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Nutritional Assessment in Pancreatic Cancer

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Topics

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- Pancreatic cancer statistics
- Pancreas and it’s functions
- Malnutrition, Sarcopenia and Cachexia
- Factors affecting nutritional status
- Calculating nutritional requirements
- Functional tests and assessment tools used at MFT
- Case study

Pancreatic cancer

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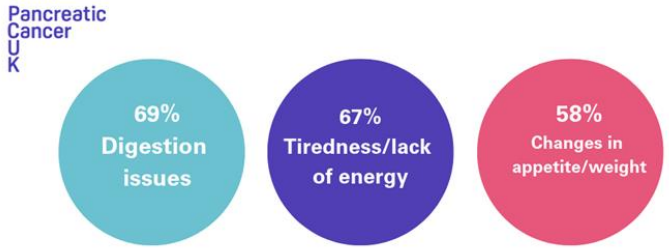
- **11th** most common cancer in the UK
  - 10,0000 Pancreatic cancer cases in the UK in 2016
- Lowest survival of all common cancers
  - **5 year** survival **less than 7%**
  - **1 year** survival **less than 24%**
- **1 in 10** will receive potentially curative surgery
- Over **80%** of patients report weight loss at the time of diagnosis

PCUK survey of 274 people living with and beyond pancreatic cancer



Pancreas and its functions

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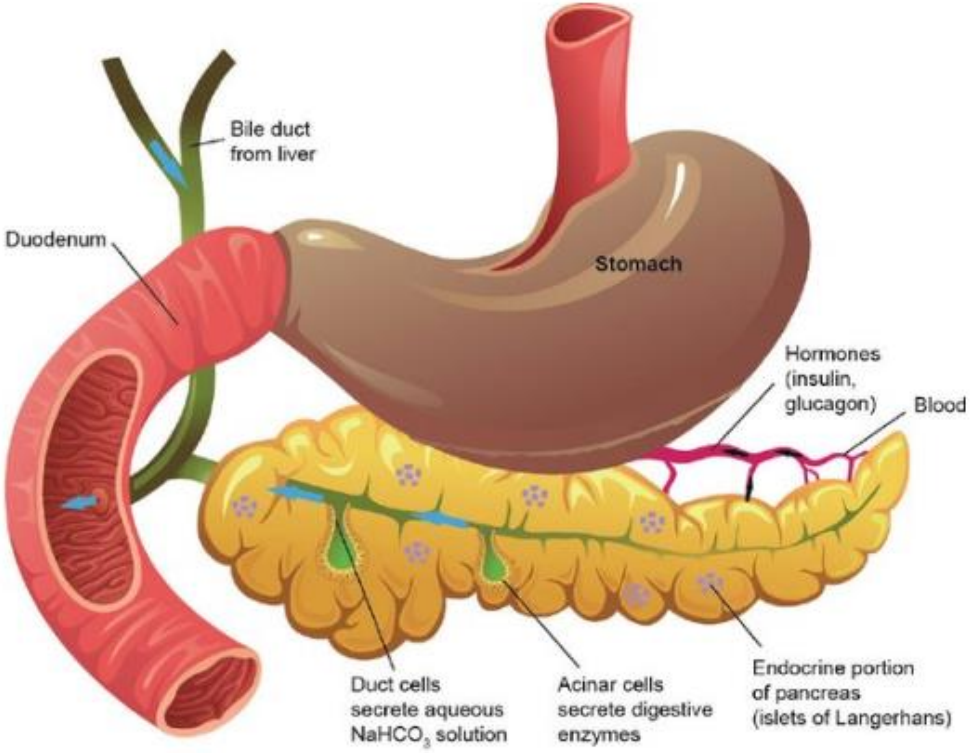
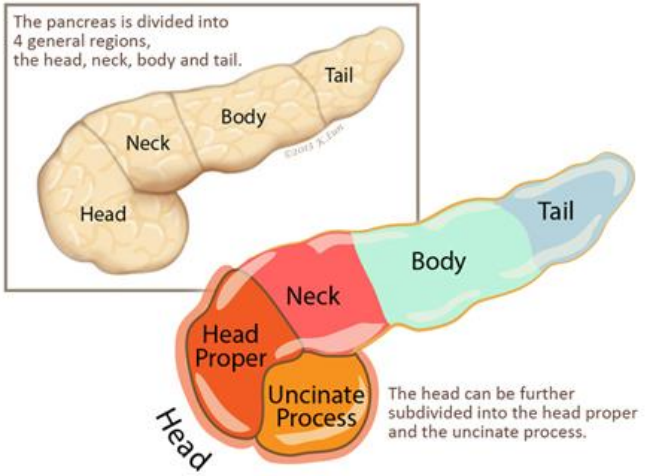
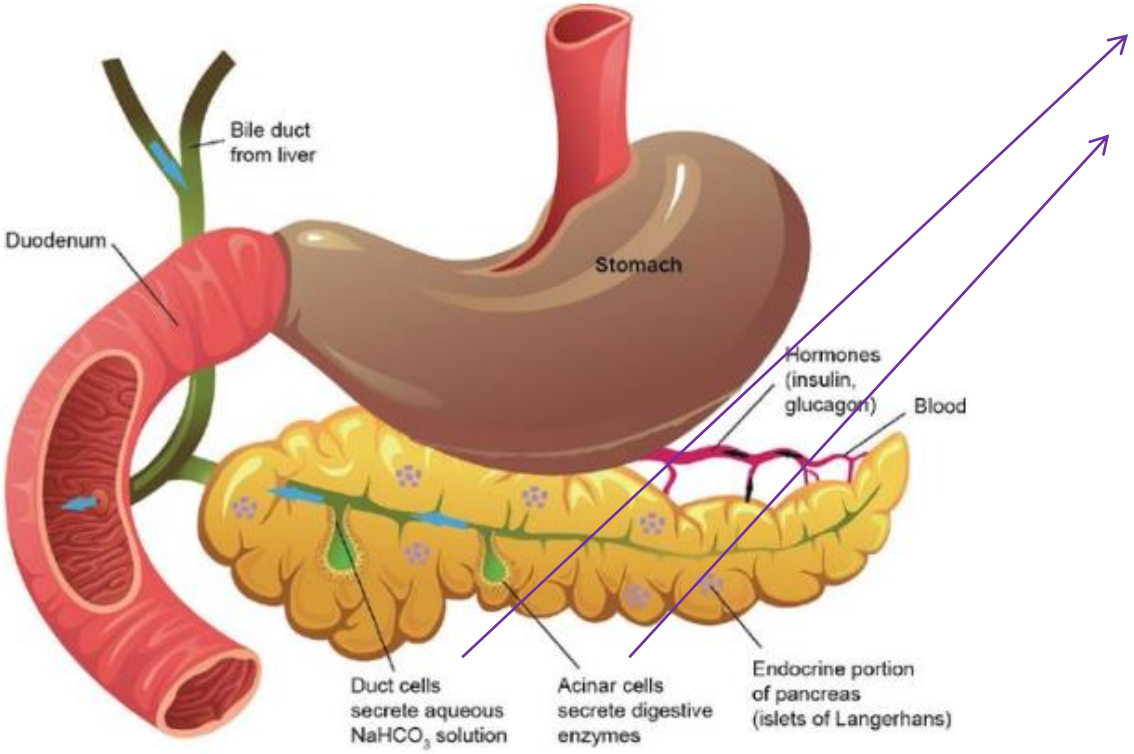




