Pancreatic Cancer UK

Pancreatic Exocrine Insufficiency

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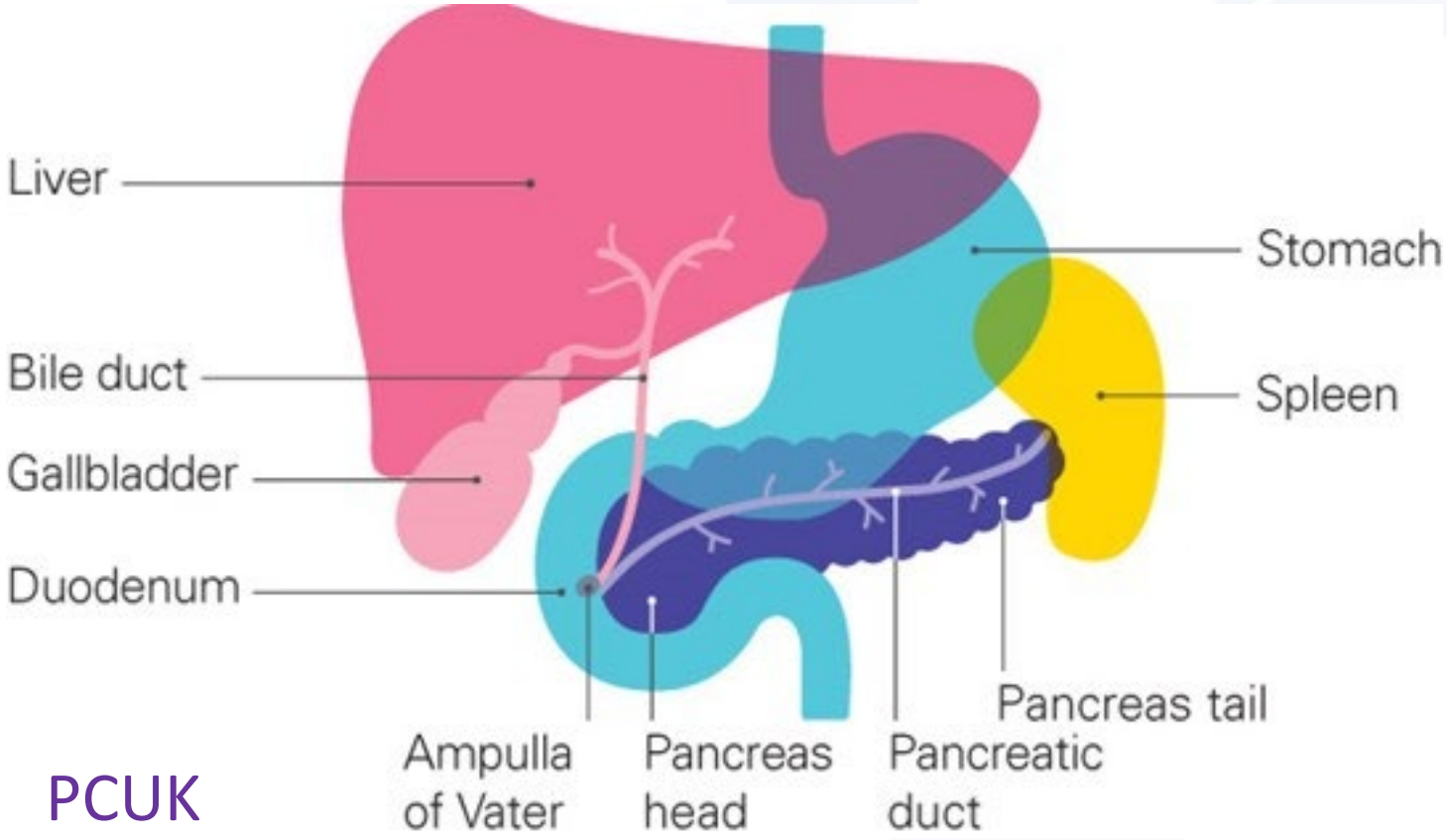
Pancreatic Exocrine Insufficiency

What is Pancreatic Exocrine Insufficiency (PEI)?

