

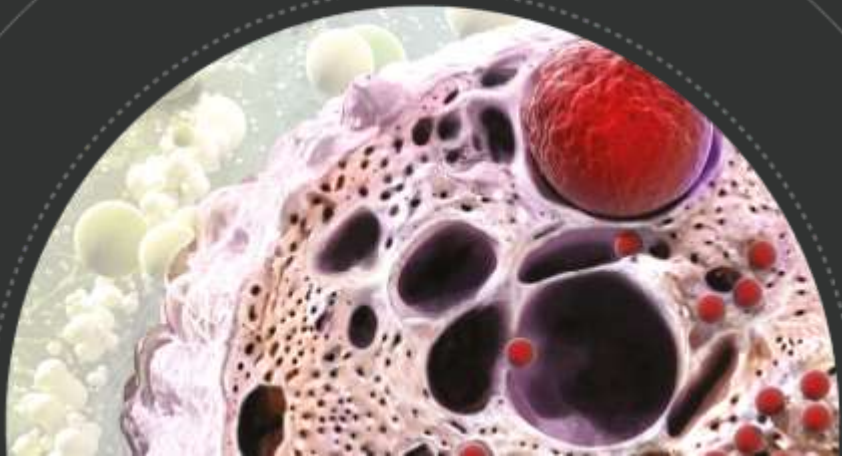
think
PEI

Optimising
Management of
Pancreatic Exocrine
Insufficiency

One organ plays two tunes - how is your pancreas today?

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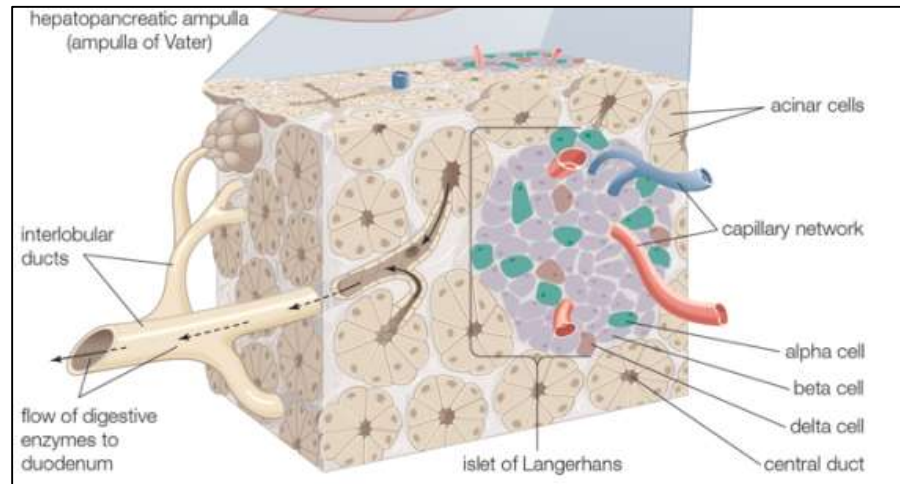


Received honoraria for attending meetings and presenting on behalf of:

- Mylan

The pancreas...

...an organ which plays 2 tunes
endocrine & exocrine



How many people in the room
are aware of pancreatic exocrine
insufficiency?

- The relationship between the endocrine & exocrine pancreas
- Types of diabetes
- Pancreatic exocrine insufficiency (PEI)
 - What is it
 - How to diagnose
 - How to manage

- The **right** diagnosis = the **right** treatment
- The **wrong** diagnosis = the **wrong** treatment
- **No** diagnosis = **no** treatment

- You can only diagnose a condition that you have heard of
- You can only diagnose a condition you have heard of and considered as possible
- **Consider all possibilities...**

- Depends on the type of diabetes

**Which types of diabetes
do you know?**

Types of diabetes

- Type 1 insulin dependent
- LADA latent autoimmune diabetes in adults
- Type 2
- Pancreatic disorders
- Drug induced
- Endocrine disorders
- Ethnic variants of diabetes
- Monogenic: MODY
- Genetic syndromes

Diabetes secondary to pancreatic disorders

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- Chronic or acute pancreatitis
- Calcific tropical pancreatitis
- Pancreatectomy
- Pancreatic cancer
- Cystic fibrosis
- Haemochromatosis

Pancreatic disease: History

- Previous pancreatitis
- Pancreatic surgery
- Alcohol excess
- Family history: pancreatitis or pancreatic disorder, haemochromatosis
- Related conditions: hypogonadism, liver disorder
- Steatorrhoea

