

Plant based diet in an infant with Cystic Fibrosis: a case report

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CF Patients on plant-based diets in local CF paediatric population (Liverpool UK)

- In the past 10 years in the Alder Hey CF Network:
 - patients on plant-based diet– 2/305
 - patients on vegetarian diet– 0/305

Plant-based diet in CF

- **Potential** benefits:
 - Reduced saturated fat intake
 - Increase PUFA intake
 - Improved gut microbiota from plant fibre
 - May increase dietary fibre
- Sustainable eating
- No evidence to advocate/no CF-specific research/literature

CF-specific nutritional considerations for following plant based diet

Nutrients which may be lower in plant-based diet

- Protein
- Essential fatty acids (EFA's)
- Iron
- Zinc
- Selenium
- Vitamin B12
- Iodine
- Sodium
- Magnesium
- Phosphate
- Fat soluble vitamins

Physiological role of these nutrients

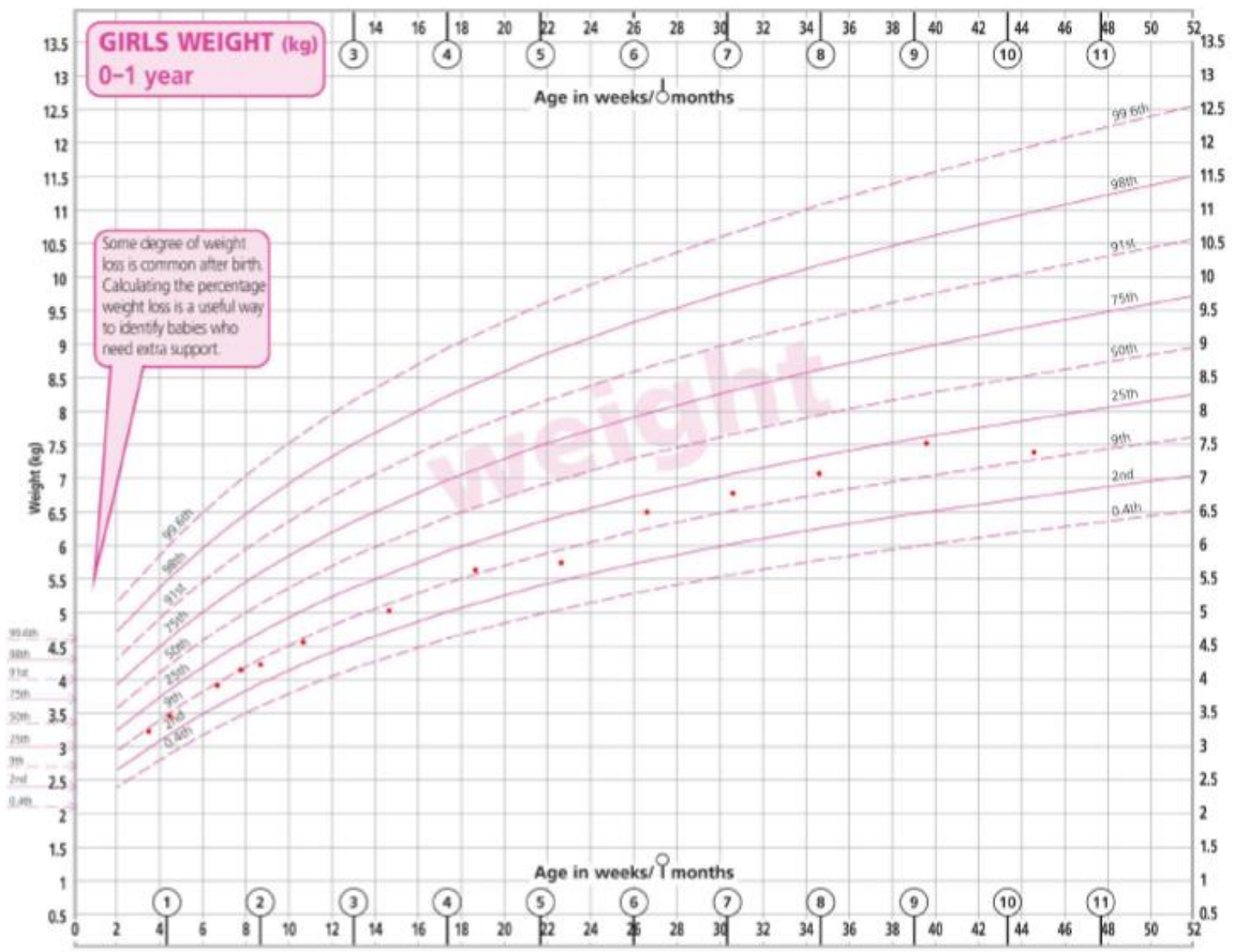
- Achievement of full growth potential
- Brain development
- Bone health
- Muscle/nerve function
- Immune function
- Inflammation
- Thyroid function
- Enzyme co-factor
- Blood oxygenation
- Vision

