



Medtronic

A Quick Guide to
**Carbohydrate
Counting**
for Insulin Pump Users



Innovating for life.

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*Sincere gratitude to our patients,
without whose continued support and inputs,
this book would not have been possible.*

Acknowledgements:

Ms. Nahid Khilji. *Bsc (Dietetics)*

Chef Ralph Dsouza. *Bsc (Hospitality and Hotel Administration - Specialisation in food production)*

Mr. Hiten Chawla. *B.Com (H), MBA; India Medtronic Pvt. Ltd.*

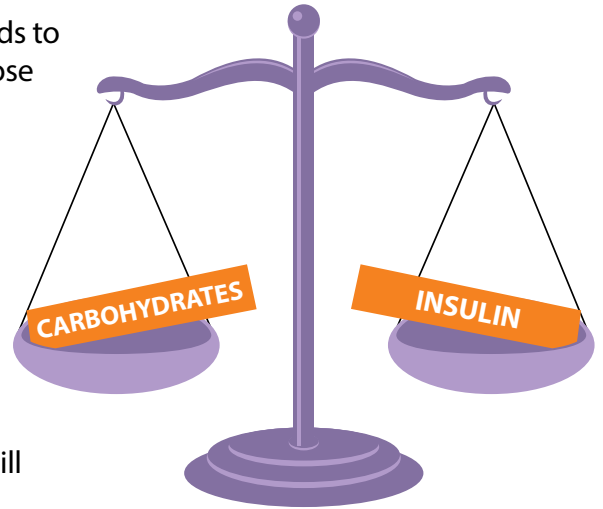
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Introduction to Carbohydrate Counting

What is Carbohydrate (Carb) counting?

- ◆ Carbohydrate Counting is one of the best and easiest methods to plan your meals and keep a check on your blood glucose levels. Counting carbs can also offer more variety to your meal plan
- ◆ It's the balance between the carbohydrates you eat and insulin you take that determines how much your blood glucose levels will rise after your meal
- ◆ Counting carbohydrate servings provides an accurate "guess" of how your blood sugar will rise after a meal or snack. The more Carbs you eat, the higher will be the spike in blood glucose levels and the more insulin you will need to cover that meal
- ◆ For example a South Indian meal of idli and dosa will raise blood glucose levels higher than a meal comprising of grilled paneer and salad. Hence you will need more insulin for the South Indian meal



With the right balance of carbohydrates and insulin, your blood glucose level will usually stay in the target range. Carbohydrate Counting helps you reach your blood glucose goals and prevent diabetes complications.

Carbohydrate Counting empowers you to manage your diabetes more effectively matching your own lifestyle, while offering more variety to your meal plan



*If you have a choice
between a cake and an apple...
What do you choose?*

**Important
Note**

Choose the right types of carbohydrates as meals rich in simple carbohydrates and fat provide little nutritional value putting you at an increased risk of obesity and heart disease. The type and amount of carbohydrate is very important in ensuring that blood glucose and blood fat levels are well within the target range.

How do you count Carbohydrates?

Carbohydrates are measured in grams and may be referred to in grams, exchanges, servings or carb choices. A food that contains 15 g of carbs are called 1 carb exchange.

**1 Exchange = 1 Choice = 1 Carb = 1 Portion = 1 CP (Carb Portion)
= 1 CU (Carb Unit) = 15 g carbohydrate**

1 carb choice (15 g Carbohydrates)



2 carb choices (30 g Carbohydrates)



But most foods are a mixture of nutrients. So how do you know how much of carbohydrates are there in any given food?

You can check serving sizes with measuring cups, spoons or a food scale to calculate the amount of carbohydrates in the food.

1 tablespoon sugar = 1 apple = 1 slice of bread = 1/3 cup pasta = 1/2 cup oatmeal = 15 g of carbs

For packaged foods, the easiest way is to read the nutrition facts section on the package.

Carbohydrate Counting Methods

One of the most important aspects of counting carbs is knowing how much carbs are there in the foods you are eating. Measuring helps give you a visual idea of how different servings look like on a plate or a bowl.

For example, measure 1 cup of rice onto your plate when you are eating. Once you have done this exercise, you will know how much 1 cup of rice serving looks like on a plate. You will then be able to estimate without having to measure each time.

Important Note

In this module, we have used a food weighing scale and standard measuring cups, spoons and household utensils to show portion sizes for a **15 g carbohydrate exchange of food**. The measuring cups and spoons are easily available in the market and are recommended to be used to standardize Carb portions of foods.

Food Weighing Scale	Measuring Cups and Spoons	Measuring Beaker (calibrated in cups & ml)
		

COMMON MEASURES

3 teaspoons = 1 tablespoon	8 tablespoons = 1 cup
2 tablespoons = 1 oz = approx 30 g	4 oz = 1/2 cup = 100 ml
4 tablespoons = 1/4 th cup = 50 ml	8 oz = 1 cup = 200 ml
6 tablespoons = 1/2 cup	1/3 rd cup = 80 ml

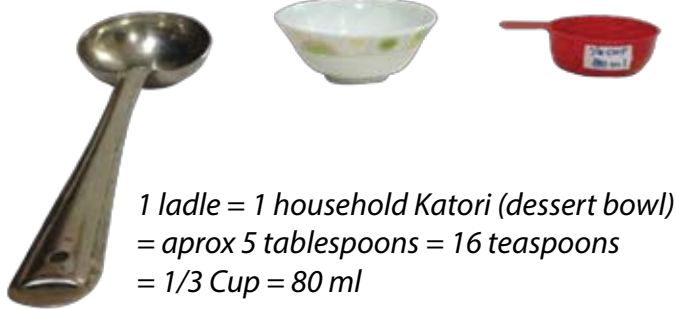
COMMON HOUSEHOLD MEASURES

1 Teaspoon (5 g)



1 Tablespoon (15 g)





1 ladle = 1 household Katori (dessert bowl)
 = approx 5 tablespoons = 16 teaspoons
 = 1/3 Cup = 80 ml



1 Standard household Soup Bowl = 10 tablespoons
 = 30 teaspoons = 3/4th of 1 Cup = approx 150 ml



Dinner Plate
 10 inches Diameter



Quarter Plate
 7 inches Diameter

As discussed earlier in the Quick Nutrition Guide, you can use your hand to gauge a healthy portion size. Here are some simple ways to estimate portion sizes based on an average sized woman's hand.



▲
 1 Healthy Serving of vegetable
 = **Size of your two open hands**



▲
 1 Serving of cereal and pulses, eg.
 flour/atta, rice, poha, pasta, pulses,
 soya others = **Your closed fist**



▲
 1 Serving of fish, meat
 = **Your palm size**



◀ 1 Serving of Fruit
 = **Your fist-size.**

1 Serving of fat ▶
 = **Your thumb tip-size**



Remember this is just an estimate and will vary depending on the size of your hand.

Important Note

Estimation is great if you do not have access to the right tools, but your chances of success are much greater with the tools.

■ Packaged Foods

For packaged foods, the easiest way is to read the nutrition facts section on the package. The laws requiring that packaged foods be labeled for their nutritional content are a Godsend for people with diabetes! Just check the label on almost any food that comes in a can, box, packet or wrapper and it will give you the total carbohydrate count.

An important note: The carbohydrates listed are not for the whole package, but just for one serving - and servings are often smaller than you would expect! Be sure to check the serving size. If you're eating two servings, double the carb count.

In this picture of the food label, the total carbohydrate content is 22.9 g per serving (30 g is one serving size) Sugar which is 1.8 g is included in the carbohydrate count of 22.9 g.

Nutritional Information [#]		
Nutrients	Per 100 g	Per 30 g
Energy Value	399 kcal	120 kcal
Protein	10.2 g	3.1 g
Carbohydrate	76.3 g	22.9 g
Sugar**	6.1 g	1.8 g
Dietary Fibre	11.5 g	3.5 g
Fat	5.9 g	1.8 g
Saturated Fatty Acids	1.2 g	0.4 g
Monounsaturated Fatty Acids	2.7 g	0.8 g
Polyunsaturated Fatty Acids	1.9 g	0.6 g
Trans Fatty Acids	0 g	0 g
Cholesterol	0 mg	0 mg
Iron	3.9 mg	1.2 mg

[#] Approximate values

Serving Size = 30 g

*As per Codex Alimentarius Commission Guidelines

** As Sucrose

Carbohydrate Goals

Carbohydrates are an important part of a healthy diet. The recommended number of servings of carbohydrates is based on your weight, activity level, diabetes medications, and goals for your blood glucose levels. For many people, having 3 or 4 servings of carbohydrate foods at each meal and 1 or 2 servings for snacks works well.

