



The Lennard-Jones
Intestinal Failure Unit



Fluid management in short bowel & intestinal failure

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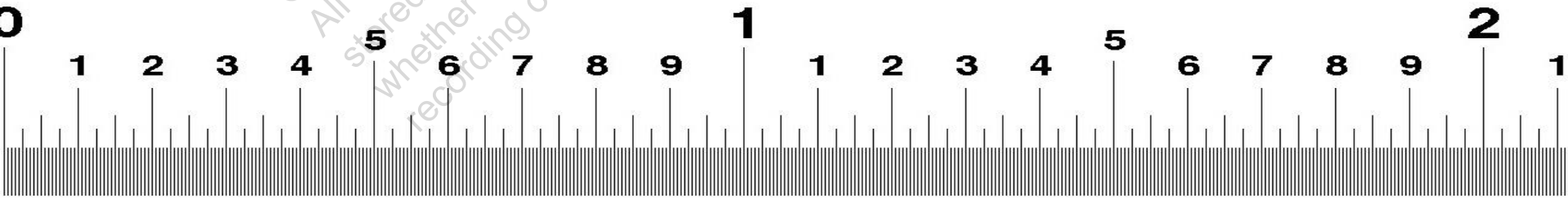
Variability of intestinal length

Technique	Author	n	Small intestinal length, m	
			Mean	Range
Autopsy	Bryant, 1924			3.0–8.5
Laparotomy	Backman, 1974	32	660	4.0–8.5
	Slater, 1991	38	500	3.0–7.8

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Short bowel

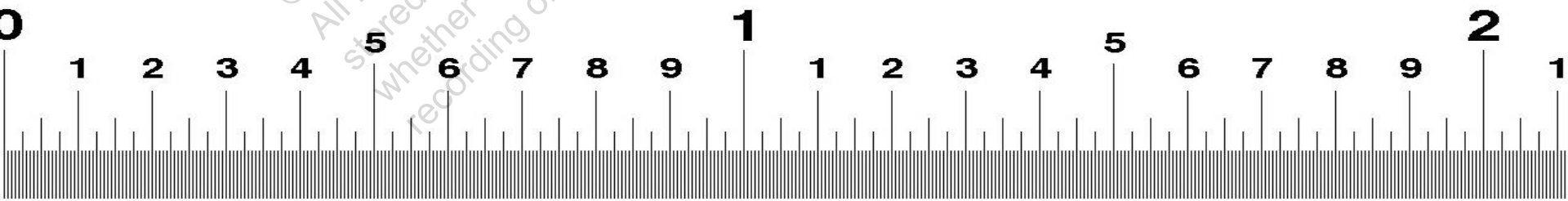
What is the critical length of bowel that you need?