Occurs when the pancreas is unable to produce sufficient enzymes or produce them at the right time to ensure adequate digestion

The Pancreas



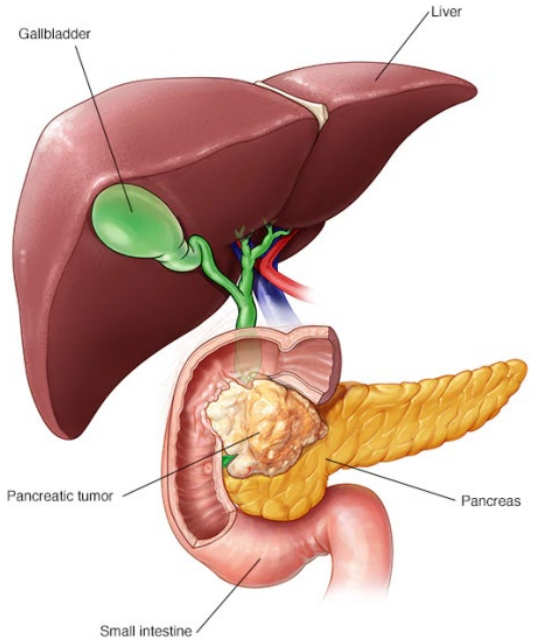
PCUK

Produces:

- Digestive enzymes
- Bicarbonate solution
- Hormones for glycaemic control

Who gets PEI?

- Lack of Healthy Pancreatic Tissue (Primary Insufficiency)
  - Pancreatic cancer
  - Pancreatic surgery
  - Pancreatitis
  - Cystic fibrosis
- Lack of Pancreatic Stimulation (Secondary Insufficiency)
  - Gastric resection
  - Duodenal resection
  - Medications that ‘dry up’ pancreatic secretions e.g. octreotide
- Increasing evidence for PEI in other conditions e.g. coeliac disease, diabetes, IBS and IBD…



Who gets PEI?

The incidence of PEI varies significantly:

- 30-90% of people with pancreatic cancer

Sikkens *et al.* 2014

- 60-100% of people following pancreatic head (PD) resection

Phillips 2015, Friess *et al.* 2016, Sabater *et al.* 2016

- 0-50% of people following distal pancreatectomy

Okano et al 2016, Sabater *et al.* 2016

Identifying PEI

Faecal Elastase

- <100ug/g severe PEI
- 100-200ug/g moderate PEI
- 200 – 500ug/g (low sensitivity/specificity)
- >500ug/g

Sensitivity: 63-100%
Specificity: 93%

Consider: the clinical picture, surgical history, treatments, CT reports and symptoms.

Loser *et al.* 1996, Domínguez-Muñoz *et al.* 1997

Identifying PEI

Symptoms:

- Oily, fatty or bulky stools
- Pale, orange or yellow stools
- Stools that float / are difficult to flush
- Offensive smelling stools
- Wind, bloating, abdo pain or cramps
- Weight loss out of balance with intake
- Micronutrient deficiencies
- Hypoglycaemia in patients with diabetes

Beware:

- Low fat diets
- Constipation – opiates

Why do we treat PEI?

