Carbohydrate Counting in the Management of Type 1 Diabetes

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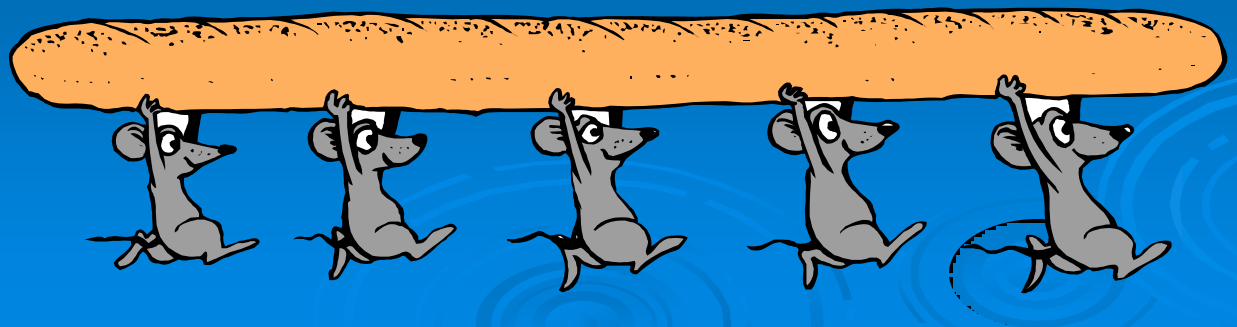


Plan

- Key principles of carbohydrate counting & insulin dose adjustment
- How do we measure carbs?
- Calculating and reviewing ratios
- Consider other nutritional factors
- Using bolus advisors
- When/how do we educate?
- Patients' experiences

How much Carbohydrate in these?

1 Pint 

500ml Sports drink 

60g Mars Bar 

individual Xmas Pudd 

Chocolate Éclair 

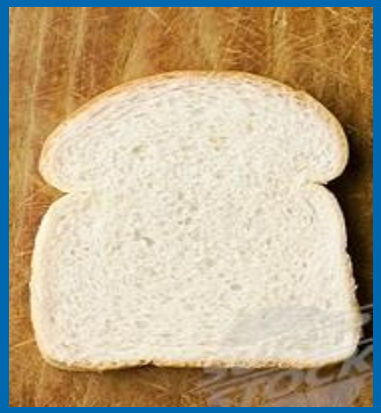
Tin Cannelini Beans 

100g dry pasta 

Medium Banana 

Meringue nest 

What will cause the biggest rise in blood glucose?



Is it important to be accurate?

3mmol.l

1 unit

Novarapid
Humalog
Apidra

10g (1CP) Carbohydrate

3mmol.l

Don’t be Carbohydrate Fooled…..

Be carbohydrate aware and be accurate!!

CHO Counting…Spot the Difference

- Insulin Analogues:

  Stable basal insulin, continuous supply- no need for daily regular supply of rapid insulin meals.

  Less risk night time hypos, no need for bed time snack

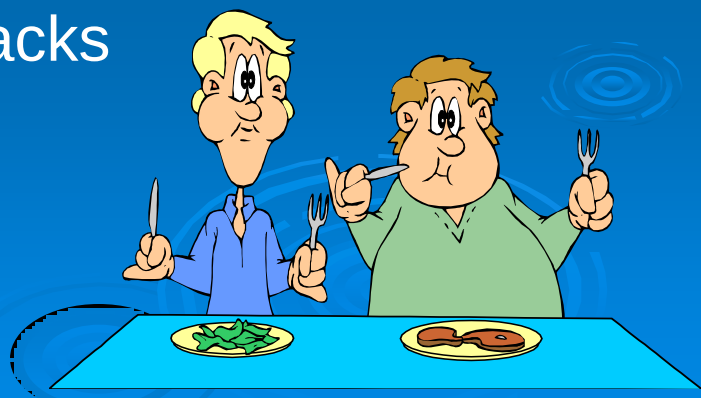
  Rapid action boluses to match blood glucose response to meals, only needed when CHO consumed

  Shorter duration so no need to have snacks

- 'Normalising food choices'

  Less restricted diets …….

