



The Lennard-Jones
Intestinal Failure Unit



Supplementary prescribing for registered dietitians

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London Southbank University
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Registered Dietitians

- Dietitians are the only qualified health professionals that assess, diagnose and treat dietary and nutritional problems at an individual and wider public-health level.
- Work with both healthy and sick people. Dietitians use evidence based research on food, health and disease which they translate into practical guidance to enable people to make appropriate lifestyle and food choices.
- Regulated by the Health and Care Professions Council (HcPC)



What Dietitians Do...



What my FRIENDS think I do



What SOCIETY thinks I do



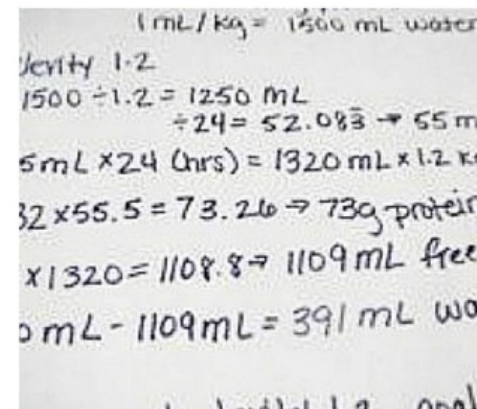
What my PATIENTS think I do



What DOCTORS think I do



What I think I do



What I ACTUALLY do

A bit about me



1993

- Qualified from North London University



1994-1996

- First job at Royal Hallamshire hospital Sheffield



1998 to date

- Started at St Mark's Hospital



2010

- Completed PhD at London Metropolitan University

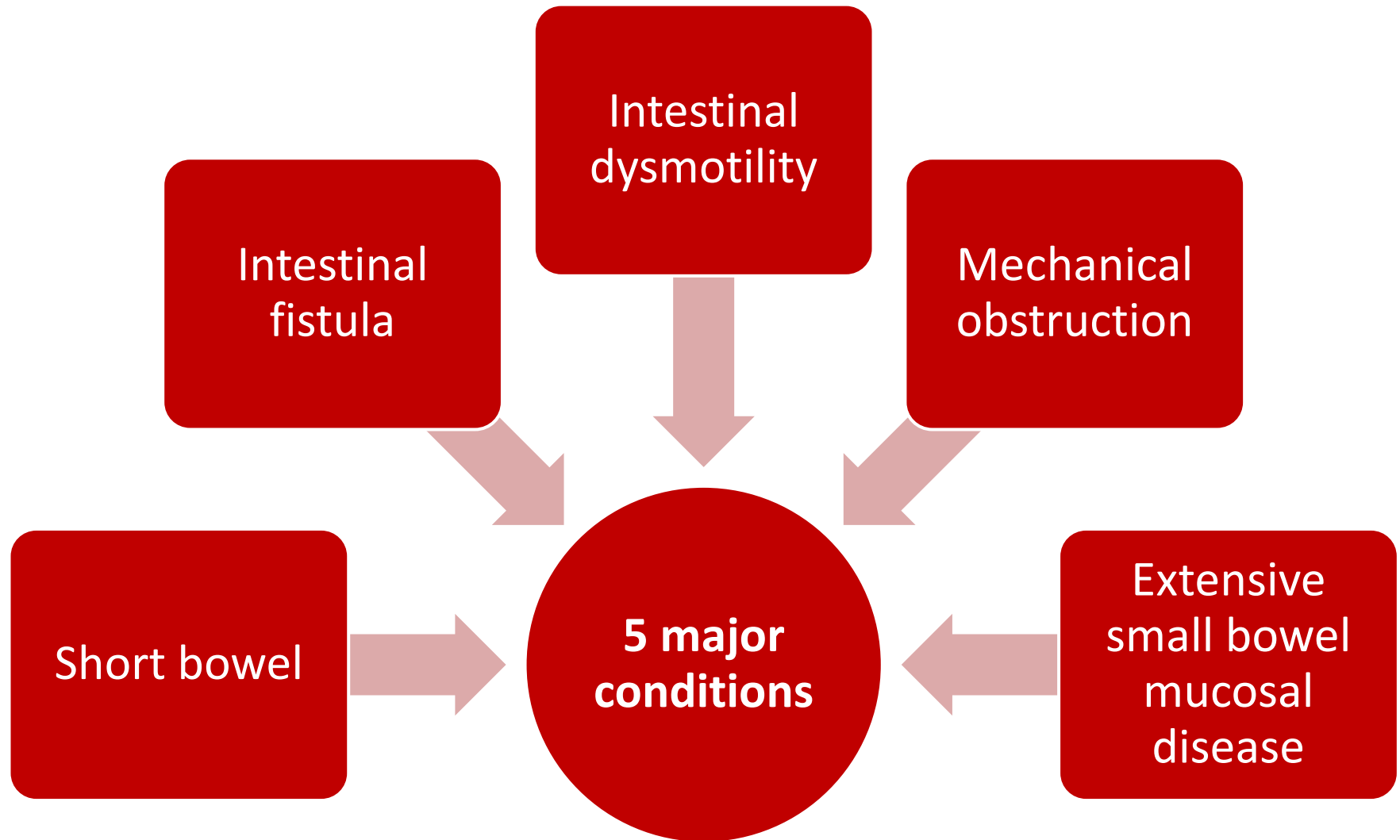
St Mark's Hospital

- The only hospital in the world to specialise entirely in intestinal and colorectal diseases
- National centre for intestinal failure, intestinal rehabilitation and home parenteral nutrition (HPN)
- Dedicated Intestinal Failure Unit (IFU)



Intestinal failure

Pathophysiological classification



Functional classification

Type 1

Self-limiting
intestinal failure

Acute
post-operative
ileus

Type 2

Significant and
prolonged PN
support
(>28 days)

GI surgery
complicated by EC
fistulation

Type 3

Chronic IF
(long-term PN
support)

