

PreDiabetes

糖尿病前期



The first step in preventing diabetes is knowing your blood sugar level. If you find yourself in the prediabetes stage, it is a warning that **"Diabetes is arriving."** Consult your doctor for suitable treatment methods and stay away from the **"Diabetes line."**

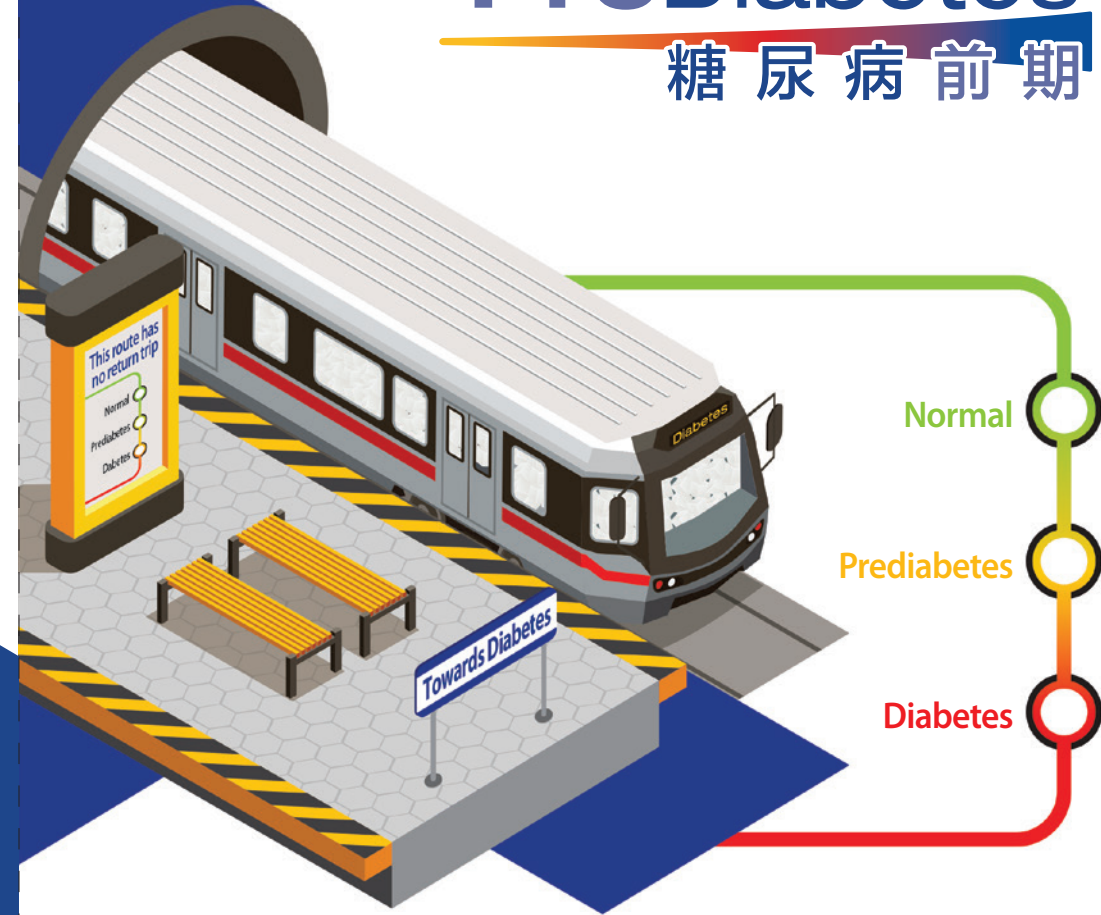
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Diabetes is arriving
Stay away from the **"Diabetes Line"**





DEFINITION & PROGRESSION

What is Prediabetes?