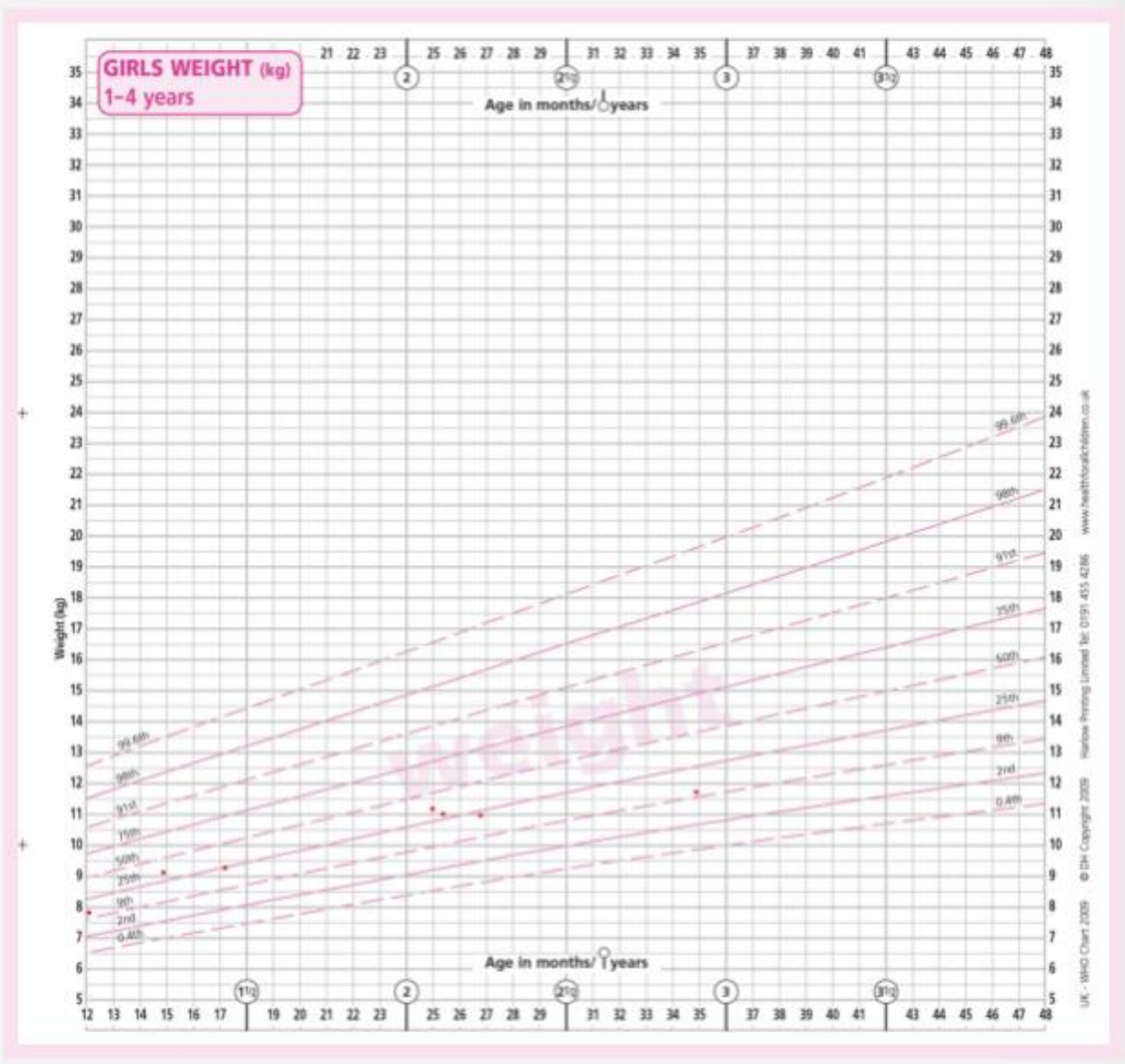
Case study

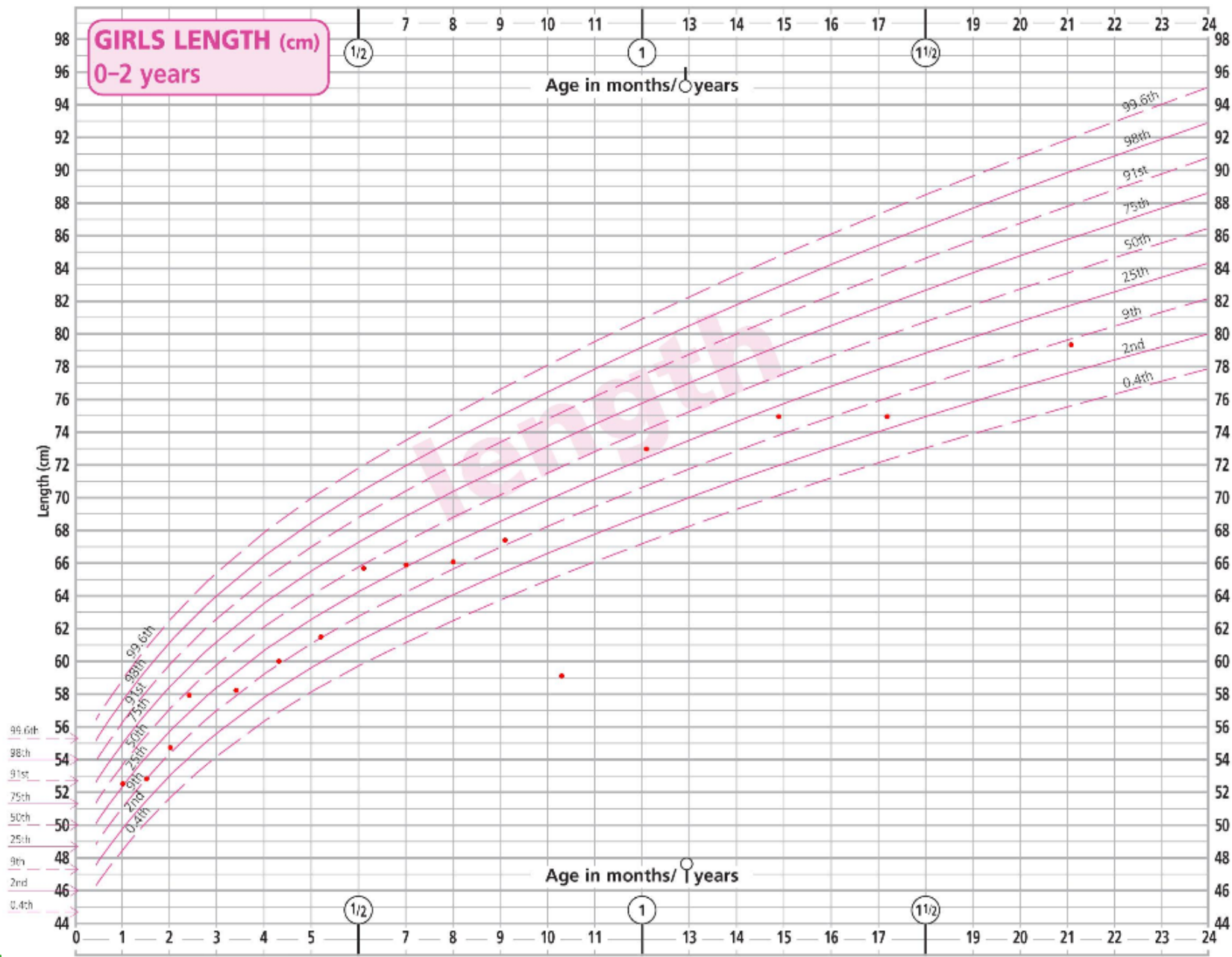
- 3-year-old CF patient homozygous F508del
- PI
- Exclusively breastfed from birth
- Initially very good weight gain and growth – tracking 25th weight and height up to age 2 y 6 m, now 9th
- Weaned onto plant-based diet at 6 months
- Parental choice – mother (not father) also changed to diet as she read about health benefits (not CF-specific)
- Social concerns – financial, learning difficulties