Short bowel
Motility disorder

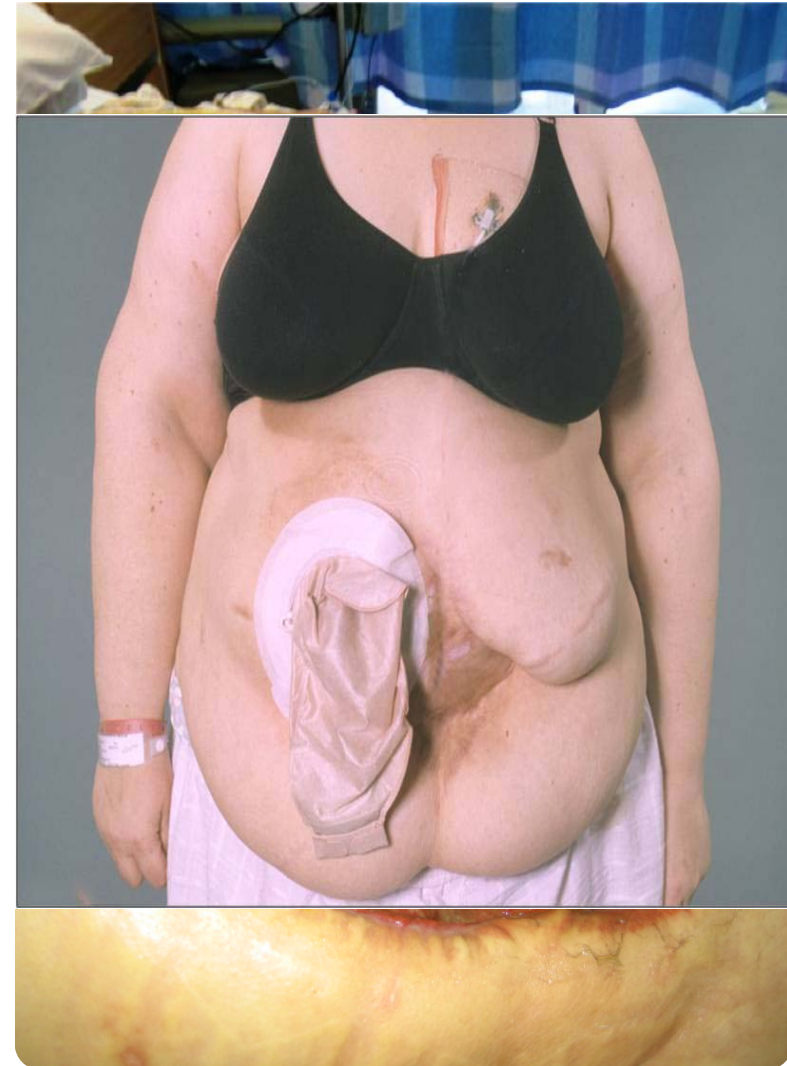
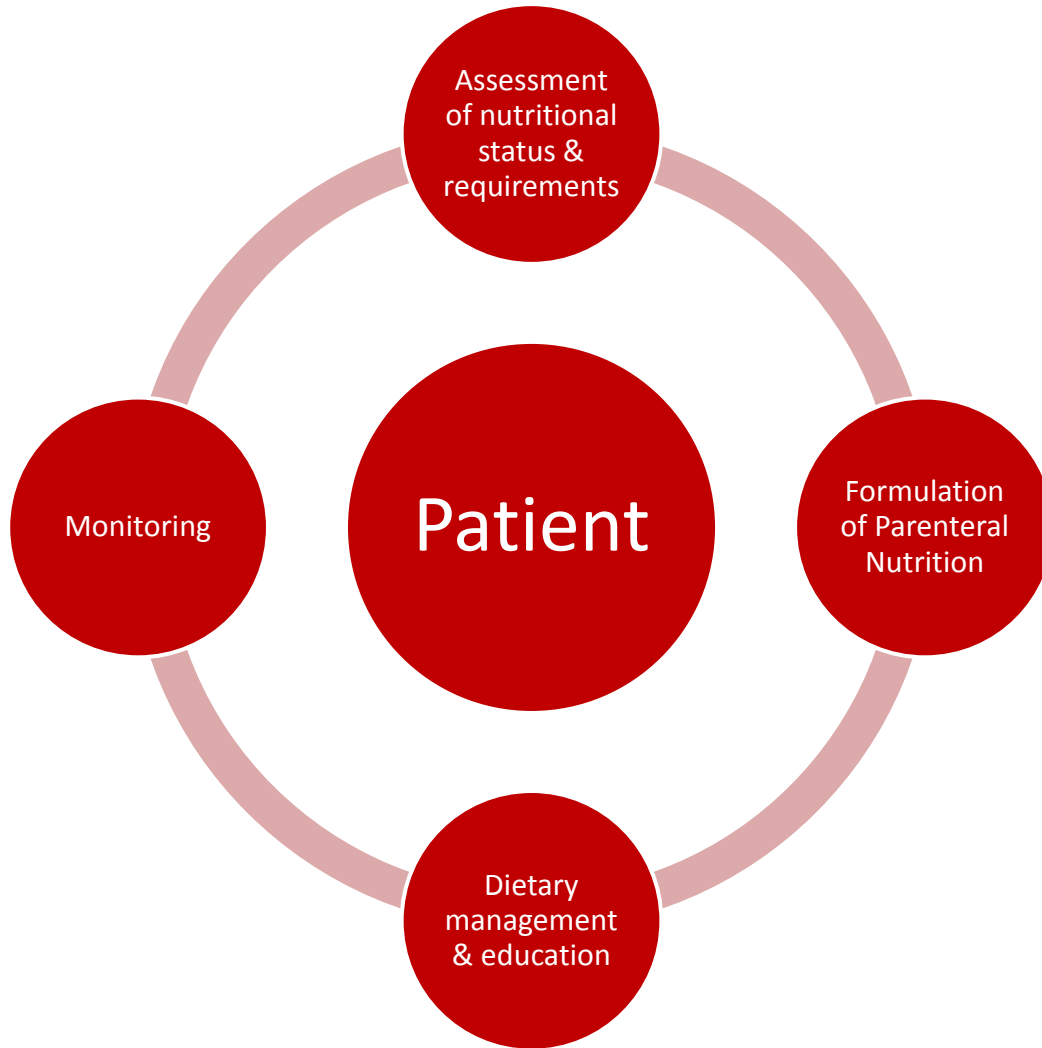
EC, enterocutaneous; GI, gastrointestinal; PN, parenteral nutrition

Parenteral Nutrition

- **Parenteral nutrition (PN)** is feeding intravenously, bypassing the usual process of eating and digestion.
- PN contains glucose, amino acids, lipids, fluid, vitamins, trace elements and minerals.