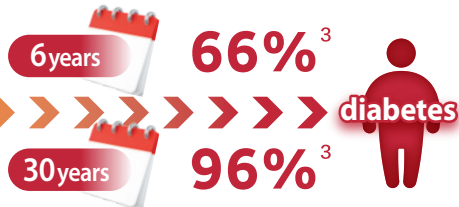
It refers to blood sugar levels that are "borderline"—higher than normal but not yet at the level of Type 2 Diabetes¹. This indicates that your body's demand for insulin is higher than a normal person's. It is a critical warning signal.

| Blood Glucose Testing Methods | Normal | Prediabetes | Type 2 Diabetes |
|-------------------------------|--------------|---|-----------------|
| FPG | < 5.6 mmol/L | 5.6 – 6.9 mmol/L Impaired fasting glucose | ≥ 7.0 mmol/L |
| OGTT (2-hour value) | < 7.8 mmol/L | 7.8 – 11.0 mmol/L Impaired glucose tolerance | ≥ 11.1 mmol/L |
| HbA1c | < 5.7% | 5.7–6.4% | ≥ 6.5% |

1 in 6 Hong Kong citizens is in the Prediabetes stage²



Without intervention...



Many people with **prediabetes** and **diabetes** will incur increasing personal and healthcare system expenditures because of associated complications, resulting in a substantial economic burden⁴.

FPG: fasting plasma glucose, OGTT: oral glucose tolerance test, HbA1c: hemoglobin A1c

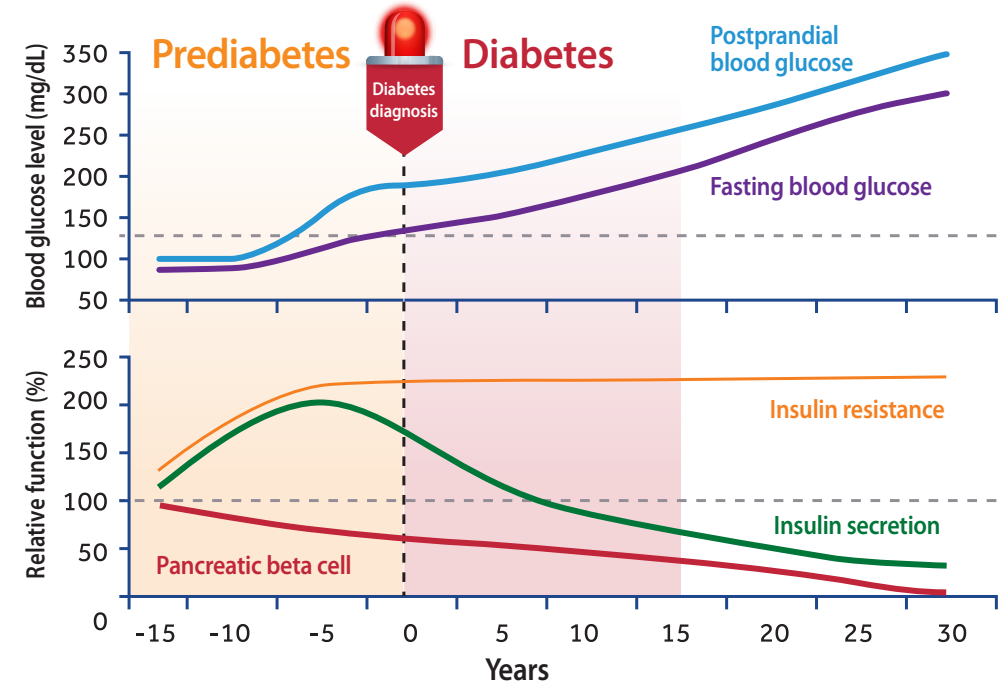


IMPACT OF PREDIABETES ON THE BODY

By the time many people are diagnosed with diabetes, the beta cells of their pancreas have already lost half of their function⁵, and this damage cannot be reversed.