  Insulin adjusted to food choice

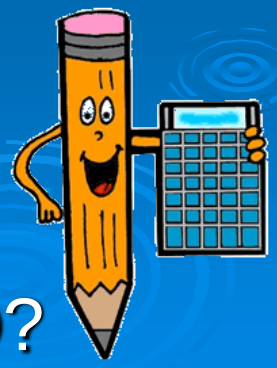


How to Carbohydrate Count

- Identify foods containing carbohydrate
- Calculate TOTAL carbohydrate content of meal/snack
- Calculate insulin dose required according to a ratio
- Consider factors that may influence blood glucose response (e.g. fat, glycaemic index)
- Consider pre-meal blood glucose
- Adjust insulin dose, amount/duration (use advisor!)
- Eat and give insulin bolus
- Record blood glucose response (pre & post meal)

Insulin:Carb Ratios

- Range ½ -3units insulin : CP or 10g Carbs
- Usually start with 1 unit:10g
- Adjust units per 10g when a pattern is seen
- Maths is easy
- How does it work by adjusting gs of CHO?



Where is Carbohydrate?

- *Starchy foods:* breakfast cereals, grains, bread, crackers. rice, pasta, couscous, flour based products [pastry, biscuits, cakes] thickening agents…

- *Vegetable starch:* potato & legumes (e.g.peas,beans)

- *Fructose:* fruit, fruit juice

- *Lactose foods*: milk, yoghurt, ice cream, custard

- *Sucrose (table sugar*): confectionary, ordinary soft-drinks, sweetened cakes, biscuits, desserts, etc.

What doesn’t count?

Resources to suit all!

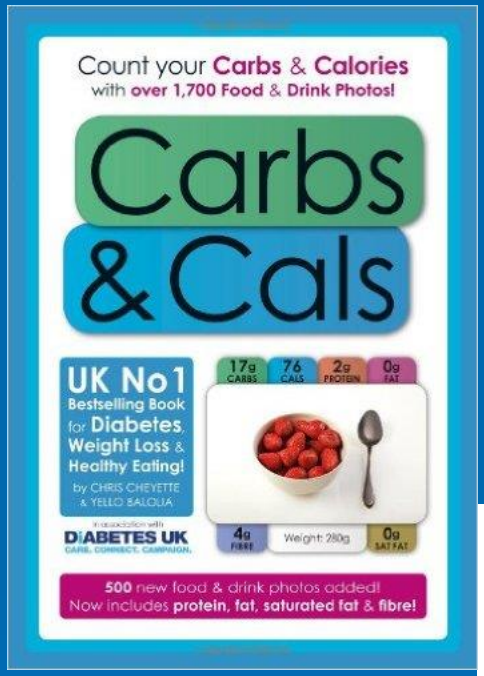
Whole Milk
Serving Size 8 fl oz (240mL)
Servings Per Container 2

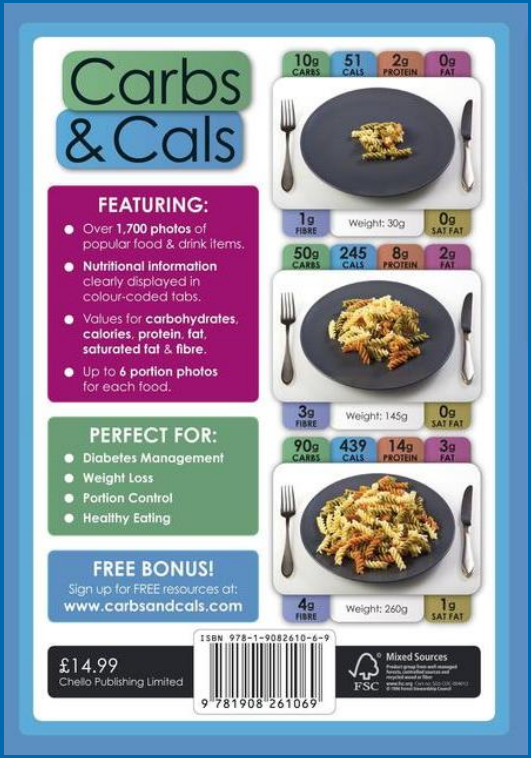
Amount Per Serving	
Calories 150	Calories from Fat 70
	% Daily Value*
Total Fat 8g	12%
Saturated Fat 5g	25%
Cholesterol 35mg	12%
Sodium 125mg	5%
Total Carbohydrate 12g	4%
Dietary Fiber 0g	0%
Sugars 11g	
Protein 8g	