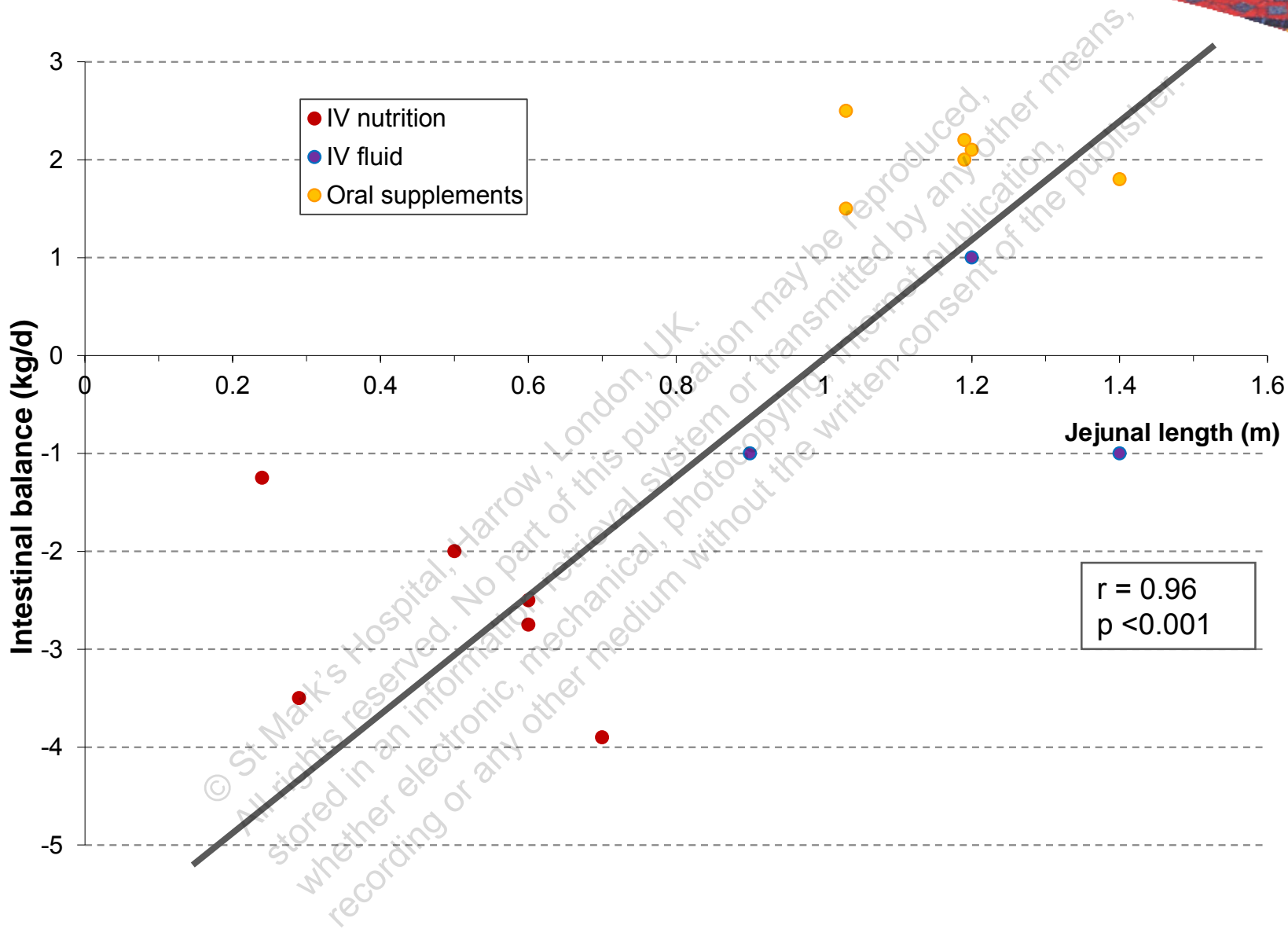


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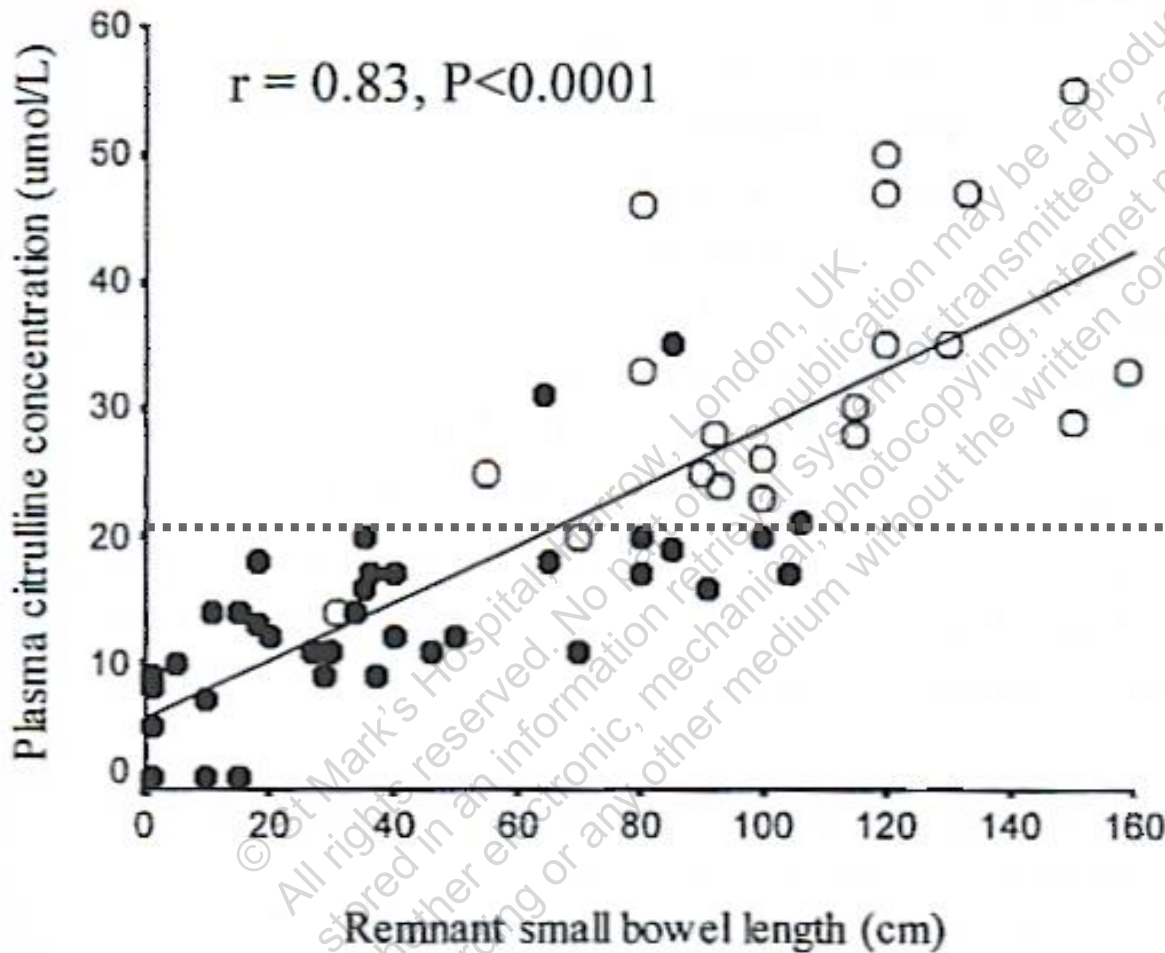
Length matters: critical lengths