Progression of Type 2 Diabetes⁵



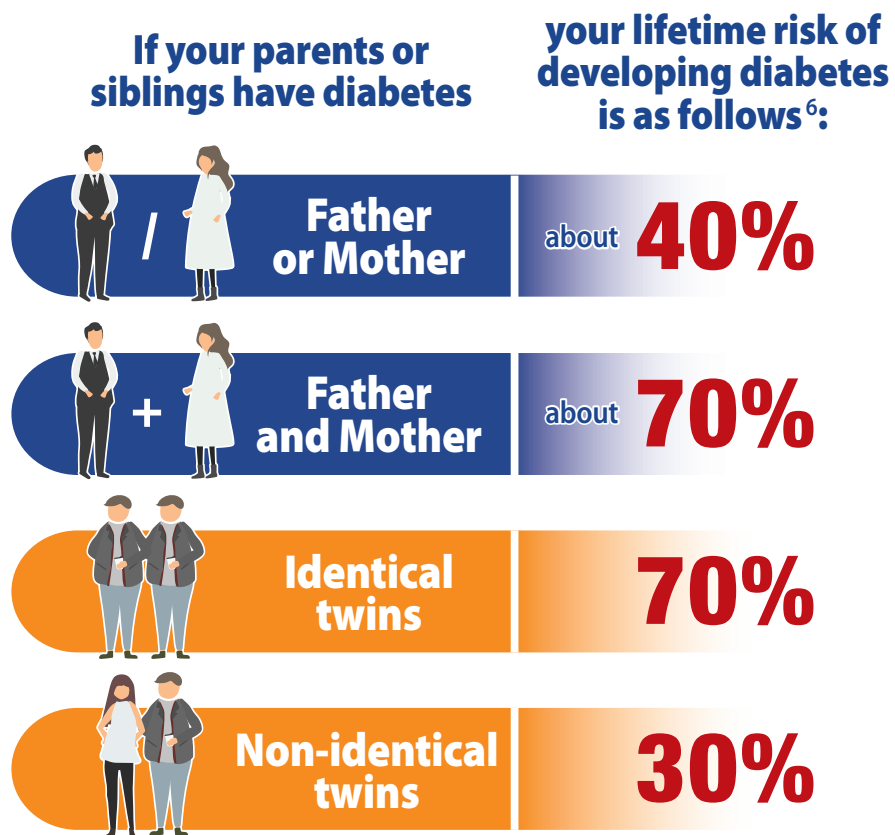
Pancreatic function is assessed by fasting and post meal blood sugar. Even if a **person with prediabetes** has normal fasting blood sugar, if their post meal blood sugar is high, they may be diagnosed with **impaired glucose tolerance**.



HIGH-RISK FACTORS

Family History

Family history is one of the risk factors for diabetes. Do you have a family history of diabetes?



HIGH-RISK FACTORS

Prediabetes usually has no symptoms. Annual check-ups are essential for high-risk groups.

-  **Polycystic Ovary Syndrome (PCOS)⁷**
-  **Gestational Diabetes⁸**
-  **Macrosomia⁹**
(birth weight > 4 kg)
-  **Being born small for gestational age¹⁰**
(birth weight < 2.5 kg)
-  **High fasting blood glucose (IFG) / impaired glucose tolerance (IGT)¹¹**
-  **Fatty Liver¹⁷**
-  **Age 40 or older¹²**
-  **Dietary Factors¹³**
-  **Overweight¹⁴**
(BMI ≥ 25)
-  **Central Obesity¹⁵**
-  **Lack of Exercise¹⁶**
-  **High blood pressure¹⁸**



HIGH-RISK FACTORS¹⁸

1 How old are you?

- Under 40 (0)
- 40-49 (1)
- 50-59 (2)
- 60+ (3)

Mark your score inside the box

2 Are you male or female?

- Male (1) Female (0)

3 If you are female, have you ever been diagnosed with gestational diabetes?

- Yes (1) No (0)

4 Do your parents or siblings have diabetes?

- Yes (1) No (0)

5 Have you ever been diagnosed with high blood pressure?

- Yes (1) No (0)

6 Do you exercise regularly?

- Yes (0) No (1)

7 What is your weight status?

(Refer to the chart on the right)

Total score

If your total score is 5 points or higher:

You may already be in the prediabetes stage and at high risk of developing type 2 diabetes.

Please consult with doctor whether you have type 2 diabetes or prediabetes (a condition where blood sugar is higher than normal before diabetes occurs).

