

Long Term Effects Oesophago-Gastric Surgery on Micronutrient Status

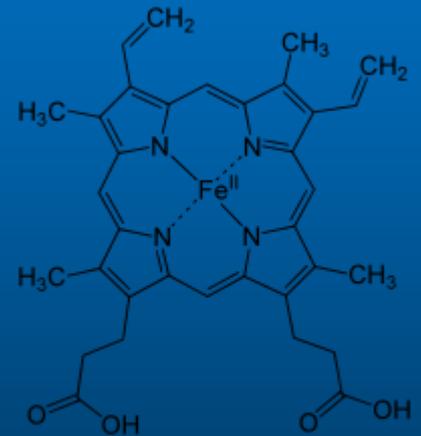
Alice Kidd

Macmillan Specialist Oesophago-Gastric Dietitian

Regional Oesophago-Gastric Unit

Royal Surrey County Hospital & St Luke's Cancer Centre

Guildford, UK



Is a diet only approach enough?



We support OG patients throughout their treatment pathway and long term after surgery.

In the past we advised

- Diet alone should be sufficient, ensuring adequate intakes of certain micronutrients such as iron and calcium.
- Deficiencies only looked for if suspected.
- Exception was vitamin B12 injections for all total gastrectomy's (TG)
- However growing concern that this was not adequate.

Improving 5 year survival



- OG are patients living longer following surgery. One study states a 47.8% 5 year survival rate following oesophagectomy (Hannah 2012)

What effect does this have on their long term micronutrient status?

- Lack of good data
- Often dated
- Focused mainly on gastrectomy patients
- No clear guidance on how we monitor and support these patients

Summary of the Evidence



Fat soluble vitamins A, E, D	<ul style="list-style-type: none">• 100% Gastrectomy patients showed abnormal faecal fat excretion (n=16)• Steatorrhoea post Oesophagectomy• 25 % Roux-en-Y gastrectomy patients deficient in vitamin A• High vitamin D deficiency in oncological patients.	Bae et al (1998) Bragelmann (1996) Okada (1998) Adams (1968) Strohle (2010)
Calcium and Vit. D	<ul style="list-style-type: none">• High prevalence of bone disorders post gastrectomy• Lower vitamin D and raised PTH post gastrectomy	Zittal (1997) Hollender (2006)
Iron	<ul style="list-style-type: none">• Low levels ferritin post gastrectomy• 48% gastrectomy patients anaemic	Hollender (2006) Bragelmann (1996)
B1	<ul style="list-style-type: none">• Low levels post gastrectomy• Found to be deficient in gastrectomy patients who developed peripheral neuropathy	Iwase (2002) Koike (2001)

More Recent Studies



Wakefield (2011) (unpublished)	104 patients at least 1 year post oesophagectomy, Roux-en-Y total or sub total gastrectomy	Measured A, E, D, B1, B12, Iron, Zn, Ca	Greatest deficiencies in A, D, B12, iron, Zn
Haverkort (2012)	Actual nutritional intake 6 and 12 months post oesophagectomy	<10% patients had sufficient intake of all micronutrients. Most sub optimal folic acid, Vit D, copper, calcium. B1.	

- 2012 NPSA Alert 'Risk of Harm following Gastric Bypass'

'All bariatric surgical procedures have the potential to cause significant micronutrient deficiencies'

'Long term monitoring is now an essential component of bariatric practice'

Mary O'Kane et al 2014

- *Can we directly use data from Bariatric patients? – No*
 - Very different patient group with different treatment goals and no chemotherapy