Pancreatic disease: Examination

- Nutrition, BMI
- Features of liver disease
- Hypogonadism

Pancreatic disease: Investigation

- Plain x-ray of the abdomen for pancreatic calcification
- CT scan of the abdomen for pancreatitis / liver disease
- Faecal elastase test
- Ferritin, genetic testing for haemochromatosis

Pancreatic Calcification

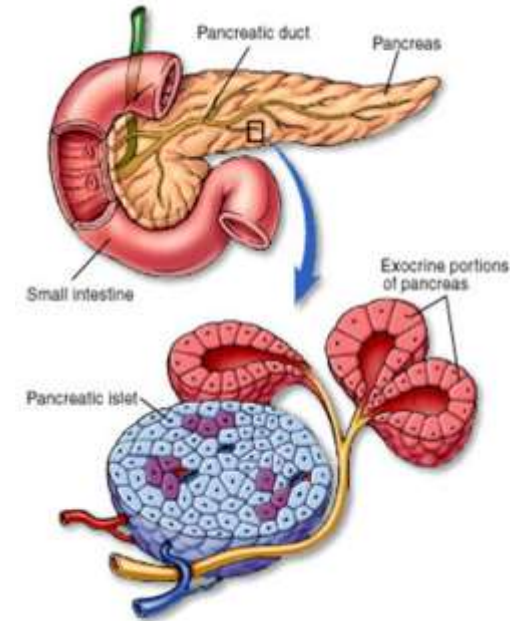


- Acute phase reactant
- Alcohol excess
- Liver disease
- Uncontrolled diabetes
- Hemochromatosis

One organ, two tunes

Compound gland with distinct exocrine and endocrine functions

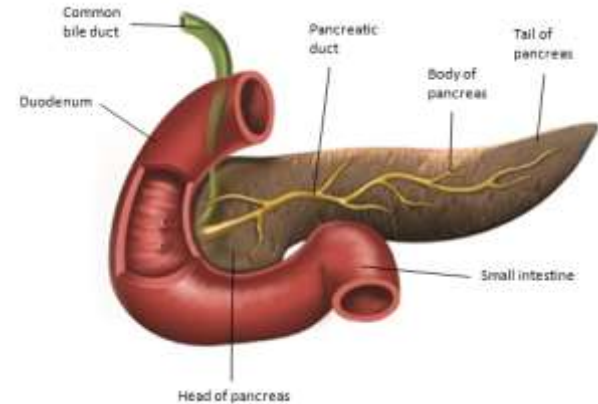
- Exocrine tissue: 80% to 85% of the pancreas
- Exocrine acini secrete digestive enzymes and bicarbonate
- Endocrine pancreas: Islets of Langerhans secrete insulin and glucagon



Pancreatic exocrine insufficiency

Condition in which quantity of activated enzymes secreted in response to a meal are insufficient for maintaining normal digestion

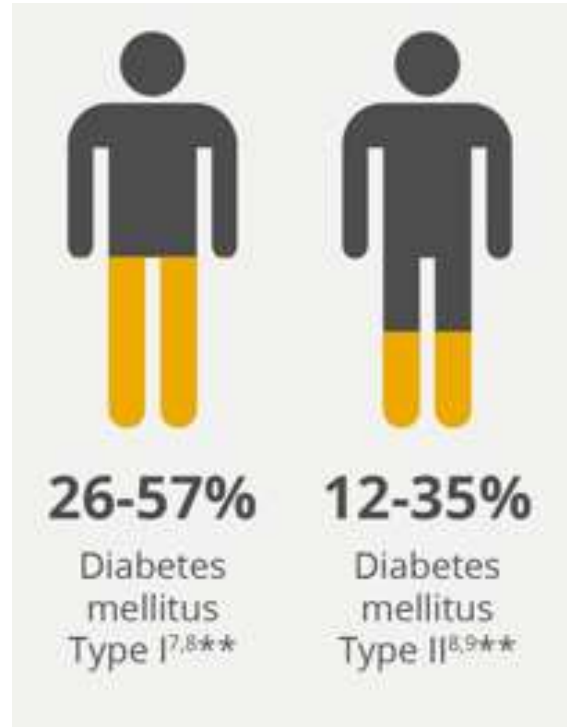
- Reduced availability of pancreatic enzymes
 - Loss of parenchyma
 - Pancreatic duct obstruction
 - Inadequate stimulation of enzyme production due to postprandial asynchrony, coeliac disease