Vitamin A 6% • Vitamin C 4%
Calcium 30% • Iron 0% • Vitamin D 25%

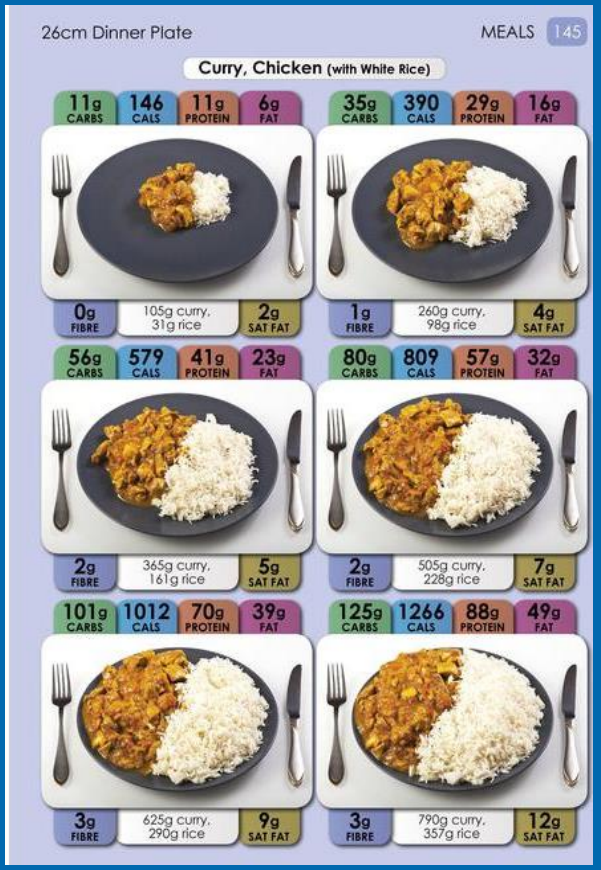
* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g





phone apps



Carbs and Cals book

My Fitness Pal

DAFNE plates

Weighing foods good for accuracy but - another challenge!