Role of the Intestinal Failure Dietitian



Supplementary prescribing for registered dietitians

A Big Mountain



2nd of March 2017 Passed course

September 2016 Started SP course

June 2016 London Southbank University approved by HcPC

March to May 2016 Contacted all HEIs regarding SP for RDs

February 2016 Ministers approval given

26th of November 2015 CMH approved

17th of September 2015 Presented to the CMH

June 2015 Prepare for consultation at commission on human medicines (CMH)

June 2015 460 responses to public consultation (only 7 rejected proposal)

April 2015 Public engagement events

February 2015 Public consultation

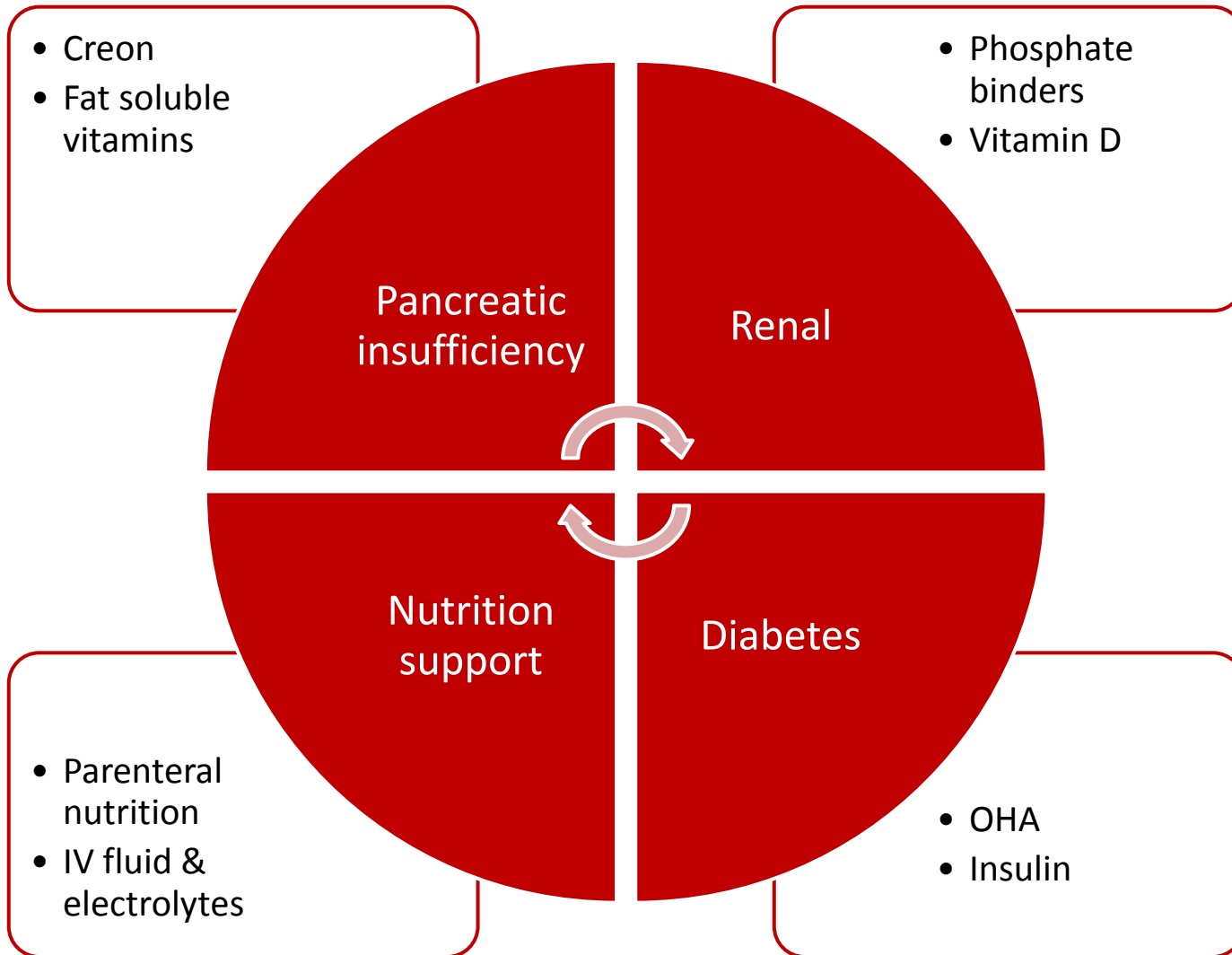
September to December 2014 Preparation for the public consultation

May 2014 Case of need proposal sent to NHSE

April 2014 1st meeting for "case of need"