Please discuss with your doctor whether you need further tests.



| Height (ft/cm) | Weight (lb) | | |
|----------------|-------------|---------|------|
| 4'10" / 147 | 119-142 | 143-190 | 191+ |
| 4'11" / 150 | 124-147 | 148-197 | 198+ |
| 5'0" / 152 | 128-152 | 153-203 | 204+ |
| 5'1" / 155 | 132-157 | 158-210 | 211+ |
| 5'2" / 157 | 136-163 | 164-217 | 218+ |
| 5'3" / 160 | 141-168 | 169-224 | 225+ |
| 5'4" / 163 | 145-173 | 174-231 | 232+ |
| 5'5" / 165 | 150-179 | 180-239 | 240+ |
| 5'6" / 168 | 155-185 | 186-246 | 247+ |
| 5'7" / 170 | 159-190 | 191-254 | 255+ |
| 5'8" / 173 | 164-196 | 197-261 | 262+ |
| 5'9" / 175 | 169-202 | 203-269 | 270+ |
| 5'10" / 178 | 174-208 | 209-277 | 278+ |
| 5'11" / 180 | 179-214 | 215-285 | 286+ |
| 6'0" / 183 | 184-220 | 221-293 | 294+ |
| 6'1" / 185 | 189-226 | 227-301 | 302+ |
| 6'2" / 188 | 194-232 | 233-310 | 311+ |
| 6'3" / 191 | 200-239 | 240-318 | 319+ |
| 6'4" / 193 | 205-245 | 246-327 | 328+ |
| | (1) | (2) | (3) |

If your weight is lower than the weight shown in the left column (0)

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Gestational diabetes was not included as part of the model when validating the original algorithm.

Risk Reduction

Good news: With some small changes, you can reverse prediabetes and live a longer, healthier life.

If you are at high risk, you should contact your doctor to see if further testing is needed.

Please visit the following websites for more details

DoIHavePrediabetes.org



PreDiabetes

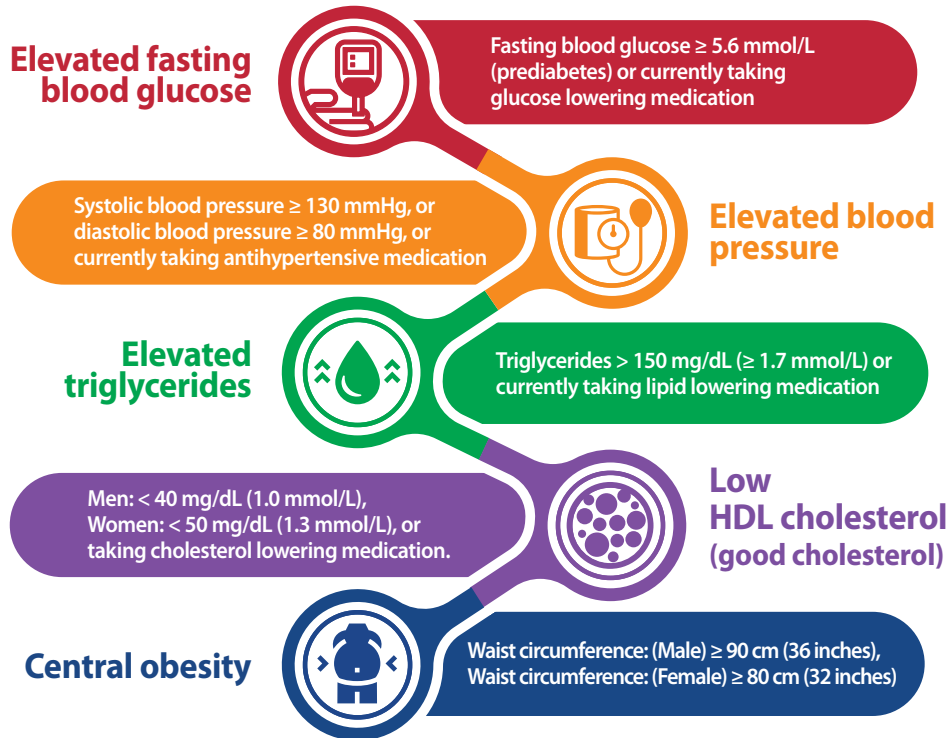
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HIGH-RISK FACTORS

Having metabolic syndrome increases the risk of developing type 2 diabetes, and vice versa; the two are closely related.

Metabolic syndrome includes **five** cardiovascular risk factors related to insulin resistance. A diagnosis of metabolic syndrome requires at least **3** of the following^{18,19}:



People with metabolic syndrome have **3** times the risk of heart disease and stroke compared to non-sufferers, while the risk of developing type 2 diabetes is as high as **4** times or more. Men, in particular, should pay extra attention.