Food where portion size varies
Rice, pasta, potatoes, breakfast cereals

Cooked vs uncooked

Compare with reference values
carb per 100g

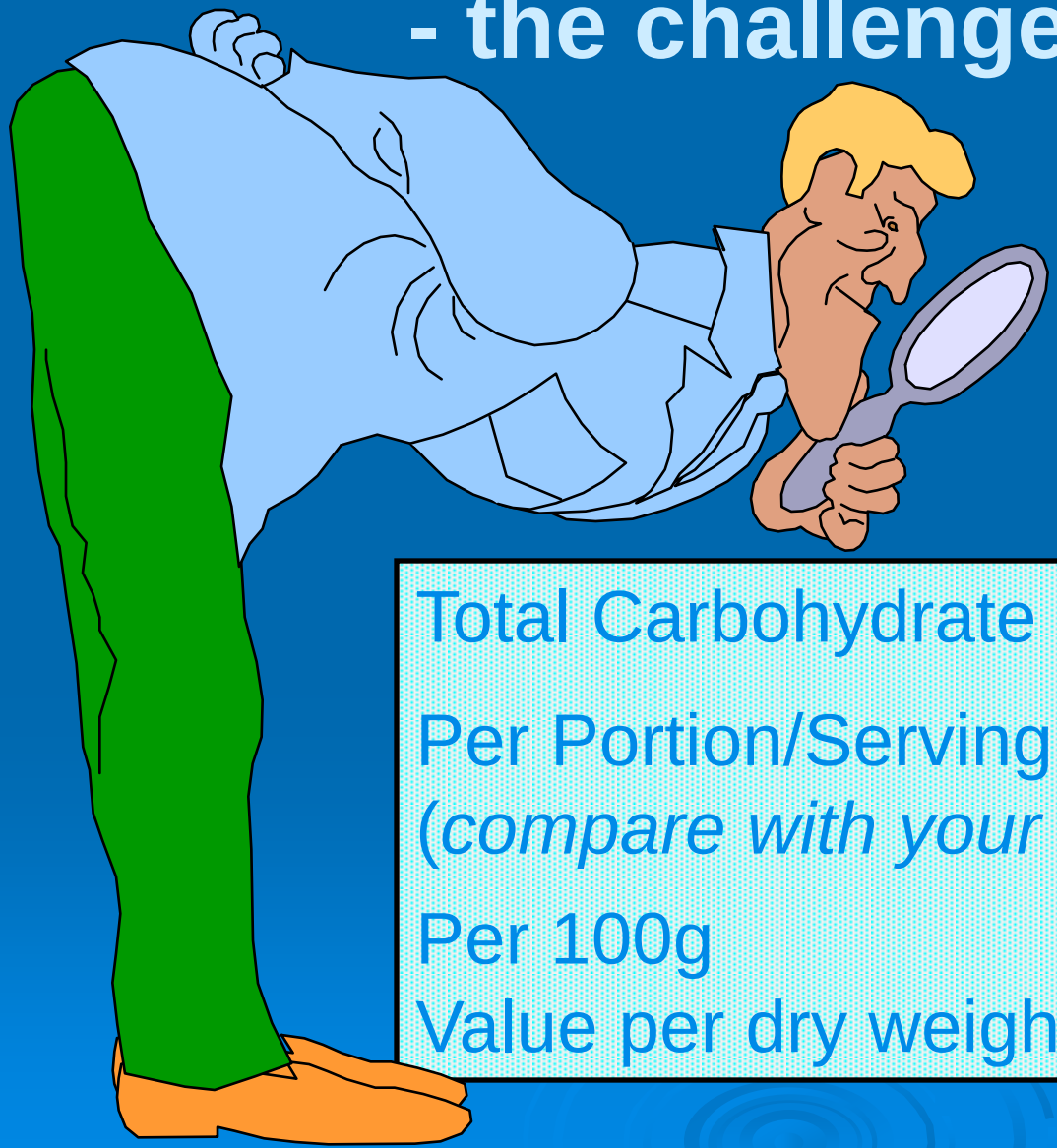
Handy measures

Carbohydrate Portions

BREADS	TYPICAL PORTION	Carbs (g)
Wholemeal Bread	1 thick slice	20
	1 medium slice	15
	1 thin slice (small loaf)	10
Wholemeal Bap	1	20
White Bap	1	30
White Finger Roll	1	20
French Stick	1” slice	10
Crusty White Roll	1	25

Taken from our “Carbohydrate Counting Tables”

Reading Food labels - the challenge!



Total Carbohydrate

Per Portion/Serving
(*compare with your serving*)

Per 100g

Value per dry weight or served?

Food labels

Dorset Cereal

	per 100g
Energy kcal	360
Carbohydrate	59.2g
Of which sugars	12g
Fat	9.5g
Fibre	7.4g

How much CHO in a 60g portion?

Tips for Patients

- Handy things to have in kitchen;
  Scales, calculator, measuring cups., favourite plate
- Serve food in kitchen
- Serve rice/pasta, etc, separate to sauce
- Remember food composition changes with cooking
- Become familiar with personal portions & create own lists
- Practice makes perfect!

Lets have a go!

But what about all the maths?

"I don't want to admit it but……..

…..I just don't understand!!!!!!!"

- Poor numeracy skills are associated with glycaemic control in Type 1 diabetes

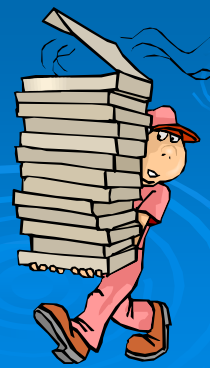
  Marden et al. 2011 Diabetic Medicine

Eating out - can be the biggest challenge….

- Variable carb portions but often large
- Difficult to judge carb values, plate size, mixed meals
- Rich, high fat & high protein food – digestion can be slowed
- Lots of courses
- Alcohol consumed







Total Carbohydrate

- The larger the CHO load, the more digestion may be delayed.
- Think about splitting insulin boluses.

Fat & Protein

A meal with more than 40g fat (fish & chips, cheesecake & cream) may delay the rise in blood glucose level

A meal containing carbohydrate (30g +) and 40g protein (~160g meat) can add extra BG effect

Glycaemic Index

Glycaemic Index vs Glycaemic Load

Glycaemic Load = Amount of CHO x GI

Low GI foods cause a slower rise in the glycaemic response compared to high GI carbohydrates but the total amount of carbohydrate is the most important factor to consider and is more predictive.

