Paradox of plenty:

Can we really have concerns over micronutrient intakes in the UK?

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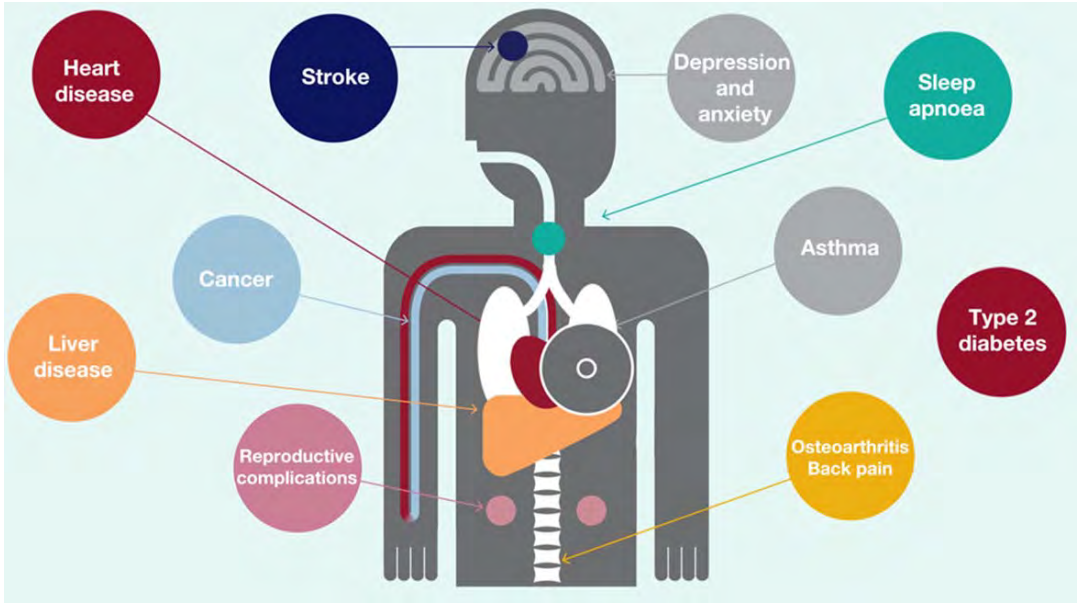
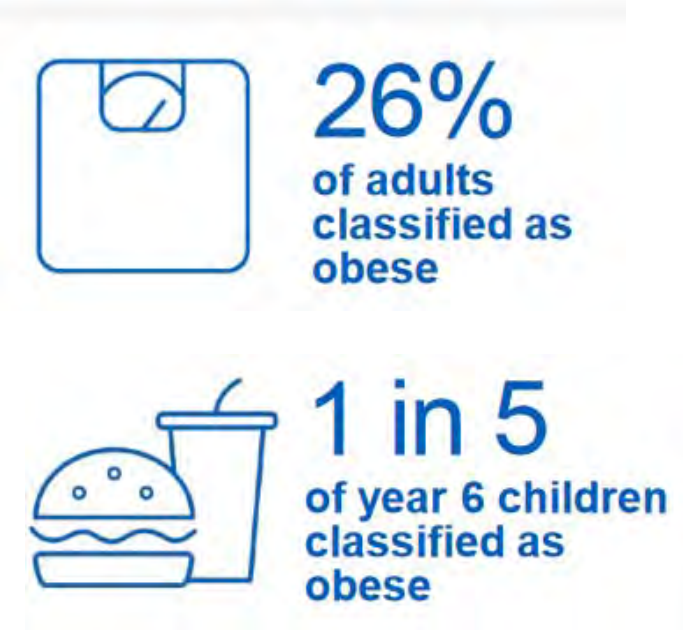
IFST Vitamins and Minerals - Small but Mighty

We are rightly concerned about obesity!





The **treatment of obesity and diabetes** costs us more each year than the police, fire service and judicial system combined.