Learn how to follow a consistent Carbohydrate Meal Plan or adjust insulin for carbohydrates to help keep your blood glucose close to target levels.

Example: 1300 kcal/day diet

- $1300 \text{ Calories} \div 2 = 650$ ($\frac{1}{2}$ calories from carbohydrates)
- 1 gram carbohydrate = 4 calories
- $650 \div 4 = 162$ g carbohydrates / day

Break up of Carbohydrates at each meal

Meal	Grams of Carbohydrates	Carbohydrate Choices
Breakfast	30 g	2 choices
Snack	15 g	1 choice
Lunch	45 g	3 choices
Snack	15 g	1 choice
Dinner	45 g	3 choices
Snack	15 g	1 choice
Total (11 x 15)	165 g	11 choices

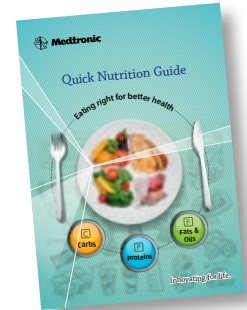
*Important
Note*

A Registered Dietician (RD) can help plan a balanced diet with the right amount of nutrients for you.

CHAPTER 4 Carbohydrates in foods



Before you go through this section, make sure you read and understand the quick nutrition guide.



■ Make a note of the below mentioned points before you proceed further

- 1) Each of the illustrations shown below represent 15 g of carbs/1 exchange of carbs
- 2) Illustrations in this section have been shown for home cooked meals
- 3) Serving size for both raw/uncooked and cooked version are shown
- 4) As you will see, weight and cup /plate size for raw/uncooked and cooked foods differ
- 5) Look for the foods you commonly eat and become familiar with the serving size that equals 15 g of carbs
- 6) The plate used is a quarter plate (7" diameter)

Starch List

This group includes cereals such as wheat, rice, jowar, bajra, ragi, breakfast cereals, bread, biscuits, oats, noodles, pasta, maida, starchy vegetables, beans, peas and lentils.

Avoid refined grains like maida, polished rice and white bread and choose healthier options such as whole wheat flour, barley, quinoa, brown rice, multigrain bread, durum wheat pasta etc.

Choose whole-grain and low-fat starches as often as you can.

In general one starch exchange contains

1 serving = 15 g carbohydrate, 3 g protein, 1 g of fat and 80 calories

Bread (29g)



White Bread



Brown Bread



Pav



Rusk (2 no.)

Each of the foods shown below represent 15 g Carb exchange

Breakfast Cereals



Muesli (19.2 g)



Oats (24 g)



Chocos (18 g)



Cornflakes (16 g)

Chapati (Raw weight of atta / flour=22 g)

The size of the chapati, paratha and bhakri will vary depending on its thickness.



Bhakri (Raw weight = 22 g)

Aloo Paratha (15 g flour and 21 g potato)



Raw



Cooked

Each of the foods shown below represent 15 g Carb exchange



Raw Rice (Raw weight)= 19 g



Cooked Rice (Cooked weight)= 65 g



Egg Biryani (Raw weight)= 19 g



Pulao (Raw weight)= 19 g

Similar for Chicken and Mutton biryani

Noodles (Raw weight = 25 g)



Raw



Cooked



Poha (Raw weight = 19 g)



Raw



Cooked



Each of the foods shown below represent 15 g Carb exchange

Upma (Raw weight =20 g)



Raw



Cooked



Sabudana (Raw weight = 17 g)



Raw



Cooked



Idli & Dosa (Raw weight = 21 g)



Batter



Dosa & Idli



Homemade Idli (7.5 g carbs each)



Restaurant Idli (15 g carbs each)



Idli size will vary from restaurant to restaurant

Starchy Vegetables

Corn	1/2 cup
Corn on the cob	1/2 cob (15 cm)
Peas	1 cup
Plantain, ripe	1/3 cup
Potato, boiled, sweet potato	1/2 cup (90 g)
Potato, mashed	1/2 cup
Popcorn	3 cups

Each of the foods shown below represent 15 g Carb exchange

Potato Vegetable (66 g potato)



Raw



Cooked



Sweet Potato (53 g)



Green Peas (94 g)



Sweet Corn (61 g)



Popcorn (24.6 g Act II)

Pulses

On an average, 25 g of pulses give 15 g of Carbs | 1 serving = 15 g carbohydrate

Each of the foods shown below represent 15 g Carb exchange

Dal (Raw weight = 25 g)



Raw



Cooked



Moong Chilla (Moong dal raw weight = 25 g)



Batter



Cooked

Usal (Raw weight=25 g)



Raw



Soaked



Usal Cooked



Each of the foods shown below represent 15 g Carb exchange

Moong (Raw weight = 25 g)



Raw

Moong Sprouts



Sprouted (quantity doubles as well as the fiber content increases)

Roasted Chana (Raw weight= 25 g)



Important
Note

When you eat a meal with a good helping of pulses/ sprouts, consider the effect of fiber and protein. There is a slow and sustained release of sugar observed. If on the insulin pump, you can balance the effect of fiber and protein by extending the time of your bolus.

Fruits

- ◆ Fruits are an excellent source of vitamins, minerals and fiber which are vital for good health
- ◆ Choose from a variety of colorful seasonal fruits
- ◆ A whole fruit is preferred over fruit juice as it gives more satiety because of its fiber content
- ◆ Commercially available fruit juices may be labeled as “sugar free”. This does not mean that it does not contain carbohydrates. Check for the amount of carbohydrate on the food label

Helpful Tip

All fruits are not the same. Some fruits are higher in calories than the others of the same weight. In such cases, you need to keep a check on the portion of fruit you eat. Raw or partially ripe fruits are preferable for people with diabetes.

One serving (exchange) = 15 grams of carbohydrate, no protein or fat, and 60 calories



Fruits in the amounts listed below equal one exchange (15 g). Weight includes skin, core, seeds and rind.

Apricots, fresh 4 whole (~ 150 g)	Melon, 1 slice (300 g)
Banana, small 1 (120 g)	Nectarine, small 1 (150 g)
Blackberries 3/4 cup	Orange, small 1 (180 g)
Cherries, fresh 12 (90 g)	Strawberries (medium-7no.)
Figs, fresh 2 medium (100 g)	Pineapple, canned 1/2 cup = 2 slices
Fruit cocktail 1/2 cup	Plums, small 2 (150 g)
Grapefruit, large 1/2 fruit (300 g)	Plums, dried / prunes 3
Grapes, medium 12 (90 g)	Raisins 2 Tbsp
Guava, medium 1 (120 g)	Tangerine, small 2
Kaki, small 1	Peach, canned 1/2 cup
Kumquat 5 (100 g)	Pineapple, fresh 3/4 cup = 3 slices
Kiwi 1 (100 g)	Peach, fresh, medium 1 (120 g)

Fruit Juice (unsweetened)

Apple juice	1/2 cup
Grapefruit juice	1/2 cup
Grape juice	1/3 cup
Orange juice	1/2 cup
Pineapple juice	1/2 cup

Each picture shown below represents edible portion of fruit containing 15 g of carbohydrate



Mango (90 g, small 1/2 cup cubed)



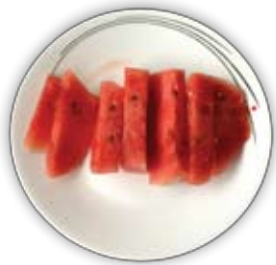
Pear (126 g, 1 medium)



Pomegranate (103 g, 1 small)



Sweet lime (161 g, 1 big)



Watermelon (454 g, dinner plate, 10" diameter)



Papaya (208 g, quarter plate, 7" diameter)



Apple (120 g, 1 medium)



Banana (55 g)



Dry Figs (2 nos)



Dried Dates (3 nos)



Apricots (4 nos)

Milk

- ◆ Milk and milk products like yoghurt, buttermilk, low fat cheese, whey water and low fat paneer from the dairy group are excellent sources of high quality protein and calcium. They must be included in your meal plan to ensure strong bones and teeth.



Though low in carbohydrate and rich in protein, Milk is also a rich source of saturated fat and cholesterol. It is advisable to opt for the low fat versions.