To prevent and/or reverse

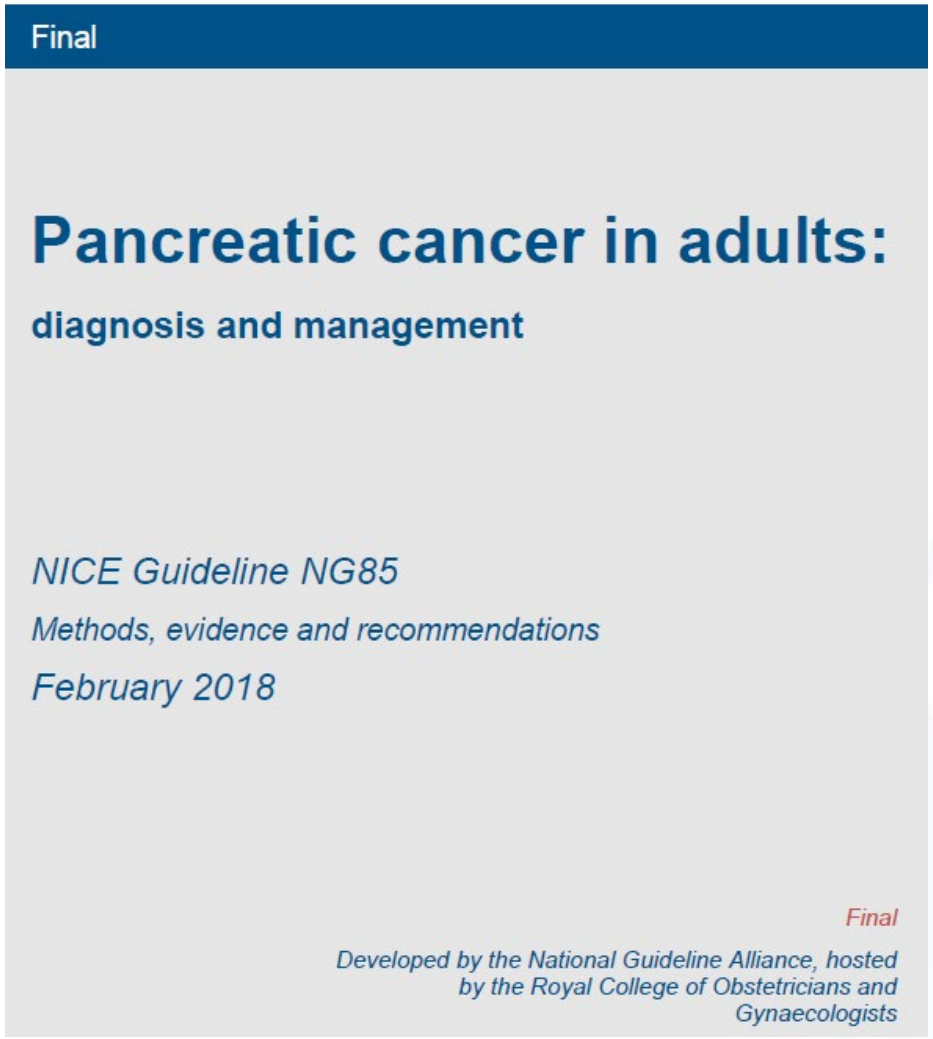
- **Malnutrition**
- Weight loss/ difficulty gaining weight
- Reduced strength/ poor function
- Vitamin & mineral deficiencies and associated complications e.g. osteoporosis, night blindness
- GI symptoms
- Reduced QoL

Malnutrition

‘Lack of proper nutrition, caused by not having enough to eat, not eating enough of the right things, or being unable to use the food that one does eat’

Oxford English Dictionary

National Institute for Health and Care Excellence



Good nutritional input can improve quality of life for people with pancreatic cancer and, potentially improve their ability to undergo oncological treatment and survival.

NICE 2018

J Gastrointest Surg (2008) 12:1193–1201
DOI 10.1007/s11605-008-0505-z

Cachexia Worsens Prognosis in Patients with Resectable Pancreatic Cancer

Jeannine Bachmann · Mathias Heiligensetzer · Holger Krakowski-Roosen · Markus W. Büchler · Helmut Friess · Marc E. Martignoni

Cachexia has a significant impact on survival (654 vs. 451 days)