For those with metabolic syndrome, the risk of developing diabetes is **5** times higher than for a healthy person.

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When blood sugar levels are higher than normal, blood vessels throughout the body have already been adversely affected.²¹⁻²³

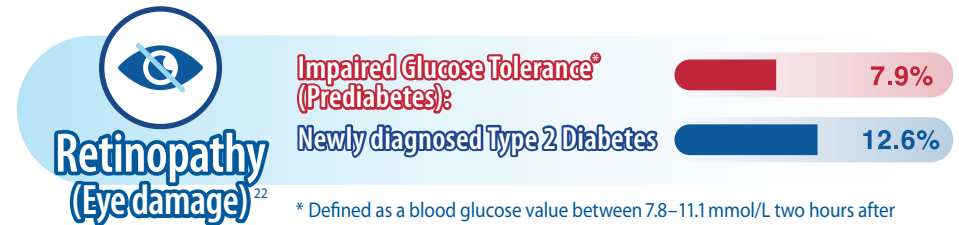
Therefore, prediabetes is considered the body's final alarm signal.

Prediabetes Complications

Within **9.5 years**, those with prediabetes have higher risks of:

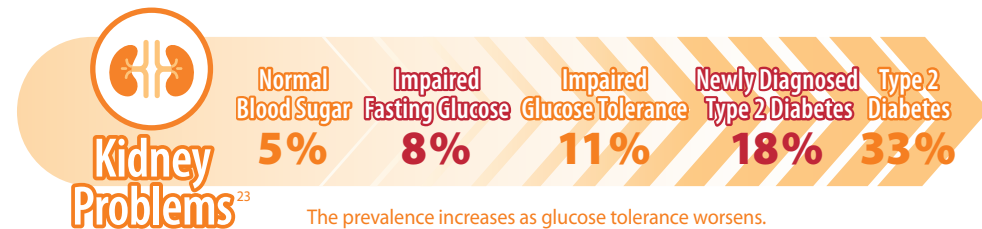


Within **3.1 years**:



* Defined as a blood glucose value between 7.8–11.1 mmol/L two hours after consuming 75g of glucose (dissolved in 250–300 ml) during a glucose tolerance test.

Proteinuria exists even before the onset of diabetes





Criteria for screening for hidden (undiagnosed) diabetes¹

Recommendations differ according to individual conditions

- All other adults should start regular screening from **age 35**
- Women who had gestational diabetes should have **screening at least every 3 years** (most Hong Kong doctors recommend at least yearly)
- People with prediabetes (HbA1c \geq 5.7%, impaired glucose tolerance or impaired fasting glucose) should be tested **at least once a year** to check if they have progressed to diabetes.
- Adults who are overweight (BMI \geq 23 kg/m²) and have one or more of the following risk factors should be screened:

- Lineal relatives with diabetes
- High-risk ethnic group (e.g. Asians)
- History of cardiovascular disease
- Hypertension (or taking blood pressure medication)
- Dyslipidaemia (e.g. high triglycerides, low HDL-cholesterol)
- Women with polycystic ovary syndrome
- Lack of Exercise



Please "✓" in the applicable box



Coping with diabetes – adopting a healthy lifestyle



Seven principles of healthy eating²⁴ :

1. Keep an upper limit for carbohydrates in your diet.
2. Low-fat foods.
3. Low glycaemic index (GI) foods.
4. Count the amount of carbohydrate in each meal.
5. High-fibre diet.
6. Eat less & more frequent: have appropriate portion sizes and spread them evenly throughout the day.
7. Light cooking methods



Benefits of exercise for diabetes²⁴ :

1. Maintain or reduce body weight.
2. Improve glucose tolerance.
3. Reduce triglycerides and increase HDL-cholesterol.
4. Improve insulin resistance, maintain or reduce blood glucose levels.
5. Increase insulin sensitivity.
6. Increase glucose uptake and utilisation.
7. Speed up metabolism.
8. Reduce the risk of cardiovascular disease

Targets for people with prediabetes²⁴ :

- Reduce at least **7%** of body weight.
- At least **150 minutes** of exercise per week.

**Control • stabilise
balance blood sugar**

People with prediabetes already have blood sugar levels above normal. If not actively managed, up to **96%** of people with prediabetes will eventually develop **type 2 diabetes**³.





