6)
Early satiety	7 (18.4)	31 (81.6)	8 (21.1)	30 (78.9)	7 (28)	18 (72)
Bloating	8 (34.8)	15 (65.2)	5 (29.4)	12 (70.6)	9 (47.4)	10 (52.6)
Abdominal pain	13 (37.1)	22 (62.9)	7 (30.4)	16 (69.6)	12 (35.3)	22 (64.7)
Flatulence	16 (33.3)	32 (66.7)	17 (38.6)	27 (61.4)	14 (35)	26 (65)
Diarrhoea	3 (20)	12 (80)	9 (32.1)	19 (67.9)	8 (30.8)	18 (69.2)
Faecal incontinence	3 (27.3)	8 (72.7)	5 (45.5)	6 (54.5)	5 (33.3)	10 (66.7)
Constipation	6 (16.7)	30 (83.3)	8 (25)	24 (75)	10 (43.5)	13 (56.5)

Grace et al. Human Nutrition and Dietetics 2018

Patient reported nutritional problems

Cancer and Nutrition
NIHR infrastructure collaboration

National Institute for
Health Research

Improving cancer prevention and care.
For patients. For Clinicians. For researchers.

Report of Phase One July 201

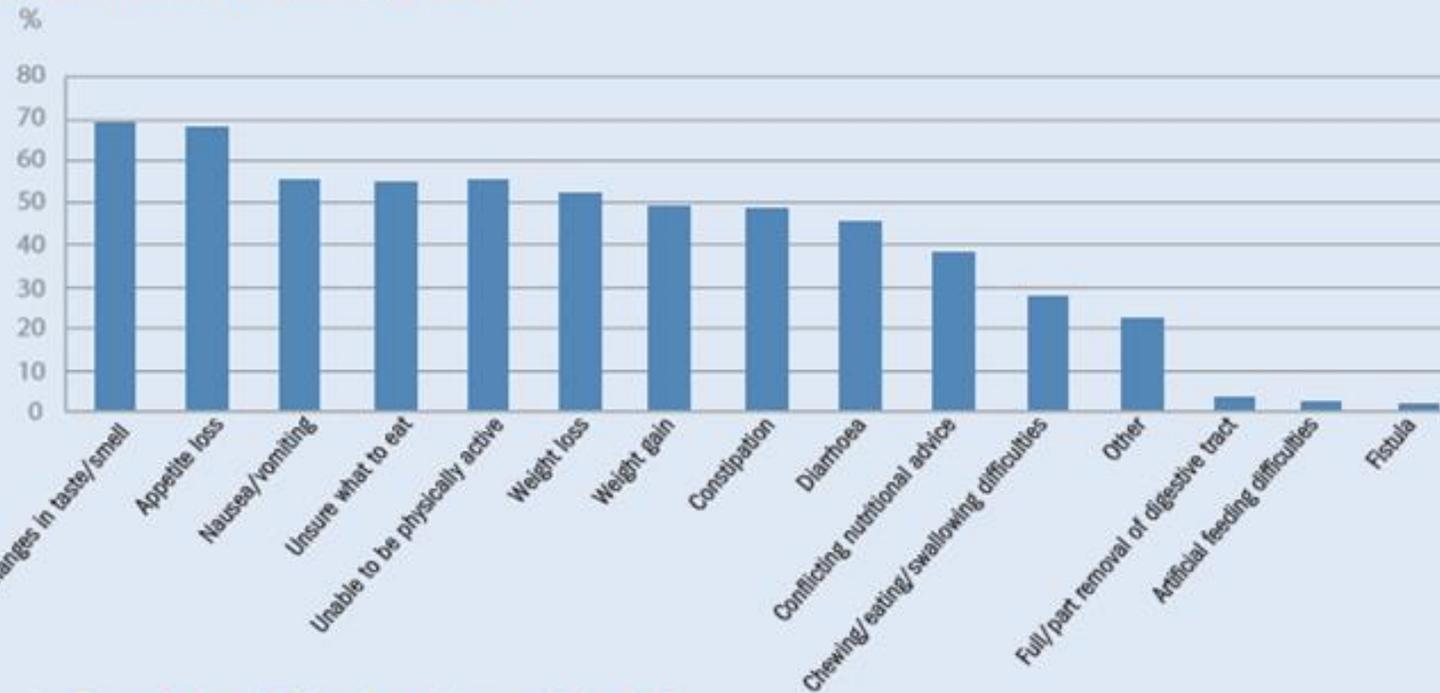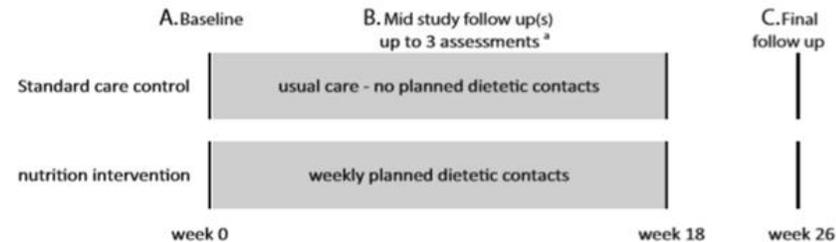Reported nutrional problems, % (n=96)