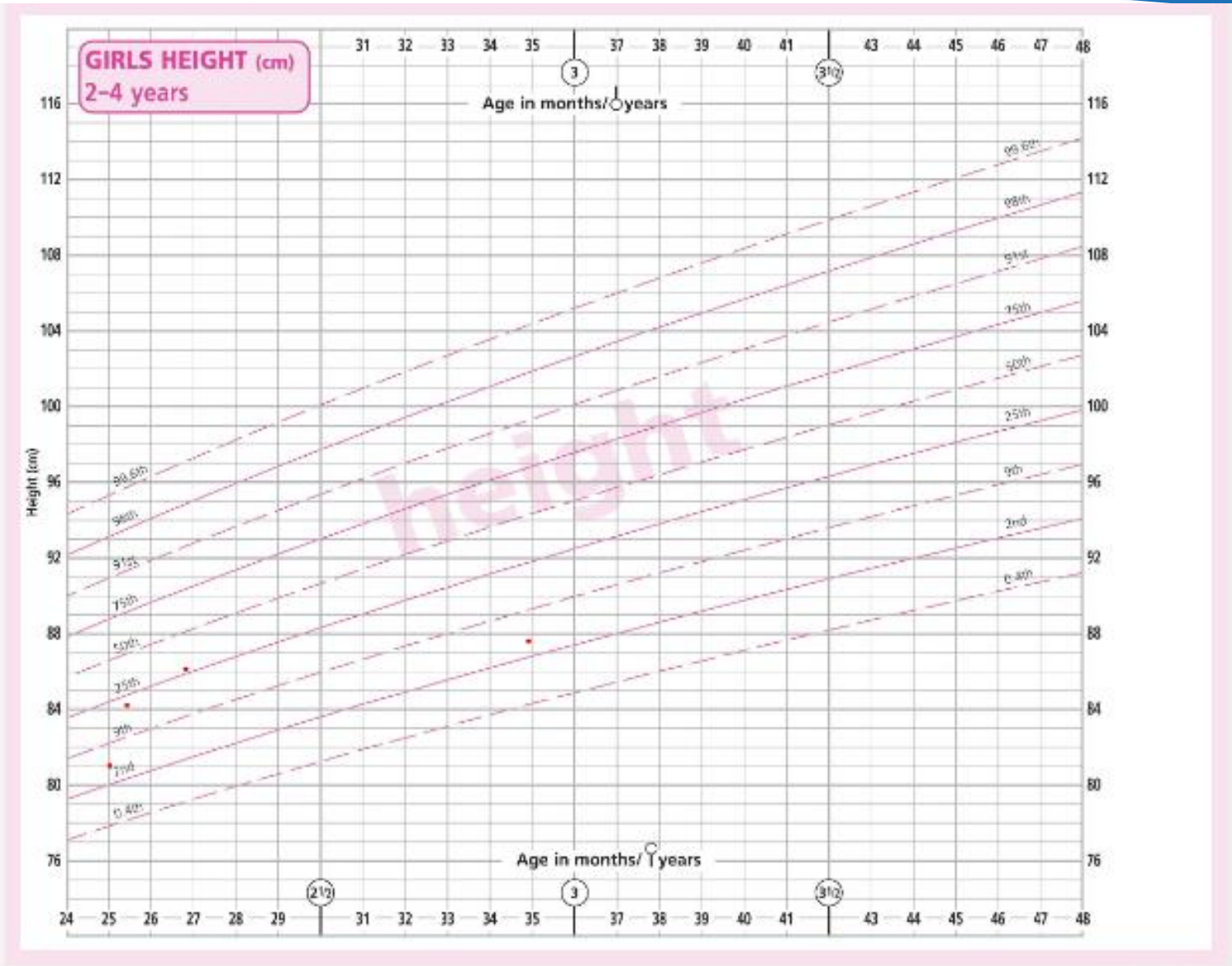
Practical considerations

- Knowledge of plant-based diets
- Cooking skills
- Knowledge of alternative ingredients
- Access to ingredients/transport
- Plant-based PERT/fat soluble vitamins/supplements
- Cost considerations









Dietetic advice

- Review at appointment prior to weaning and discussed plant-based weaning diet
- Focus on plant-based sources of:
 - Protein beans, lentils, chickpeas, tofu, mycoprotein, soya
 - Iron fortified cereals, baked beans, green vegetables
 - Calcium fortified plant-based drinks for cereal/cooking
 - B12 yeast flakes, B12 spread, supplements
 - Zinc chickpeas, lentils, tofu, nuts (spreads), seeds
 - Selenium wholegrain rice, nut spreads/ground nuts
 - Magnesium seeds, nut butters and spreads, wholegrains
 - Phosphate tofu, wholegrains, nut butters

Dietetic input

- 4 weekly reviews until 12 months old
- Good weight gain and growth until 2 y 6m – wt slowing down as breastfeeding reduced – advised increased kcal
- Struggles with Creon dosing and breastfeeding
- Some steatorrhea
- Difficult to get clear verbal history from parents
- Happy to take Paravit (contains animal products). Advised additional supplement 'Nature's aid mini drops' – Iron
 - 1ml provides – 10mg iron, 15mg Vitamin C, 100µg Folic acid, 1 µg Vitamin B12 (£7.95 for 2/12 supply)

