Pancreatic surgery, enteral tube feeding & enzymes

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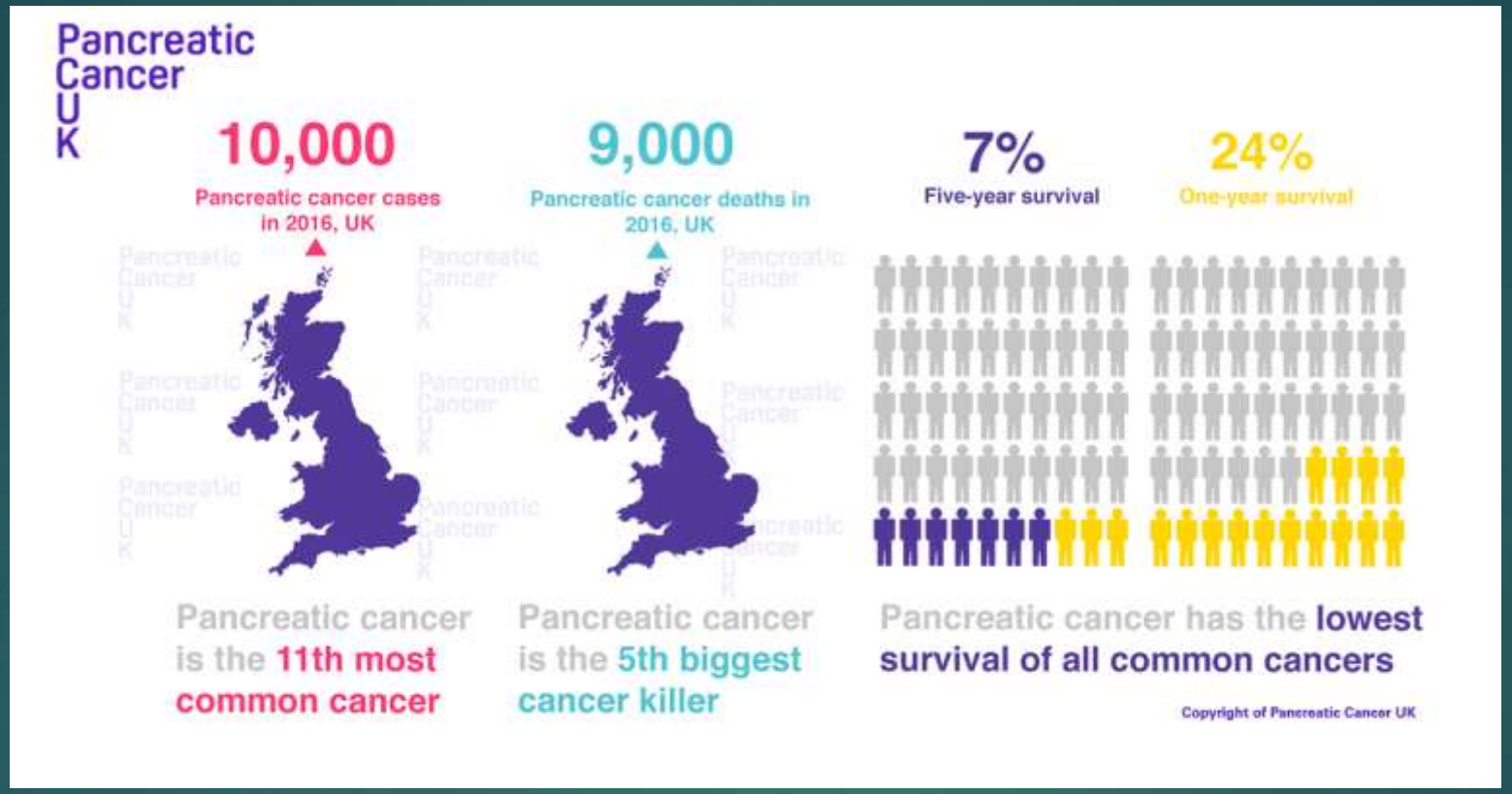
LEEDS TEACHING HOSPITALS NHS TRUST

Introduction

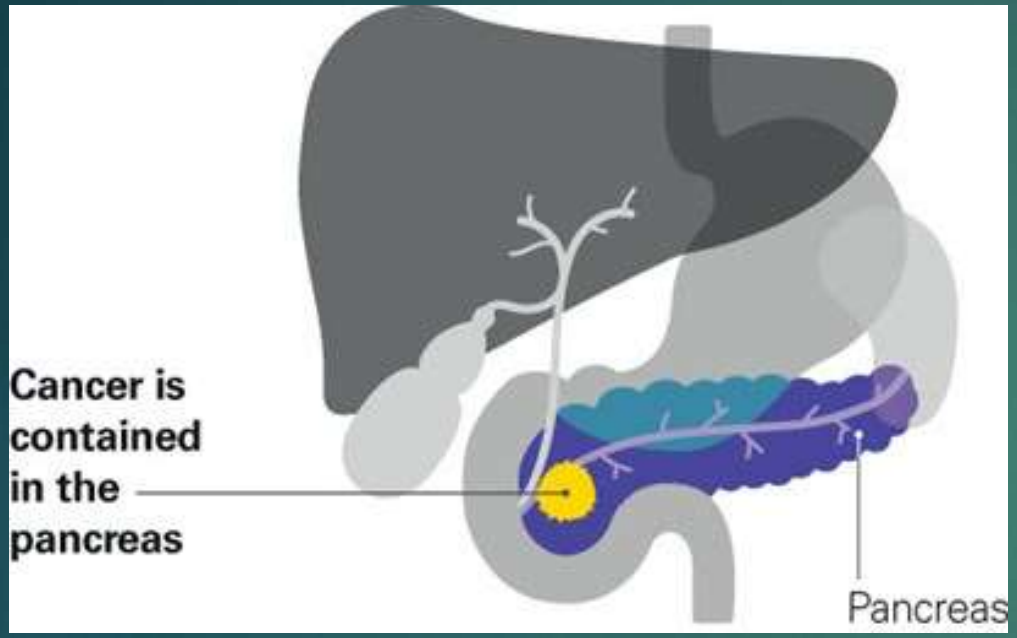
- Statistics
- Anatomy
- Surgical treatment
- Enteral feeding
  - PERT
  - Evidence
  - What happens elsewhere