Jan 2014 Email from Najia Qureshi asking for volunteers. PN case study requested

SP Roles for Dietitians

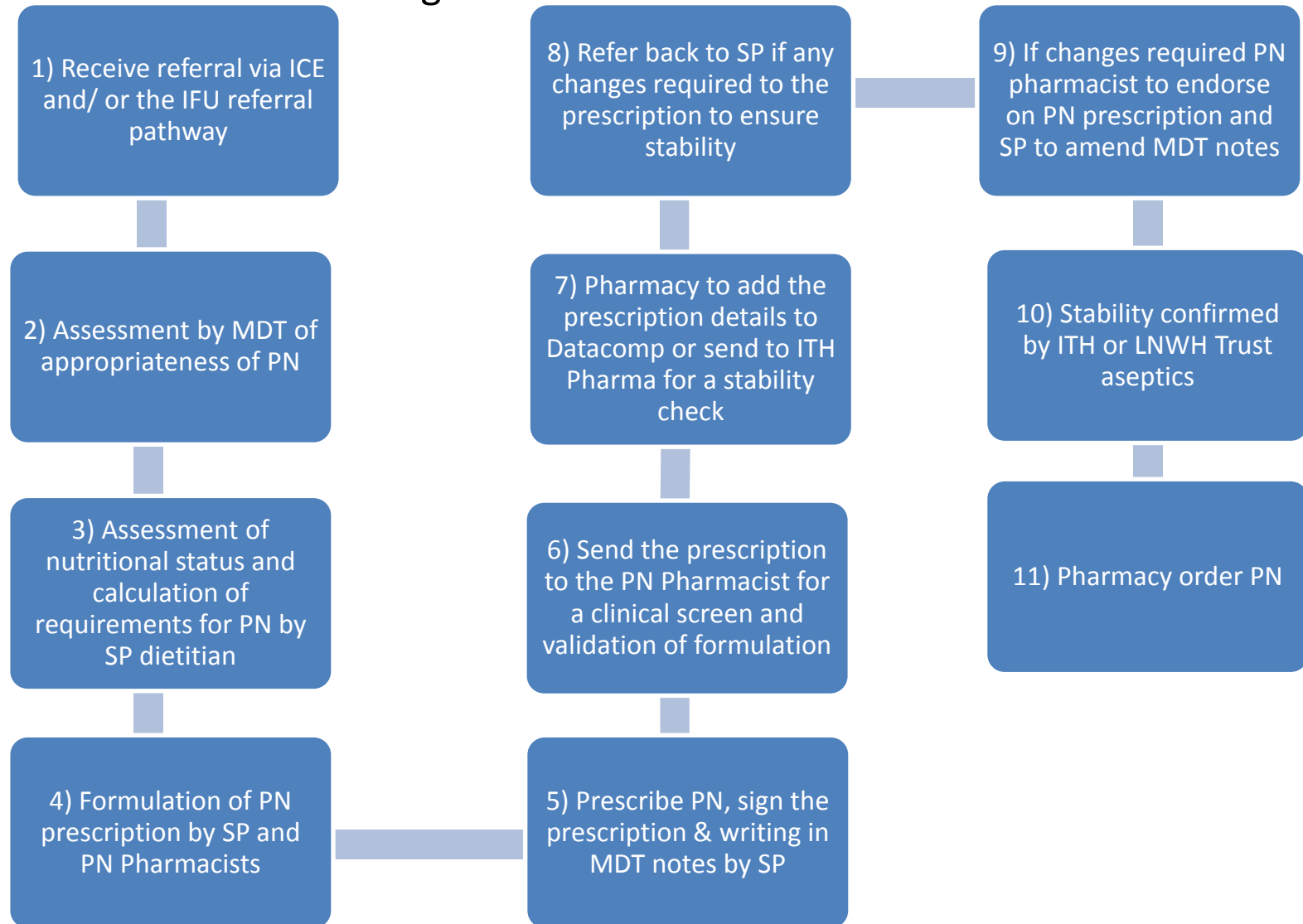


Pre course Hoops

- Trust approval
- Create Clinical Management Plan
- Create a flow chart for Parenteral Nutrition



Review, Prescribing, Clinical screening, Validation and Ordering process for inpatients starting Parenteral Nutrition (PN) to support supplementary prescribing for registered dietitians at LNWH Trust



IFU = Intestinal Failure Unit, MDT=multidisciplinary team, SP=supplementary prescriber

The Course



Post course Hoops

- Trust approval
- Clinical Management Plan reapproval



Clinical Management Plan

Clinical management plan for supplementary prescribing for registered dietitians at London Northwest Healthcare Trust (LNWHT)

Name of Patient:		Patient medication sensitivities/allergies:	
Patient identification e.g. ID number, date of birth:			
Current medication:		Medical history:	
Independent Prescriber(s): Simon Gabe Contact details:		Supplementary Prescriber(s): Alison Culkin Contact details:	
Condition(s) to be treated: Intestinal failure		Aim of treatment: Improve or maintain nutritional, fluid, electrolyte and micronutrient status	
Medicines that may be prescribed by SP: BNF Section 9.3: Intravenous Nutrition: All parenteral nutrition (PN) used at London Northwest Healthcare Trust (including commercially available PN, 'standard' PN commercially made specifically for London Northwest Healthcare Trust and tailored bags for individual patients)			
Preparation: Nutrition & Fluids IV fluids, amino acids, glucose, lipid emulsions, sodium, potassium, calcium, magnesium, phosphate, vitamin and trace element preparations. IV bicarbonate. IM vitamin preparations. Oral electrolytes, bicarbonate vitamin and trace element preparations. Oral rehydration solutions (ORS).	Indication: Intestinal failure	Dose schedule: Quantity of nutrition, fluid, electrolytes & micronutrients to be prescribed following a full nutritional assessment Examples of doses below: Nitrogen 0-0.3g/kg/d Glucose 0-7mg/kg/d Lipid Og -2g/kg/d Sodium 0-1.5mmol/kg/d Potassium 0-2mmol/kg/d Calcium 0-0.15mmol/kg/d Magnesium 0-0.2mmol/kg/d Phosphate 0-0.8mmol/kg/d Fluid 5-50ml/kg/d Bicarbonate Vitamins 1-2 vials/d (e.g. Cernevit, Solitivo and Vitlipid) Trace elements 1-2 vials/d Vitamin D 150,000-300,000IU IM Vitamin and trace element supplementation as per Trust guidelines or manufacturers guidance ORS 0.5-1L/day	Specific indications for referral back to the IP Adverse effects or intolerance to PN Any serious concerns regarding fluid, electrolyte, metabolic or liver complications Any concerns relating to catheter e.g. catheter related bloodstream infection
Anti-secretory Proton pump inhibitors, H2 antagonists	Intestinal failure	Oral Lansoprazole 15-30mg bd Omeprazole 20-40mg od-bd Ranitidine 150mg bd/300mg od IV Pantoprazole 40-80mg od Esomeprazole 20-40mg od Ranitidine 50mg tds	Any serious concerns regarding fluid and electrolyte complications
Anti-motility Loperamide, codeine phosphate	Intestinal failure	Loperamide 2mg qds increasing to a maximum of 24mg qds. Codeine 30mg qds to a maximum of 60mg qds	Any serious concerns regarding fluid and electrolyte complications
Pancreatic enzymes Creon	Intestinal failure resulting in pancreatic insufficiency	To be determined by diet history. Dose range from 10,000 to 40,000 units before meals and snacks	Any serious concerns regarding fluid and electrolyte complications
Bile acid sequestrants Colestyramine	Intestinal failure associated diarrhoea	4 g a day	Any serious concerns regarding fluid and electrolyte complications