Resected patients N=150		∅ Cachexia N=105 (70%)	Cachexia N=45 (30%)	p value
Gender	Male	52 (49.5)	29 (64.4)	0.094
	Female	53 (50.5)	16 (35.6)	
Age		64 (57/ 70)	66 (61/72)	0.245
Body mass index		24.22 (22.54/27.37)	23.67 (21.88/26.16)	0.189
Weight loss (kg)		0 (0/ 4.5)	12 (10.0/16.5)	<0.001
Weight loss (%)		0 (0/ 5.7)	15.3 (12.3/20)	<0.001
CA19-9 (U/ml)		148.85 (36.39/419.5)	137.45 (20.73/658.93)	0.980
ASA classification	I	2 (1.9)	0 (0)	0.198
	II	49 (46.7)	17 (37.8)	
	III	54 (51.4)	28 (62.2)	
Tumor size	T1	1 (1.0)	0 (0)	0.508
	T2	0 (0)	0 (0)	
	T3	101 (96.2)	45 (100)	
	T4	3 (2.8)	0 (0)	
Lymph node status	Negative	23 (21.9)	9 (20)	0.795
	Positive	82 (78.1)	36 (80)	
Distant metastases		11 (10.5)	1 (2.2)	0.089
Grading	G1	4 (3.9)	6 (14.3)	0.076
	G2	64 (62.7)	26 (61.9)	
	G3	34 (33.3)	10 (23.8)	
Resection margin	R0	58 (55.8)	18 (40)	0.062
	R1	43 (41.3)	24 (53.3)	
	R2	3 (2.9)	3 (6.7)	
Tumor stage	UICC II	91 (86.6)	44 (97.8)	0.040
	UICC III	3 (2.9)	0 (0)	
	UICC IV	11 (10.5)	1 (2.2)	
Type of resection	Whipple	78 (74.3)	39 (86.7)	0.076
	Total DP	8 (7.6)	4 (8.9)	
	Left res.	19 (18.1)	2 (4.4)	
30 days mortality		3 (2.9)	2 (4.4)	0.621
Morbidity		45 (42.9)	25 (55.6)	0.155
Diabetes mellitus	Yes	22 (21)	22 (48.9)	0.001
	No	83 (79)	23 (51.1)	

Clinical Nutrition (2004) 23, 239–247

ELSEVIER

Clinical Nutrition

www.elsevier.com/locate/clnu

ORIGINAL ARTICLE

Weight stabilisation is associated with improved survival duration and quality of life in unresectable pancreatic cancer ☆

Wendy Davidson[a,b,*], Susan Ash[a], Sandra Capra[b], Judith Bauer[b,c], on behalf of the Cancer Cachexia Study Group

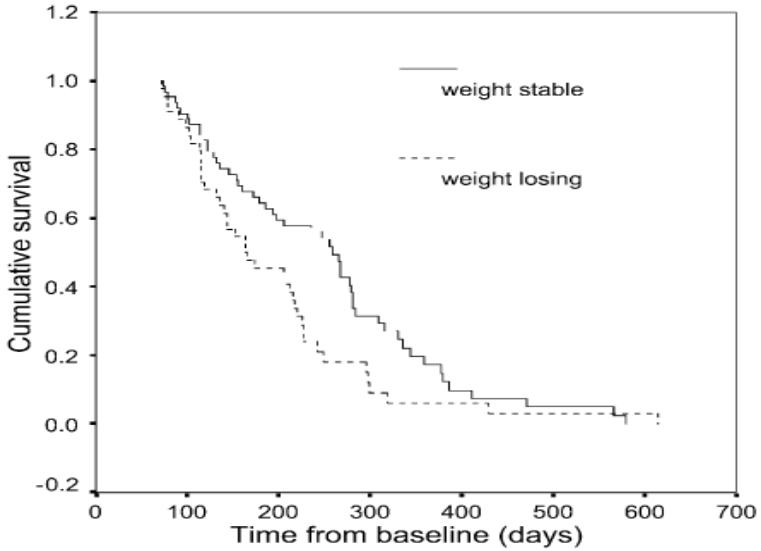


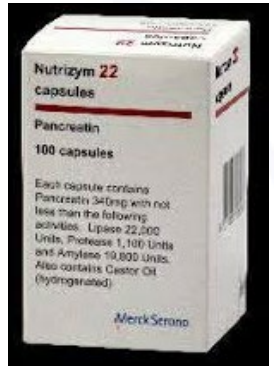
Figure 1 Comparison of survival time from baseline for weight-losing ($n = 44$) and weight-stable ($n = 63$) pancreatic cancer patients (Kaplan–Meier log rank statistic 5.53 (df = 1) $P = 0.019$).