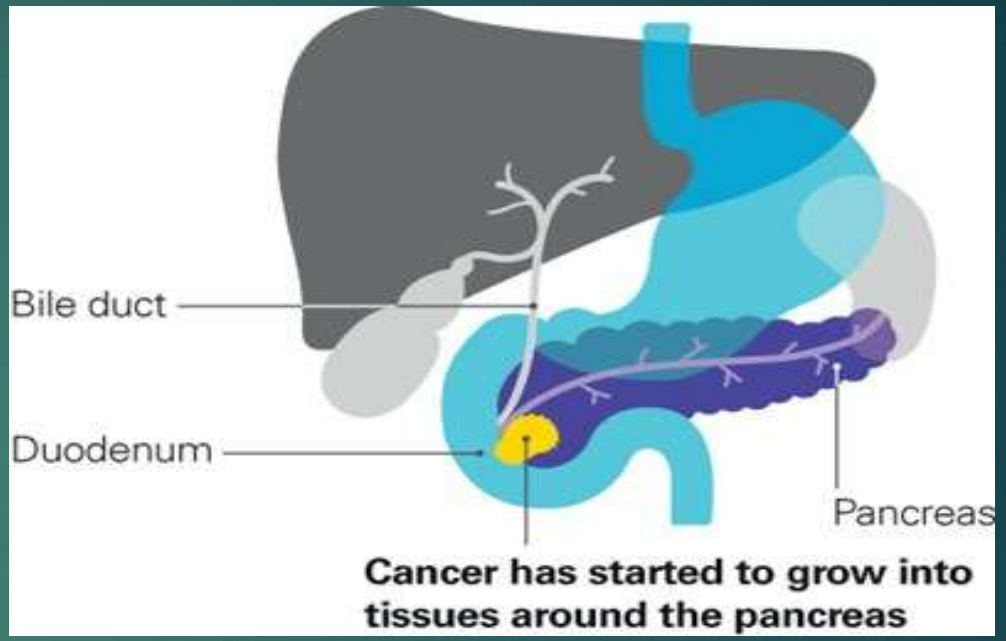
Pancreatic cancer



- 7 in 10 patients do not have any chemotherapy, radiotherapy or surgery
- 1 in 10 patients will go on to have curative surgery

Resectable pancreatic cancer





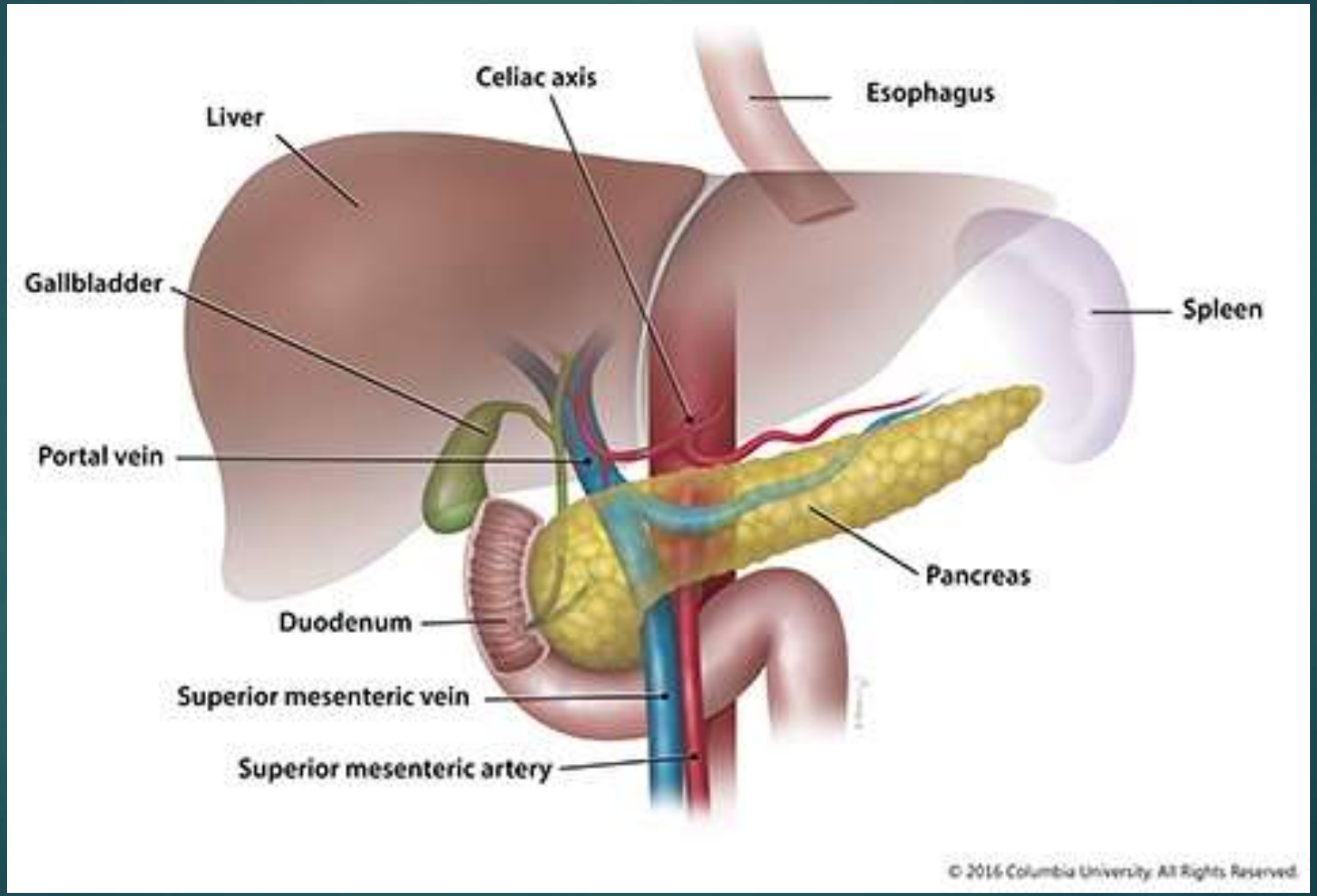
•**Stage 1A** means that the cancer is smaller than 2cm.