Annual bloods

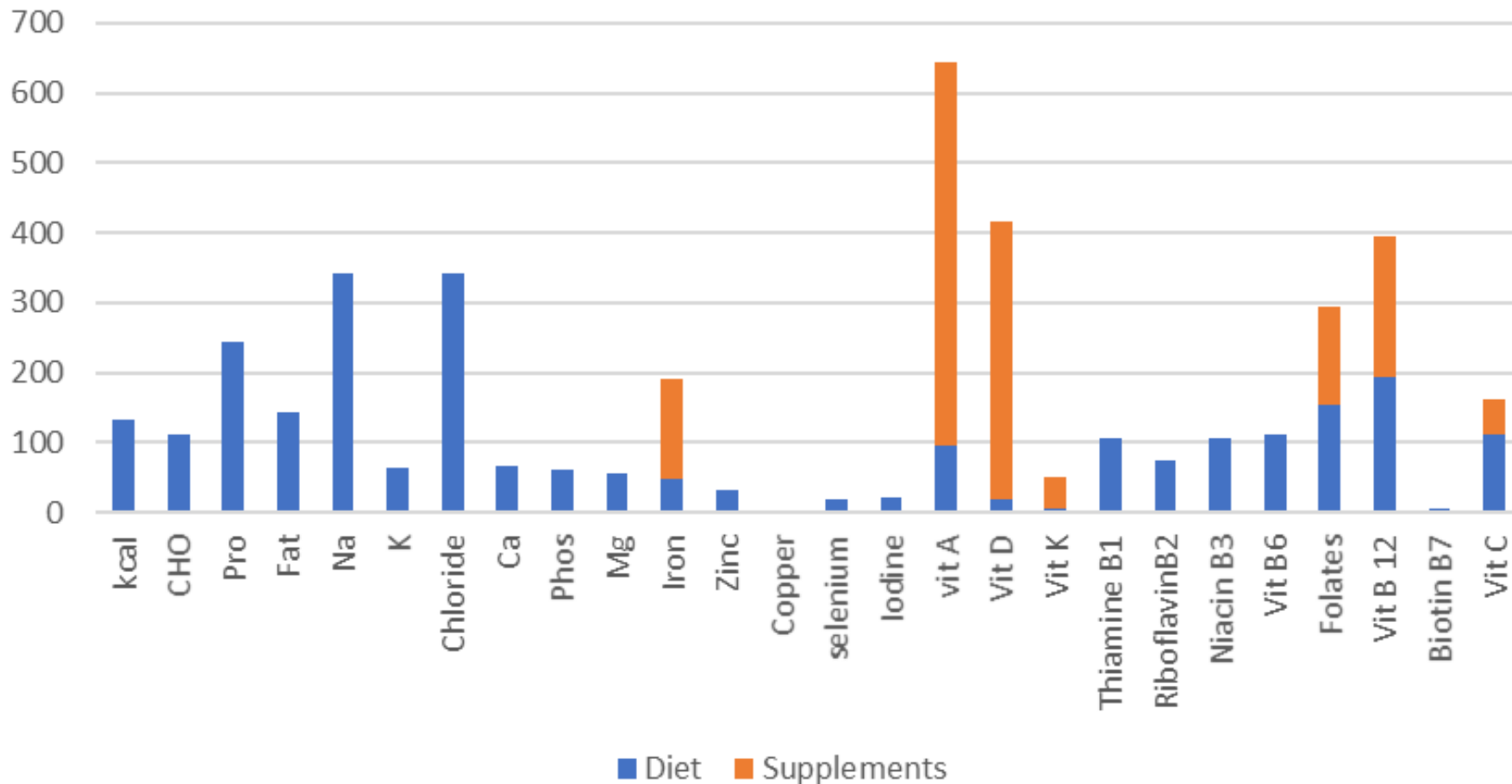
- Given age/plant-based diet and limited detailed history, requested additional nutritional bloods
- At 1st and 2nd year annual review bloods, ordered: FBC, B12, Folate, Iodine and Zinc in addition to fat soluble vitamins.
- **Unfortunately** – very difficult to obtain bloods so only standard bloods checked.

	2021	2022
Ferritin	13.9	17.6
Hb	114	NA
Vitamin D	89	83
Vitamin E	15.7	18.6
Vitamin A	1.23	1.17