Weight stabilisation is associated with better survival in unresectable pancreatic cancer
259 days vs. 164

How do we treat PEI?

Pancreatic enzyme replacement therapy (PERT):

- **Pancreatin** - enteric-coated minimicrospheres / microtablets
- Containing:
  - Lipase – digests fat
  - Protease – digests protein
  - Amylase – digests carbohydrate



- Creon Micro, Creon 10,000, **Creon 25,000**
- **Pancrex V powder**, Pancrex granules, Pancrex V Capsules, Pancrex V tablets
- **Nutrizym 22 capsules**
- **Pancrease HL capsules**

All are of porcine origin

How much PERT?

Everybody is different….

	Mean intra-digestive	Post prandial peak
Amylase	50 – 250u/min	500 – 1000u/min
Lipase	up to 1000u/min	3000 – 6000u/min
Proteases (Trypsin)	50 – 100u/min	200 – 1000u/min

Enzymes release continues for approximately 2 hours post prandially (360,000-720,000u lipase)

Keller and Layer 2005

How to take PERT effectively

- Starting with 50-72,000 units lipase with each meal, 20-50,000 units with snacks and milky drinks

Bruno *et al.* 1998, Whitcomb *et al.* 2010, Domínguez-Muñoz 2011

- Build up dose depending on symptoms
- Wait 3-4 days before increasing dose
- Give education on foods that need more / less
- Provide supporting written information
- If cannot swallow whole open capsule, mix contents with a teaspoon of something soft, cold and acidic

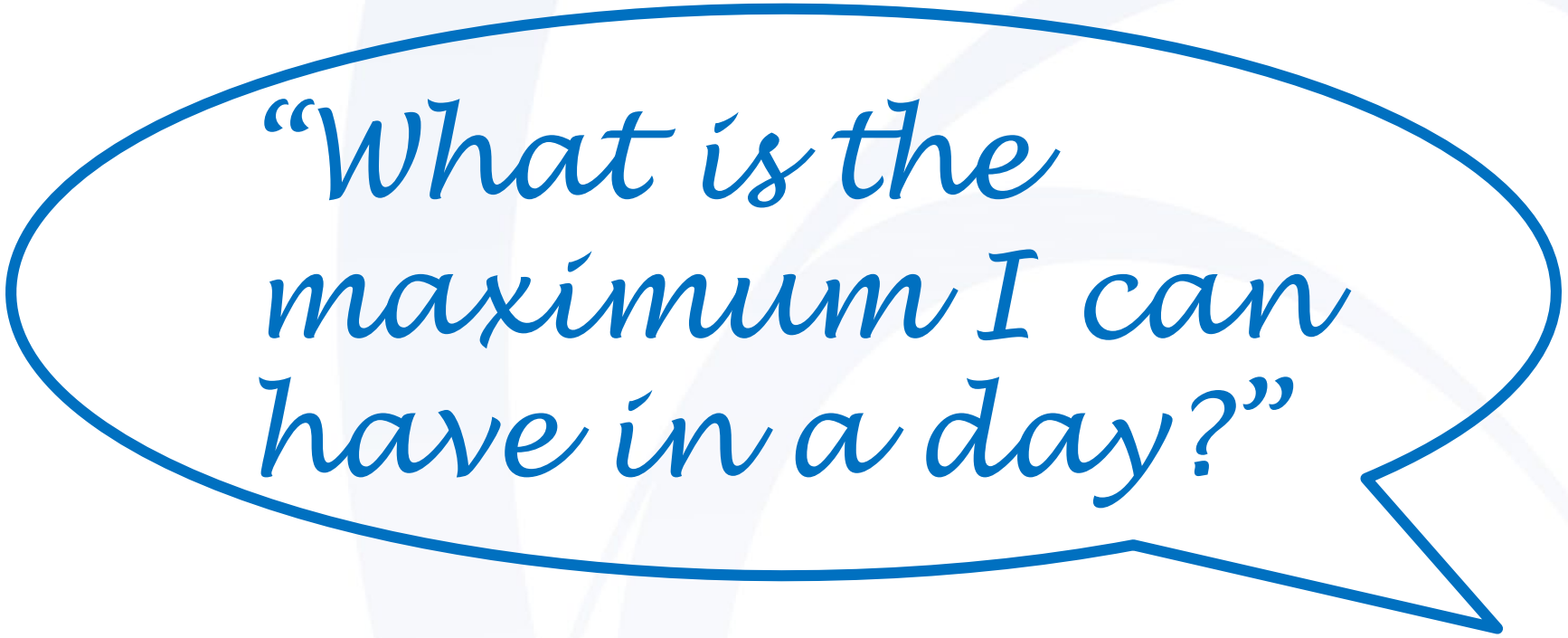
Larger portions and/or fattier foods require more enzymes.