SBS type	Critical SB length	Note
Jejunostomy or EC fistula	100 cm	More needed if diseased bowel
Jejunocolic anastomosis	Around 50 cm	Depends on amount of residual colon





Citrulline



95% positive predictive value
in distinguishing transient
from permanent IF

Short bowel

How much fluid does a patient need?

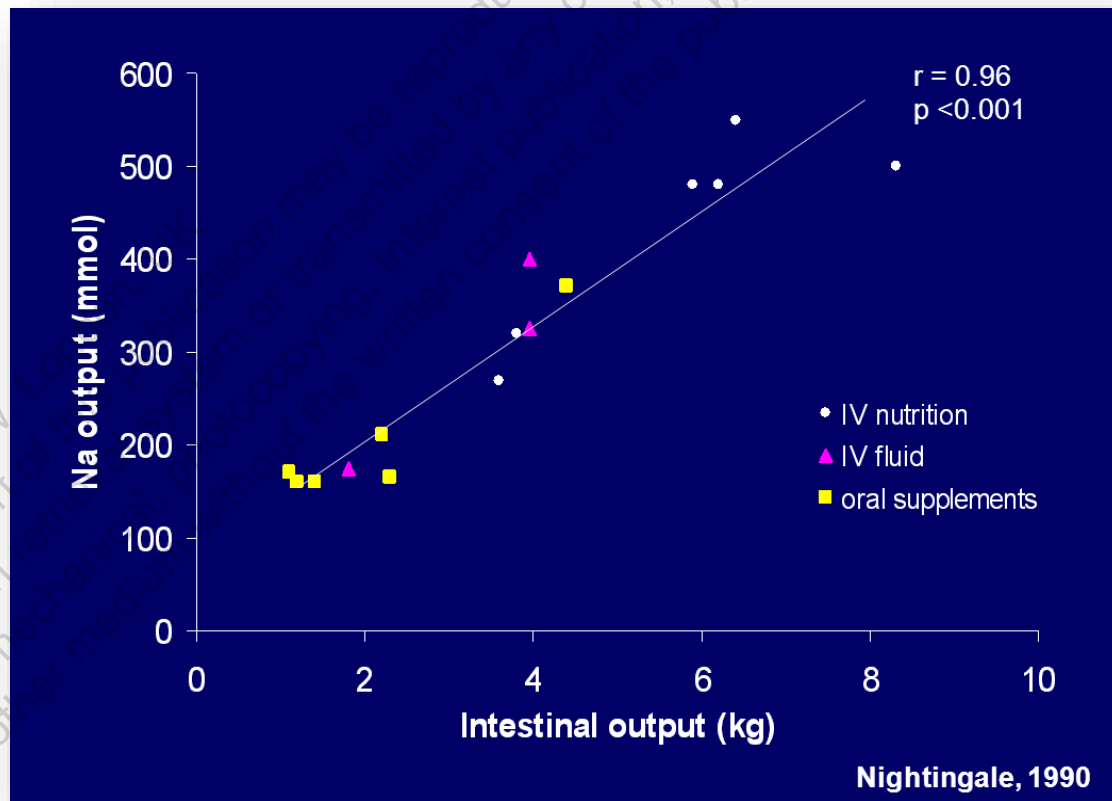
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Salt & water losses