•**Stage 1B** means that the cancer is larger than 2cm – but is still contained in the pancreas.

•**Stage 2A** cancer is larger than 4cm and started to grow outside the pancreas, but **has not** spread to the lymph nodes.

•**Stage 2B** means the cancer **has** spread to nearby lymph nodes.

Anatomy


Celiac axis
Esophagus
Liver
Gallbladder
Spleen
Portal vein
Pancreas
Duodenum
Superior mesenteric vein
Superior mesenteric artery
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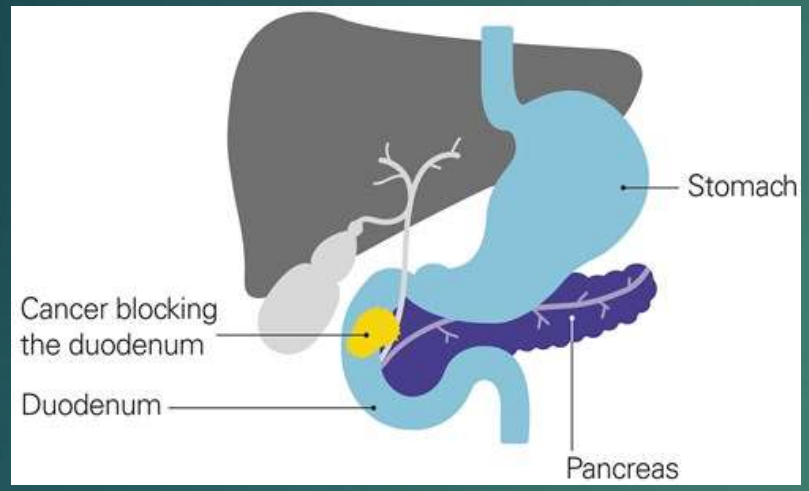
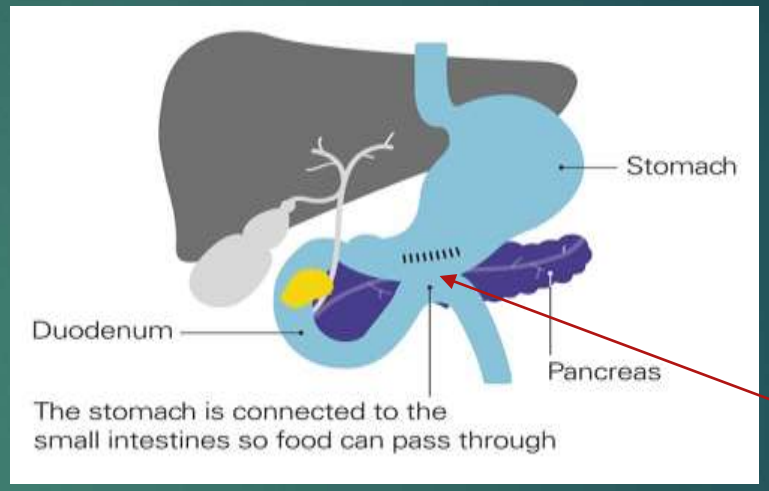
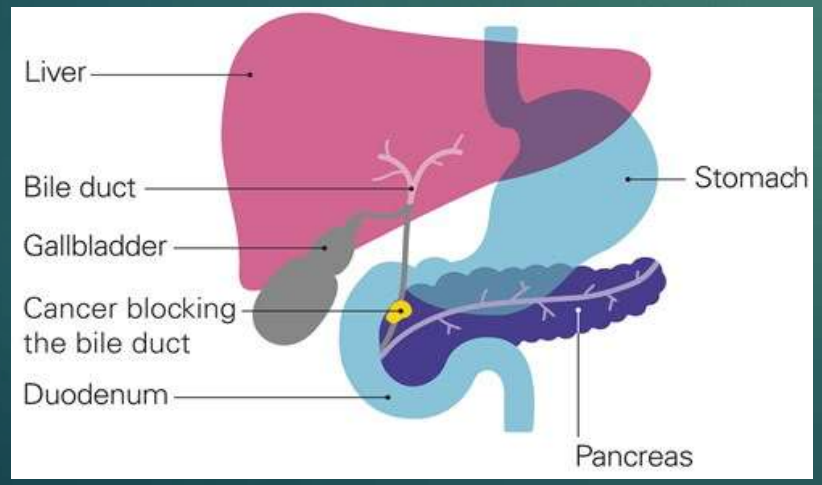
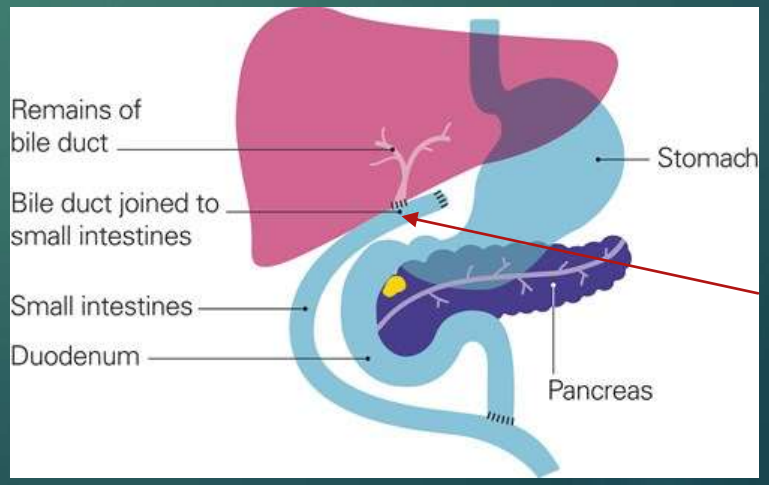
Unresectable pancreatic cancer – palliative bypass