Most patients can self adjust their doses appropriately with some education.

TWO

THREE

FOUR



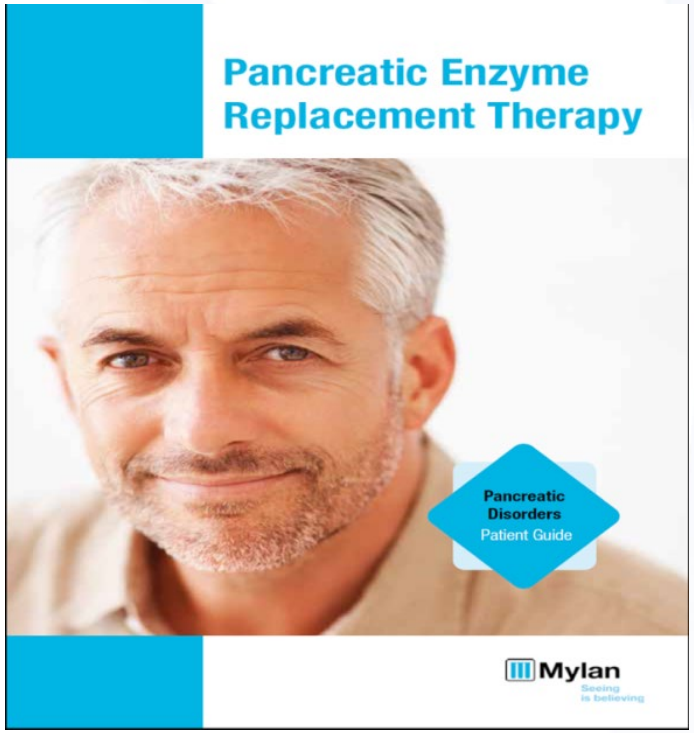
- There is no maximum dose
- If you do take more than your body really needs, you can get irritation of the anus

Things to avoid…

Things to check…

Things that help

- Patients and staff knowing what PERT is for, how and when to take it
- Written information
- Self medicating by most patients



Troubleshooting

- Adequacy of dose
- PPI
- Timing
- Storage
- Differential diagnoses: coeliac disease, bile acid malabsorption, bacterial over-growth, lactase deficiency, a food intolerance, infective diarrhoea……
- Consider changing the brand of PERT

Summary

- PEI is very common in pancreatic cancer and surgery and should always be considered with these diagnoses
- Min starting dose 50,000 units lipase/ meal
- With (almost) everything eaten & milky drinks - no daily dose
- No foods are banned
- Porcine - informed consent
- Self medication in hospital encouraged
- Monitoring is important

Sli.do: #StudyDay19

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