But what about micronutrients?

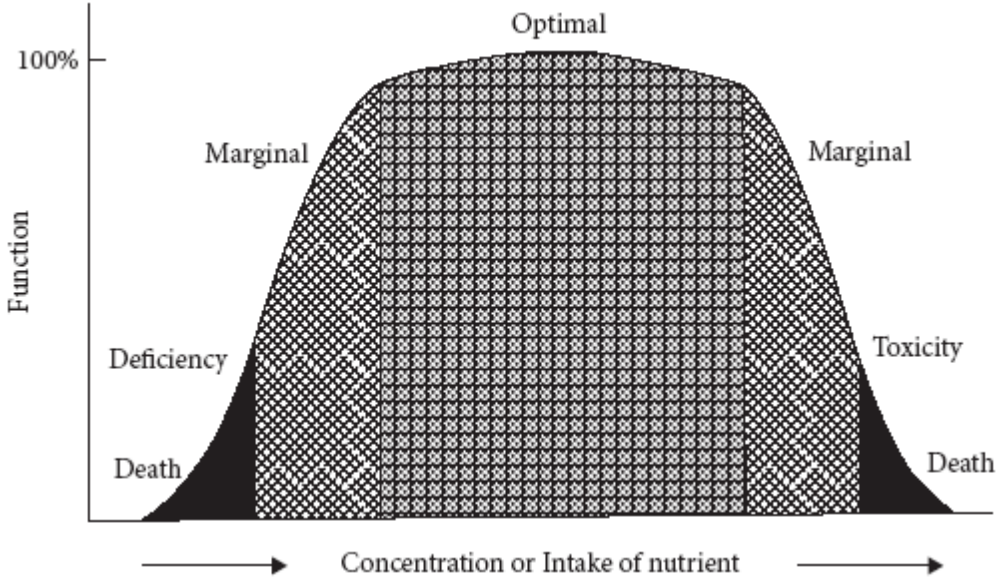
They are indeed ‘small and mighty’ -

Note severe consequences of deficiency in developing countries

- **Iodine** deficiency: primary cause of preventable brain damage in children.
- **Vitamin A** deficiency : leading cause of preventable blindness in children. increases the risk of disease and death from severe infections.
- **Iron** deficiency anaemia, increases the risk of haemorrhage and bacterial infection during childbirth and is implicated in maternal deaths

But more ≠ better

Intake and health is not a linear relationship



Unicef 2015; Meretz 1981

UK Micronutrient intakes: evidence of inadequacy?

% males & females of different ages with intakes of micronutrients below lower reference nutrient intake (LRNI)

	1.5-3	4-10		11-18		19 - 64		65-74		75+	
	All	M	F	M	F	M	F	M	F	M	F
Calcium‡	1	2	1	11	**22**	7	**11**	0	11	4	10
Folate‡‡	1	0	1	2	**15**	3	**5****	0	3	3	6
Iodine‡	3	6	4	14	**27**	9	**15**	2	6	4	9
Iron‡	10	0	3	12	**54**	2	**27**	0	8	2	12
Potassium‡	0	0	0	18	**38**	11	**23**	4	22	16	34
Zinc‡	5	9	14	18	**27**	7	**8**	5	3	8	12

‡ food sources only ‡‡ food sources and supplements)

****7% of women aged 19-49 y ('childbearing age') with intakes below LRNI**

Data: National Dietary and Nutrition Survey Years 7&8 (2014/2015-2015/2016)
LRNI only meets the need of 2.5% population. Intakes below the LRNI are inadequate for most individuals
Some DRVS (e,g. potassium, zinc) based on limited data - health impact of intakes below LRNI is unclear

Roberts *et al.* 2018

UK: Evidence of deficiency?
Its not measured by a 'naturopath'