Simple Message

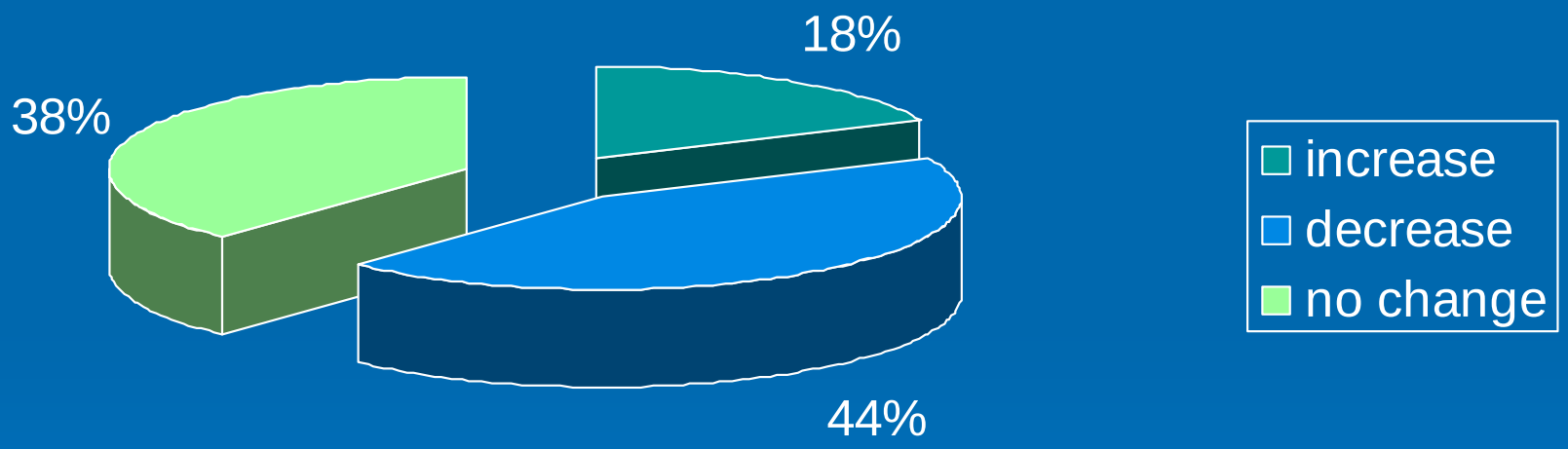
Treat hypos with high GI foods – sweets & Dextrose tables, Lucozade drink.

The glucose rise from very low GI foods such as porridge, lentil Dahl may be better matched by giving insulin at the end of the meal or split the dose as with high fat meals.