PEI & type 1 & type 2 diabetes

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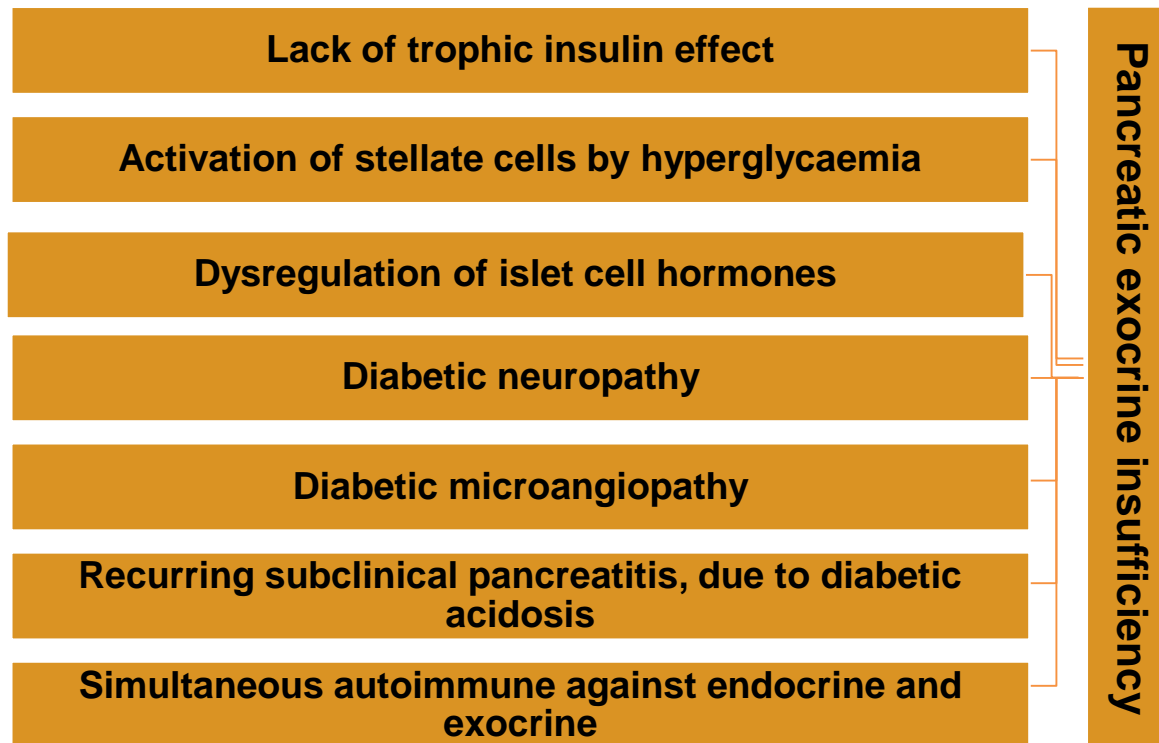
**Using faecal elastase 1 (FE-1) screening. All studies used a threshold <200 µg/g FE-1 to indicate potential PEI

Icks A, Haastert B, Giani G, et al. Low fecal elastase-1 in type I diabetes mellitus. *Z Gastroenterol* 2001; **39**: 823-30.

Hardt PD, Krauss A, Bretz L, et al. Pancreatic exocrine function in patients with type 1 and type 2 diabetes mellitus. *Acta Diabetol* 2000; **37**: 105-10.

Why might patients T1 & T2 diabetes have PEI?

They can develop chronic changes in their pancreas



PEI symptoms

- PEI causes malabsorption and maldigestion, resulting in symptoms of:

**Weight
loss**

**Abdominal
Pain**

Fatigue

Diarrhoea

Steatorrhoea

Flatulence

- Steatorrhoea is the most common symptom of PEI and is characterized by loose, greasy, foul-smelling voluminous stools that are difficult to flush
 - Steatorrhoea may not appear until PEI is advanced

- Low BMI
- Low insulin dose
- Insulin sensitivity
- Falling insulin requirements
- Features of haemochromatosis, stigmata of liver disease

Symptoms are often missed because...

- Gastrointestinal symptoms are commonly attributed to side-effects of diabetes medications, particularly:
 - metformin
 - glucagon-like peptide-1 receptor agonists
 - dipeptidyl peptidase-4 inhibitors
- Autonomic neuropathy
- Small intestinal bacterial overgrowth
- Coeliac disease
- Irritable bowel syndrome / inflammatory bowel disease
- Bowel cancer

Symptoms of PEI are common, non-specific and can be attributed by other causes, making PEI difficult to detect