Pancreas and its functions

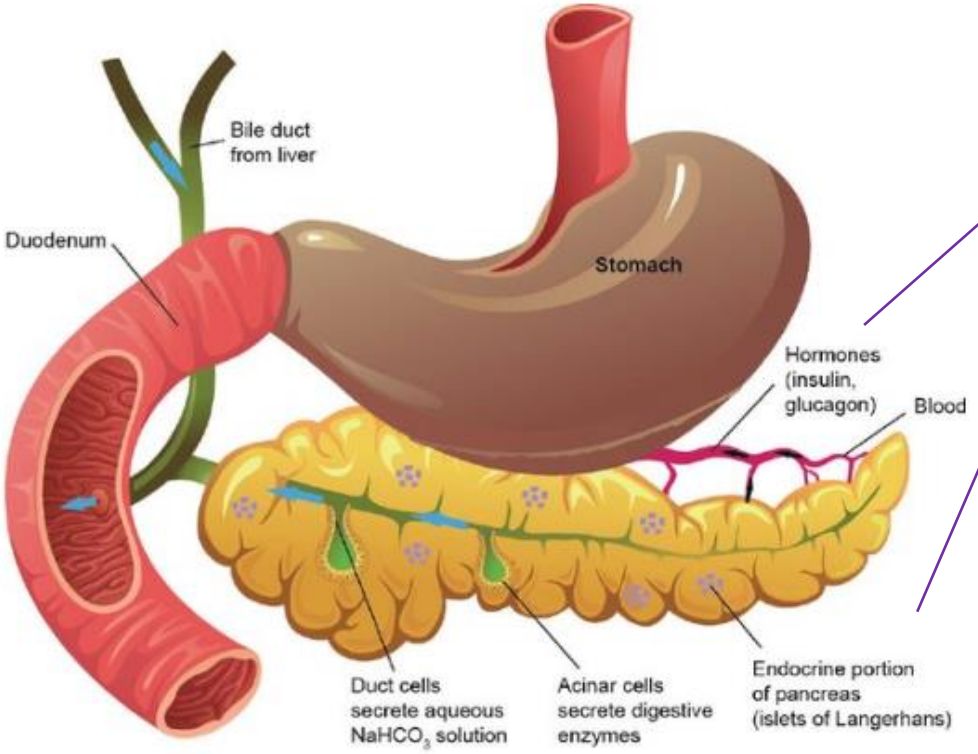


<u>Exocrine</u> function (Acinar cells and ducts)

- Accounts for 85% of the pancreas
- Produces and secretes enzymes:
  - Lipase (fats)
  - Amylase (carbohydrates)
  - Protease (proteins)

Digestion

Pancreas and its functions



<u>Endocrine</u> function (Islets of Langerhans)

Produce and secrete hormones into the bloodstream:

- Beta cells – Insulin (↓)
- Alpha cells – glucagon (↑)

- Delta cells - Somatostatin

Blood glucose regulation

Why is nutritional assessment so important in pancreatic cancer ?

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- Early nutritional intervention is crucial
- High prevalence of malnutrition
- Weight loss common at diagnosis
- Malnutrition leads to:
  - Longer Hospital stay
  - Increased risk of complications
  - Reduced QoL
  - Increased morbidity + mortality
- Better prognosis if weight is stable
- Weight loss and steatorrhoea are very late symptoms of PEI

Factors affecting nutritional status

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- Increased REE
- Malabsorption due to pancreatic exocrine insufficiency
  - Abdominal pain, loose stools, Steatorrhoea, lethargy, bloating, flatulence/burping
- Taste changes
- Weight loss associated with chemotherapy/radiotherapy/surgery
- Low mood
- Misdiagnosed/undiagnosed hyperglycaemia
- Nausea/Vomiting
  - Side effect from treatment
  - Secondary to delayed gastric emptying/gastric outlet obstruction

What is the difference between malnutrition, sarcopenia and cachexia?

Malnutrition

- 'Malnutrition is a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein and other nutrients causes measurable adverse effects on tissue / body form (body shape, size and composition) and function and clinical outcome.' (BAPEN, 2020)

Sarcopenia

- Defined as progressive and generalized loss of skeletal muscle mass and strength
- Prevalence of 55.9%-63% reported in pancreatic cancer patients