Figure 3: **Reported nutritional problems, % (n=96)**

Oral Nutrition Intervention Approaches

Lee et al. Supportive Care in Cancer 2016- Systematic review	Counselling with or without ONS showed improvements; energy/protein , QoL , less severe toxicity from radiotherapy
De Van der Schueren et al. Annals of Oncology 2018- Systematic review/ Meta-analysis	Overall benefit of intervention on body weight. Effect driven by high-protein n-3 PUFA ONS
Koshimoto et al. Supportive Care in Cancer 2019- Cross sectional study	Association between patients experience of eating related distress and demand for nutritional counselling –conflict , concern and anxiety around undernutrition
Ravasco et al. Am J Clinical Nutr 2012 – Randomised trial	Early individual nutrition counselling had sustained effect on outcome , nutritional intake ,↓ late radiotherapy toxicity, QoL and prognosis
Isenring et al. J Hum Nutr Dietetics 2004 – Randomised controlled trial	Patients receiving NI perceive nutrition as being beneficial and of higher importance to health than UC
Van der Werf et al. BMC Cancer 2015- Randomised controlled trial	Individualised counselling to prevent loss of muscle mass in colorectal cancer cancer. Early results being reported ESPEN 2019

Regular dietary counselling versus intensive interventional nutrition therapy

Fig. 1. Unexpected hospitalization days from study enrollment up to 2 years after study ending. The linking symbol at the top of the graph demonstrates the statistical significance between the two groups. P = 0.0072.

P = 0,0072

Survival proportions: Mortality

— Nutrition Therapy
-•- Control

P = 0,0039

Fig. 2. Kaplan–Meier curves showing patient survival from study enrollment up to 2 years after study ending. P = 0.0004.

Effect of early and intensive nutritional care via telephone

TEND (Telephone or Electronic Nutritional care Delivery) trial:- *currently recruiting*

Individually tailored, symptom-directed nutritional behaviour management program

1.Early intensive nutritional care via telephone

2.Via mHealth mobile App myPace

3.Usual care alone

Hanna et al. BMC Cancer 2018

Nutrition Counselling

- Individualised approach
- Address the presence and severity of symptoms and concerns - physical and emotional
- Convey the reasons and goals for nutritional recommendations
  - specify/prescribe protein / energy requirements
  - oral nutritional supplement requirements
- Motivate the patient, family and carers to adapt to altered nutritional demand of their disease
- Provide resources and techniques to support changes