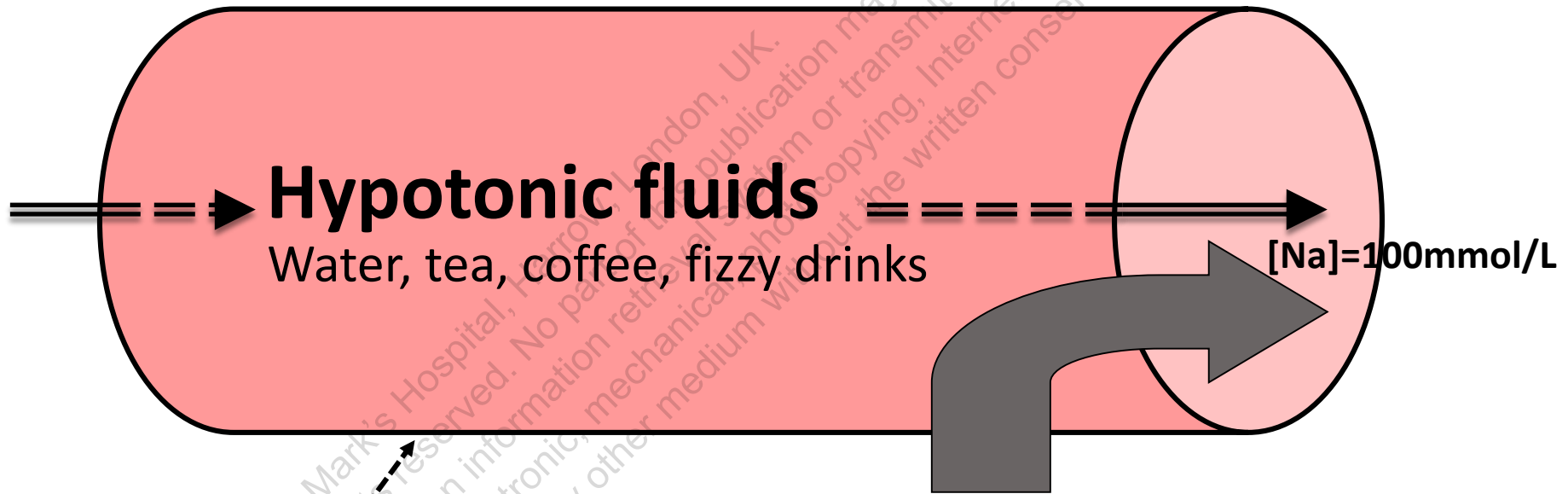
Patients with short bowel have a high output

The higher the output the higher the sodium losses

These losses need replacing otherwise the patient will become both salt & water deplete