Anti-emetic Ondansetron	Nausea	4-8mg bd	Any serious concerns regarding nausea		
Antiseptic line lock Taurolock & Ethanol	Prevention of CVC infection	Taurolock 1ml 70% Ethanol 1ml	Any concerns relating to catheter e.g. catheter related bloodstream infection		
Feed supplements	Disease related malnutrition	As determined following a full nutritional assessment	Any serious concerns regarding fluid and electrolyte complications		
Nutritional supplements	Disease related malnutrition	As determined following a full nutritional assessment	Any serious concerns regarding fluid and electrolyte complications		
Guidelines or protocols supporting Clinical Management Plan: Parenteral and enteral nutrition group (PENG) handbook of the British Dietetic Association (BDA) European Society of Parenteral and Enteral Nutrition (ESPEN) guidelines: Chronic Intestinal failure in adults (2016) Clinical Nutrition, 35:247e307. NICE guidelines on nutrition support in adults (2006) Clinical guideline 32. British Society of gastroenterology guidelines on the management of short bowel (2006) Current LNWHT policies: Strong potassium injections prescribing & administration policy February 2013 Clinical guideline for the management of hypomagnesaemia in adults September 2016. Guidelines for the Management of Hypophosphataemia in Adult Patients October 2016 Treatment of vitamin D deficiency November 2012 Long Term Central Venous Feeding Catheter Complication Protocol 2013 Adult parenteral nutrition policy (2015)					
Frequency of review and monitoring by:					
Supplementary prescriber: Daily Monday to Friday to maintain nutritional, fluid, electrolyte and micronutrient status the following parameters will be monitored: weight, biochemistry, fluid balance, blood pressure, respiratory rate, temperature, urinalysis, capillary blood glucose, urine output sodium, oral food and fluid intake Monthly: measurement of body composition including mid arm circumference, tricep skinfold thickness and mid arm muscle circumference plus handgrip strength for functional capacity		Supplementary prescriber and independent prescriber: The parameters mentioned in SP column plus the clinical progress of patient and plans for discharge (in patients)			
Process for reporting ADRs:					
<ul style="list-style-type: none"> Notify independent medical prescriber Documentation in patient's medical notes If indicated, report via the MHRA Suspected Adverse Drug Reactions Yellow Card scheme Complete the Trusts Datix form 					
Shared record to be used by IP and SP:					
<ul style="list-style-type: none"> To be filed in patient's medical notes PN prescription to be kept on the ward in the PN folder until completed and then file in patient's medical notes Outpatient prescriptions, electronic unsigned copies kept on secure shared drive, signed originals sent to homecare provider, signed copies kept in St Mark's pharmacy office 					
Agreed by independent prescriber(s)		Date	Agreed by supplementary prescriber(s)	Date	Date agreed with patient/carer
Signature:			Signature:		
Name: Simon Gabe			Name: Alison Culkin		

Case

66 year old female lives with husband

PMH Depression, chronic headaches

Date	Surgical history
May 2017	Road traffic collision:Laparotomy for small bowel & mid ileal injury: Small bowel resection & sigmoid colostomy.
June	Acute abdomen ? Bleed ? Ischaemia. Emergency laparotomy with small bowel resection, Jejunostomy and ileal mucus fistula formed → ICU Acute Kidney Injury on HD
July	High output stoma >4L/d on Parenteral Nutrition via Peripherally Inserted Central Catheter (PICC)
August	Transferred to St Mark's for surgical review and home parenteral nutrition

Staphylococcus Epidermidis in PICC so removed

Started on Teicoplanin but changed to Vancomycin due to resistance

Maintained on IV fluid & electrolytes until central venous catheter (CVC) inserted



Assessing nutritional status

- Assessment of weight
- Body mass index (BMI)
- % Weight loss
- Mid upper arm circumference (MUAC)
- Tricep skinfold thickness (TST)
- Mid arm muscle circumference (MAMC)
- Grip strength

Weight can be deceptive.....



Weight of ascites and/or oedema to estimate dry weight

Kg	Ascites	Oedema
Minimal	2.2	1.0
Moderate	6.0	5.0
Severe	14.0	10.0

Anthropometry

Measurement of the body or its parts

- Mid-arm circumference (MAC)
- Triceps skin fold thickness (TST)
- Mid-arm muscle circumference (MAMC)



Provide information on the amount and rate of change in body energy stores and protein mass

Handgrip dynamometry



Anthropometry & biochemistry

- **BMI 29.4 kg/m² (overweight)**
 - ▣ Height 167 cm
 - ▣ Weight 82kg
- **% weight loss 32%**
 - ▣ Lost 38kg on slimming world prior to RTC
- **Body Composition & Functional Capacity**
 - ▣ Mid arm circumference 25-50th
 - ▣ Tricep skinfold thickness 5-10th
 - ▣ Mid arm muscle circumference 75-90th
 - ▣ Handgrip 16kg <85% normal
- **Micronutrients**
 - ▣ Full micronutrient screen on admission

WCC	9.8
Sodium	140
Potassium	3.8
Urea	3.7
Creatinine	35
CRP	16.1↑
Bilirubin	4
Alk Phos	134↑
ALT	15
Albumin	28↓
Adj Ca	2.56
Magnesium	0.74
Phosphate	1.41



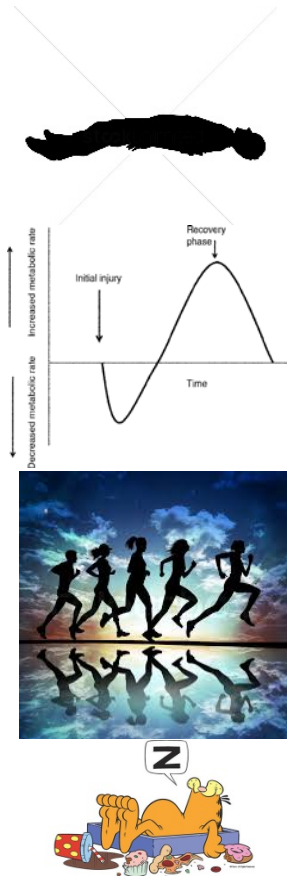
Clinical & dietary

- Observations normal
- Mobilising
- Output between 1.6-2.3L/day
- 500ml oral fluid restriction
- Eating low fibre diet ~500kcal & 25g protein