P Ravasco. Nutrition 2015

Behaviour Change Techniques

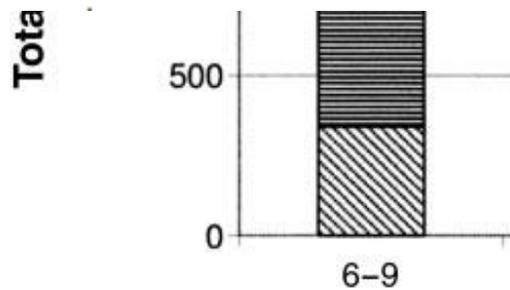| Behaviour change technique	Description of example during nutritional intervention
Provide information about behaviour-health link.	Patients informed of the relationship between poor health outcomes such as debility, compromised immunity, malnutrition and impaired response and tolerance to anti-neoplastic therapy
Provide information on consequences	Patients informed of dietary modifications to manage active or potential nutrition impact symptoms depending on treatment modality
Provide information about others' approval	Patients informed that their treating medical officer has recommended research participation due to the potential health benefits
Prompt barrier identification	Barriers to implementing dietary modifications and strategies to overcome these were discussed weekly, e.g. with treatment related fatigue resulting in poor intake, encourage food availability with pre-prepared meals/meal provision from family or friends on treatment days
Provide general encouragement.	Positive feedback was provided weekly to patients upon weight maintenance or gain, compliancy with dietary modifications consumption of supplements, etc.
Provide instruction	Patients requiring nutritional supplements were informed on supplements preparation, volume to consume daily and frequency of consumption, e.g. as a mid-meal snack, prior to bed
Prompt specific goal setting.	Specific dietary goals were provided to patients each week such as consume six small meals/day to combat reduced intake
Prompt review of behavioural goals	Each week goals that were set in the previous week were reviewed and compliance assessed. Review of dietary goals was undertake as part of nutritional assessment
Prompt self-monitoring of behaviour	Patients were asked to keep a weekly weight record, document a food and symptom diary if it was thought that specific foods may have been triggering adverse symptoms, and to document occasions or reasons if non-compliance with previous weeks nutritional goal setting

Dietary patterns in patients with advanced cancer: implications for anorexia-cachexia therapy[1-4]
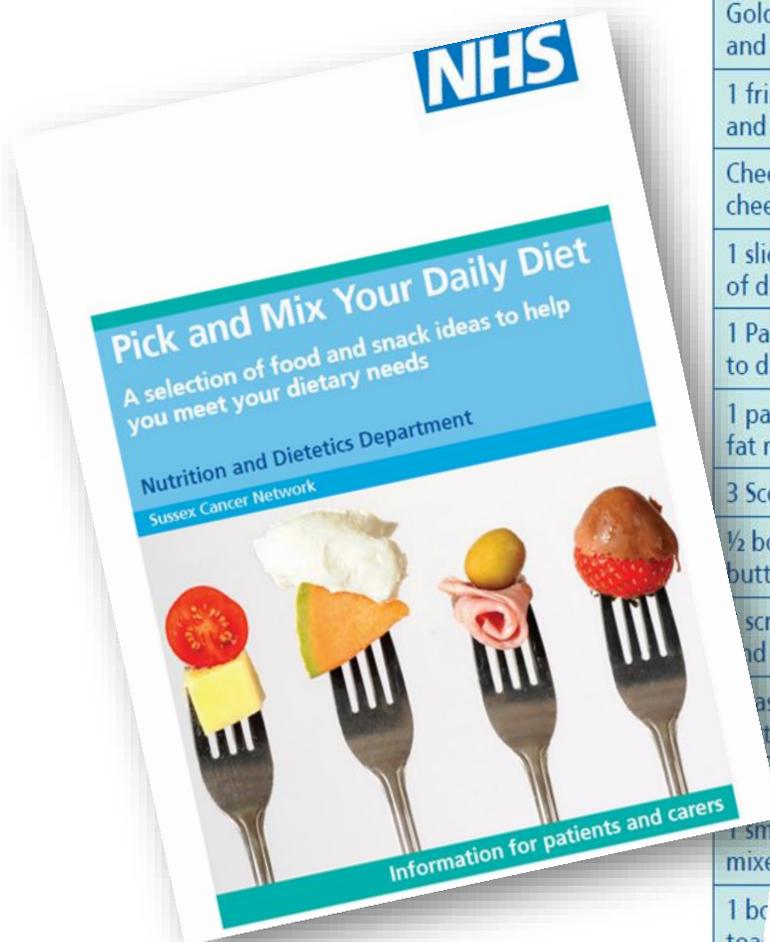
Joanne L Hutton, Lisa Martin, Catherine J Field, Wendy V Wismer, Eduardo D Bruera, Sharon M Watanabe, and Vickie E Baracos