Jejunum

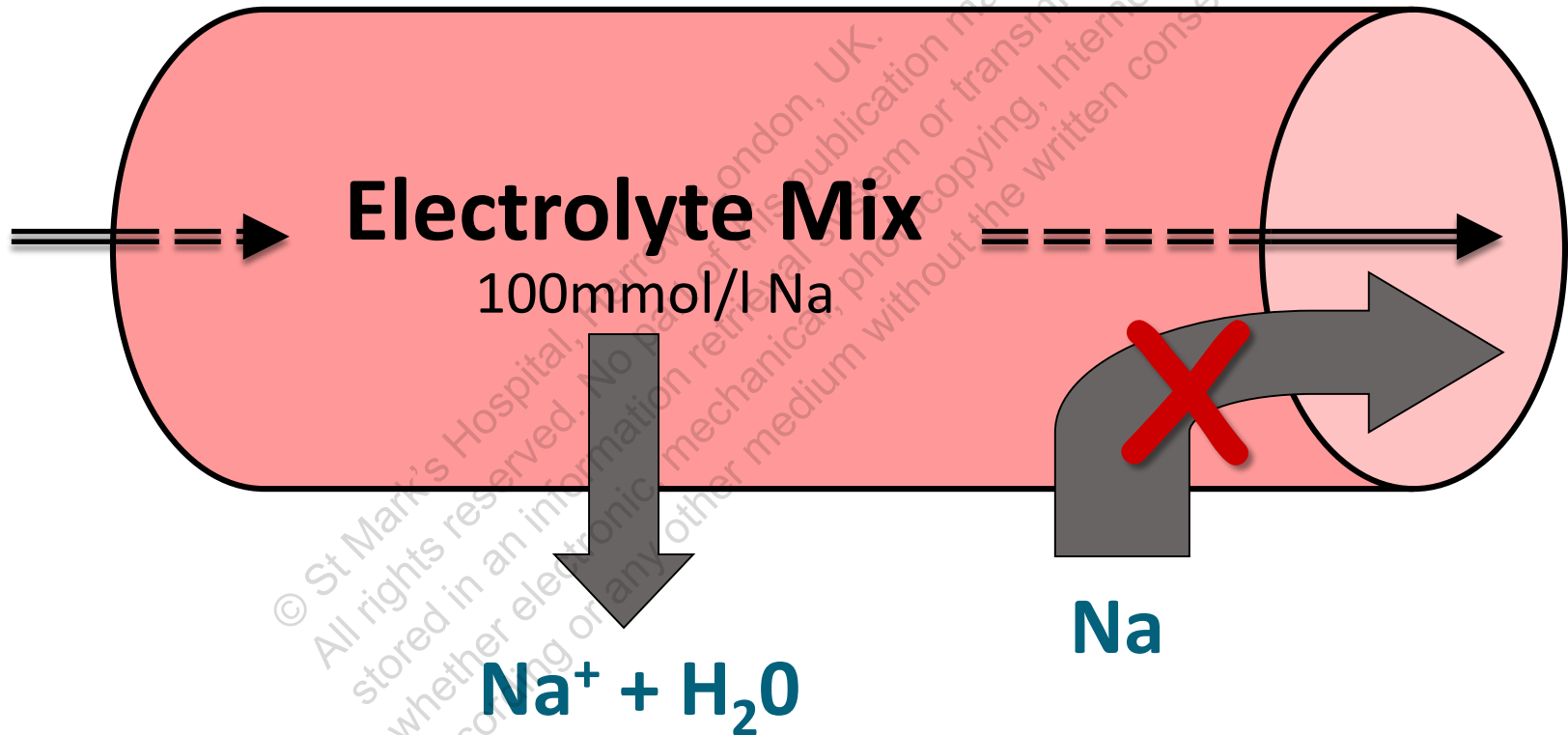


Jejunal mucosa

Unable to maintain a Na
gradient $>30-40\text{mmol/L}$

Jejunum

Decreasing fluid losses & increasing absorption



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Oral rehydration solutions

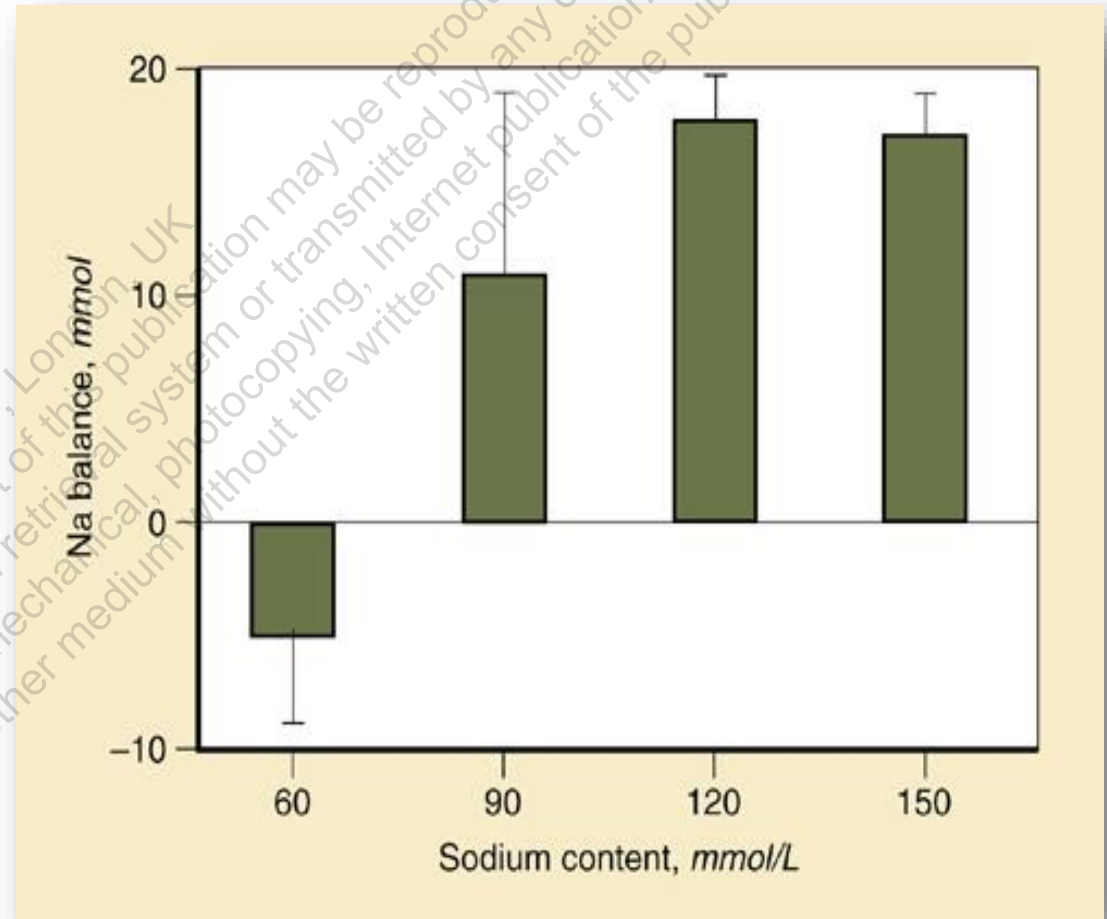
Water & sodium solutions
<90mmol/L

■ Negative Na balance¹

Sodium solutions >90mmol/L

■ Greater Na absorption

■ But palatability an issue²




¹Rodrigues *et al.* (1988) *Clin Sci*;74:69P

²Nightingale *et al* (1992) *Gut*; 33:759-761

Treatment: high output

Drink little hypotonic fluid	Maximum 1L/day
Drink a glucose-saline solution	Maximum 1L/day

	Na mmol/l	K mmol/l	Glucose mmol/l	Volume ml
WHO	75	20	111	1000
Electrolyte mix 	90	0	111	1000
Dioralyte	60	20	90	200
Glucodrate	120	0.9	111	1000

Powerade isotonic	12	4	0 (214) sucrose & maltodextrin	600
Powerade isotonic + ½teaspoon NaCl	85	4	0 (214) sucrose & maltodextrin	600

E-mix recipe

Ingredient	Amount	Note
Glucose	20g	6 teaspoons
Salt	3.5g	1 level 5ml teaspoon
Sodium bicarbonate	2.5g	1 heaped 2.5ml teaspoon

Stir into 1L water & chill overnight: enjoy the next day!