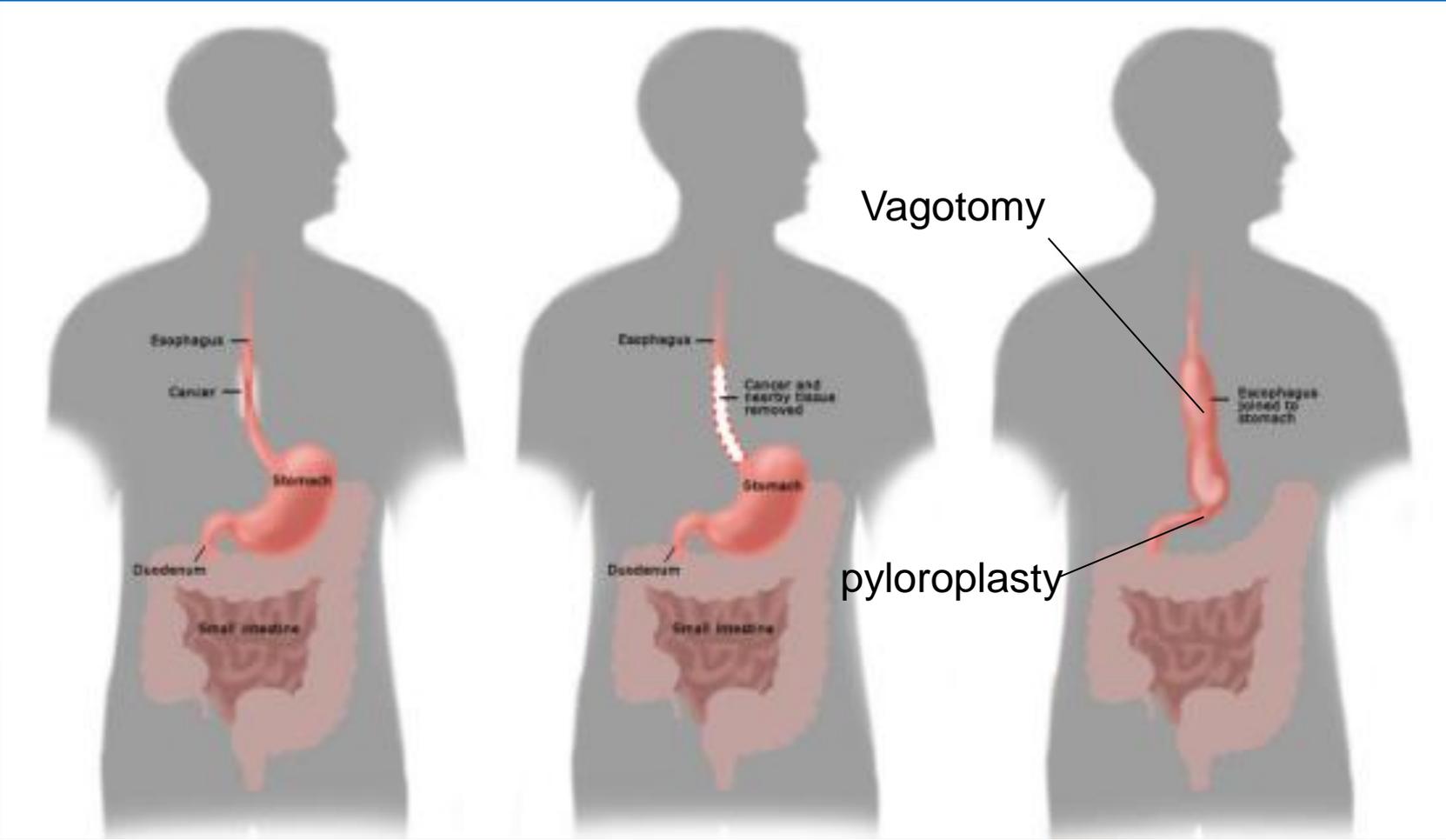
But – if these patients are at risk it is highly likely that oesophago-gastric patients will be.