Clinical variables by dietary intake pattern[1]

Clinical variable	Milk and Soup pattern (n = 25)	Fruit and White Bread pattern (n = 39)	Meat and Potato pattern (n = 87)	P
BMI (kg/m^2)	22.3 ± 5.3[2]	23.8 ± 5.3	23.5 ± 4.6	NS
Weight loss history				
Absolute (kg)[3,4]				
Percentage weight loss (%)[3,4]				
Time to death (mo)				

Preferred foods		Avoided foods	
Fruits and vegetables	62.1%	Greasy/fried foods	45%
Soup	55.9%	Spicy foods	39.9%
Poultry	54.4%	Citrus/acid foods	28.1%
Pasta	49.5%	Indian food	27.6%
Fish	47.5%	Mexican food	26.9%

Coa et al. Nutrition and Cancer 2015

Pick and Mix Your Daily Diet

A selection of food and snack ideas to help you meet your dietary needs

Nutrition and Dietetics Department

Sussex Cancer Network

Information for patients and carers

Breakfast picks

Breakfast picks	Energy (Kcal)	Protein (g)
Golden syrup porridge pot made with full fat milk and 1tbs double cream	290	8
1 fried rasher of back bacon with 1 fried egg and a slice of	320	13
Cheesy omel... cheese (mat...		
1 slice eggy... of double c...		
1 Pain au C... to drink		
1 packet o... fat milk t...		
3 Scotch		
½ boil in... buttered		
scram... d 1ts...		
ashe... ter...		

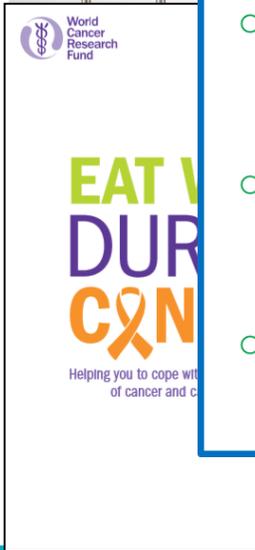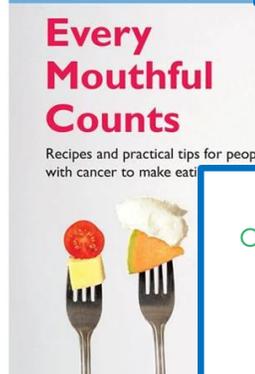|	Energy (Kcal)	Protein (g)
1 medium sized jacket potato with 2 tbs grated cheese and butter	310	10
¼ of Margherita pizza	290	13
¼ of Pepperoni pizza	290	14
2 potato waffles with 2 tbs baked beans	290	7
1 sausage with 2 ½ tbs mash potato (with butter) and 2 tbs gravy	300	10
½ can cream of chicken soup with 1 buttered soft bap	300	9
2 fish fingers, 10 chips and 2 tbs baked beans	320	14
½ ready meal of macaroni cheese	340	13
1 small slice of Quiche Lorraine and 2 tbs coleslaw salad	410	11
240g Shepherd's Pie	350	21
½ tin sausages & beans with 1 tbs grated cheese on top	270	14
1 baked chicken kiev	350	24
2 thin slices smoked salmon and cream cheese (2tsp) on a toasted muffin	340	23
2 small crab or fish cakes with 1tbs of crème fraiche	380	26
½ tin baked beans on 1 slice of buttered toast and sprinkle of grated cheese on top (match box size)	360	18
½ readymade fish pie with 2tbs peas covered in 1 tsp butter	290	14
250mls glass of soya milk... banana and 1tbs peanut butter		

6 pick and mix portions
6 x 300 kcals – 1800 kcals
72 g protein

Take-home messages

- o Screen all patients with cancer for nutritional risk as early as possible
- o Assess and provide individual holistic nutritional care plans
- o Monitor care plans and adjust according to changing needs
- o Use resources to support interventions

Thank you – questions?