Each of the foods shown below represent 5 g Carb exchange



*Curd - 166 g
5 g carbohydrates*



*Milk - 100 ml
5 g carbohydrates*



*Paneer - 250 g
5 g carbohydrates*

Non Starchy Vegetables

- ◆ Non starchy vegetables contain small amounts of carbohydrates and calories, but they pack an important nutritional punch as they are rich sources of fiber and micronutrients such as vitamin C, folic acid, B complex vitamins, iron and calcium
- ◆ Try and include vegetables, raw or cooked, in your meals, two to three times a day
- ◆ Choose more dark green, yellow and red colored vegetables such as leafy vegetables, bell peppers, broccoli and others
- ◆ Fill up with vegetable juices, clear vegetable soups, salads, stir fry or some sautéed vegetables

**One serving (exchange) = 5 grams of carbohydrate,
2 grams of protein, no fat and only 25 calories.**



Important Note

If you eat 1 1/2 cups or more of cooked vegetables or 3 cups or more of raw vegetables in a meal, you should count them as one carbohydrate exchange (15 g of carbohydrate).

Amaranth	Onions	Cucumber
Asparagus	Radish	Eggplant
Baby corn	Peppers, all varieties	Green onions
Bamboo shoots	Sauerkraut	Scallions
Green beans	Soybean sprouts	Greens, collard, kale, mustard, turnip
Bean sprouts	Spinach	Leeks
Beets	Summer squash	Mixed vegetables without corn, peas or pasta
Broccoli	Tomato	Moong bean sprouts
Brussels sprouts	Turnips	Mushrooms
Cabbage (green)	Vegetable juice cocktail	Okra (Lady Finger)
Carrots	Water chestnuts	
Cauliflower	Zucchini	
Celery		

Sweets, Desserts and other Snacks

- ◆ Try cutting down on "unhealthy food" as much as possible as they contribute large amount of calories from fat and sugar without really providing any nutritional value. These include all chips, bakery foods, candy, soft drinks, fried foods, refined foods like white breads, parathas, naan, doughnuts, khari, nankatais, biscuits, brownies, cakes, etc.
- ◆ It is also a good idea to talk to your dietician about how to fit these foods into your meal plan

Helpful Tip

If you choose to eat sweets or desserts, do so in moderation and make sure you do not exceed your calorie and carbohydrate allowance for the day. Balance and moderation is the key here especially if you are watching your weight. This will also prevent your blood glucose from rising.

Here's a guide to common sweets, desserts and other snacks. Remember to include the exchanges in these products as part of your daily allowance.

Each of the foods shown below represent 15 g Carb exchange

Sugar



1 tablespoon (15 g)

Honey



1 tablespoon (15 g)

Jaggery



1 tablespoon (15 g)



Gulab Jamun
(1 no., no sugar syrup, 40 g)



Seviyan Kheer



Motichur ladoo (1/2 no.)



Puran poli
(1/2 no)



Cup Cake
(1 no., edges shaved off)



Rasmalai
(1 no., no sugar syrup)



Pudding
(1 small pc)

Other Snacks

Each of the foods shown below represent 15 g Carb exchange



Veg Pizza (6" ,1 slice)



French Fries (12 nos, 66 g potato)



Dhokla (2 nos)



Khandvi (12 medium pcs)



Muthia (3 small)



Banana chips (20 chips)

Carbohydrate Count for the Most Commonly Eaten Snacks



Menu item	Serving	Total carbohydrate (g)
Paani puri	5 puris	20
Dahi puri	5 puris	21
Aaloo tikki	1 patty (50 g potato)	11
Bhel puri	1 cup	26
Dahi wada	1 wada	22
Sev puri	5 puris	33
Bread pakora	1 no	24
Onion pakora	1 no (big)	10
Masala peanuts	30 g	10
Masala mattar	30 g	16
Chakli	30 g (1no)	7
Jeera butter	30 g (4 nos)	15
Khari	30 g (3 nos small)	15
Cheese sandwich	1 no (2 bread slices)	22
Grilled sandwich (small) with potato filling	1 no (2 bread slices)	26
Veg Frankie or Veg wrap or Veg roti	1 no	34
Chicken Frankie or Chicken Wrap or Chicken roti	1 no	28
Veg cutlet	1 no	21
Samosa	1 no	35
Wada	1 no	20

Disclaimer: These are only estimates. Actual amounts may vary depending on many factors, for example portion size, method of preparation, etc.

Nuts & Dry fruits

- 15 g carb exchange *



Dates (fresh)	6 nos
Dry dates	3 nos
Raisins	35 nos
Groundnuts	30 nos
Cashewnuts	45 nos
Walnuts	65 nos
Almonds	110 nos
Pistachios	88 nos

Biscuits

- 15 g carb exchange



Parle G	3 biscuits
Marie gold	4 biscuits
Good day (cashew, pista badam)	3 biscuits
Good day (butter)	2 biscuits
Priya gold classic cream	3 biscuits
Pickwick	4 biscuits
50-50 maska chaska	7 biscuits
Chocopie	1 pie
Nutri Choice (ragi / oats)	3 biscuits
Bourbon	1.5 biscuits
Hide and seek	4 biscuits
Dark fantasy	2 biscuits
Oreo	3 biscuits
Mc Vities Digestive	2.5 biscuits
Cream Crackers	3 biscuits
Monaco	5 biscuits
Pure Magic	2 biscuits
Britannia 5 grain	1 biscuit
Digestive High Fiber	3 biscuits
Jim Jam	2 biscuits
Oatmeal Cookies	3 biscuits
Nice	2 biscuits



Nuts and dried fruits are high in calories. Keep a check on the amount consumed.

Chips

100 g of Frito lays (India's Magic Masala) has 51.4 g of carbs. A medium sized packet of Frito lays is 26 g. 26 g (17 chips) has 13.4 g of carbs.

You can calculate the Carbohydrate Content of different chips available in a similar manner.



NUTRITIONAL INFORMATION (APPROX)		
		Per 100g
Energy	kcal	555
Protein	g	8.9
Carbohydrate	g	51.4
Sugars	g	4.1
Fat	g	30.7



Chocolates

65 g (10 pcs) of Cadburys Dairy Milk Silk has 37.9 g of Carbs. This means 1 pc has 3.8 g of Carbs. You can calculate the Carb Content depending on the amount you eat.

You can calculate the Carbohydrate Content of different chocolates available in a similar manner.



Helpful Tip

Restrict on the amount as Chips and Chocolates are high in fats.

Juices and Aerated drinks

If you look at the food label on the left, the Réal fruit juice 100 ml has 13.5 g of carbohydrate. If you drink a glass of Réal juice (200 ml), the carb content in your juice is $2 \times 13.5 = 27$ g.

NUTRITION FACTS PER 100 ml (APPROXIMATE)	
Energy	56 kcal
Protein	0.4 g
Carbohydrate	13.5 g
Natural Fruit Sugars	6.7 g
Added Sugar	6.8 g
Fat	0 g
Calcium	4 mg
Iron	0.3 mg
Vitamin C	42 mg
Vitamin A	115 mcg
Vitamin E	1.88 mg

Given are 15 g carb exchanges for aerated drinks



Helpful Tip

Juices and aerated drinks should be consumed only when blood sugars are low as they increase blood sugars rapidly.

➔ When you can't measure, estimate portions

You may have no problem counting carbohydrates in your morning bowl of oatmeal, egg sandwich or an apple; but walk into a restaurant and order the chicken manchurian with fried rice and you are left guessing as to how much carbohydrate you are eating. An essential part of carb counting is accurately estimating portion sizes.

When dining out at the homes of friends and family or at restaurants, do not hesitate to ask for information about the ingredients that have been used to prepare the dish, so that you can count your carbohydrates.

■ When at a restaurant, keep these simple tips in mind

- ▶ Try and eat portion similar to what you would eat at home
- ▶ Ask for salad dressing on the side
- ▶ Ask for smaller or half portions
- ▶ Skip appetizers, bread, and butter
- ▶ Order extra veggies (eg. sauted spinach, grilled mushrooms) on the side
- ▶ Go for clear soups instead of the creamy ones
- ▶ Ask for less sauce to be added to your meals
- ▶ You may ask the chef to hold the cream, which is often put as a garnish over most soups. Avoid fried croutons in the soup
- ▶ You may ask the chef not to add any cream, tadka or ghee or butter before serving

Healthy options	Roasted
	Steamed
	Grilled
	Broiled
	Poached
	Baked
	Lightly stir fried
	Red sauce (instead of white)
	Choose mustard over mayonnaise
	Plain lime and vinegar dressing
	Low fat yoghurt

➔ Carbohydrate content in Indian and International cuisines

The following pages show images of commonly eaten dishes of Indian and International cuisines eaten at restaurants. However the portions will change from restaurant to restaurant. This is just a guide for understanding carb portions of your favourite cuisines.