Requirements-Energy

Main components of energy expenditure are:

- Basal metabolic rate (BMR)
- Metabolic stress
- Activity
- Diet induced thermogenesis





Calculation of basal metabolic rate

Standard formulae used based on sex, age and weight

Henry/Oxford Equations

	Females	Males
18-30	$13.1W + 558$	$16.0W + 545$
30-60	$9.74W + 694$	$14.2W + 593$
60-70	$10.2W + 572$	$13.0W + 567$
70+	$10.0W + 577$	$13.7W + 481$



Metabolic stress

- Equations determine BMR in health
- Patients have altered requirements due to:
 - ✓ Surgery
 - ✓ Injury
 - ✓ Infection
 - ✓ Inflammation
- Stress response
 - ✓ ↑ Temperature
 - ✓ ↑ WCC
 - ✓ ↑ CRP & ↓ albumin
 - ✓ ↑ Urea

Combined factor for activity & diet induced thermogenesis

Bedbound immobile	10%
Bedbound mobile/sitting	15-20%
Mobile on the ward	25%





Adjust for weight change

- Only in metabolically stable not stressed patients
- During metabolic stress unlikely to gain lean body mass
 - Avoid overfeeding
- Can add or subtract 400-1000Kcal/day if weight change required



Requirements- Nitrogen

Requirements increased during:

- Sepsis & stress
- Large losses from stoma/fistula

	g/kg
Normal	0.17 (0.14-0.2)
Hypermetabolic	
5 - 25%	0.2 (0.17-0.25)
25 – 50%	0.25 (0.2-0.3)
>50%	0.3 (0.25-0.35)
Depleted	0.3 (0.2-0.4)

Requirements – Fluid & electrolytes

British Consensus Guidelines on Intravenous Fluid Therapy for Adult Surgical Patients

GIFTASUP

Jeremy Powell-Tuck (chair)¹, Peter Gosling², Dileep N Lobo^{1,3}, Simon P Allison¹, Gordon L Carlson^{3,4}, Marcus Gore³, Andrew J Lewington⁵, Rupert M Pearce⁶, Monty G Mythen⁶

On behalf of ¹BAPEN Medical - a core group of BAPEN, ²the Association for Clinical Biochemistry, ³the Association of Surgeons of Great Britain and Ireland, ⁴the Society of Academic and Research Surgery, ⁵the Renal Association and ⁶the Intensive Care Society.