Can I reverse prediabetes?

People with prediabetes can work with families and doctors to find the treatment approach that suits them and keep away from the “diabetes line”. In addition to adopting a healthy lifestyle, they may also use medication to control blood sugar and delay progression to diabetes.

Medication

The Hong Kong Department of Health has approved **Metformin / α -glucosidase inhibitors** for use in people with prediabetes. **Both have been shown in many studies to effectively reduce or delay the progression to type 2 diabetes**²⁸⁻²⁹. Metformin has over 65 years of clinical experience in treating type 2 diabetes, and medical literature has confirmed its efficacy and safety³⁰. When choosing medication, people with prediabetes may consider drug efficacy and long-term safety, price and affordability. For more information on medicines for diabetes prevention, please consult your doctor.

Evidence: Long-term studies show that lifestyle changes can reduce diabetes risk by up to 58%³⁴.



Is blood sugar still poorly controlled?

Many people believe that prediabetes is not serious, choosing to ignore it or follow a passive dietary approach. Individuals with prediabetes face many challenges when trying to change their lifestyle habits:



Difficult to sustain²⁵



Weight fluctuations²⁶



Low adherence²⁵

Diabetes Prevention Program (DPP) Starting in 1996, 3,234 high-risk individuals about to develop diabetes were divided into 3 groups. After the study ended in 2002, follow-up tracking discovered the following results³²⁻³³:

| Time Period | Comparison of Diabetes Incidence Reduction (Relative to Placebo Group) | |
|-----------------|--|----------------------------------|
| | Healthy Lifestyle Changes | Medication Treatment (Metformin) |
| After 2.8 years | -58% | -31% |
| After 10 years | -34% | -18% |
| After 15 years | -27% | -18% |
| After 22 years | -25% | -18% |

Lifestyle change has the greatest effect in preventing diabetes. If lifestyle modification alone cannot achieve ideal blood sugar levels, medication may be needed. **Combining lifestyle changes with medication can provide a sustained and effective reduction in diabetes incidence.**^{27,32-33}

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Glycaemic Index (GI) and Healthy Eating³¹

People with prediabetes can work with families and doctors to find the treatment approach that suits them and keep away from the “diabetes line”. In addition to adopting a healthy lifestyle, they may also use medication to control blood sugar and delay progression to diabetes.

GI classification:

Low GI: 55 or below, slower rise in blood sugar, more stable

Medium GI: 56–69, moderate speed of blood sugar rise

High GI: 70 or above, rapid rise, more likely to cause blood sugar fluctuation

Grains and Starches

Low GI (55 or below)

| | | |
|---------------------------------|-----------------------------------|-----------------------|
| Multigrain bread | Whole wheat / High-fibre crackers | Macaroni |
| Whole wheat / Whole grain bread | Quinoa | Silver needle noodles |
| Sourdough wheat bread | Whole wheat pasta | Mung bean vermicelli |
| Whole wheat/Oat flakes | Oat noodles | Glass noodles |

Medium GI (55–69)

| | | |
|--------------------------------|-------------------------------------|-------------------------------|
| Brown rice / Red rice | Lai Fun / Kuy Teav | Sponge cake |
| Rice vermicelli / Rice noodles | Spinach noodles / Whole egg noodles | BBQ pork buns |
| Malted wheat flakes | Scallop noodles / Knife-cut noodles | Cantonese steamed sponge cake |
| Steamed white buns | Non-fried instant noodles | Sticky rice dumplings |

High GI (70 or above)

| | | |
|-------------------------------|--|---------------------------------------|
| White rice / Sushi rice | Crispy breakfast cereals | Ho Fun / Yi Mein |
| Congee / Teochew-style congee | Instant oatmeal / Cornflakes | Shrimp roe noodles / Shanghai noodles |
| Glutinous rice / rice rolls | Radish cake / Rice cake | Custard buns / Lotus seed paste buns |
| Bread / Milk toast | Rice noodle rolls / Fried dough sticks | Egg rolls |

Dairy Products

Low GI (55 or below)

Milk / Sugar-free soy milk

Medium GI (55–69)

Flavored milk (e.g., Chocolate milk)

High GI (70 or above)