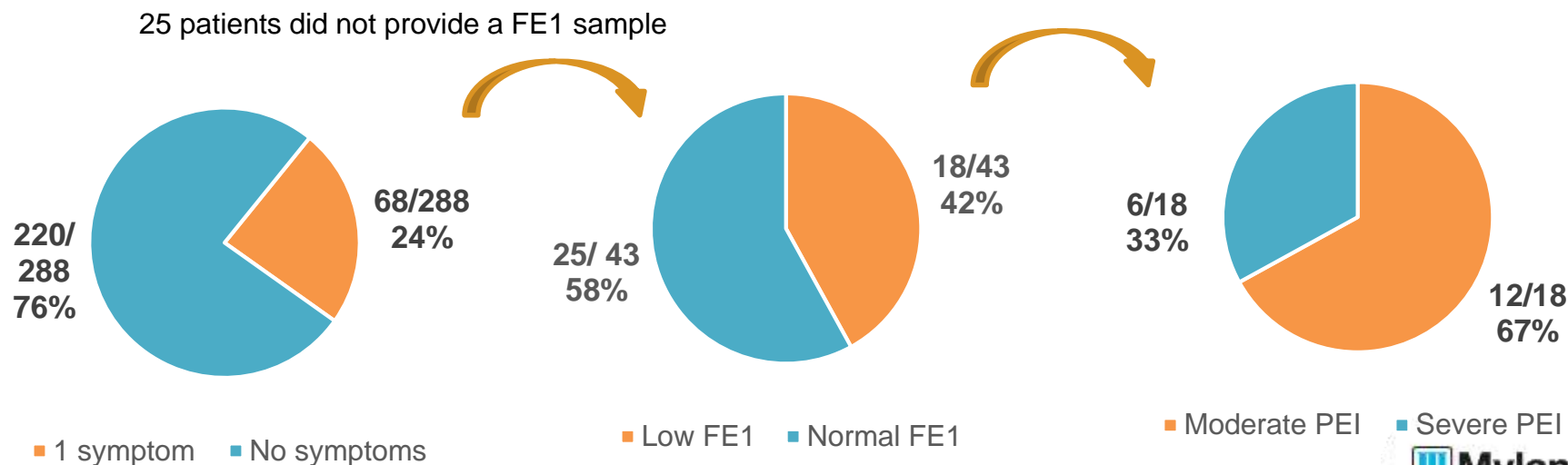
What should I do if I suspect PEI?

- Faecal elastase test (FE1) – a non-invasive pancreatic function test
- Faecal elastase is an enzyme produced in the pancreas; the measurement of this correlates to the overall pancreatic secretion

>200ug/g of stool	Normal Value
100- 200ug/g of stool	Suggests mild pancreatic insufficiency
<100ug/g of stool	Suggests severe pancreatic insufficiency

Should we routinely ask about GI symptoms?

- During DM clinic, routinely asked about GI symptoms, including diarrhoea (Type 5, 6 and 7 were considered abnormal), steatorrhoea or unexplained weight loss
- Faecal elastase was performed



Who should we screen?

PEI may be more likely in people with:

- History of pancreatic disease or surgery
- History of high alcohol intake
- Recurrent unexplained hypoglycaemia, decreasing insulin requirements, or particularly erratic blood glucose control
- Long duration of T1DM

Why should we treat?

It's important to treat PEI to avoid complications

- PEI leads to maldigestion and malabsorption which results in:

**Low bone
mineral
density**

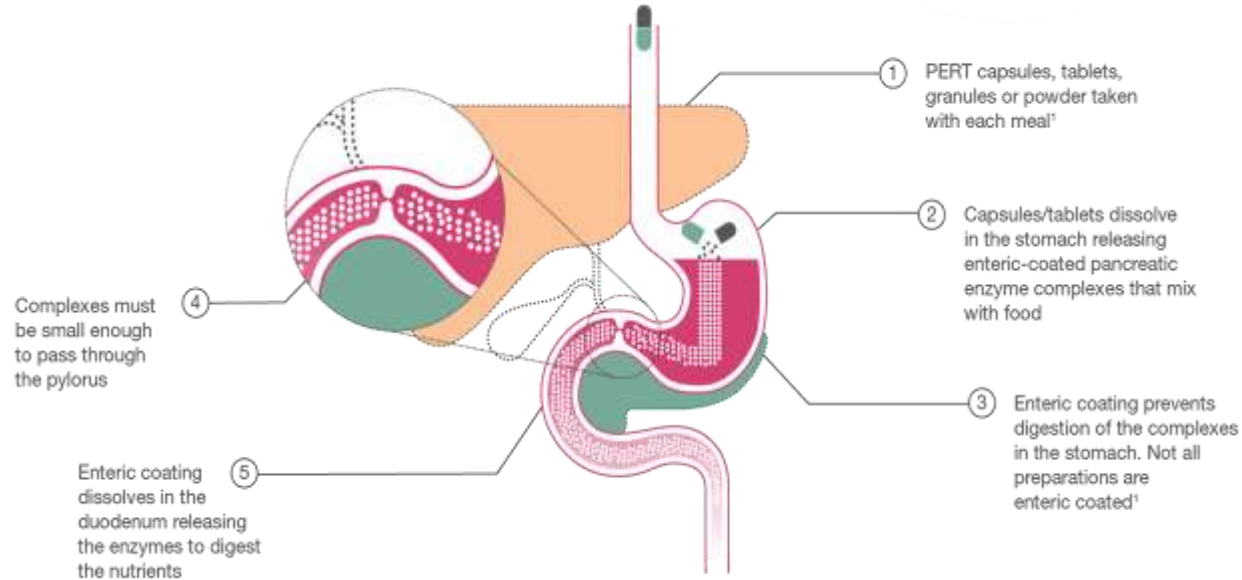
**Vitamin
Deficiencies**

Malnutrition

How to treat PEI

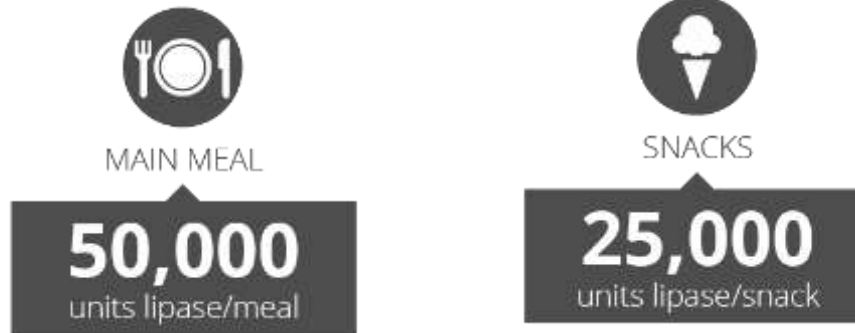
- Pancreatic Enzyme Replacement Therapy (PERT) is the main treatment for PEI in adults, children and infants
- Orally-administered PERT provides the extra digestive enzymes needed to maintain healthy digestion

How PERT works



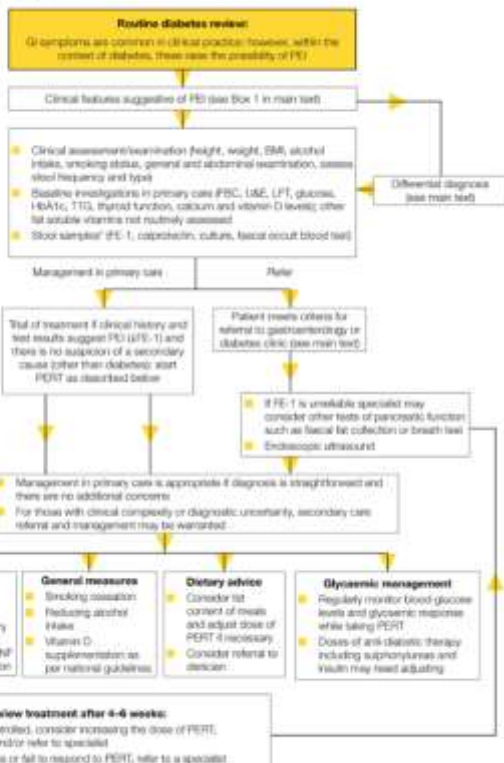
PERT dosing in adults

Recommended initial doses of PERT:



PERT should be taken with food

Guidelines



Gastrointestinal disorders in diabetes— could it be pancreatic exocrine insufficiency?

- Algorithm developed by a multidisciplinary expert panel
- Supported via an educational grant from Mylan
- To raise awareness of PEI in diabetes
- To give a clear and concise management algorithm
- To ultimately give better care to people with diabetes who may have PEI but who have not been diagnosed

Summary

think
PEI

Optimising
Management of
Pancreatic Exocrine
Insufficiency

- ✓ PEI pancreatic exocrine insufficiency
- ✓ More common than we may think
- ✓ Can be diagnosed if it is considered
- ✓ Suspect in diabetes, alcohol, pancreatic disorders
- ✓ Look out for steatorrhoea, diarrhoea, weight loss
- ✓ Order a faecal elastase test
- ✓ Easy to treat with enzyme supplements

- To find out more about PEI including its diagnosis, treatment and management, and the conditions underlying it, visit the new website resource for HCPs:

thinkPEI.com

THINK TEST TREAT

Thank you for your attention!

Any questions?