RSCH surgical treatment pathway



Treatment		Nutrition
Pre -op 3 cycles neo adjuvant chemotherapy (ECX – epirubicin, cisplatin, capecitabine)	Majority excluding early tumours or those not deemed fit for chemo	Oral Modified texture Or Jejunostomy if needed.
Surgery	Oesophagectomy Gastrectomy	-Jejunostomy gradual reintroduction food - 1 week PN then oral only
Post op. 3 cycles adjuvant ECX	Majority excluding early tumours or those not deemed fit for chemo	Ongoing jejunostomy feeding until completion chemotherapy or full oral diet established
Long term follow up	All surgical patients reviewed regularly alongside surgeons and CNS's for 5 years following surgery.	

Refresher on OG resections

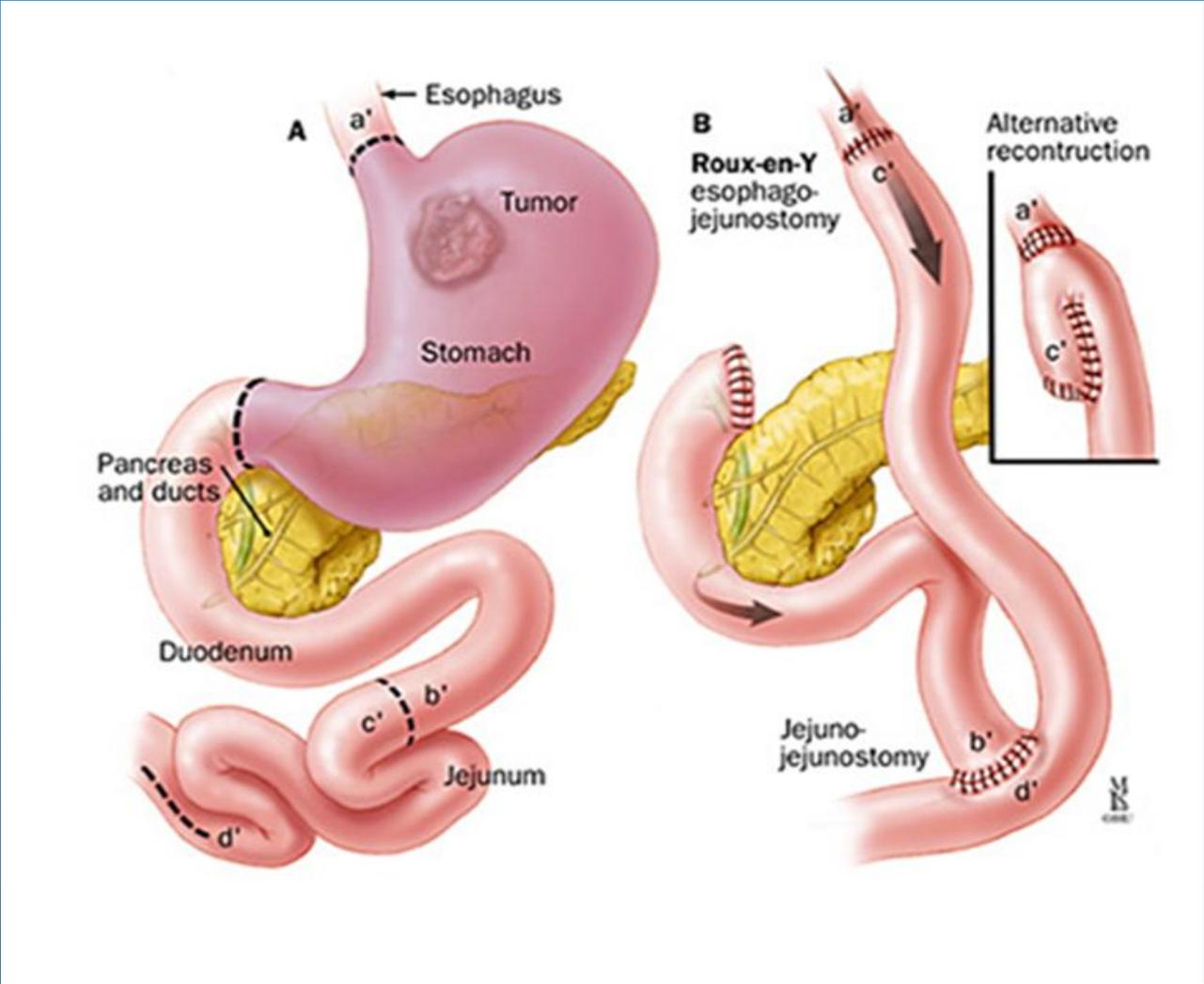


Oesophagectomy

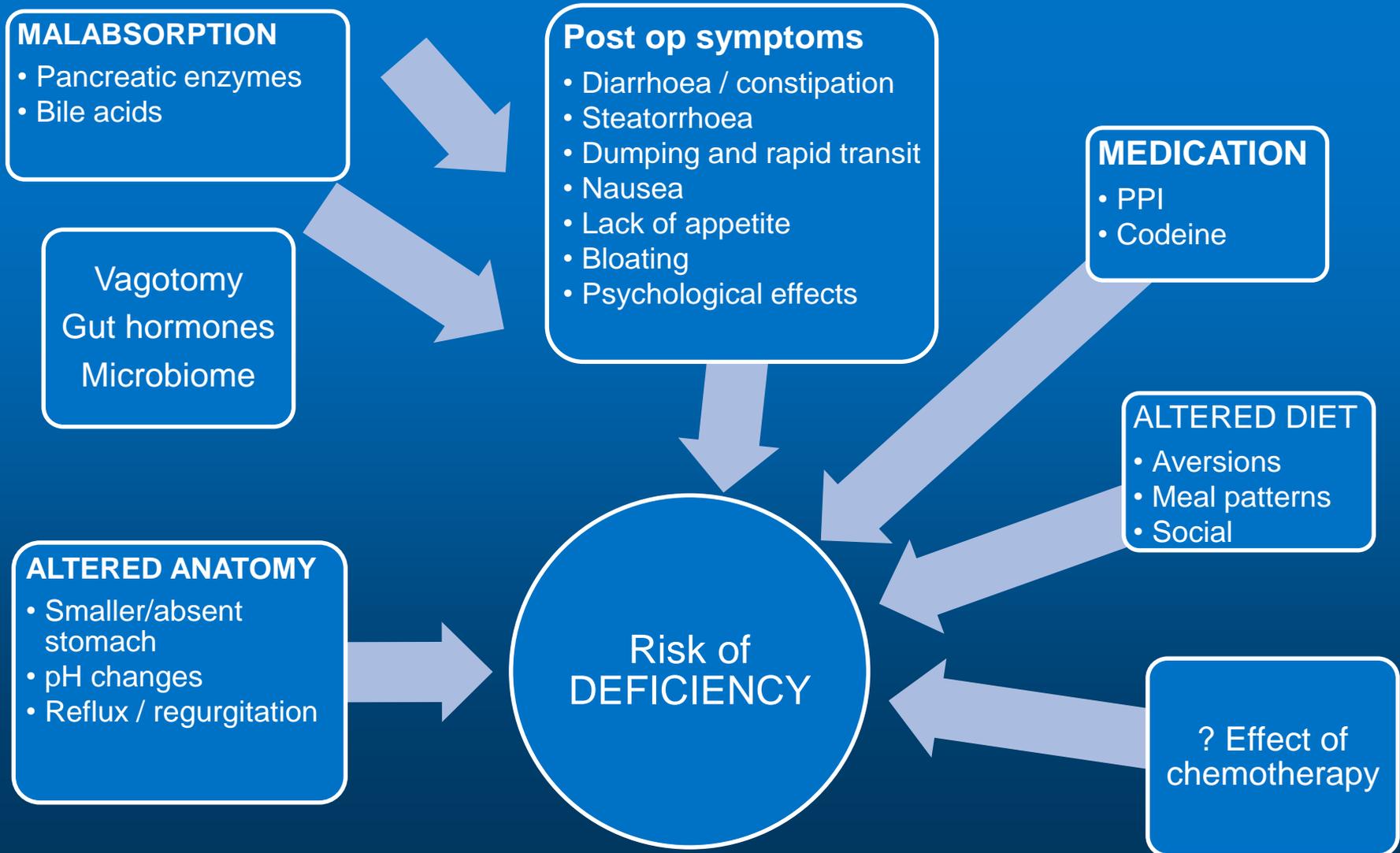
Refresher on OG Resections



Total Gastrectomy



Why may deficiencies occur?



Which Micronutrients to Check?

Possible cause for deficiency	Micronutrient
Absorbed in stomach or duodenum	B12 (via IF), selenium, thiamine(B1), iron, copper
Maybe effected by altered pH	Zinc, Iron (Folate), Calcium
May be effected by pancreatic insufficiency	Fat soluble vitamins A, D, E (zinc)
May be depleted by chemotherapy or surgical stress	Selenium, Vitamin E, Zinc

- Potentially 'at risk' micronutrients were identified from the literature and published guidelines
- Iron was to be monitored by ferritin, transferrin, total iron, iron saturation and Haemoglobin (Hb).
- Patients >1 year following surgery and remain cancer free
- Blood test taken at next surgical outpatient appointment.
- Details of any nutritional supplements or pancreatic enzyme replacement therapy (PERT) recorded.