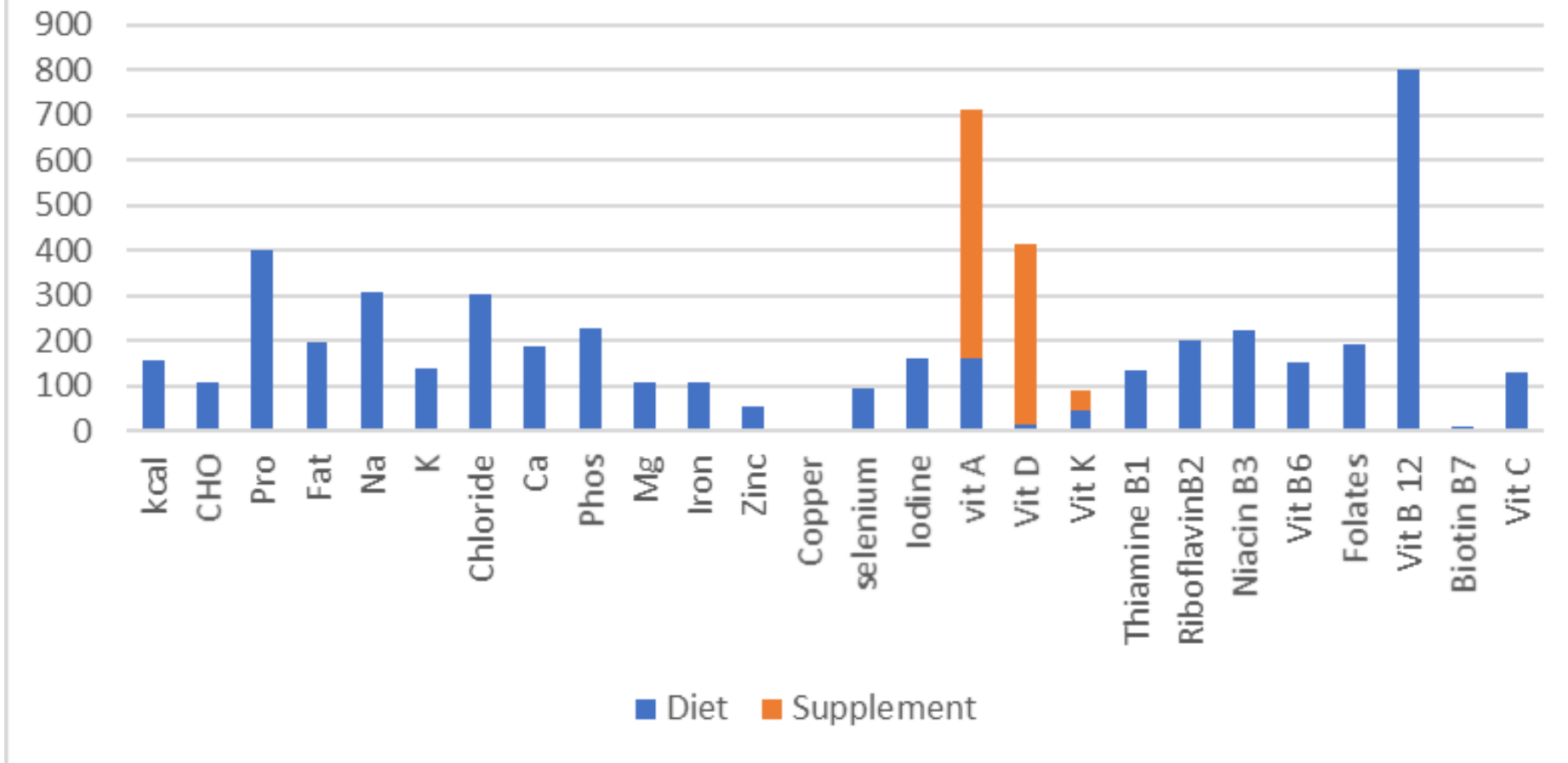
Dietary analysis

- 3 day detailed diet diary completed by parents with weights and portion sizes - in 2022
- Used Nutritics™ to analyse 3 days and compare to SACN (2017) and COMA requirements for age
- For purpose of the case study, also analysed 3 days of the same diet to compare animal to plant protein sources e.g. 'fishless fingers' for fish fingers