Important Note

Though some of the dishes are low in carb, they could be high in fat. Choose wisely!
Order low carb, low fat options

■ Idli Sambhar



Serving Amount	Carbohydrate
2 Idlis (60 g each)	30 g
Sambhar (130 g)	29 g
Chutney (30 g)	2 g

■ Medu Vada



Serving Amount	Carbohydrate
2 Vadas (60 g each)	43 g
Sambhar (130 g)	29 g
Chutney (30 g)	2 g

■ Sada Dosa



Serving Amount	Carbohydrate
1 Dosa (60 g each)	28 g
Sambhar (130 g)	29 g
Chutney (30 g)	2 g

■ Masala Dosa



Serving Amount	Carbohydrate
1 no. (60 g)	28 g
Potato bhaji (100 g)	14 g
Sambhar (65 g)	14 g
Chutney (30 g)	2 g

■ Rawa Masala Dosa



Serving Amount	Carbohydrate
1 no. (60 g)	42 g
Potato bhaji (100 g)	14 g
Sambhar (65 g)	14 g
Chutney (30 g)	2 g

■ Appam



Serving Amount	Carbohydrate
1 Appam (65 g)	40 g

■ Malabari Paratha



Serving Amount	Carbohydrate
1 Paratha (40 g)	20 g

■ Tamarind Rice



Serving Amount	Carbohydrate
180 g	105 g

■ Hyderabadi Biryani



Serving Amount	Carbohydrate
350 g	58 g

■ Rasam



Serving Amount	Carbohydrate
100 g	5 g

■ Avial



Serving Amount	Carbohydrate
350 g	49 g

■ Ishtew



Serving Amount	Carbohydrate
280 g	36 g

■ Vazhakkai thoran



Serving Amount	Carbohydrate
136 g	20 g

■ Mirchkasalan



Serving Amount	Carbohydrate
100 g	12 g

■ Chicken Chettinad



Serving Amount	Carbohydrate
220 g	8 g

■ Pal Payasam



Serving Amount	Carbohydrate
140 g	25 g

■ Gillefirdaus



Serving Amount	Carbohydrate
145 g	35 g

West Indian

Indian Cuisine

■ Aamti



Serving Amount	Carbohydrate
100 g	30 g

■ Tomato Sar



Serving Amount	Carbohydrate
250 g	12 g

■ Masala Bhaat



Serving Amount	Carbohydrate
140 g	57 g

■ Prawn Pulav



Serving Amount	Carbohydrate
250 g	60 g

■ Kombdi Vade



Serving Amount	Carbohydrate
200 g gravy (120 g chicken + 80 g gravy) + 2 vade (30 g each)	38 g

■ Tamatara Ursev Ki Subzi



Serving Amount	Carbohydrate
150 g	12 g

■ Gatte Ki Subzi



Serving Amount	Carbohydrate
200 g (gatta 120 g + 80 g gravy)	33 g

■ Makkai Nu Shaak



Serving Amount	Carbohydrate
230 g	30 g

■ Goan Fish Curry



Serving Amount	Carbohydrate
329 g	28 g

■ Fish Caldeen



Serving Amount	Carbohydrate
220 g (120 g fish + 100 g gravy)	22 g

■ Laalmaas



Serving Amount	Carbohydrate
250 g	10 g

■ Mutton Kolhapuri



Serving Amount	Carbohydrate
220 g	10 g

West Indian

Indian Cuisine

■ Pork Vindaloo



Serving Amount	Carbohydrate
230 g	5 g

■ Sukhe Mutton



Serving Amount	Carbohydrate
220 g	5 g

■ Safedmaas



Serving Amount	Carbohydrate
340 g	16 g

■ Bharwanmirch



Serving Amount	Carbohydrate
120 g	13 g

■ Kulcha



Serving Amount	Carbohydrate
1 Kulcha (68 g)	33 g

■ Plain Paratha



Serving Amount	Carbohydrate
1 Paratha (75 g)	31 g

■ Tandoori Roti



Serving Amount	Carbohydrate
1 Roti (72 g)	35 g

■ Naan



Serving Amount	Carbohydrate
1 Naan (90 g)	47 g

■ Cholebhature



Serving Amount	Carbohydrate
Chole (1/2 cup 125 g)	30 g
Bhature 2 no. (25 g each)	15 g
Bhature 1 no. (85 g)	35 g

■ Makkeki Roti



Serving Amount	Carbohydrate
1 Roti (50 g)	24 g

North Indian

Indian Cuisine

■ Sarso Da saag



Serving Amount	Carbohydrate
250 g	17 g

■ Dal Makhni



Serving Amount	Carbohydrate
200 g	58 g

■ Dum Aloo



Serving Amount	Carbohydrate
230 g	29 g

■ Bainganbharta



Serving Amount	Carbohydrate
150 g	9 g

■ Dum Bhindi



Serving Amount	Carbohydrate
285 g	15 g

■ Tinda Masala



Serving Amount	Carbohydrate
100 g	6 g

■ Gobhimusallam



Serving Amount	Carbohydrate
250 g	22 g

■ Shammi Kebab



Serving Amount	Carbohydrate
1 kebab (50 g)	5 g

■ Reshmi Kebab



Serving Amount	Carbohydrate
150 g	4 g

■ Kakori Kebab



Serving Amount	Carbohydrate
3 kebabs (102 g)	3 g

■ Chicken Tandoori



Serving Amount	Carbohydrate
150 g	3 g

■ Rogan Josh



Serving Amount	Carbohydrate
265 g	3 g

North Indian

Indian Cuisine

■ Chicken Makhanwala (Butter Chicken)



Serving Amount	Carbohydrate
30 g	16 g

■ Acharigosht



Serving Amount	Carbohydrate
200 g	6 g

■ Jalebi



Serving Amount	Carbohydrate
1 Jalebi (25 g)	41 g

■ Kulfi



Serving Amount	Carbohydrate
125 g (1 stick)	17 g

■ Sooji Halwa



Serving Amount	Carbohydrate
100 g	38 g

■ Momos



Serving Amount	Carbohydrate
1 Momo (25 g)	9 g

■ Jhalmuri



Serving Amount	Carbohydrate
38 g	8 g

■ Thukpa



Serving Amount	Carbohydrate
200 g	35 g

■ Luchi



Serving Amount	Carbohydrate
2 Luchi (25 g each)	15 g

■ Ghee Bhaat



Serving Amount	Carbohydrate
200 g	78 g

■ Cholar Dal



Serving Amount	Carbohydrate
1 serving (150 g)	31 g

East Indian

Indian Cuisine

■ Lau Chingri



Serving Amount	Carbohydrate
150 g (prawns 50 g + 50 g dhudhi + 50 g gravy)	10 g

■ Doimach



Serving Amount	Carbohydrate
200 g	14 g

■ Macherjhol



Serving Amount	Carbohydrate
250 g (150 g Fish + 100 g gravy)	13 g

■ Sandesh



Serving Amount	Carbohydrate
1 Sandesh (30 g)	16 g

■ Patishapta



Serving Amount	Carbohydrate
1 no (80 g)	35 g

■ Rosogullah



Serving Amount	Carbohydrate
1 small (15 g)	33 g

■ Chum Chum



Serving Amount	Carbohydrate
1 Chum Chum (50 g)	49 g

■ Malpua



Serving Amount	Carbohydrate
1 piece (60 g)	23 g

■ Mistidoi



Serving Amount	Carbohydrate
1 serving (50 g)	34 g

■ Balushahi



Serving Amount	Carbohydrate
1 no (35 g)	28 g

Thai

International Cuisine

■ Tom Yum Gong



Serving Amount	Carbohydrate
120 g	4 g

■ "Som Tam" Spicy Papaya Salad'



Serving Amount	Carbohydrate
200 g	29 g

■ Galoumbihartao-hou



Serving Amount	Carbohydrate
200 g	36 g

■ Tung Tong



Serving Amount	Carbohydrate
1 no.	4 g

■ Krathak Fire Cracker



Serving Amount	Carbohydrate
150 g (4 pc.)	11 g

■ Gai Med Ma Moung (Chicken Cashew nuts)



Serving Amount	Carbohydrate
360 g	40 g

International Cuisine

Thai

■ Stuffed Chicken Breast



Serving Amount	Carbohydrate
400 g	10 g

■ Geng Kheaw Wan Gai (Green Curry Chicken)



