



# DIABETES AND PANCREATIC EXOCRINE INSUFFICIENCY

## ➤ WHY IS THIS LEAFLET FOR YOU?

Pancreatic exocrine insufficiency (PEI) is important to understand in diabetes care due to the changing functions in the pancreas. This leaflet will give you essential information on:

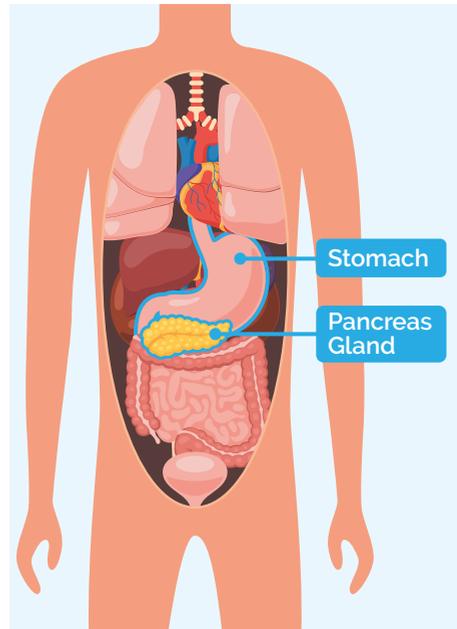
- What is PEI?
- What are the symptoms?
- How is it treated?
- How to get the most out of your treatment
- How PEI affects your diabetes



## ➤ WHAT IS PANCREATIC EXOCRINE INSUFFICIENCY?

The pancreas gland lies underneath the stomach. It produces insulin which is secreted directly into the blood (endocrine), and digestive enzymes which are secreted via ducts into the gut (exocrine). Insulin controls blood glucose levels. A total or partial lack of insulin results in diabetes.

Digestive enzymes secreted by the pancreas break down the food you eat (fats, proteins and carbohydrates), so that it can be absorbed from your gut into the bloodstream. Pancreatic exocrine insufficiency (PEI) means the pancreas does not produce enough digestive enzymes to digest food properly. This means that your body does not get all the nutrients it needs, especially fat-soluble vitamins. This is called malabsorption.



### How is it diagnosed?

PEI is diagnosed by testing a sample of your stool for an enzyme called faecal-elastase-1. Sometimes a scan of your abdomen may be required.

### Who is at risk?

You may be at particular risk if you have or have had the following:

- Surgery to your pancreas and stomach
- Acute Pancreatitis
- Chronic Pancreatitis
- Cystic Fibrosis
- Pancreatic Cancer

If left untreated, PEI can lead to malnutrition and this may result in bone weakness (osteoporosis, osteopenia), and deficiency of fat-soluble vitamins (A, D, E and K) which may lead to further complications.

## > WHAT ARE THE SYMPTOMS?

- Bloating
- Excessive wind
- Abdominal discomfort
- Diarrhoea
- Fatigue
- Oily and pale or yellow stools (undigested fats in the stomach result in frothy, foul-smelling stools that float and are difficult to flush)
- Weight loss, in severe cases

PEI may potentially be responsible for variable glycaemic control in people with diabetes.

If you have these symptoms, you can use this chart to show your doctor what your stools look like:

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

Your doctor will want to exclude other conditions that have similar symptoms and may be associated with diabetes, such as diabetic neuropathy, coeliac disease or an intolerance to metformin if you are taking this medication, as well as conditions that are not associated with diabetes, such as irritable bowel syndrome.

## ➤ HOW IS PEI TREATED?

### Pancreatic enzyme replacement therapy (PERT)

PEI is treated by replacing the enzymes that are not being produced by the pancreas, usually in a capsule form. The medication should be swallowed whole, not crushed or chewed, with a cold drink. Hot drinks will stop the enzymes working properly.



To work effectively, these enzymes need to be taken each time you eat or have a milky drink, including meals and snacks. Take them just before you begin eating or with the first few mouthfuls of food as they need to be taken with food/milky drink to work. If you take more than one capsule you should space them out throughout your meal or snack.