Results

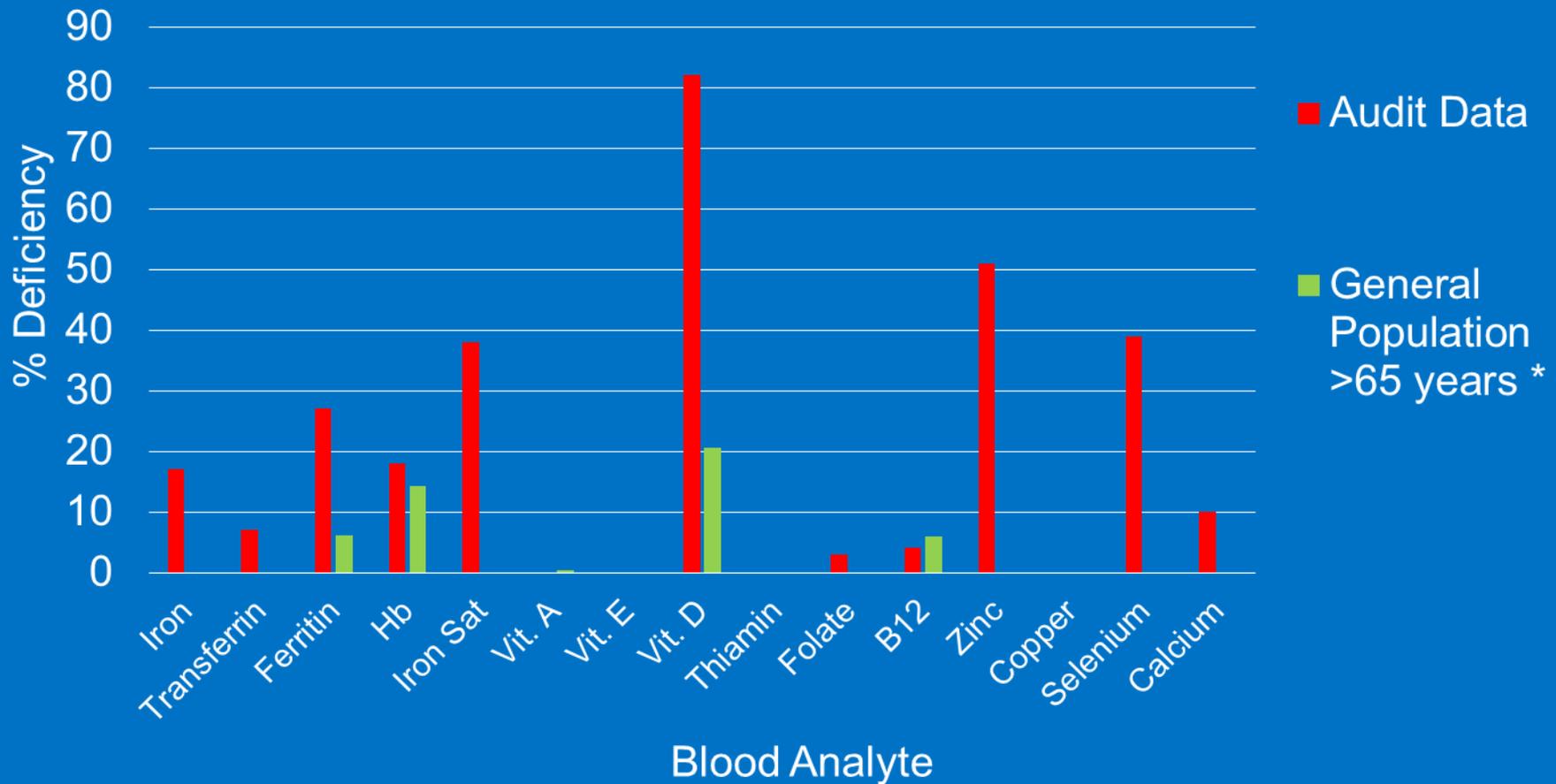


Months post surgery	oesophagectomy	gastrectomy	combined
12-23	31	6	37
24-35	15	0	15
36-47	13	1	14
>48	12	4	16
Total	71	11	82

- Average age: 65 years 26 Women 56 Men