Serving Amount	Carbohydrate
300 g	14 g

■ Steam Rice



Serving Amount	Carbohydrate
180 g cooked (60 g raw)	42 g

■ Kao Phad Fried Rice



Serving Amount	Carbohydrate
300 g	86 g

■ Pad Thai



Serving Amount	Carbohydrate
390 g	50 g

■ **Minestrone Soup**



Serving Amount	Carbohydrate
400 g	21 g

■ **Pasta e Fagioli
(Pasta and Beans Soup)**



Serving Amount	Carbohydrate
210 g	21 g

■ **Risotto**



Serving Amount	Carbohydrate
100 g	42 g

■ **Caponata**



Serving Amount	Carbohydrate
185 g	12 g

■ **Spaghetti with Meat Balls**



Serving Amount	Carbohydrate
375 g	49 g

■ **Pasta with Arabiatta Sauce**



Serving Amount	Carbohydrate
275 g	38 g

■ Pasta with White Sauce



Serving Amount	Carbohydrate
255 g	46 g

■ Lasagna



Serving Amount	Carbohydrate
300 g	58 g

■ 12" Plain Medium Thin Crust Pizza, no extra toppings



Serving Amount	Carbohydrate
1 Slice (1/8th of a pizza: 55 g)	16 g

■ Tiramisu



Serving Amount	Carbohydrate
85 g	32 g

■ Mexican Corn Soup



Serving Amount	Carbohydrate
230 g	20 g

■ Chimichangas



Serving Amount	Carbohydrate
105 g	27 g

■ Chilli Con Carne



Serving Amount	Carbohydrate
190 g	25 g

■ Pimento rice



Serving Amount	Carbohydrate
125 g	54 g

■ Burrito



Serving Amount	Carbohydrate
120 g	43 g

■ Quesadilla



Serving Amount	Carbohydrate
90 g (1 no.)	21 g

International Cuisine

Mexican

■ Enchilada



Serving Amount	Carbohydrate
400 g	83 g

■ Tacos



Serving Amount	Carbohydrate
170 g	75 g

■ Nachos



Serving Amount	Carbohydrate
50 g	19 g

■ Fajitas



Serving Amount	Carbohydrate
120 g	31 g

■ Hot and Sour Soup



Serving Amount	Carbohydrate
210 g	12 g

■ Wonton Soup



Serving Amount	Carbohydrate
300 g	7 g

■ Manchow Soup (without noodles)



Serving Amount	Carbohydrate
200 g	7 g

■ Spring Rolls



Serving Amount	Carbohydrate
120 g (1 pc. of 40 g)	10 g

■ Sichuan Beans



Serving Amount	Carbohydrate
90 g	3 g

■ Stir Fried Chicken and Peppers



Serving Amount	Carbohydrate
220 g	4 g

■ Chinese Fried Rice



Serving Amount	Carbohydrate
150 g	47 g

■ Chowmein



Serving Amount	Carbohydrate
285 g	82 g

■ Hakka Noodles



Serving Amount	Carbohydrate
285 g	75 g

Please refer to the following websites for the fast foods. Keep a watch on portion size and the dressings used. Opt for low calorie dressings like mustard, lemon and vinegarett wherever possible

1. Mc Donalds



www.mcdonaldsindia.com

Go for smaller portions without mayonnaise

Below mentioned are the values for some of the commonly eaten items at Mc Donalds

Item	Amount	Carb (g)
Mc Chicken	1 no (163 g)	45
Mc Veggie	1 no (168 g)	56
Mc Aloo Tikki	1no (155 g)	49
Chicken Mc Grill	1no (140 g)	33
Fries	Regular	41
	Medium	58
	Large	82

2. Subway



www.subway.co.in

Choose subs without cheese and mayonnaise and generous helping of vegetables

Healthy options

- ▶ Veggie delite sub and salad
- ▶ Roasted chicken breast sub & salad
- ▶ Turkey breast sub & salad
- ▶ Southwest chicken

3. KFC

www.kfc.com

Refrain from crispy options

Healthy options

- ▶ Grilled chicken



4. Pizza

Choose Thin crust pizzas with less cheese and more vegetable toppings

Healthy options

- ▶ Thin crust pizza
- ▶ Garlic bread (without cheese)
- ▶ Mexican salsa wrap

4a. Pizza Hut



www.pizzahut.com

Below mentioned are values for Regular Crust pizza

Item	Amount	Carb (g)
12"	1 slice (91gms)	27
8"	1 slice (60 gms)	18

4b. Dominos Pizza



www.dominos.co.in

Below mentioned are values for Regular Crust Chicken Tikka pizza

Item	Amount	Carb (g)
5" Small	1 slice	19
10" Medium	1 slice	21
12" Large	1 slice	23

5. Ice Creams (Baskin Robbins)

www.baskinrobbins.com





Healthy Snacking Options (Low Carbohydrate)

- ▶ Salads / Carrot Cucumber Sticks (only mustard / vinageratte / lemon dressing / No croutons)
- ▶ Grilled / SautedVegetables
- ▶ Sauted Mushrooms
- ▶ Clear soups (No noodles / Croutons)
- ▶ Popcorn.
- ▶ Boiled Eggs
- ▶ Tandoori Chicken
- ▶ Grilled / Steamed Fish
- ▶ Kababs
- ▶ Plain tea, green tea or coffee without milk or sugar.
- ▶ Salted Lemon Water
- ▶ Tomato juice
- ▶ Thin Buttermilk
- ▶ Rasam
- ▶ Moong Jor / Chana Jor
- ▶ Koormura Chana
- ▶ Scrambled / Grilled Tofu / Low fat Paneer
- ▶ Sprouted Moong
- ▶ Moong / Sprout Dosa
- ▶ Soy Milk (plain / unsweetened)
- ▶ Besan Chilla / Moong Dal Chilla / Pudla
- ▶ Steamed Patra/Aluwadi
- ▶ Steamed Khandvi
- ▶ Steamed Momos
- ▶ Rice wrap Steamed Veg / Chicken Spring rolls
- ▶ Low Fat Yoghurt
- ▶ Moong Noodles with Veggies and Egg / Mushroom / Shredded Chicken

Quiz Time 1

Q1. Calculate the Carbohydrate Content for this meal.



Q2. Which has more carbohydrates, Rasam or Dal?

Q3. Fill in the carbohydrate content of the following meals

- a. 2 Small Moong Dal Chillas
Curd 100 g
1 Pear
- b. Half Plate Poha
1 cup Milk
1 Apple
- c. Half portion Chinese Fried Rice
1 Bowl Manchow Soup
2 Spring Rolls

Q4. Complete the following chart to test your understanding:

- a. 2 slices whole wheat bread = _____ grams of carbohydrates
- b. 1 whole banana = _____ grams of carbohydrates
- c. 1 cup oatmeal with 1 cup milk = _____ grams of carbohydrates

Continued on next page (Answers on Page 57)

Q5. Plan two breakfast meals containing 45gms of carbohydrate.

.....

Q6. Calculate the carbohydrate content for this meal.



.....

Q7. Test your memory.

How much of each of these foods can you have for a 15 gram carbohydrates serving?

- a. Strawberries _____ d. Rice _____
b. Raisins _____ e. Marie biscuits _____
c. Popcorn _____ f. Usal _____
-

Q8. Which will have the greater effect on blood glucose?

1 tsp sugar or 1/2 cup mashed potatoes

.....

Q9. Calculate the available carbohydrate for this breakfast meal.

Breakfast Meal	Carbohydrate (g)	Fiber (g)	Available Carbohydrate (g)
½ grapefruit	15	1.7	
½ cup bran cereal	22	10.0	
1 slice whole - wheat bread	12	1.5	
Total	49	13.2	

Answers on Page 57

Insulin Pump Therapy

Insulin pump therapy is a boon to people with diabetes today as you can match your insulin to your lifestyle, rather than getting an insulin injection and matching your life to how the insulin is working. People of all ages with type 1 diabetes use insulin pumps and people with type 2 diabetes have started to use them as well.

Insulin pumps mimic the healthy human pancreas by delivering bolus (just before meals) and basal (in between meals and night) insulin, hence improving blood glucose control.



■ Basal dose:

- ◆ The insulin pump delivers a low level of continuous insulin at a set rate throughout the day to keep your blood glucose levels in range between meals and overnight
- ◆ Take help from your doctor and diabetes educator to set the right basal dose for you

■ Bolus dose:

- ◆ The insulin pump delivers insulin just before meals which helps in controlling your post-meal sugars. This is called Food Bolus
- ◆ It is also used to 'correct' an out of range blood glucose-correction bolus

Hitting the Bull's Eye- Know your targets:



For most people with diabetes, the American Diabetes Association recommends the following blood glucose targets

- Fasting blood glucose should be in the range of 70-130 mg/dl (3.9-7.2mmol/l)
- Post meal to be less than 180 mg/dl. (10.0 mmol/l)
- A1c <7%

Your target ranges may differ depending upon your age, in pregnancy, complications and other factors. Speak to your doctor/diabetes educator to know your blood glucose targets.