Milkshakes
Sweetened condensed milk

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Meat

Low GI (55 or below)

| | |
|--|---|
| Pork (Lean meat, pork tenderloin, ribs) | Chicken (Chicken breast, chicken thigh, chicken tenderloin) |
| Beef (Lean beef, beef brisket, beef tenderloin) | Duck and Goose |
| Lamb (Lamb shoulder, lamb chop, lamb tenderloin) | Fish (Salmon, yellow croaker, eel) |
| | Seafood (Shrimp, crab, scallops) |

Medium GI (55–69)

Canned fish (Sardines in tomato sauce)

High GI (70 or above)

Canned meats (Honey glazed sausages)

Fruits

Low GI (55 or below)

| | | |
|-----------------------|-----------------|----------------------------|
| Cherries | Coconut | Pomegranate |
| Peaches / Apricots | Strawberries | Blueberries / Blackberries |
| Apples / Green apples | Grapefruit | Guava |
| Pears / Snow pears | Just-ripe mango | Dragon fruit |

Medium GI (55–69)

| | | |
|------------------|--------|-----------------------|
| Pineapple | Papaya | Kiwi |
| Overripe mango | Figs | Lychee |
| Just ripe banana | Grapes | Honeydew / Cantaloupe |

High GI (70 or above)

| | | |
|-----------------|--------|--------------|
| Watermelon | Longan | Kyoho grapes |
| Overripe banana | Durian | |

Vegetables

Low GI (55 or below)

| | | |
|--------------|-------------|--------------|
| Curly kale | Eggplant | Onion |
| Chinese Kale | Mushrooms | Potato |
| Spinach | Peppers | Sweet potato |
| Cabbage | Lettuce | Celery |
| Tomato | Green beans | Winter melon |

Medium GI (55–69)

Beetroot
Chestnuts

High GI (70 or above)

Mashed potatoes
Pumpkin

Even with Low GI foods, you still need to **pay attention to portion sizes and cooking methods**. You should maintain a balanced diet rather than consuming unlimited quantities. Choosing sugar-free or low-sugar cooking methods will further help stabilize blood sugar.






Factors Influencing GI: ³¹

1. Fibre


Soluble fibre forms a gel-like substance in the gut, acting as a “barrier” that slows down the digestion of carbohydrates and the absorption of sugar. Insoluble fibre can also indirectly help reduce blood sugar.



Examples of High Soluble Fiber:

- ✓ Fruits: Apples, pears, citrus fruits, kiwi. 
- ✓ Beans: Chickpeas, lentils, black beans. 


- ✓ Vegetables: Carrots, okra, onions. 
- ✓ Grains/Seeds: Oats, barley, chia seeds, flaxseeds.

Examples of High Insoluble Fiber:

- ✓ Whole Grains: Brown rice, whole wheat, corn, buckwheat. 
- ✓ Fruits: Apple skin, grape skin, berry seeds.

- ✓ Vegetables: Leafy greens, vegetable stems, root skins. 
- ✓ Nuts/Seeds: Almonds, sunflower seeds, sesame seeds. 




Tips:

- ✓ Try **replacing refined starches with whole grains**, e.g. use brown rice or multi-grain rice instead of white rice.
- ✓ Include at least one bowl of vegetables in each meal 


2. Fat and protein

Fat and protein in food can slow gastric emptying and **slow carbohydrate absorption**, so carbohydrates are not absorbed all at once, helping to lower the GI.

Dietary Examples:

- ✓ Congee + Meat (GI is lower than only eating congee). 
- ✓ Whole wheat bread + Avocado or Boiled egg (GI is lower than only eating bread). 
- ✓ Oats + Black sesame (GI is lower than only eating oats). 



Caution:

- ✓ Excessive fat increases calories and leads to obesity, which adversely affects blood sugar control.
- ✓ Choose Healthy Fats (fish oil, nuts, olive oil) and High-Quality Proteins (chicken breast, fish, eggs, low-fat dairy) 



3. Food Ripeness: Choose fruit that is “just ripe” rather than over ripped

The riper the fruit, the faster it raises blood sugar. During the ripening process, starch gradually converts into sugar. For example:









Higher starch, Lower GI.  vs  Sugar increases significantly, Higher GI.