- 37% already taking a vitamin or mineral supplement
- All T.G. and 1 oesophagectomy having B12 injections
- 9% on PERT

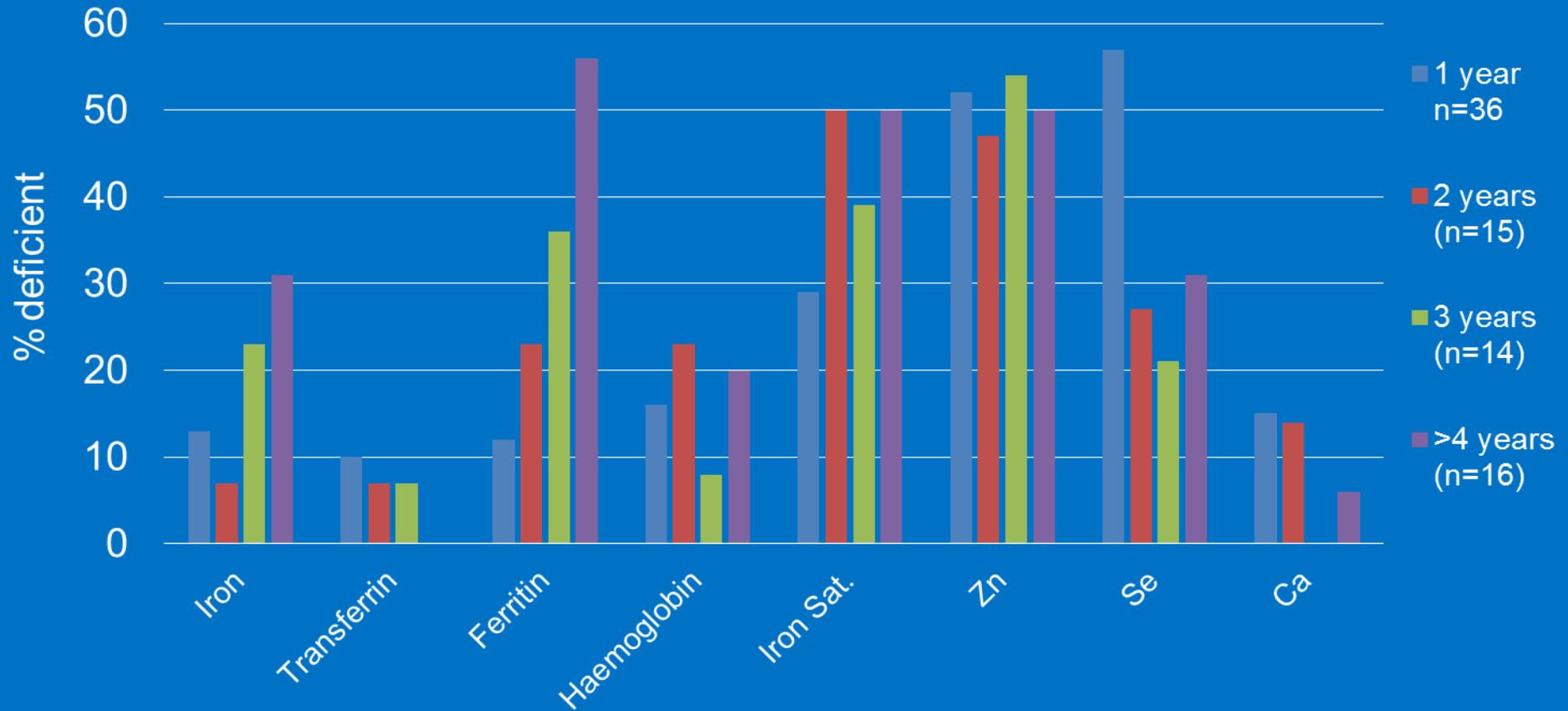
What deficiencies did we find?