Gastrojejunostomy

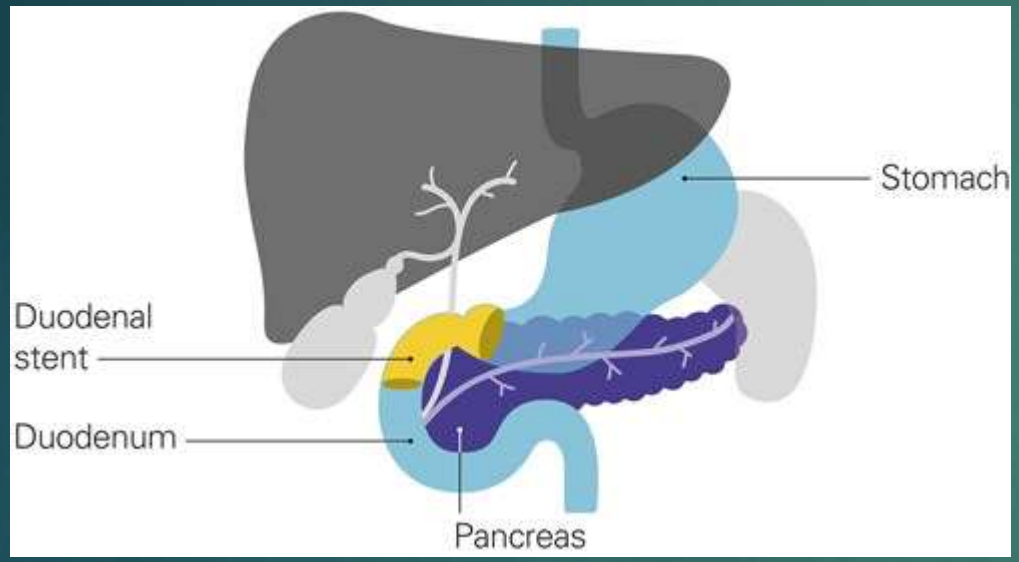




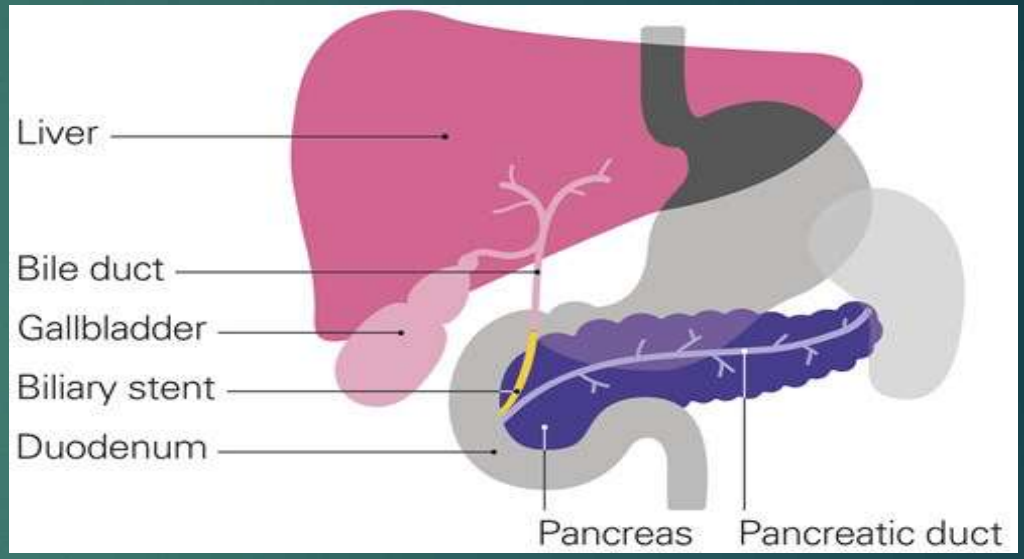
Hepaticojejunostomy

Unresectable pancreatic cancer

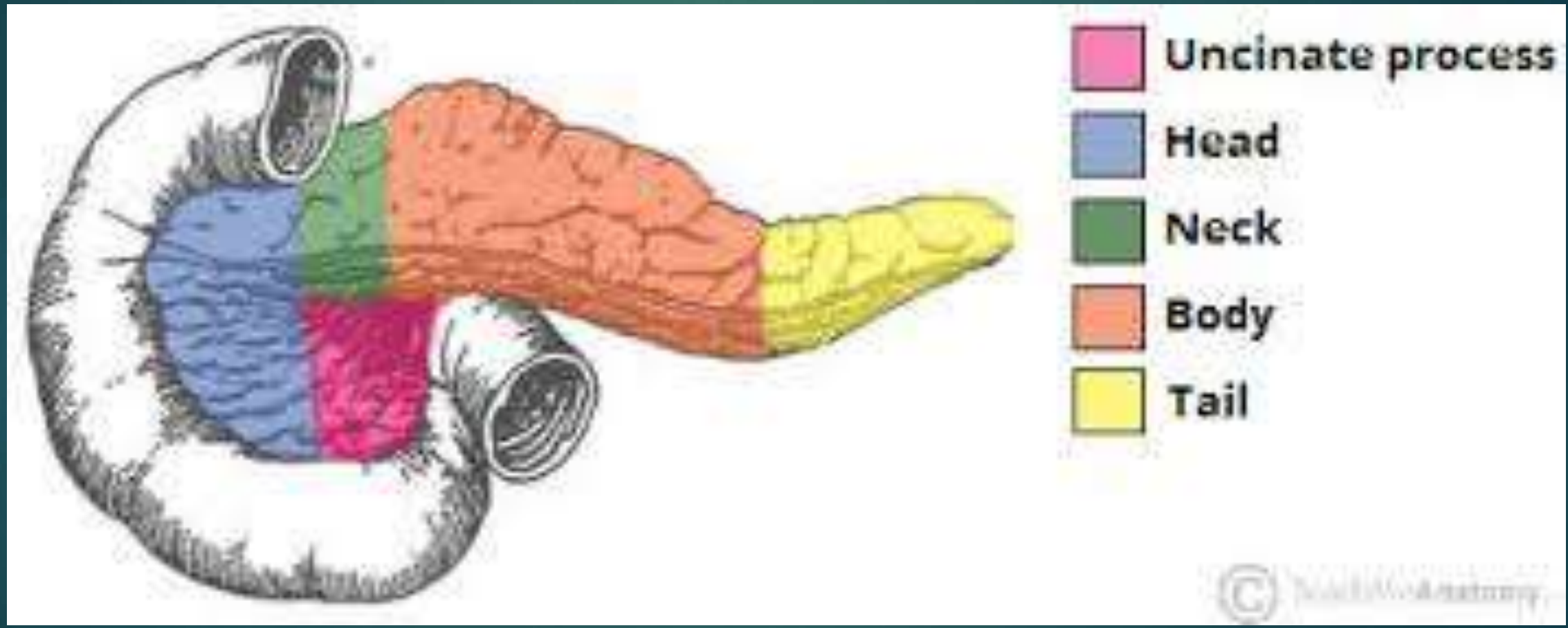