If you are unable to swallow the capsules or you have been prescribed granules, open them carefully and mix the granules (without crushing them) in a spoonful of soft acidic food or drink such as yoghurt or apple juice. Do not chew. Swallow immediately as PERT may cause irritation to the tissue inside your mouth causing ulcers. Follow this with a cold drink to wash any residue from your mouth.

The usual starting dose for PERT is 50,000 units with meals and 25,000 units for snacks. If you take insulin, you will be familiar with measuring your dose in units and may be alarmed at the number of units required for PERT. However, this therapy aims to replace the digestive enzymes your pancreas is unable to produce. In someone without PEI, the pancreas typically produces around 720,000 units for a 300 to 600 kcal meal!

Pancreatic enzyme supplements are made from pork products. There is currently no alternative. Please discuss this with your healthcare professional if you have any concerns.

## > GETTING THE MOST OUT OF YOUR TREATMENT



Keep your treatment at room temperature as it is damaged by high temperature. Your treatment may also be affected if you keep the capsules or granules in your pocket.



Use by the expiry date.



Your doctor will adjust the dose to suit you, until you have relief from diarrhoea and abdominal symptoms. When you are digesting food and absorbing nutrients properly, you will also feel less tired. Continue taking PERT: do not stop because you feel better.



Stop smoking as smoking may cause more damage to your pancreas.



Some foods do not need PERT. These are generally fat-free foods, such as fruit and vegetables (except avocados) and sugar (e.g. jam, honey, fruit juice, fizzy drinks, jelly, boiled sweets, sorbets and fruit lollies). Everyone should aim to eat healthily, but if you have PEI, you should eat a nutrient-rich diet. If you need advice about this, ask your doctor or nurse to refer you to see a dietitian.



You may be advised to take fat-soluble vitamins (e.g. A, D, E, K) and mineral supplements. However, if the treatment is effective and you eat a nutrient-rich diet, supplements are usually unnecessary.



Cut out alcohol. Alcohol may cause more damage to your pancreas.



Frequent diarrhoea can make your anal area sore. This should improve when you have found the right dose of PERT, but using a barrier cream can protect tender skin in the meantime. You can ask your pharmacist for advice. Washing gently after every bowel motion will help to prevent soreness.

## ➤ HOW PEI AFFECTS YOUR DIABETES

Pancreatic enzymes are needed to digest carbohydrates found in starchy and sugary foods, so if you have PEI, you may have difficulty controlling your blood glucose levels.

When you start to digest and absorb food properly during PERT, especially if you regain weight, you may find a change in your blood glucose levels. If you are able to test your blood glucose, you should monitor more frequently until your PERT is stable, as your diabetes tablets or insulin doses may need adjusting. Consult your diabetes nurse or doctor if you have concerns about your blood glucose levels.



**⚠ Insulin and some diabetes tablets can cause low blood glucose (hypoglycaemia). Check with your pharmacist if you are not sure if this is a side effect of your treatment. Low blood glucose should be treated immediately with quick-acting glucose which does not require PERT, but if you follow this with a starchy snack, you will need to take PERT with this.**

## ➤ REPORTING OF SIDE EFFECTS

Please be aware some side effects may be experienced with PERT. Consult your product patient information leaflet or speak to your healthcare professional if you need further information. This includes any possible side effects not listed in the package leaflet. You can also report side effects directly via the Yellow Card Scheme at [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard).

By reporting side effects, you can help provide more information on the safety of these medicines.



## > KEY POINTS:

- ❗ Pancreatic Exocrine Insufficiency (PEI) may affect people with diabetes.
- ❗ A simple test can diagnose the condition.
- ❗ If you think you have symptoms, discuss with your healthcare professional.



## > USEFUL RESOURCES:

[www.diabetes.org.uk](http://www.diabetes.org.uk)

[www.pancreatitis.org.uk](http://www.pancreatitis.org.uk)

[www.pancreasfoundation.org](http://www.pancreasfoundation.org)

[www.pancreaticcanceraction.org](http://www.pancreaticcanceraction.org)

[www.trend-uk.org](http://www.trend-uk.org)

Please note Mylan has had no involvement in any of the websites listed above.



™ TREND-UK Limited. Content to be reviewed January 2020

The content of this leaflet was developed by TREND-UK in collaboration with Mylan.  
This leaflet was initiated and funded by Mylan.