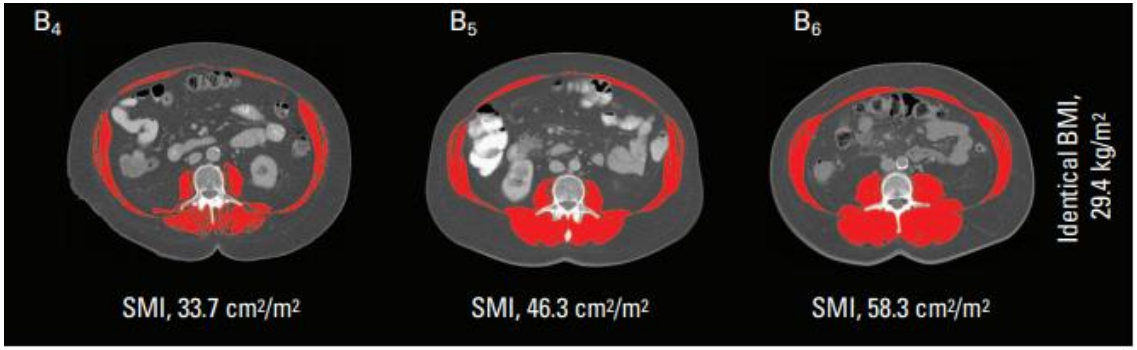
Cachexia

- Multifactorial syndrome characterised by an ongoing loss of skeletal muscle mass (with or without loss of fat mass) that cannot be fully reversed by conventional nutritional support and leads to progressive functional impairment
- Prevalence of up to 80% in those with progressing pancreatic cancer

JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

Cancer Cachexia in the Age of Obesity: Skeletal Muscle Depletion Is a Powerful Prognostic Factor, Independent of Body Mass Index

Lisa Martin, Laura Birdsell, Neil MacDonald, Tony Reiman, M. Thomas Clandinin, Linda J. McCargar, Rachel Murphy, Sunita Ghosh, Michael B. Sawyer, and Vickie E. Baracos



BMI = 29.4kg/m2
BUT…
differing skeletal muscle

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How do we assess nutritional status?

Nutritional requirements

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ESPEN guidelines (2016)

Energy

- 25-30kcal/kg/day
- Evidence level: low

Protein

- 1-1.5g/kg/day
- Evidence level: moderate

PENG (2018)

Energy

- 24kcal/kg/day
  - ≤65 yrs
  - (BMI 18.5-30kg/m^2)
- 24kcal/kg/day (range 22-27)
  - > 65 yrs
  - (BMI 18.5-30kg/m^2)
- 25kcal/kg/day (range 24-26)
  - (BMI<18.5kg/m^2)

Protein

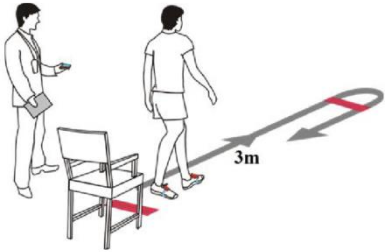
- Based on ESPEN guidelines
- 1-1.5g/kg/day

Functional tests

- Sit to stand

AGE	MEN	WOMEN
60-64	< 14	< 12
65-69	< 12	< 11
70-74	< 12	< 10
75-79	< 11	< 10
80-84	< 10	< 9
85-89	< 8	< 8
90-94	< 7	< 4

- Timed up and go



- Handgrip strength

- Duke Activity Index

Other

- Bioelectrical Impedance Analysis (BIA)

Assessment tools

- Faecal elastase-1 (FE-1)
  - Has limitations
- Scored Patient Generated - Subjective Global Assessment (PG - SGA)
  - Vashi et al – nutritional + survival outcomes in pancreatic cancer patients receiving enteral/parenteral nutrition during cancer treatment. Categorised patients into improved SGA(28.6%), deteriorated SGA(30.3%) and unchanged SGA(41.1%). **“Improvement in SGA correlated with a significantly decreased risk of mortality independent of sex, previous treatment history, and evidence of biological anticancer activity.”**
- Knowledge of PERT
- Gastrointestinal symptoms
- Assessment of physical activity levels (both aerobic and resistance)
- Nutritional deficiencies
  - Vitamin D, Vitamin B12, Folate , Ferritin, Iron, Zinc, Selenium, Copper, HbA1c, random blood glucose

Scored Patient Generated Subjective Global Assessment (PG-SGA)

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

Patient ID Information

Pt should complete if possible; not professional or family unless needs help (sight, literacy, etc.)