Regular **blood glucose monitoring** is the key to giving you the information you need to effectively manage your diabetes. Without regular testing, you won't know how well your diet, exercise, or medication are working. Testing blood glucose 4-6 times a day tells you if you are on the right track or if you need to make changes.

Insulin to Carbohydrate ratio (I:C factor)

As you are aware, eating foods rich in carbohydrate causes your blood glucose to rise. Insulin helps move the glucose from the blood into the cells where it can be used for energy. Using insulin-to-carbohydrate ratio is an advanced method of carbohydrate counting. This method matches your insulin dose to the amount of carbohydrates you eat. This can help you keep your blood glucose levels within your goal range.

Your healthcare team will help you determine your insulin to carb ratio.

Example of how to determine an insulin dose using an Insulin-to-Carb Ratio and Blood glucose correction factor

Insulin to Carbohydrate Ratio (I: C factor):

The number of carbohydrate grams covered by one unit of insulin.

1 unit of insulin covers _____ grams of carbohydrate

.....

Correction Dose: The amount of insulin added to or subtracted from a bolus to correct blood glucose that is above or below target.

.....

Target blood glucose (Target B.G): The Blood glucose value that is targeted when determining the need for a correction dose. The target may change for pre-meal, post-meal or bedtime.

When your blood glucose goes unexpectedly high, a correction bolus can be used to bring it down. To use the right correction bolus, we need to first identify the insulin-sensitivity factor.

.....

Insulin Sensitivity Factor (ISF): It is the dose of insulin required to bring down a high blood glucose level to the desired target range.

.....

1 unit of rapid- or short-acting insulin for every ____ points (mg/dL) blood glucose level is over target of ____ mg/dL

You figure the dose in a 2-step process

Step 1: Calculate the total daily dose

Total Daily Dose (TDD) is the amount of insulin delivered by the insulin pump each day.

Pump TDD = Basal insulin + Bolus insulin (units/day)

For eg: Basal dose= 20 and Bolus dose= 20,

Total Daily dose (TDD)= 40

Step 2: Calculate Insulin to Carb Ratio (ICR)

Determine the amount of carbohydrates (grams) covered by one unit of insulin

* 500 Rule

$500 \div \text{by the Pump TDD} = \text{ICR}$

For Eg: $500 \div 40 = 12.5$ grams (TDD= 40)

1 unit covers ~ 12.5 grams of carbohydrate

**For very young children who need less than 10 units of insulin a day, 500 rule may not be applicable. These cases sometimes need more doses of insulin in which case, the 300–450 rule may be adaptable. In practice, the detailed records of self-monitored blood glucose (SMBG results), carb intake and insulin doses provide useful information for making ratio adjustments.*

Check your blood glucose levels before and after meals. If your glucose levels two hours after meals (unless your doctor advises you otherwise) are in the target range, it means that your insulin to carb ratio is working fine.

For Example (Breakfast):

2 Toast: 30 g
Egg: 0 g
1 cup Milk: 7.5 g
1 Apple: 15 g

Total Carbs: 52.5

Insulin to Carb Ratio 1:12.5

Amount of insulin required for this meal: 4.2 U

Delivery options for meal bolus

Insulin pump therapy offers flexibility by allowing meals and snacks to be customized to fit your schedule and preferences in timing, size of meals and type of food.

The Medtronic Minimed pump offers three unique meal bolus delivery options: **Normal, Square Wave and Dual Wave.**

By means of a continuous glucose monitoring system (CGMS), we now have the option to monitor post meal blood glucose excursions much more closely than was possible in the past with just finger tip blood glucose monitoring. This will help understand the impact of all meal-related factors on post meal blood glucose and ways to achieve good blood glucose control.



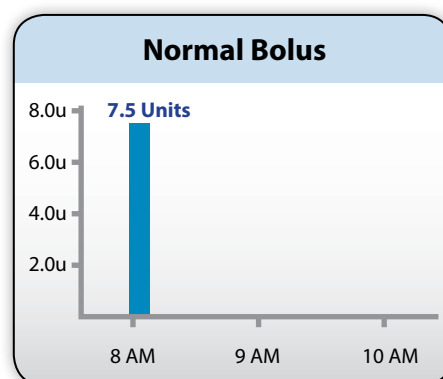
i) Normal bolus

A Normal bolus delivers a specific dose of insulin over a short period of time. It acts similar to your insulin injection.

Where to use Normal Bolus?

This bolus type is the most commonly used option for everyday meals and snacks containing high carb, average protein and fat content. It covers the carbohydrates in your meal and returns blood glucose to normal levels quickly.

It is also used to deliver correction boluses to lower your blood glucose.



Meal Examples:

- High glycemic index foods
- Pasta, white rice, bread, biscuits, fruits, fruit juice / root veg (potato, yam, arbi)

ii) Square wave bolus

A square wave bolus delivers insulin evenly over a specified period of time that you set. The time set can range from 30 minutes to 8 hours.

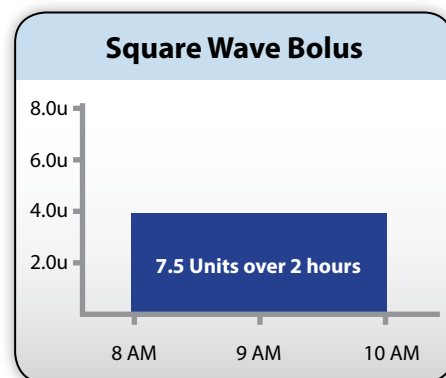
Where to use a square wave bolus ?

High protein (more than 40% protein), minimal carb meals or high fiber meals.

Foods high in protein, fat or fiber may take a few hours to digest, thereby delaying absorption of the carbohydrates raising blood glucose for upto many hours after the meal is eaten.

Multi course meal where absorption is delayed due to grazing such as receptions, get togethers.

In Coeliac disease or medical conditions caused due to diabetes like gastroparesis where there is delayed digestion and absorption due to which glucose levels run high for upto some hours after the meal.



Meal Examples:

- Low Glycemic Index foods,
- Big steak with grilled vegetables
- Tandoori Chicken with salad, Oatmeal, Muesli, Cake, Desserts like ice-cream, custard shrikand, gulab jamun, rasgulla.

For example: 8 Units Bolus

Buffet - square over 4 hrs
 $8/4 = 2$ Units /hr

iii) Dual wave bolus

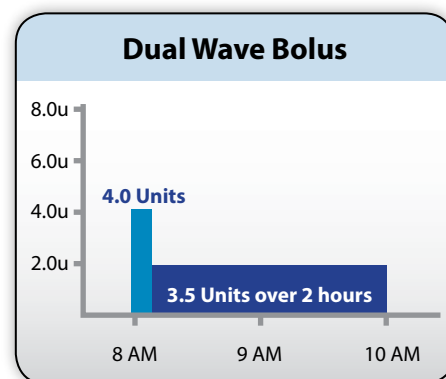
Dual Wave bolus is the combination of a Normal Bolus and a Square Wave Bolus.

In this kind of bolus setting, part of the bolus is delivered as soon as **ACT is pressed (Normal)** and the remainder delivers evenly over the period of time you set (**Square Wave**).

Where to use a dual wave bolus?

The dual wave bolus is primarily used for mixed meals and foods high in carbohydrate and fat. Carbohydrates are absorbed quickly whereas fat take longer to absorb, which delay digestion (for example: pizza, Indian, Chinese or Mexican meals).

For example, you may start your dinner with fruit salad, but then eat a few slices of pizza, which can cause your blood sugar to rise much later.



Meal Examples:

- Mixture of low glycemic and high glycemic foods
- Coke/Fruit+ Cheese sandwich
- Chinese / Mexican meals
- Indian Meal- Chapati+ Dal+ yoghurt+ vegetable
- Fruit salad / Coke+ pizza
- Biryani+ Raita

For example: 8 Units Bolus

Fruit salad + high fat meal (Cheese Pizza , baked dish with rich white sauce and cheese)-
30:70 square over 4 hrs
 $8/4 = 2.4$ U Normal bolus+ 5.6 squared over four hours

- ◆ The fraction of bolus you set to deliver now (normal bolus) and as a square wave bolus will vary based on the carb, protein and fat content of the meal
- ◆ When using the Dual wave bolus with meals that are relatively moderate in their protein and fat content, many Medtronic Minimed pump users experience an improved food to insulin match by taking **30% of the bolus dose as normal and 70% of the bolus dose as square delivered over 1 ½ -2 hours**
- ◆ Traditional Indian thali -Chapati, rice, dal and vegetable - 60 % Normal bolus and square the remaining 40% over 1 to 2 hrs
- ◆ Meal-Pizza, tiramisu, and regular Coke (11% protein, 53% carbohydrate, 36% fat) 70% as normal bolus and 30% squared over 2 hours *
- ◆ Protein rich meal-Grilled chicken with a small portion of mash potato or a Sizzler with a big portion of steak-20% Normal bolus and 80% squared over 2 to 3 hours *



As the fat and protein content of the meal starts increasing, we should consider extending the "time" factor of the "square" part of the bolus as the fat and protein delay the absorption of glucose. The amount of carbohydrate in the meal would influence the ratio of Normal to Square wave bolus.