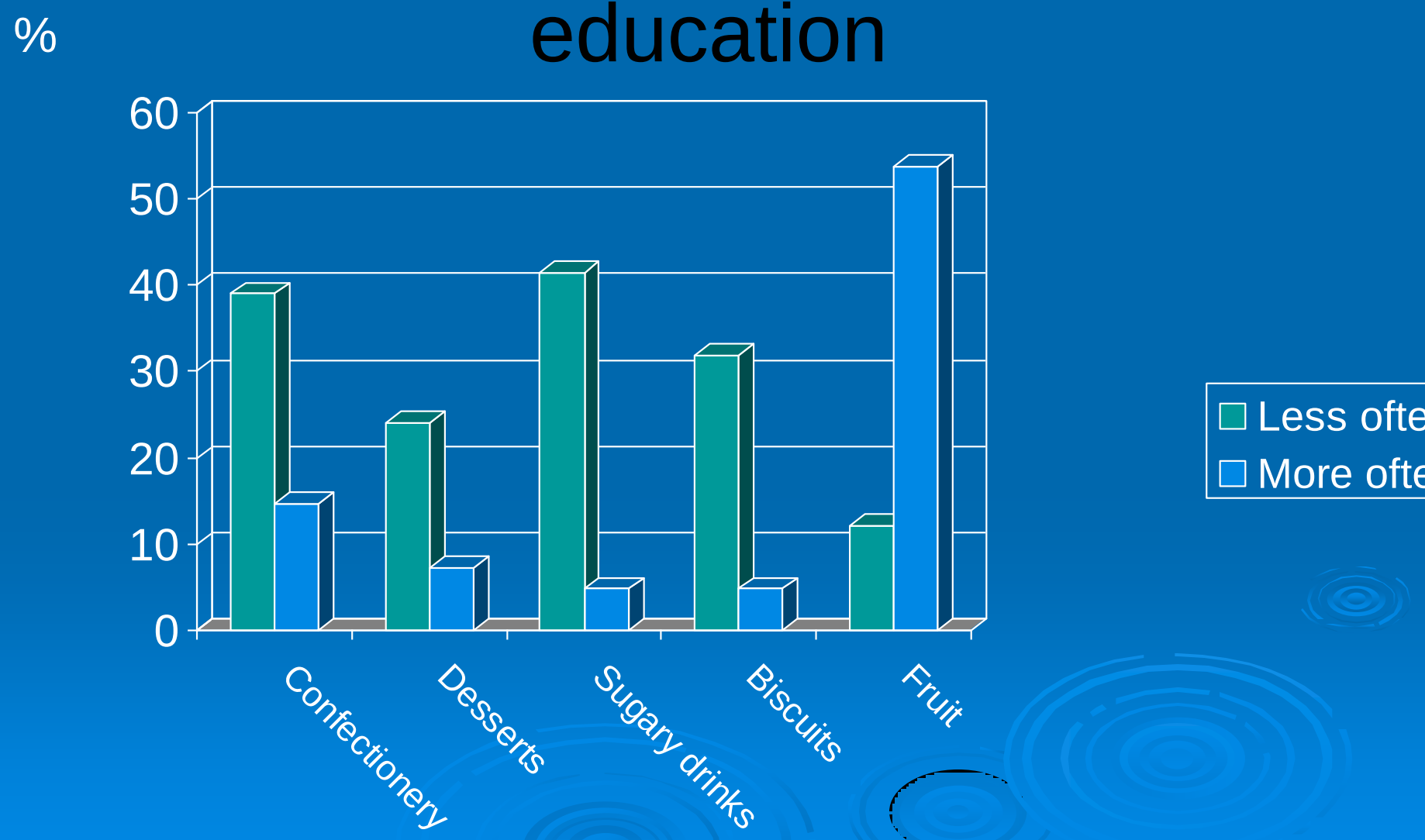
Survey

- 41 adults with type 1 diabetes, who had participated in intensive education completed a postal questionnaire (33% response)
- Mean age 26 yrs
- Mean duration of diabetes 20 yrs

Weight change following education



Frequency of food intake after education



Comments from patients

"If I could get rid of the 3 children, stop working I might have time to myself to study & learn again"

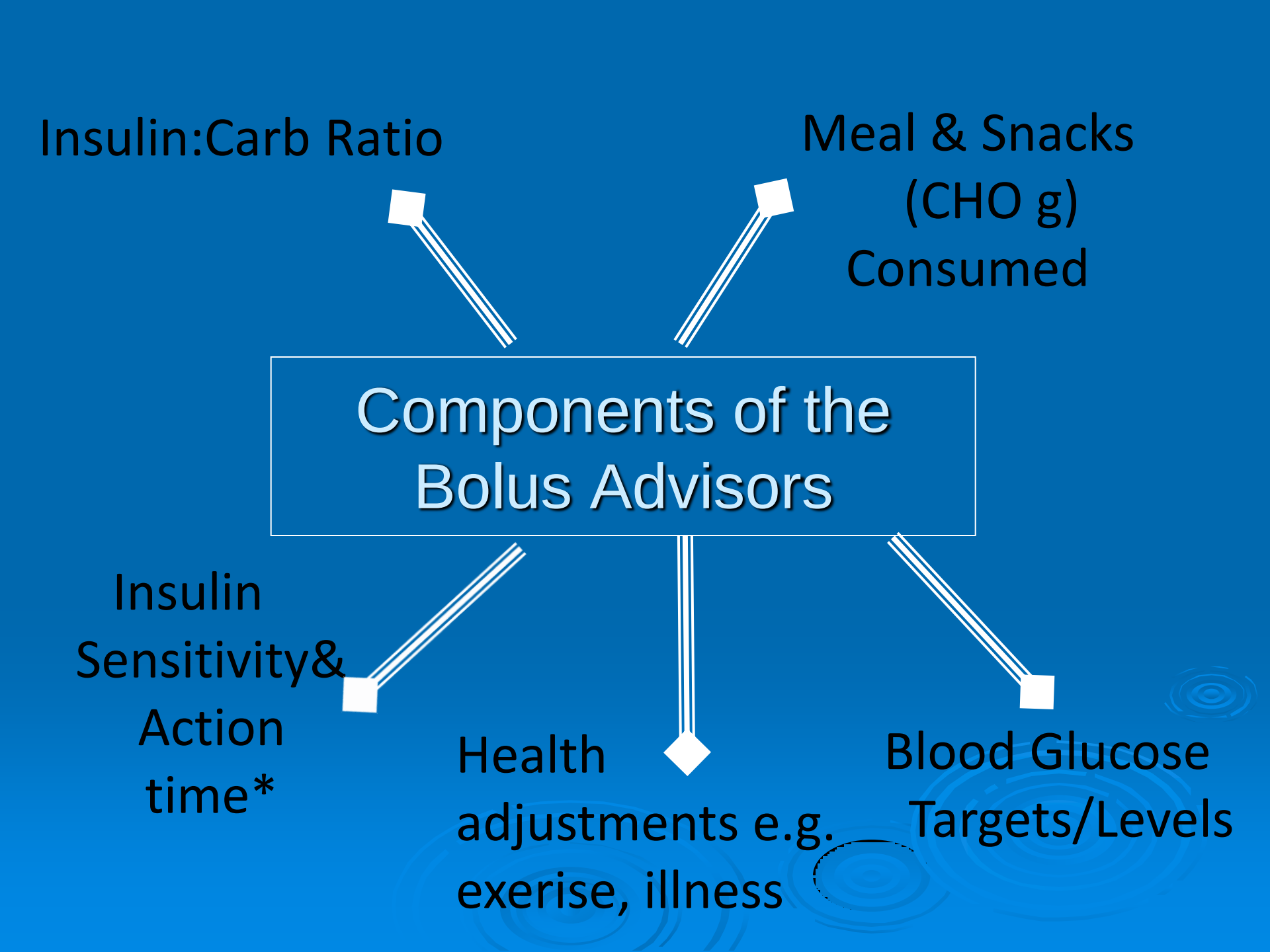
eating habits more flexible, less of a worry