History Boxes 1-4 are designed to be completed by the patient.
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

1. Weight *(See Worksheet 1)*

While height is not essential for scoring, the app calculates BMI

In summary of my current and recent weight:

I currently weigh about _____ pounds
I am about _____ feet _____ tall

Complete both 1 & 6 months; for scoring, use 1 mo if available. Use 6 mos only if 1 mo is not available

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

During the past two weeks my weight has:

☐ decreased (1) ☐ not changed (0) ☐ increased (0) Box 1

Box 1 max score = 5 points: up to 4 pts from wt loss + up to 1 point for past 2 wks

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

Score how the patient self-rates his/her intake during the past month; this helps to address recent deficit / current risk

☐ 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 (4) Box 2

Box 2 not additive; max = 4; use the highest score checked, no matter how many checked

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)
☐ nausea (1)
☐ constipation (1)
☐ vomiting (3)
☐ diarrhea (3)
☐ mouth sores (2)
☐ things taste funny or have no taste (1)
☐ problems swallowing (2)
☐ pain; where? (3) _____
☐ other** (1) _____
☐ dry mouth (1)
☐ smells bother me (1)
☐ feel full quickly (1)
☐ fatigue (1)

** Examples: depression, money, or dental problems

Box 3 Any symptoms that patient reports (checks off) that has kept them from eating enough during the past 2 weeks gets scored. Add all points for Box 3 total score

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)

This is the WHO or ECOG performance status in patient terms, Patient rates his/her activity level over the past month regardless of the cause – inadequate intake, metabolic stress (corticosteroids, fever, inflammation, trauma) or significant inactivity. Remember, 1 week of complete bed rest is associated with up to 4% loss in lean tissue/muscle mass

Box 4

Additive Score of the Boxes 1-4 A

Email: faithotterymdphd@aol.com or info@pt-global.org

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Scored Patient Generated Subjective Global Assessment (PG-SGA)

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

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

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

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%

Numerical score from Worksheet 1 ☐

Additive Score of the Boxes 1-4 (See Side 1) ☐ A

5. Worksheet 2 - Disease and its relation to nutritional requirements

All relevant diagnoses (specify) _____

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

One point each:

☐Cancer ☐AIDS ☐Pulmonary or cardiac cachexia ☐Presence of decubitus, open wound, or fistula
☐Presence of trauma ☐Age greater than 65 years ☐Chronic renal insufficiency

Numerical score from Worksheet 2 ☐ B

6. Work Sheet 3 - Metabolic Demand

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

Fever: Score fever intensity or duration, whichever is greater. (99°F= 37.2°C 101°=38.3° and 102° = 38.9°)

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 steroid (≥ 30mg prednisone equivalents/day)

Numerical score from Worksheet 3 ☐ C

Even short term use of corticosteroids can adversely impact protein status and muscle mass

See www.pt-global.org for prednisone equivalents chart and metric and additional language version (as available)

7. Worksheet 4 - Physical Exam

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 3+ = severe

Muscle Status:				
clavicles (pectoralis & deltoids)	0	1+	2+	3+
interosseous muscles	0	1+	2+	3+
thigh (quadriceps)	0	1+	2+	3+
Global muscle status rating	**0**	**1+**	**2+**	**3+**

Fluid Status:				
orbital fat pads	0	1+	2+	3+
triceps skin fold	0	1+	2+	3+
Global fat deficit rating	**0**	**1+**	**2**	**3+**

These are examples of areas that can/should be considered in determining loss/deficit (or excess fluid). RELAX... One does NOT have to assess all of these to have a global sense for loss or deficit of muscle or fat. Remember the maximum point score for physical exam is only 3 points and you are not likely to be off by more than 1 point...