These are only examples. Your healthcare team and your doctor are the best judge. Please consult them to know which bolus type and amount would work best for your unique needs.

*Ref No 17,18

Bolus Wizard

- ◆ **Bolus Wizard** is a useful feature available in Medtronic Minimed Paradigm. Insulin pumps which helps you estimate the food bolus and correction bolus based on your blood glucose levels, carbohydrate intake and other parameters that are programmed in the pump. You need to set the wizard on in order to get maximum benefit out of your insulin pump

<p>Example Setting</p> <p>Wizard : On</p> <p>Carb Units : Grams</p> <p>Carb Ratios : 12</p> <p>Sensitivity : 42</p> <p>BG Target : 100-110</p> <p>Active Insulin Time : 5 hours</p>	<p>Example of Dose Calculation</p> <p>Estimate Details</p> <p>Estimate total : 3.0 units</p> <p>Food Intake : 24 grams</p> <p>BG : 220 mg/dL</p> <p>Food : 2.0 units</p> <p>Correction : 2.6 units</p> <p>Active Insulin : 1.6 units</p>	$\begin{array}{r} 24 \text{ grams} \\ + 12 \text{ (carb ratio)} \\ \hline 2.0 \text{ units (food bolus)} \end{array}$ $\begin{array}{r} 220-110 \text{ (target BG)} = 2.6 \text{ units} \\ 42 \text{ mg/dL (sensitivity factor)} \\ \hline \end{array}$ $\begin{array}{r} 2.6 \text{ units (correction)} \\ - 1.6 \text{ units (active)} \\ \hline = 1.0 \text{ unit (suggested correction)} \end{array}$ $\begin{array}{r} \mathbf{2.0 \text{ units (food bolus)}} \\ + \mathbf{1.0 \text{ unit (suggested correction)}} \\ \hline \mathbf{3.0 \text{ units (estimated bolus)}} \end{array}$
--	--	---

- ◆ The Bolus Wizard calculator lets you set different blood glucose targets throughout the day. These unique personalisations helps ensure that bolus estimates are more closely matched to your needs, which can help you achieve even better blood glucose control

- ◆ Get help from the Medtronic representative to set the Bolus Wizard

Once the Bolus Wizard is programmed, all you need to do is enter your current blood glucose and the number of grams of carbohydrate that you plan to consume.

The Bolus Wizard calculator will do the math and provide a suggested insulin dose based on your blood glucose, carbohydrate intake and other pre-set parameters.

You simply enter two data

- ◆ **Your current Blood glucose value**
- ◆ **The amount of carbohydrates you are eating**
- ◆ **To get your blood glucose levels back to the target range after meals, the bolus dose must match the food you eat**

EXAMPLE 1

1. Meal / Food Bolus

Eg: Breakfast: 2 Idlis+ 1 katori sambhar+1 katori chutney

30 +15 + 2= 47gms of carbs

ICR (insulin to carb ratio)..... 1:10

$$47/10= 4.7U$$

2. Correction Bolus

Current BG 240 mg/dl

Target BG 100 mg/dl

ISF (Insulin Sensitivity Factor) 1:70

$$240 - 100/70 = 2U$$

3. Bolus Wizard Estimated Bolus

One of the most common bolusing errors is to over-correct for a post-meal rise in your blood glucose. Over-correction may occur when the amount of insulin still active in your body is not properly taken into consideration.

$$4.7U + 2U = 6.7U$$

When your blood glucose is above target, the Bolus Wizard calculator automatically takes into account the amount of active insulin still in your body. This is designed to help you avoid hypoglycaemia, or low blood glucose, resulting from too much insulin.

EXAMPLE 2

1. Meal / Food Bolus

0 g

ICR (insulin to carb ratio)

1:10

$$0/10= 0U$$

2. Correction Bolus

Current BG 240 mg/dl

Target BG 100 mg/dl

ISF (Insulin Sensitivity Factor) 1:70

$$240 - 100/70 = 2U$$

Active Insulin from previous correction Bolus 1 U

3. Bolus Wizard Estimated Bolus

N.B: The Bolus wizard calculator takes into account active insulin when estimating a correction bolus in response to an elevated blood glucose but does not consider active insulin when calculating the meal/food bolus.

$$2 - 1 = 1U$$

Quiz Time 2

Q1. Your insulin to carb ratio is 1: 10. How much insulin would you need for the following meals?

a. An apple and laddoo



b. Rawa Masala Dosa (1 no)
Sambhar (1 katori)
Chutney (1 katori)
Tea (no sugar, 50 ml milk)
Apple (1 no, medium size)

Q2. Arushi's Insulin to Carb ratio is 1: 25. She is eating 100 gms of carbohydrate.

Arushi would needU of Insulin

Q3. Kashish's blood glucose levels are 75 mg/dl. She is having a cup of milk. How much bolus must she take?

Kashish must take amount of bolus

Q4. 1 unit of insulin covers 20 gms of carbs. How much insulin would I need for the following meals?

- a. 75g
- b. 100g
- c. 60g
- d. 10g

Answers on Page 57

Answer Keys

Quiz Time 1

- Q1.** 30gms
-
- Q2.** Dal as it has quantity of pulse compared to rasam
-
- Q3.** a. 2 moong dal chillas-15g, Curds 100g - 3.3g, 1 pear-15g; Total = 33.3g
b. 1 half plate poha- 30g, 1 cup milk-7.5g, 1 apple- 15g; Total =52.5g
c. ½ portion Chinese fried rice: 23g, 1 bowl manchow soup: 6.8g, 2 spring rolls: 20.2g; Total =50g
-
- Q4.** a. 30g b. approx 20g c. $15+7.5= 22.5g$
-
- Q5.** Egg+ 2 Toast+ 1 apple or 2 homemade idlis+ small katori sambhar + 1 apple
-
- Q6.** Dosa: 28g; potato veg: 13.96g; sambhar: 14.5g; chutney: 2g; Total = 58.46g
-
- Q7.** a. Strawberries 7no d. Rice 1/3 cup
b. Raisins 2 tbsp e. Marie biscuits -4 no
c. Popcorn 24.6gms f. Usal ½ cup
-
- Q8.** Mashed potato. The potatoes will contribute about 15 grams of carbohydrates, while a level teaspoon of sugar will only give 5 grams of carbohydrates. Therefore, the potatoes will have about three times the effect on blood sugar as compared to the table sugar
-
- Q9.** Bran cereal has 22g carbs and 10g fiber
 $22-10= 12g$; Net Carbs= 39g
-

Quiz Time 2

- Q1.** a) $15/10=1.5 U$, $30/10=3 U$
b) $90 g/10 = 9 U$
Rawa Masala Dosa - 1no- 42gms + 13.96gms for potato veg
Sambhar-1 katori- 14.5gms
Chutney-1 katori-2 gms
Tea (no sugar, 50 ml milk)- 2.5
Apple -1 medium-15
-
- Q2.** $100/25= 4U$
-
- Q3.** None
-
- Q4.** a. 3.75 U b. 5 U c. 3 U d. 0.5 U
-



NOTES

A series of horizontal dotted lines for taking notes.



NOTES

A series of horizontal dotted lines providing space for notes.