"…it takes away the 'guilt' ……..because with the insulin you can now easily compensate for extra snacks "

more relaxed about times and quantities, it has been invaluable

I generally try to work my diabetes around my schedule. When first diagnosed, it was the other way around

"I don't feel restricted with regards to my diet…..I am still learning and experimenting"


Insulin:Carb Ratio
Meal & Snacks (CHO g) Consumed
Components of the Bolus Advisors
Insulin Sensitivity& Action time*
Health adjustments e.g. exerise, illness
Blood Glucose Targets/Levels

Possible Benefits

- More confident corrections, working to greater degree of accuracy and tighter blood glucose targets
- Avoidance of over corrections and reduced hypoglycaemia
- Helps to tackle post prandial hyperglycaemia
- Less reliance on numeracy skills
- Less stress

Any Pitfalls?

"One of the hidden pitfalls of private medicine, I'm afraid - I've found out what's wrong with you, but I won't tell you unless you pay double."

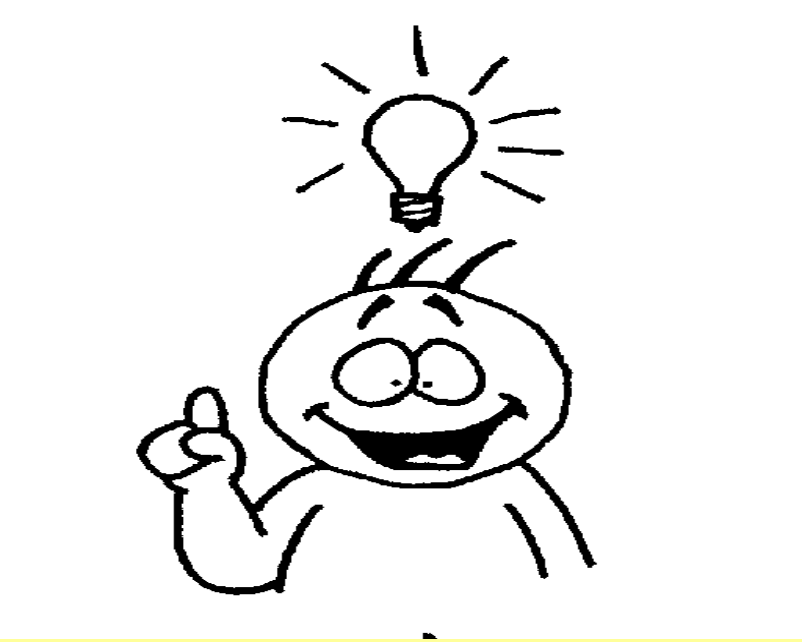
Bolus advice depends on correct settings

Setting accurate values

Not reviewing settings

Numeracy problems

Carbohydrate Counting



Have you got it?!