ASGBI
Association of Surgeons of Great Britain and Ireland



The Renal Association



The Intensive Care Society

Intravenous fluid therapy in adults in hospital

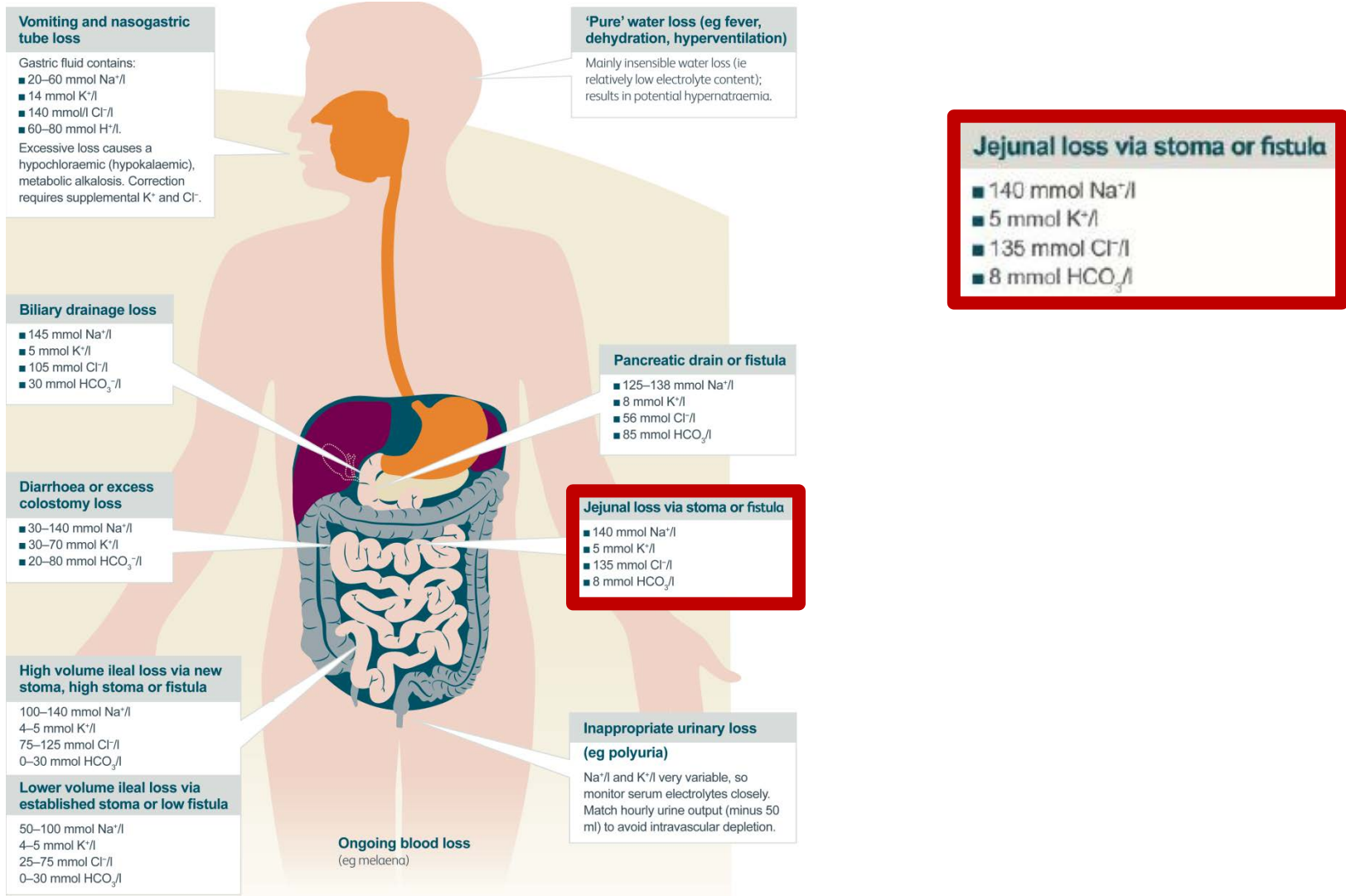
Issued: December 2013

NICE clinical guideline 174

guidance.nice.org.uk/cg174

- 25-30ml/kg/d of water
- 1mmol/kg/d of sodium & potassium

NICE fluid guidelines



Case: estimated requirements

Nutrient	Calculation	Requirement	PN
Energy	Henry & 0% SF 25% & AF -500	1260kcal	800Kcal
Nitrogen	0.17/kg	14g	12.85g
Sodium	1-1.5mmol/kg + losses	382-423mmol	40mmol
Potassium	1-1.5mmol/kg	82-123mol	70mmol
Calcium	0.1-0.15mmol/kg	8-12mmol	6mmol
Magnesium	0.1-0.2mmol/kg	8-16mmol	10mmol
Phosphate	10/1000kcal	18mmol	20mmol
Fluid	30ml/kg +losses	4710ml	1500ml



SF = stress factor, AF = activity factor

Medications

Medication & route	Dose	Frequency	Relevant side effects
Dalteparin S/C	5000 units	od	Hyperkalaemia
Ondansetron po	4mg	bd	Hypotension, diarrhoea
St Mark's oral rehydration solution po	1L	Daily	Palatability
Loperamide po	16mg	qds	Dry mouth, dizziness, nausea, vomiting
Codeine phosphate po	60mg	qds	Anorexia, dry mouth, nausea, vomiting, sweating, tachycardia, urinary retention
Omeprazole po	40mg	bd	Diarrhoea, nausea, vomiting, dizziness, dry mouth, taste disturbances, hyponatraemia, hypomagnesaemia
Paracetamol po	1g	prn	Malaise



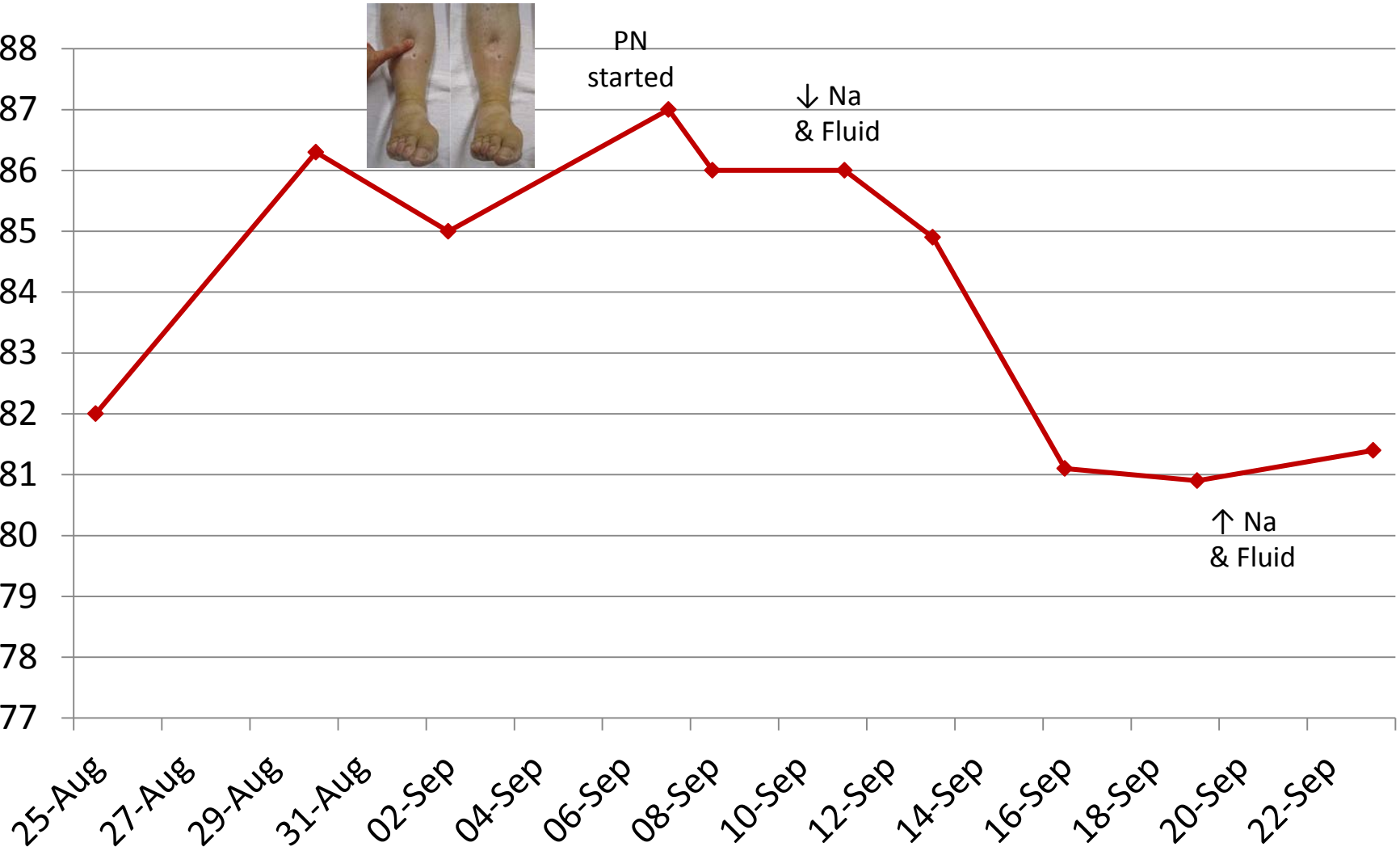
Management

- New central venous catheter inserted
- Gastrointestinal mapping for future surgery
 - ▣ 60cm from DJ flexure to jejunostomy
 - ▣ 40cm of ileum
 - ▣ No obstruction in large bowel