% Deficiency Rates in our Patient Group and Comparison with National Data.



How did this change over time?

Annual Change in Deficiency Rate



In summary



- High rates deficiency in analytes related to iron metabolism, Vitamin D, Zinc, Selenium
- No deficiencies identified for vitamin A, E, thiamine and copper.
- B12 deficiency slightly lower than general population
- Over time
 - Trend towards greater iron storage deficiencies
 - Zinc deficiency remains high
 - Possible reduction in selenium deficiency

A few words of caution....



- Single centre audit
- No pre-operative and limited general population data to compare results to.
- Other centres have shown different results
 - *higher rates of vitamin A deficiency*
- Blood tests not always accurate reflection of body stores and need to be taken in context considering time since surgery, recent diet and chemotherapy – but often best available option.
- Cost implication to blood tests

What changes have we made.



- Raised awareness to whole MDT.
- Recommend a prophylactic Complete Multivitamin and Mineral supplement with at least 14mg iron
- Optimise 'at risk' nutrients and focus on long term balanced diet and give lifestyle advice.
- Annual micronutrient screening
 - Iron, Hb, ferritin, Vitamin D, Zn, Se, Ca, PTH, Mg, CRP
 - Plus Copper and vitamin A at 4 years.
- Developed / developing protocol to deal with deficiencies that we are finding.
 - Including oral and IV supplementation

Also consider

- Prolonged jejunal feeding to optimise post operative nutritional status.
- Be proactive in addressing symptoms which may increase malabsorption
 - use of PERT
 - GI symptoms may need gastroenterology input to manage.
- Liaise with whole MDT – results may not always be due to nutritional deficiencies
 - Clinical anaemia may need a colonoscopy or other investigation.
- Watch nutrient interactions if single nutrients are commenced i.e. Zinc can inhibit absorption of copper.
- Consider deficiency in unexplained conditions i.e. neuropathy.

- We would now like to look at pre treatment levels micronutrient levels.
 - Continue to monitor and refine practice on managing the long term effects of this surgery
 - **More data is needed!**
- ? Larger multicentre study

Any Questions?