



## Blood Sugar and A1c Charts

Firstly, blood sugar and blood glucose refer to the same thing. Whether you have type 2 diabetes or prediabetes, keeping a daily log of your blood sugar levels helps you become more aware of what's occurring in your body, so you and your healthcare team can make decisions to improve your health.

Depending where you live in the world, numbers can vary slightly. However, the charts below show the generally agreed measurements of large diabetes associations worldwide in both mg/dl and mmol/l.

### Blood sugar levels from normal through to type 2 diabetes diagnosis

| Category     | Fasting<br>(morning reading)              |   | Postprandial<br>(after-meal reading)         |
|--------------|---|---|--|
|              | Minimum                                   | Maximum   | 2 hours after meal                           |
| Normal       | 70 mg/dl<br>4 mmol/l                      | 99 mg/dl<br>5.5 mmol/l, or up to 6 by<br>some organizations | Less than 140 mg/dl<br>Less than 7.8 mmol/l  |
| Pre-diabetes | 100 mg/dl<br>6.1 mmol/l                   | 125 mg/dl<br>6.9 mmol/l                                     | 140-199 mg/dl<br>7.8-11 mmol/l               |
| Diabetes     | More than 126 mg/dl<br>More than 7 mmol/l |   | More than 200 mg/dl<br>More than 11.1 mmol/l |

NOTE: There is debate about the maximum "normal" range in mmol/l, which varies from 5.5 to 6 mmol/l.

The aim of diabetes treatment is to bring blood sugar ("glucose") as close to normal ranges as possible.

### Type 2 diabetes blood sugar level goals

This chart shows the blood sugar levels to work towards as your initial daily target goals.

| Time to Check                          | mg/dl & mmol/l  |
|--|---|
| Upon waking before breakfast (fasting) | 70-130 (Ideal under 110)<br>4-7.2 (Ideal under 6.1)       |
| Before meals (lunch, dinner, snacks)   | 70-130 (Ideal under 110)<br>4-7.2 (Ideal under 6.1)       |
| Two hours after meals                  | Under 180 (Ideal under 140)<br>Under 10 (Ideal under 7.8) |

The above levels, for people diagnosed with type 2 diabetes, are the general goals set by the American Diabetes Association and the American Association of Clinical Endocrinologists. However, there is some

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variation in numbers worldwide and your physician may set you more stringent goals, or more lenient goals.

For example:

- Between 70-100 mg/dL or 4-5.6 mmol/l (**optimal**)
- 70-110 mg/dL or 4-6 mmol/l (considered good control)
- 70-130 mg/dL or 4-7.2 mmol/l (more liberal, but realistic for many)
- 2 hrs post-meal the ideal is under 140 mg/dl or 7.8 mmol/l. However, the lower your postprandial blood glucose, the better (for instance, 120 or 6.7).

As you can see from above, the “optimal” healthy range is the “normal” blood sugar range. However, goals can differ depending on your health and how long you’ve had diabetes. Still, if you can work toward it, your overall long term goal is to lower your blood sugar levels within, or as close to the normal range as you possibly can.

### Prediabetes blood sugar goals & long term goal for type 2 diabetes

| Time to Check                          | mg/dL & mmol/l   |
|--|--|
| Upon waking before breakfast (fasting) | Under 100<br>Under 5.6, or up to 6 by some organizations |
| Before meals (lunch, dinner, snacks)   | Under 100<br>Under 5.6, or up to 6 by some organizations |
| Two hours after meals                  | Under 140<br>Under 7.8                                   |

Note: These ranges are considered the normal healthy range. For people with type 2 diabetes, it can take work to achieve these numbers. But those who implement diet and lifestyle changes are often able to achieve normal levels and reduce or minimize medications. While implementing diet and lifestyle changes, it’s best to work with your healthcare team to determine your individual goals.

The reason it’s important to gain good control of blood sugar levels, is that higher-than-normal blood sugar levels causes damage to the vessels and organs in your body, which can lead to serious health complications. By controlling your blood sugar, and bringing it back within, or close to normal range, you improve your health and reduce your risk of nasty consequences.

### HbA1c

Hemoglobin A1c (HbA1c or A1c) is a blood test that reflects the average amount of glucose in your blood from the previous 3 month period. It’s a test that’s used along with other blood sugar readings, such as fasting readings and an oral glucose test to determine diagnosis of prediabetes or type 2 diabetes, or as an assessment of how well you’re controlling your diabetes. Sometimes a routine A1c test is the only test recommended to people with prediabetes.

Depending where you live in the world, A1c may differ slightly. For instance, normal A1c in US is considered under 5.7%. In the UK and Australia it is under 6%. Therefore, the generally recognized “normal” A1c range is between 4-6%.