Plant-based diet with Paravit-CF[®] and Natures Aid Iron supplement

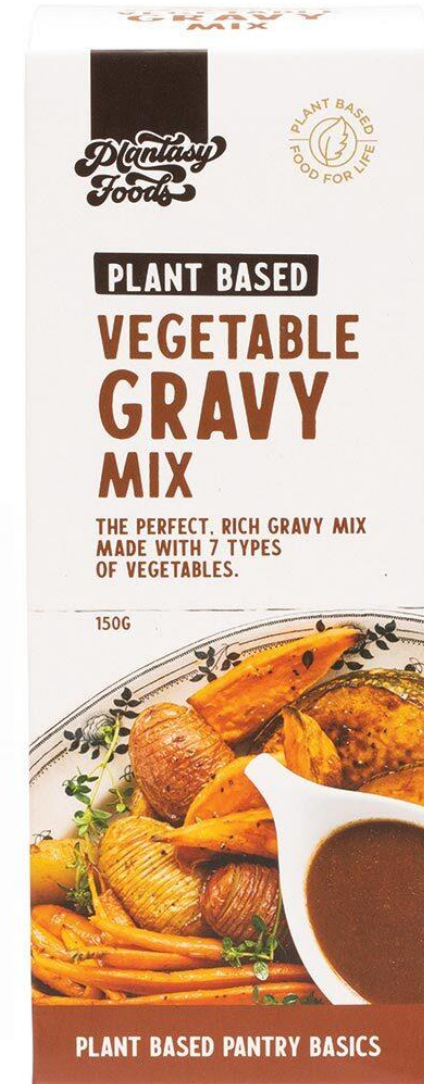


Comparable diet containing animal protein including Paravit-CF[®]



Key findings

- **Plant-based diet:**
 - Adequate macronutrients (protein >200%)
 - **high Na intake**
 - **Low: Ca, Mg, Phos, Zn, Se, I, vitamin K**
 - Sufficient: B12, Folate, Iron (**only with supplements**)
 - **Fibre (NSP) – 15.7g day**
- **Animal protein-based equivalent diet:**
 - Adequate macronutrients (protein >400%)
 - Na intake lower than plant-based diet
 - Sufficient: Ca, Phos, Mg, Iron, Se, I
 - **Low: Zn, Vit K**
 - Total fat and saturated fat intake 50% higher
 - Fibre (NSP) – 11.2g day



Cost comparison

Branded fortified soya milk - £2.00 per 100ml

VS cow's milk standard product £0.68 per 100ml

= 2.9 X PRICE



Branded dairy free fromage frais £0.59 per 100ml

VS Non-branded dairy fromage frais £0.14 per 100ml

= 4.2 X PRICE



Branded 'fishless fingers' £0.89 per 100g

Non-branded fish finger £0.32 per 100g

=2.8 X PRICE



Branded 'kids' wholegrain microwave rice £1.00 per 100g

VS Non-branded wholegrain microwave £0.20 per 100g

=5 X PRICE



Branded plant based 'cheese' £1.38 per 100g

VS Non-branded dairy cheese £0.69 per 100g

=2.8 X PRICE



Future management of patient

- Annual CF bloods plus additional nutritional bloods
- Dietary intake reassessed when breastfeeding stops (omega 3, calcium, protein, selenium, zinc, iodine) [1-7]
- Consider zinc supplementation (await result/weight)[4,7]
- Funding for additional supplements for iron and other micronutrients long term (£64 per year)
- Education/recipes and plant-based alternatives with better nutrient profile/less cost
 - Focus on more foods such as canned/dried pulses to make meals rather than 'ready meals'

Practice points

- Plant-based recipes and education - tailor to cooking skills and ability [10]
- Regular detailed dietary assessment/analysis [4-7]
- Use of additional supplementation where needed [3-7]
- Use of alternative plant-based fats to take with ETI
- Consider total Na intake for ETI patients [9]
- Commonly eaten foods in our CF population are plant-based but not necessarily high protein/fibre or good alternatives e.g., tinned spaghetti, potato shapes
- Consider socioeconomic status/food insecurity [10]

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