Treatment: high output

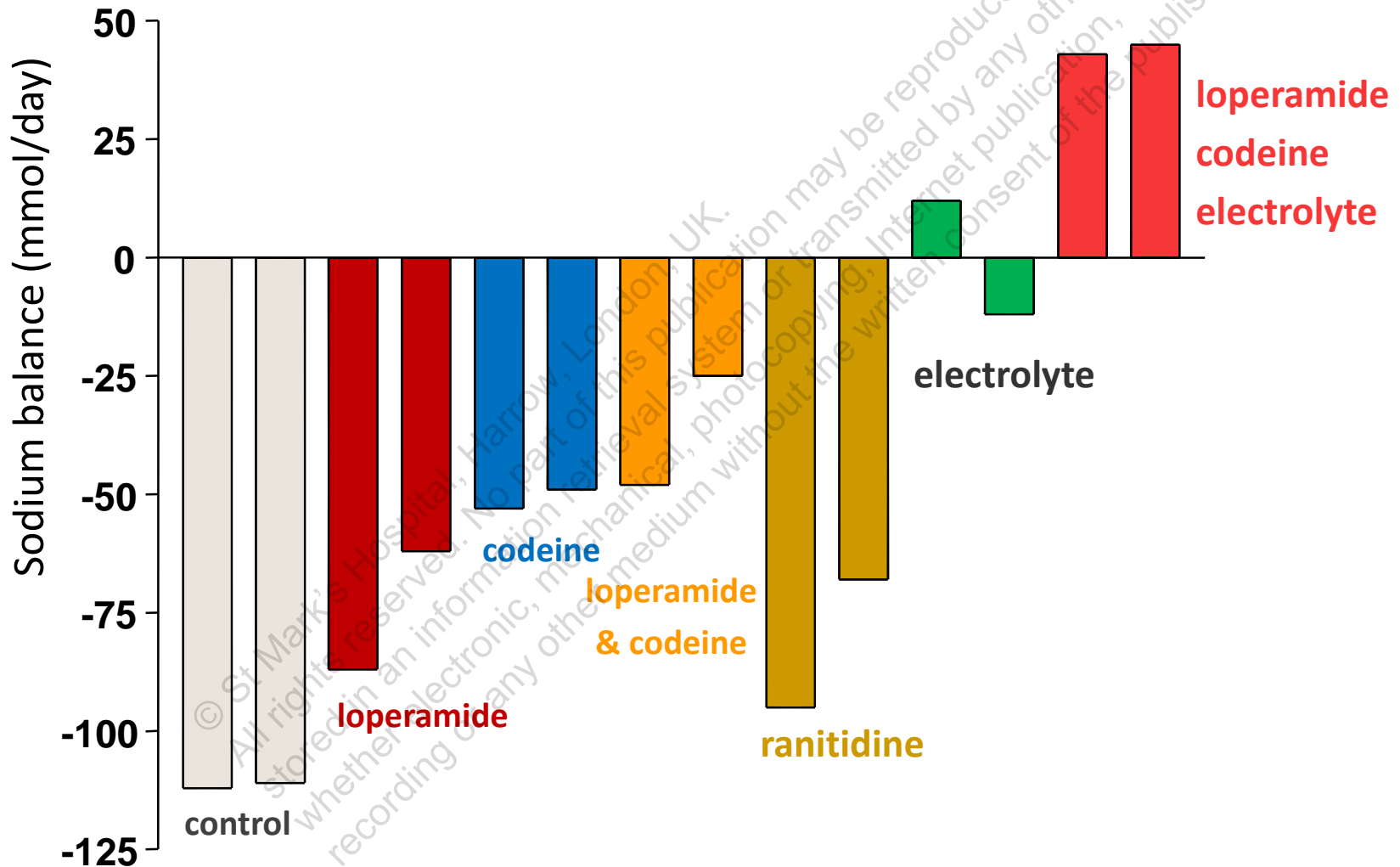
Drink little hypotonic fluid	Maximum 1L/day
Drink a glucose-saline solution	Maximum 1L/day

Drug therapy	Antimotility	Loperamide (up to 32mg QDS)
		Codeine phosphate (up to 60mg QDS)
	Antisecretory	Omeprazole (40mg BD)
		?Octreotide (50µg BD)
		?Clonidine patch
		?Racecadotril

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Sodium balance

Patient with jejunostomy at 100 cm



Potassium & magnesium

Potassium

- Negative K balance when jejunum <50 cm
- Hyperaldosteronism in chronic Na deficiency

Magnesium

- Deficiency is common
 - 40% jejunum-colon pts
 - 70% jejunostomy pts
- No correlation between Mg balance & jejunal length