Duodenal stent



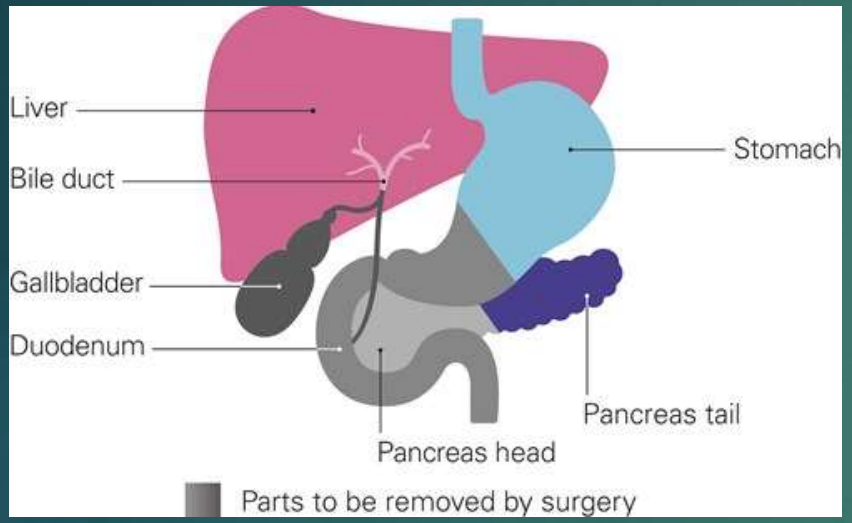
Biliary stent

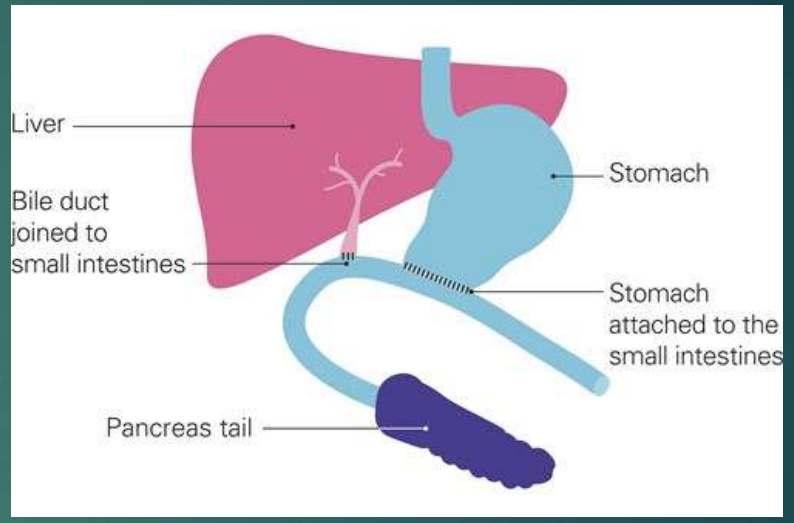


Anatomical areas



Whipples/Pylorus Preserving Pancreatico - Duodenectomy (PPPD)