	Deficiency disorder	Measure of status (blood/urine)	WHO Clinical thresholds indicating increased risk
Folate	Folate deficiency anaemia Neural Tube Defect (e.g spina bifida)	RBC Folate	% with concentration < 305nmol/L (anaemia) % with concentration < 748 nmol/L (NTD)
Iron	Iron deficiency anaemia	FBC Haemoglobin + plasma ferritin	% below threshold both for haemoglobin and plasma ferritin e.g non pregnant females: haemoglobin <120g/L and ferritin <15mg/L
Iodine	Impaired cognitive development (cretinism)	Urinary Iodine concentration	Gen population: median 100-199µg/L + < 20% samples <50µg/L Pregnancy: median 150µg/L and 249µg/L (defines population with no deficiency)
Vitamin D	Nutritional Rickets	Plasma 25-hydroxyvitamin D	% with concentration <25nmol/L (UK threshold)

Considering our future generation: Looking at status

	Adolescents		Adults		
	Boys	**Girls**	**Men**	**Women**	**Women child bearing age**
Folate % increased risk of anaemia % increased risk NTD	15	28	3	11	16 91
Iodine Risk of deficiency in population	0	0	0	0	Median 102µg/L does not meet criterion for sufficiency in pregnant women
Iron % iron- deficiency anaemia	1	9	1	5	n/a

NTD case data may not include early fetal losses termination and data (Termination of Pregnancy for Fetal Anomaly, 81%)

PHE/FSA 2018; Morris *et al.* 2016; Biencowe *et al.* 2018

We need to talk about……. Vitamin D

BPSU Rickets:
2015-17
130 cases reported
'Uptake of vitamin D supplementation remains low'

	Intake mcg/d (RNI 10mcg/d)				**Status**
	From food sources only		From food sources plus supplements		% low vitamin D status (<25nmol/L)
	Intake	% RNI	Intake	% RNI	All (M/F)
1.5-3 y	2.0	20	2.9	29	N/A
4-10 y	2.0	20	2.7	27	10
11-18 y	2.1	21	3.5	35	26 (15/39)
19-64 y	2.7	27	4.2	42	17 (19/16)
65-74 y	3.5	35	6.0	60	13 (11/15)
75 y and over	2.8	28	5.3	53	N/A

UK government recommends

- Under 5s and at risk groups: should take a daily vitamin 10mcg D supplement (0-1 years: 8.5 -10 mcg)
- Over 5s: to consider taking a daily supplement containing 10mcg of vitamin D during the autumn and winter months.

Julies *et al.* 2018; Roberts *et al* 2018;NHS Choices 2017

Dietary patterns impact on micronutrient intakes

Less specific focus on single nutrients to the diets that have the most public health benefit

Healthy pattern typically characterised by

- **higher** consumption of vegetables, fruit, wholegrains, low fat dairy, seafood nuts, seeds, legumes
- **lower** intakes of fatty/processed meat, refined grains, sugars-sweetened foods/drinks, salt, sat fat

Teens poor dietary choices reflected in poor nutrient intake

Only 8% meeting 5 A Day Around 176g similar to mean of 1.5 – 3y

	11-18		Example food sources
	M	F	
Calcium	11	**22**	Dairy, non-dairy fortified alternatives, canned fish, fortified flour
Folate	2	**15**	Green leafy veg, wholegrains, nuts, fortified breakfast cereals
Iodine	14	**27**	Dairy foods, eggs, fish, shellfish
Iron	12	**54**	Red meat, liver, pulses, nuts, fortified breakfast cereals, dried fruit, dark green leafy veg
Potassium	18	**38**	Potatoes, fish, dairy, veg, dried fruit, nuts, seeds
Zinc	18	**27**	Meat, poultry, shellfish, nuts, wholegrains

DGAC 2015; Roberts *et al.* 2018; CoFID 2015

Its not just the calories…

Concept of dietary quality or nutrient density is sometimes overshadowed

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For further information, go to: www.nutrition.org.uk