✓ Unripe Banana ✗ Overripe Banana

4. Cooking Method and Time: **Avoid long cooking times or pureeing; keep the food’s whole structure.**

Long cooking breaks down starch structure, making it easier to digest and absorb, and raises the GI.





Examples: Low ← GI → High

- ✓ Steamed Rice  vs  ✓ Rice Congee
- ✓ Baked Potato  vs  ✓ Mashed Potato
- ✓ Steamed Pumpkin  vs  ✓ Pumpkin Soup
- ✓ Steamed Sweet Potato  vs  ✓ Sweet Potato Puree

5. Food Form: Whole food is better than ground/pureed food.

When food is crushed or blended into a paste/puree, it is absorbed faster, naturally leading to a higher GI.

Examples: Low ← GI → High

- ✓ Eating whole fruit  vs  ✓ drinking fruit juice
- ✓ Eating whole-flake oats  vs  ✓ instant oat powder



Carbohydrate Counting Table³¹

Diabetic patients should maintain a consistent amount of carbohydrate intake per meal to stabilize blood sugar. Carbohydrate counting helps in flexible meal planning, especially when eating out.

- **General Recommendation: 3–6 servings per meal (30–60g)**
- **Snacks: 1–2 servings (10–20g)**

Note: Actual portions should be adjusted based on weight, medical condition, medication, and activity level. Consult a doctor or registered dietitian.

10g Carbohydrate Exchange Table

Grains

| | Portion Size (Approx. 10g Carbs) |
|----------------------------------|----------------------------------|
| Rice | 1 heaping tablespoon or 1/5 bowl |
| Congee | 1/2 bowl |
| Teochew Congee | 1/3 bowl |
| Rice Vermicelli/Noodles (cooked) | 1/5 bowl |
| Macaroni/Pasta (cooked) | 1/3 bowl |
| Bread | 1/2 slice |
| Oatmeal (dry) | 2 level tablespoons |
| Digestive Biscuit (low fat) | 1 piece |
| High-fiber/Saltine Crackers | 2 pieces |



Beans

| | Portion Size (Approx. 10g Carbs) |
|---------------------------|----------------------------------|
| Fresh Chestnuts (shelled) | 2 large pieces |
| Red/Green Beans (cooked) | 2 heaping tablespoons |
| Glass Noodles (soaked) | 1/2 bowl |
| Dried Green Peas (cooked) | 2 level tablespoons |
| Green Peas (cooked) | 4 heaping tablespoons |
| Black Beans (cooked) | 4 heaping tablespoons |
| Beans in Tomato Sauce | 4 heaping tablespoons |



Note: 1 bowl = medium bowl (300ml / 10oz capacity).



High-Starch Vegetables

| | Portion Size (Approx. 10g Carbs) |
|----------------------------|----------------------------------|
| Potato (peeled) | 1 piece (size of a chicken egg) |
| Sweet Potato | 1 piece (size of a chicken egg) |
| Taro | 1 piece (size of a chicken egg) |
| Carrots/Lotus Root/Pumpkin | 2 pieces (size of a chicken egg) |
| Corn | 1/3 cob |
| Corn Kernels | 3 tablespoons |
| Water Chestnuts | 4 pieces |



Fruit

| | Portion Size (Approx. 10g Carbs) |
|----------------------------|----------------------------------|
| Apple/Green Apple (medium) | 1/2 fruit |
| Pear (medium) | 1/2 fruit |
| Orange (medium) | 1/2 fruit |
| Plum/Peach | 1/2 fruit |
| Peach | 1/2 fruit |
| Pomelo | 2 segments |
| Papaya | 1/4 pound |
| Banana | 3 inches long |
| Grapes | 10 small or 5 large |
| Durian | 1/2 seed (size of a chicken egg) |
| Fresh Orange Juice | 1/2 cup |



Dairy

| | Portion Size (Approx. 10g Carbs) |
|--------------------------|----------------------------------|
| Low-fat/Skim Milk Powder | 4 level tablespoons |
| Low-fat/Skim Fresh Milk | 1 cup (240ml) |
| Evaporated/Low-fat Milk | 6 tablespoons (90ml) |
| Plain Yogurt | 150ml |
| Low-sugar Soy Milk | 240ml |