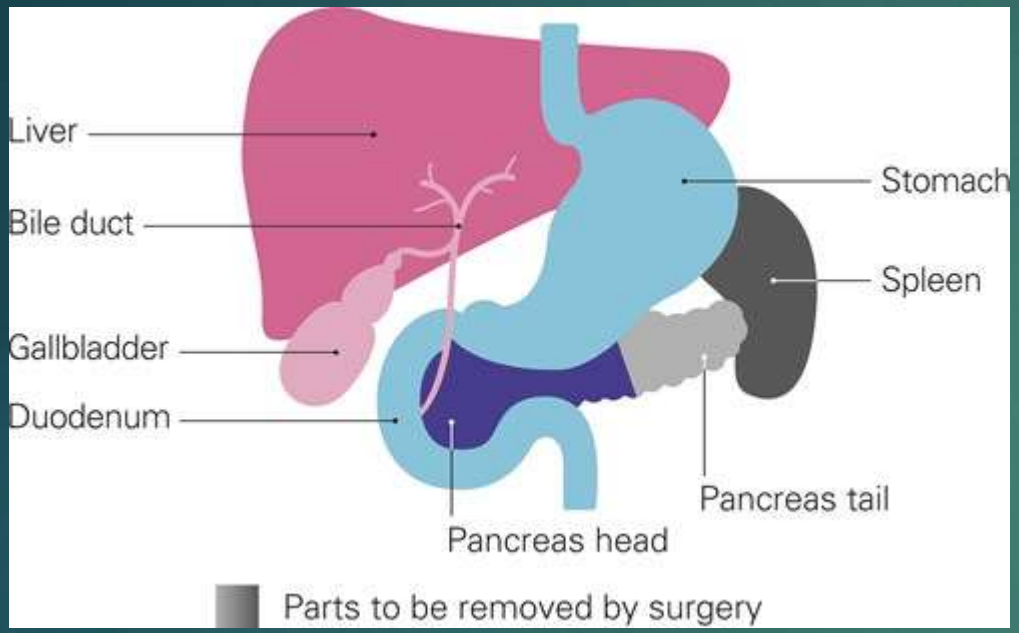


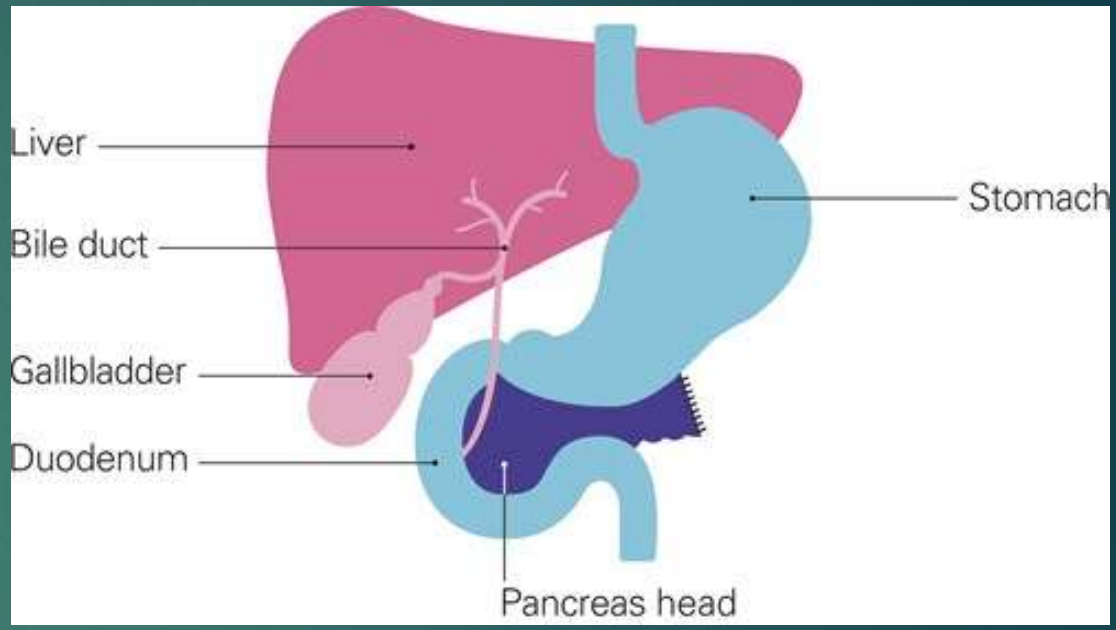


Stomach Delayed gastric emptying	15-40%
Duodenum Reduced pancreas-stimulating hormones	100%
Pancreas Diabetes PEI	20-50% ?

Tran, Lanschot, Bruno & van Eijeck. Pancreatology. 2009:9:729.