## Type 2 diabetes A1c control chart

|       | Excellent |     |     | Good |     | Poor |      |      |       |
|-------|-----------|-----|-----|------|-----|------|------|------|-------|
| HbA1c | 4.0       | 5.0 | 6.0 | 7.0  | 8.0 | 9.0  | 10.0 | 11.0 | >12.0 |

## A1c diagnostic ranges

According to the American Diabetes Association, the prediabetes diagnostic range is 5.7% to 6.4%. Whereas in the UK it's set at 6% to 6.4%. Type 2 diabetes diagnostic is above 6.5%. This means if your blood test results come back in these ranges, you may be diagnosed with type 2 diabetes or prediabetes.

## Estimated average glucose, or eAG

The American Diabetes Association now recommends the use of a new term in diabetes management, “estimated average glucose,” or “eAG.”

It's a way that health professionals can report an A1c result to you in the same measurements you're used to, either mg/dl or mmol/l.

Take this chart as an example:

| A1c % | mg/dL | mmol/l |
|-------|-------|--------|
| 5.7   | 117   | 6.5    |
| 6     | 126   | 7      |
| 6.5   | 140   | 7.8    |
| 7     | 154   | 8.6    |

You can [use this calculator](#) to work out your estimated average glucose.

## Commonly asked questions

### When is the best time to take a fasting measure of blood sugar?

It's best to test your blood sugar right when you get up. If you make it part of your morning routine, such as after you go to the bathroom or brush your teeth, it's easier to remember.

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## What makes my blood sugar levels rise?

Many things can influence blood sugar levels, including the food you eat, the amount of exercise you do or don't do, sleep, stress, medications, illness, among other things. The factors you can self-manage to gain good control are your diet and exercise, along with getting adequate sleep and minimizing stress. In particular your diet has one of the greatest influences over your daily numbers, especially the type and amount of carbohydrates you eat.

## Why is my blood sugar always high in the morning even when I haven't eaten?

Your liver can still produce glucose internally, which is why blood glucose still rises when you're asleep or if you fast. In the morning, this process is triggered by a range of hormonal changes that naturally occur in the body. Gaining better control over your daily blood sugar levels can help lower your morning numbers as well.

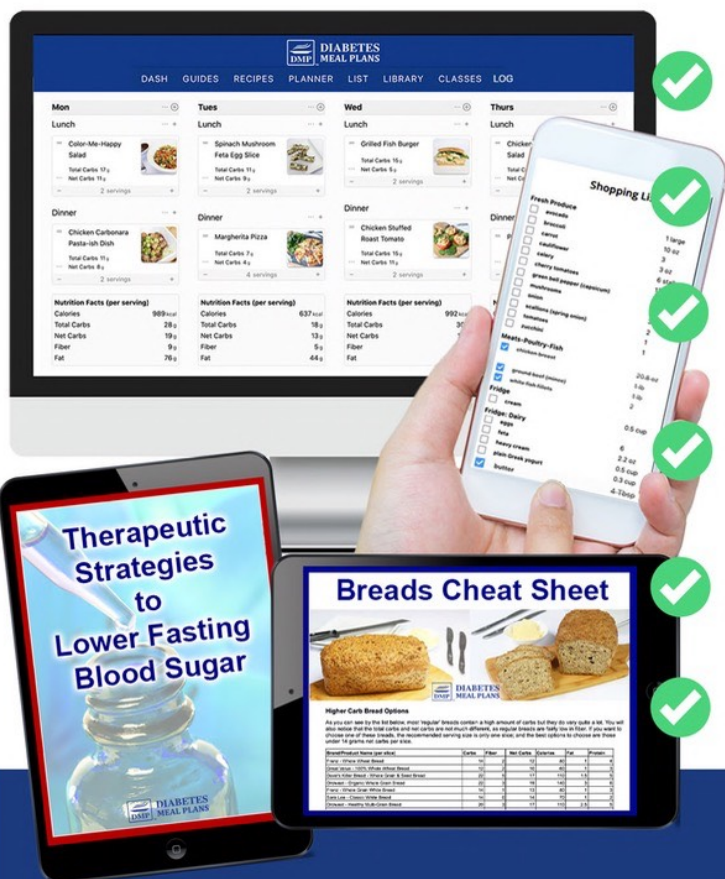
## How often should I take a blood sugar sample?

There is wide variability on how often to monitor, depending on the state of your diabetes and treatment. But, most people monitor 1-2 times daily – fasting (first thing in the morning) and 2 hours after the biggest meal. For your after-meal (postprandial) blood sample, time from your first bite of food.

If you're newly diagnosed or trying to gain better control, it can be helpful to monitor more frequently so you can assess your progress and work on changing diet and lifestyle habits to support your goals.

One thing that is helpful with mealtimes is "monitoring in pairs." To monitor in pairs you check your levels before, then 2 hours after a meal. It's a great way to get an indication of the effect of foods and the amount of carbs you're consuming. If you log your numbers and your daily food intake and lifestyle habits, you will soon see patterns emerging and then you can make the necessary adjustments to your dietary routine.

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