Micronutrient management

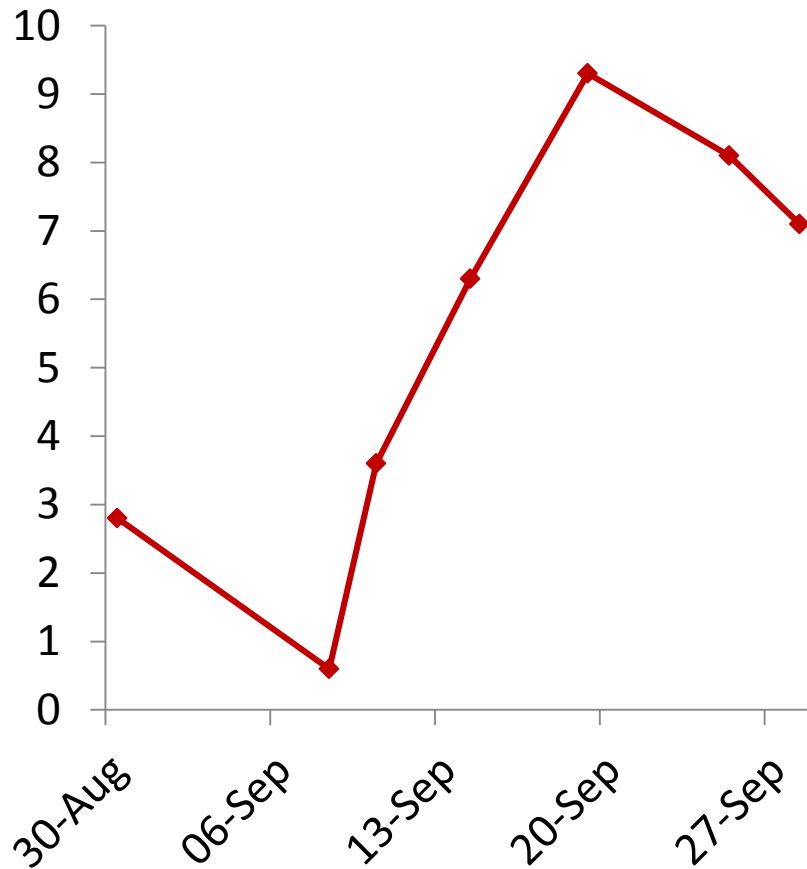
Micronutrient	Result	Treatment
Vitamin D (>50)	18	300,000 units IM
Selenium (0.8-1.4umol/L)	0.45	500micrograms IV 3/7
Zinc (8-17umol/L)	16.4	None
Copper (11-22umol/L)	18.4	None
Vitamin A (0.77-3.95umol/L)	0.55	100,000 units IM
Vitamin E (9.5-41.5umol/L)	20.0	None
Vitamin B12 (197-771pg/ml)	363	None
Folate (3.9-20.0ng/ml)	>20	None
Ferritin (13-150ng/ml)	610	None
CRP (0-5mg/L)	22.4	

Progress - weight

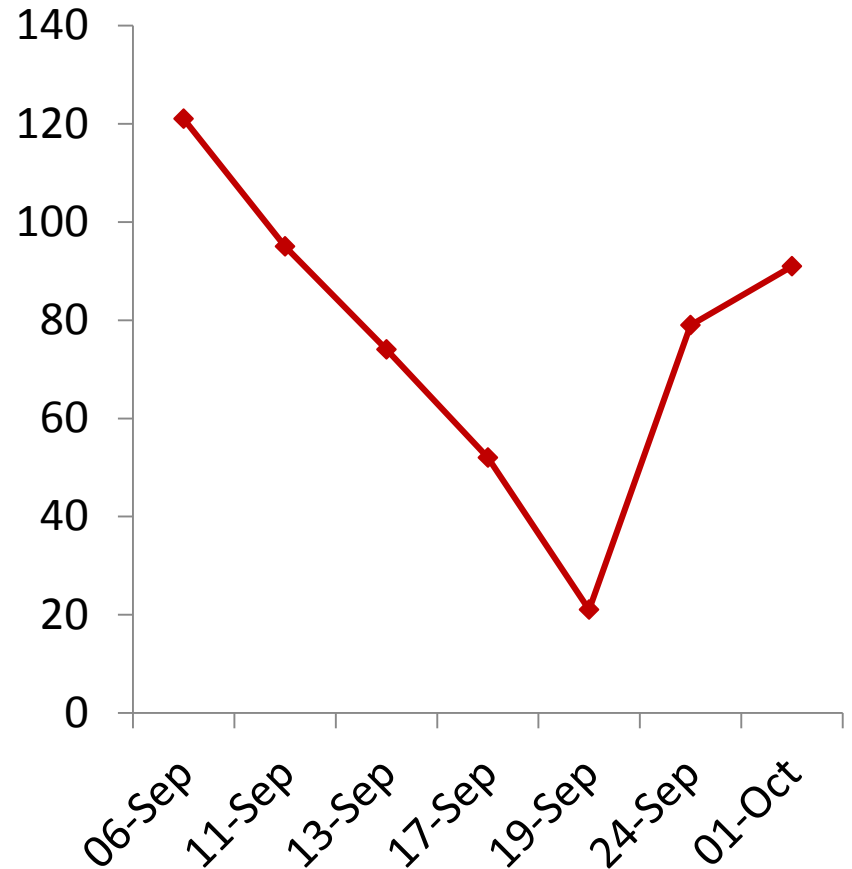


Urea & Urine Sodium

Urea (mmol/L)



Urine Sodium (mmol/L)





Conclusion

Patient with short bowel requiring HPN

Overweight & overloaded

- Appropriate PN

Dietary advice

- High energy, protein, fat & salt, low fibre diet
- Corrected micronutrient deficiencies

Quality of life

- Overnight feeding

Future surgery planned

- Maintain nutritional status

Acknowledgements



Najia Qureshi
BDA Policy
Officer
(Prescribing &
Regulation)



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