References

- 1) Insulin Forward
- 2) Nutritive Value of foods- NIN
- 3) www.medtronic.co.in
- 4) www.mimimed.com
- 5) care.diabetesjournals.org
- 6) www.ncbi.nlm.nih.gov/pubmed/9416027
- 7) www.foodtalk.com.au
- 8) Carbohydrate Counting: Getting Started, The American Diabetes Association, The American Dietetic Association, 1995
- 9) www.exploratorium.edu
- 10) www.docstoc.com
- 11) <http://www.manitobahealthyliving.ca/keeping-portion-size-under-control>
- 12) <http://www.mayoclinic.com/health/diabetes-diet/DA00069>
- 13) Carbohydrate Counting: Moving On, The American Diabetes Association, The American Dietetic Association, 1995
- 14) Practical Carbohydrate Counting, American Diabetes Association, 2001
- 15) lowcarbdiets.about.com
- 16) www.diabetes.org
- 17) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2787051/>
- 18) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2494638>
- 19) www.Joslin.org
- 20) www.integrateddiabetesservice.com
- 21) www.wikipedia.org/wiki/insulin_pump
- 22) Insulin Pump Therapy-The Diabetes educator
- 23) www.livestrong.com
- 24) www.myfitnesspal.com
- 25) www.desidieter.com
- 26) The importance of carbohydrate counting in the treatment of diabetes in children- Review article, Pediatric diabetes 2007
- 27) www.integrateddiabetes.com
- 28) www.kfc.com
- 29) www.dominos.co.in
- 30) www.mcdonaldsindia.com
- 31) <http://www.subway.co.in/index.html>
- 32) www.baskinrobbins.com

For Indian and International Cuisines

- <http://www.spicytreats.net/2011/03/ghee-rice.html>
<http://www.mellownspicy.com/2012/10/20/doi-ilishhilsa-in-yogurt-and-mustard-sauce/>
<http://www.simplytadka.com/2012/11/aloopostto-with-bengali-flatbread-luchi.html>
<http://kitchenquickrecipe.blogspot.in/2012/12/prawn-with-vegetables-curry.html>
<http://www.flickr.com/photos/somagallery/5540601411/>
<http://hindi.boldsdy.com/recipes/sweets/malai-chum-chum-sweet-dish-002537.html>
http://www.thestar.com/life/food_wine/recipes/2008/10/23/maple_mishti_doi.html
news.priyo.com
<http://calcuttachow.com/category/recipes/page/7/>
<http://missionsharingknowledge.wordpress.com/tag/rasgulla/>
<http://cooks-hideout.blogspot.in/2012/11/bengali-maplua.html>
<http://xitefun.com/cooking-recipes/balushahi-t521.html>
<http://kootation.com/great-patty-caper.html>
http://recipes.onlinefoodgrocery.com/food-recipe/16314/chicken_momos_with_tomato_achar_recipes.html
<http://hamareerasoi.blogspot.in/2012/04/jhal-muri-ultimate-snack-of-bengal.html>
<http://forum.santabanta.com/showthread.htm?240078-India-s-favourite-food-Part-1/page5>
<http://ttraveloqoholic.blogspot.in/2012/05/kalpa-lovely-village-in-kinnaur-valley.html>
[www.maharajawestseattle.com](http://maharajawestseattle.com)
www.dannemann.com
www.lilchefsworld.com
courtesykitchen.blogspot.com
chefkunalkapur.com
www.monadarling.com
www.awesomecuisine.com
www.suratisweetmart.com
<http://food-forthought.blogspot.in>
commons.wikimedia.org
thespiceracks.blogspot.com
enjoyindianfood.blogspot.com
www.indiafoodkitchen.com
food-forthought.blogspot.com
illa-cookingdelights.blogspot.com
www.feminiya.com
www.channel4.com
foodviva.com
throughmyeyes-vaibhav.blogspot.com
homeofcooking.blogspot.com
www.tumblr.com
cherrapeno.com
<http://ashwita.com/recipes/labels/rich%20dishes.html>
chocolatehitchips.blogspot.com
doublehorserecipe.com
ofsoupsandsouffles.wordpress.com
21food.com
www.foodviva.com
evernewrecipes.com
commons.wikimedia.org
talimpu.com
peppergarlickitchen.com
<http://www.kamat.ae/gallery/dum-aloo-kashmiri-4/>
desikitcheen.desibantu.com
<http://www.veganricha.com/2013/06/gobimusallam-whole-roasted-cauliflower.html>
<http://www.allvoices.com/contributed-news/9860966-dum-AX>
http://creativekhadija.com/wp-content/uploads/2012/09/img_8793.jpg
http://foodydoody.files.wordpress.com/2011/07/dsc_0048-e1310601955637.jpg
<http://fortheloveofyum.wordpress.com/tag/chicken-shami-kebab/>
<http://www.urbaneye.in/urbangourmet/dum-pukht-mumbai-the-countrys-best-indian-restaurant>
<http://www.boldsdy.com/cookery/soups-snacks-drinks/baked-grilled-snacks/chicken-reskhi-kebab-recipe-033268.html>
<http://www.vazhayila.com/2010/08/vazhakka-thoran-ethakka-thoran-raw.html>
<http://www.boldsdy.com/cookery/vegetarian/maincourse/side-dishes/avarekalu-sambhar-recipe-031910.html>
<http://culinaryexperimentsofanamateurblogspot.in/2012/08/onam-vannallo-ponnonam-vannallo-pal.html>
http://chezshuchi.com/Tamarind_Rice.html
<http://allrecipes.com/recipe/chicken-biryani-hyderabadi-style/?scale=1&ismetric=1>
http://www.youtube.com/watch?v=UMGMHSjK_pg
<http://www.youtoocancook.net/2012/09/chettinad-chicken-masala-chicken-dry.html>
manjuseatingdelights.blogspot.com
kurryleaves.blogspot.com
http://www.tastyappetite.net/2013/01/how-to-make-aviyal-south-indian-avial.html#Ug_rJL_sug
spicychilly.com
tastyappetite.net
pachakam.com
<http://www.chiangraitimes.com/news/3214.html>
<http://thainakorncuisine.com/>
<http://ucan-thaifood.blogspot.in/2013/04/kang-khiew-wan-gai-green-chicken-curry.html>
<http://www.myredstar.com/thai-me-up/>
http://www.templeofthai.com/recipes/papaya_salad.php
<http://tasteologie.notcot.org/post/44335/>
<http://cavegirlcuisine.com/2012/04/14/stuffed-chicken-breast/>
<http://www.mrssonshine.com/apps/blog/daniel-fast-recipes-from-the-left-side>
<http://www.mysixer.com/?p=18446>
<http://www.maflavourjourney.com/2013/03/22/spagheti-and-meat-balls/>
http://atrainatobklyn.blogspot.in/2009_03_01_archive.html
<http://m.reveal.co.uk/lifestyle/Recipes/a409349/pasta-from-a-master-alvaro-maccionis-arrabiata-penne.html>
<http://www.theliveinkitchen.com/2012/03/21/roasted-vegetable-lasagna/>
<http://www.foodnetwork.com/recipes/ellie-krieger/minestrone-soup-recipe/index.html>
<http://zdrowie.re.pl/artykul/101647.html>
<http://theveganfoodie.wordpress.com/category/vegan-mofo/>
<http://peaceloveandpolenta.com/pasta-e-fagioli/>
<http://www.idigthepig.net/risotto-prawn-zucchini/>
<http://www.perthnow.com.au/corn-soup-with-capsicum-puree/story-fn6cn0dh-1226047045195>
<http://www.fedrest.com/chilliconcarne.html>
http://www.nibblemethis.com/2010_01_01_archive.html
http://2.bp.blogspot.com/-2o5keP_SKVA/TntBiqzZF/AAAAAAAAAB94/ICj9yj7HsxU/s640/Pepper+rice.JPG
https://s3.amazonaws.com/Menu_Pic/794e3e3d-1e83-4dc5-b7d3-d2ae6538f297_Steak_burrito.jpg
<http://www.wikikitchen.net/wp-content/uploads/2011/04/Quesadilla.jpg>
http://forum.smartcanucks.ca/attachments/general-discussion-tea-room/137488d1347969754-happy-rep-day-chicken_ranch_tacos_1.jpg
<https://upload.wikimedia.org/wikipedia/commons/8/87/Nachos-cheese.jpg>
http://www.ocado.com/cmscontent/recipe_image_large/83549.jpg?CTQA
<http://cooksjoy.com/blog/wp-content/uploads/2013/02/Hot-and-Sour-Soup-2.jpg>
<http://jeanetteshealthyliving.com/wp-content/uploads/2011/11/ThaiStirFryChickenWithBasil2-e1321978332653.jpg>
<http://www.jbgorganic.com/blog/wp-content/uploads/2012/10/1-sichuan-green-beans.jpeg>
<http://mumandleahcook.files.wordpress.com/2012/11/fried-rice-served.jpg>
<http://resources.desmet.org/Faculty/Klein/Section6/chartantohml/noodlesoup.jpg>
<http://static.webshopapp.com/shops/008309/files/002728457/healthy-boy-spring-roll-sauce-250ml.jpg>
<http://4.bp.blogspot.com/-NUIddVjmn8/UMuR1e59hZ/AAAAAAAAALRg/YbMphFkLbCs/s1600/SSWF-VegetableChowMein.jpg>
<http://www.kamat.ae/wp-content/uploads/2013/03/Manchow-Soup.jpg>
<http://www.wowkieren.com/images/news/00008716.jpg>
<http://anotherislam.wordpress.com/2013/09/02/for-the-love-of-food/>



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