Numerical score from Worksheet 4 ☐ D

Total PG-SGA score ☐
(Total numerical score of A+B+C+D above)

(See triage recommendations below)

Global PG-SGA rating (A, B, or C) = ☐

Clinician Signature_____RD RN PA MD DO Other_____ Date _____

Worksheet 5 - PG-SGA Global Assessment Categories

	Stage A	Stage B	Stage C
Category	Well nourished	Moderately malnourished	Severely malnourished
Weight	No wt loss **OR** Recent wt gain	<5% wt loss in 1 month (or 10% in 6 mos) **OR** Progressive wt loss	> 5% wt loss in 1 month (or >10% in 6 mos) **OR** Progressive 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	Present of nutrition impact symptoms (PG-SGA Box 3)	Present of nutrition impact symptoms (PG-SGA Box 3)
Functioning	No deficit **OR** Recent improvement	Moderate functional deficit **OR** Recent deterioration	Severe functional deficit **OR** recent significant deterioration
Physical Exam	No deficit **OR** Chronic deficient but recent improvement	Evidence of mild to moderate loss of muscle mass / SQ fat / muscle tone on palpation	Obvious signs of malnutrition (e.g., severe loss muscle, SQ possible edema)

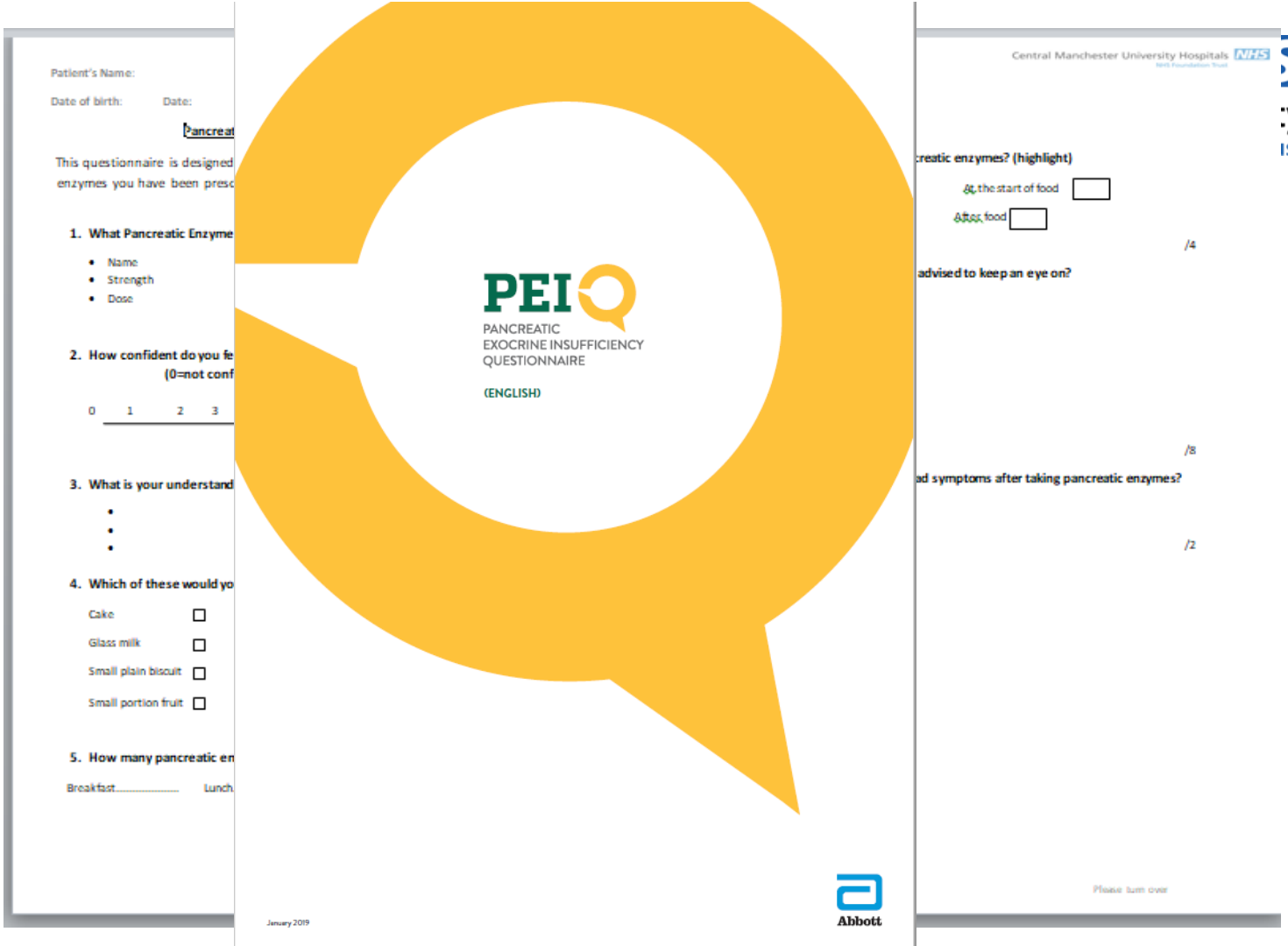
Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).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