Distal Pancreatectomy



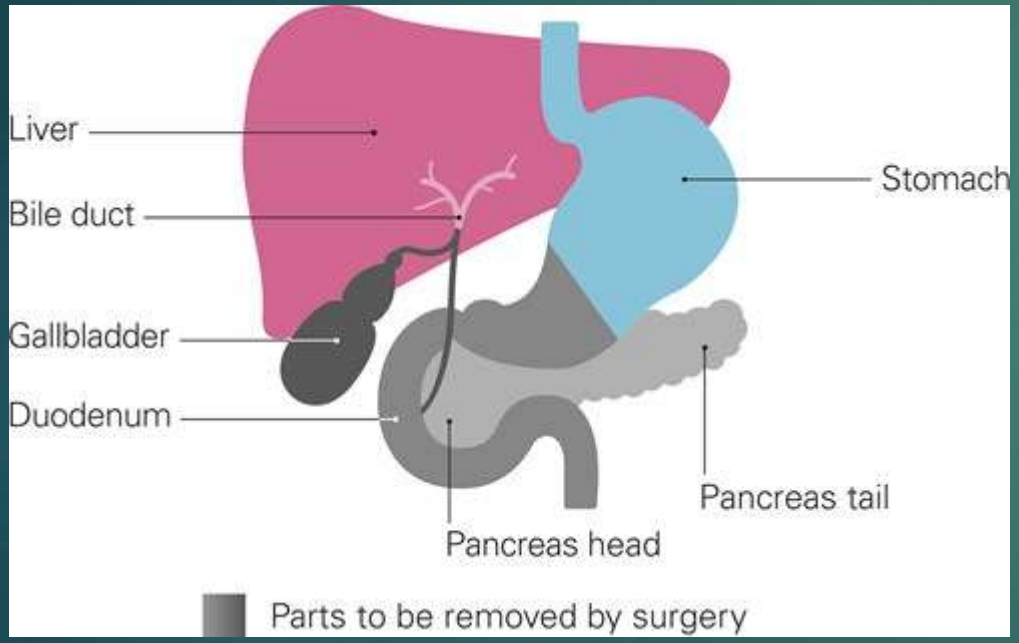


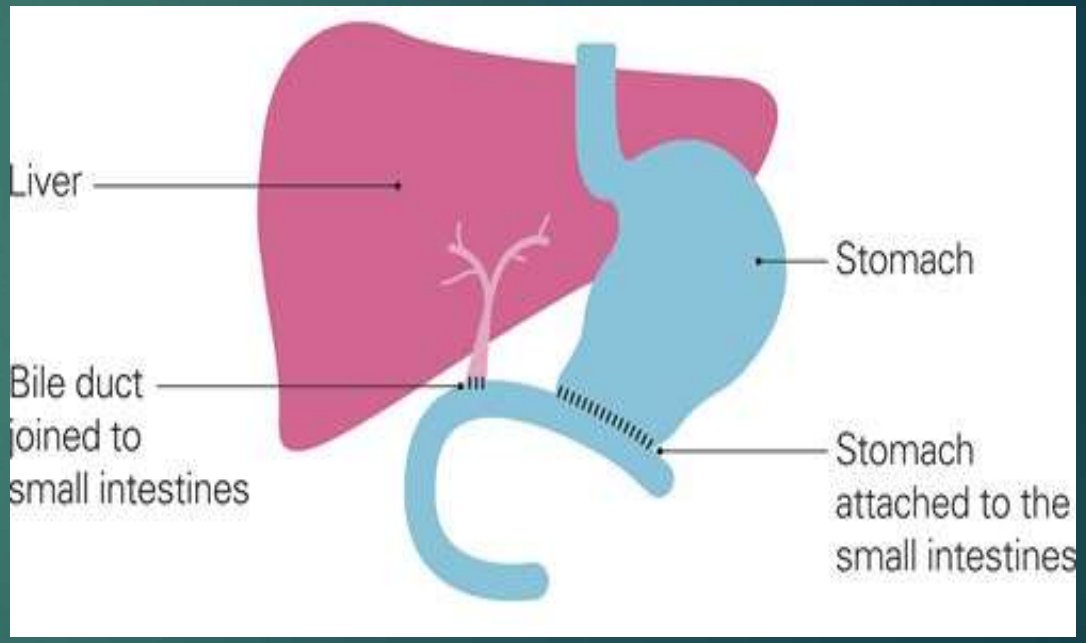
PEI incidence
16-60% pre-op
20-80% post-op

Varied results:

- Amount of pancreas removed/remaining
- Testing methods – eg Feacal elastase, onset of steathorrea, prescription of enzymes
- Presence of symptoms – malabsorb up to 55g before!
- Variable timescales – pancreatic atrophy later on

Total Pancreatectomy





PEI incidence and malnutrition

Distal pancreatectomy	16-60% pre-op 20-80% post-op	Speicher & Traverso (2010) Phillips (2015)
Pancreacticoduodenectomy	22-45% pre-op 56-98% post op	Matsumoto & Traverso (2006) Phillips (2015)

- Loss of functional parenchyma
- Asynchrony of enzymes
- Oedema/obstruction at anastomosis
- Ph differentials

Loss of duodenum:

- Nutrient absorbtion
- Cholecystokinen secretion
- Bile flow

- Dumping
- Rapid transit

- **<u>Effects of surgery</u>**
  - Raised REE
  - Increased protein turnover
  - Reduced appetite
  - Pain, nausea, sickness
  - Drains
  - Medications
  - ?Infection

Nutrition support - enteral feeding

Enteral feeding - a key route of nutrition support in pancreatic disease:

- **Malignant disease -**
  - Prior to surgery
  - Following surgery (eg. FTT)

Enteral feeding

How do we use PERT alongside enteral feeding?