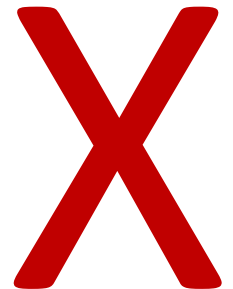
Fluid & nutritional balance

Fluid

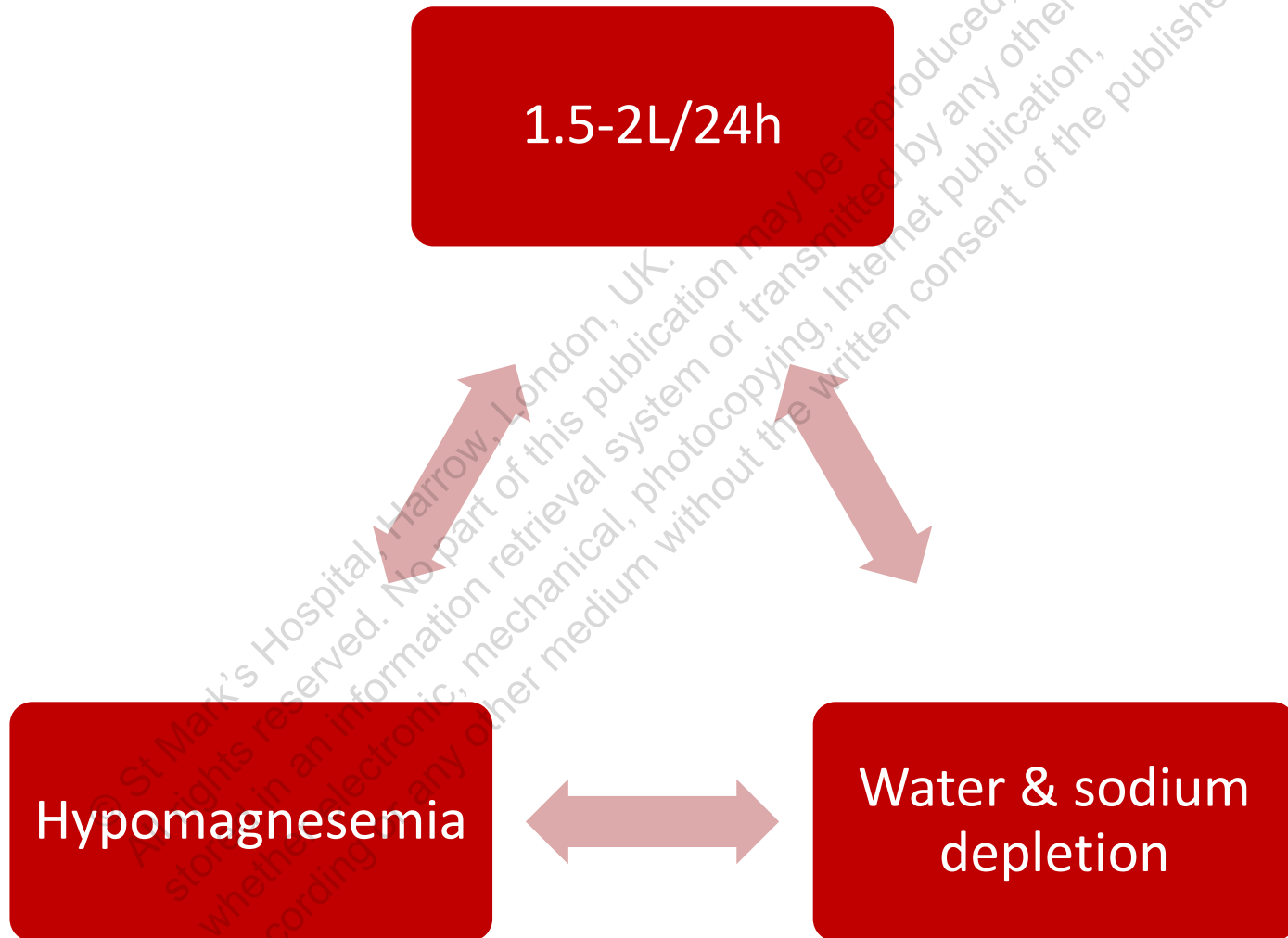
- Measure losses
- IV fluid replacement
- Accurate fluid balance charts essential
- Urine Na best gauge of hydration status

Nutrition

- Assess current nutritional status
- Dietary history
- Losses
- Albumin NOT a good marker



High output stoma



High output stoma

Thirst & cramps

Output 1.5-2L/day

Water & sodium loss

Hypomagnesemia

Stomal problems

Frequent emptying of bag

Leakage / difficult skin care

Tremor

Magnesium depletion

Undernutrition

Dehydration

Decreased absorption

What NOT to do...

Drink more water

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Summary

Critical SB length

- 1m without colon
- 50cm with whole colon

Stomal sodium loss

- 90-100mmol/L

Decreasing output

- Drink less, use oral rehydration solution
- Antimotility & antisecretory agents
- Consistent message to the patient

High output stoma

- Surprisingly common (13-16% ileostomists)*
- Look at the colour of the output
- Look for the symptoms and signs