Triage based on PG-SGA point score

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 lab values as appropriate.
4-8	Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
≥ 9	Indicates a critical need for improved symptom management and/or nutrient intervention options.

Worksheet 5 May be helpful to circle relevant statement for each PG-SGA category to visually help identify the overall global assessment

PERT Questionnaire



GI symptoms

Date:

Gastrointestinal symptom questionnaire

This questionnaire is designed to establish how severe your gastrointestinal symptoms are. This information allows us to advise you appropriately on your treatment

1. Please rate your symptoms during the last week by placing a tick in the box that best describes your symptoms

	Never	Occasional (once a week)	Frequent (2-3 times a week)	All the time (every day)
1.Abdominal pain after eating	☐	☐	☐	☐
2.Abdominal bloating/ distention	☐	☐	☐	☐
3.Increased flatulence/ wind	☐	☐	☐	☐
4.Belching or burping	☐	☐	☐	☐
5.Stomach/abdominal gurgling	☐	☐	☐	☐
6.Heartburn or acid reflux	☐	☐	☐	☐
7.Nausea	☐	☐	☐	☐
8.Vomiting	☐	☐	☐	☐
9.Urgency to open bowels	☐	☐	☐	☐
10.Incomplete evacuation	☐	☐	☐	☐
11.Greasy/oily/ Pale/floaty stools	☐	☐	☐	☐
12.Foul smelling stools	☐	☐	☐	☐
13. Tiredness/ lethargy	☐	☐	☐	☐

Please turn over

Date:

2. Currently how often do you open your bowels?

- Less than once a week ☐
- Once every 4-7 days ☐
- Once every 2-3 days ☐
- Once a day ☐
- 2-3 times a day ☐
- 4-6 times a day ☐
- 7 or more times a day ☐

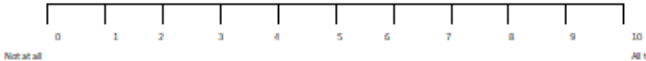
3. Please pick the box(es) which best describe(s) your stool:

Bristol stool chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. **Entirely liquid**

☐ ☐ ☐ ☐ ☐ ☐ ☐

4. How much do your bowel symptoms affect your quality of life?



☐

Total score: / 53

Case study – Mrs Y

- 50Y female
- Presented in March 2020 with painless jaundice
- Diagnosed with HOP cancer May 2020
- Consideration for Whipples surgery
- Commenced on PERT by local Hospital

Initial Dietetic assessment (June 2020)

- Weight 60kg, BMI 23.4kg/m2, 17% weight loss in 3 months
- PG-SGA stage B
- Scored 13/44 (29%) on PERT questionnaire
- Reported taking 50,000IU with meals, 25,000IU with snacks, nil PERT with nutritional supplements
- GI symptom questionnaire 17/53
  - Flatulence, burping, urgency to open bowels SEVERE
  - Bowels opening once every 2-3 days, type 1 bristol stool chart
  - Felt symptoms were not affecting QoL
- PERT education provided

2nd Dietitian assessment (3 weeks later)

- Weight stable
- Had increased dose of PERT with meals + snacks
- Now taking PERT with nutritional supplements
- Scored 30/44 (68%) on PERT questionnaire
- Symptoms of PEI much improved
  - GI symptom questionnaire 6/53
  - Bowels opening more frequently (GP had prescribed laxatives)

To conclude…

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- Many factors in pancreatic cancer that affect nutritional status
- Important to assess not only malnutrition, but sarcopenia too
- Assessment tools are useful to compare data over time
- Assessment tools useful to detect exocrine insufficiency
  - Allows timely initiation of PERT

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