- ESPEN (2006) recommend peptide feeds in pancreatic disease but patients still malabsorb
    - Therefore enzyme replacement therapy needed
    - PERT predominently designed for oral administration
    - ...little evidence to support/guide practice...
- Literature
    - International variability - standards, practices, health insurance
    - Different EN formula
    - Different enzyme preparations, inc different doses
    - In-vitro studies
    - CF populations
    - Remember - **Goal: Right time, right place, right pH**

Evidence…

- **Ferrie (2011)** (Austrailia) -
  - Jejunal tubes: Open capsule, crush microspheres (remove coating), activate with Na bicarb 8.4%, flush,
  - or, or dissolve uncrushed microspheres in Na bicarb for ~ 20-30mins, flush
  - add directly to enteral feed
- **However:**
  - Crushing granules not advised in UK (Handbook of Drug Administration via Enteral Feeding Tubes, 3rd Ed. 2015)
  - Time and labour intensive when patients require regular doses
  - Unlicensed use
  - Reduced enzyme effect with crushing and dissolving/activating
  - Gastric tubes: Open capsule, maintain enteric coating, suspend in thickened acidic fluid eg. "nectar consistency fruit juice", administer
- **However**:
  - Consistency of fluid is key to avoid blocked tubes
  - Tube lumen size: 10 & 12 Fr use low dose enzymes (eg. 5000IU – not in UK, Hollander 2015 recommends no smaller than 16Fr using beads 0.71-1.6mm in Creon 24000u) = varied advice

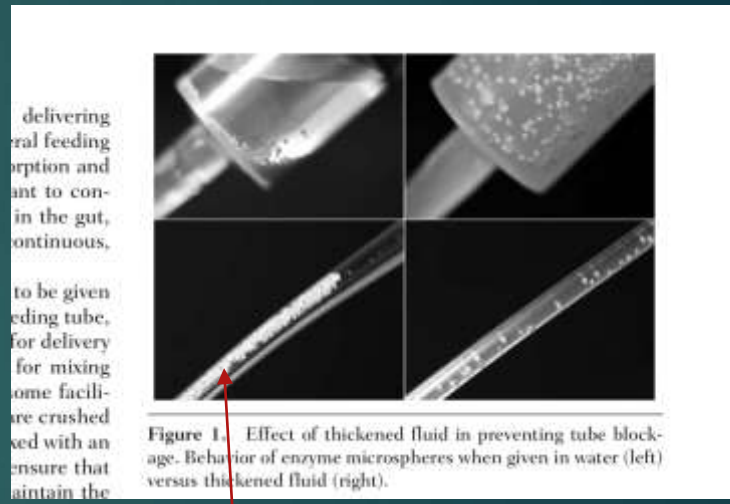


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Figure 1. Effect of thickened fluid in preventing tube blockage. Behavior of enzyme microspheres when given in water (left) versus thickened fluid (right).

Microspheres clumping together

Locally

- Change from Creon, dissolved in Na bicarb, flushed 2-4hourly to Pancrex V mixed with water in gastric and jejunal tubes
- Why?
  - Cost
  - Easier
  - Less labour intensive
  - Positive feedback from nursing staff!

Locally

Pancrex V	Lipase (BP units)
½ level 5ml teaspoon	25000
1 level 5ml teaspoon	50000
1&½ level teaspoons	75000
2 level 5ml teaspoons	100000

Starting doses:	NG	2tsp = 100 000u
	NJ	1½ tsp = 75 000u

Directions:

1. Stop feed
2. Flush tube with water
3. Add prescribed dose of Pancrex V to a pot
4. Add 15mls water
5. Stir to disperse the Pancrex V powder
6. Draw into syringe and administer via feeding tube
7. Add further 15mls water to pot to ensure residual Pancrex V is dispersed
8. Draw into syringe and administer via feeding tube
9. Flush tube with water
10. Restart feed immediately

Adding enzymes to feeds

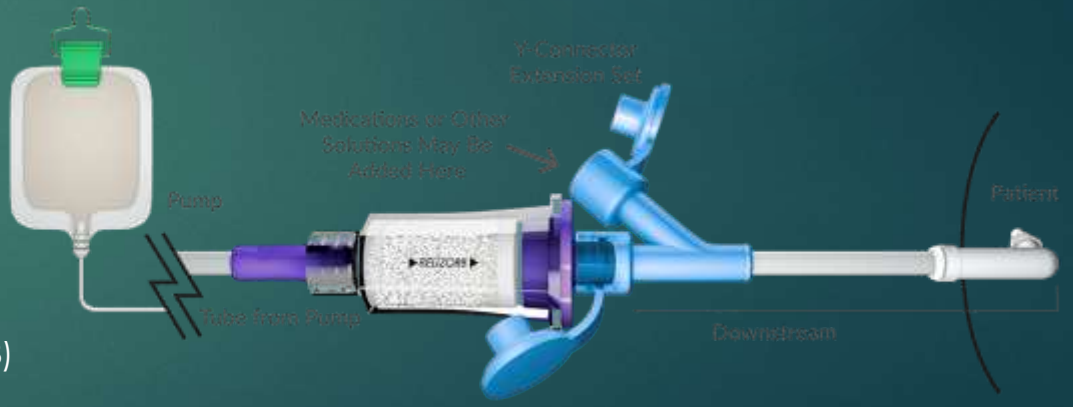
- Used regularly in some centres in pancreatic malignant and benign disease
- Positive results anecdotally:
  - Less diarrhoea/improved frequency
  - No adverse effects
  - Feeds can split (esp Peptisorb)
  - Hanging times
  - Labour intensive – requires good team understanding

  - Recorded results: improved wound healing, increased insulin reqs, less hypos, increased GS/weight (Phillips, Berry & Gettle 2018)

Future

- National online survey of using pancreatic enzymes alongside enteral feeds – watch out!
- Novel products/systems:
  - PERT cartridges – not in UK
  - Relizorb (FDA approved) - small plastic cartridge containing lipase, connects to EN giving set, hydrolyses fat as feed infuses
  - 1 cartridge per 500mls
  - Max 2 cartridges in 24 hours
  - Max rate 120mls/hr
  - Not compitable with feeds with soluble fibre
  - Poor results with TwoCal HN

(Phillips, Berry & Gettle 2018)



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Thank you!

Questions…

Evaluations…

Lunch!