GERMAN
DIABETES
RISK SCORE

Test your diabetes risk

By using the German Diabetes Risk Score (GDRS), adults, who are not yet affected by diabetes, can determine their individual risk of developing type 2 diabetes within the next 10 years.

Version for healthcare professionals

German Institute
of Human Nutrition
Potsdam-Rehbruecke

DZD
German Center for
Diabetes Research

Leibniz
Association

Information

Type 2 diabetes (also known as adult-onset diabetes or noninsulin-dependent diabetes mellitus) is a metabolic disease characterized by inefficient utilization of the hormone insulin. This causes an increased blood sugar level.

Type 2 diabetes develops gradually over the years. Blood vessels and eyes are damaged in early stages of the disease. Serious complications arising from diabetes include heart and circulatory diseases, blindness, and kidney failure.

This test was developed by researchers of the German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE). It is based on data from the EPIC*-Potsdam study and has been validated in other studies, including the EPIC-Heidelberg study and the GNHIES98** cohort.

Please note:
Even individuals with a low risk of diabetes may develop this disease. On the other hand, high-risk individuals may remain healthy.

* EPIC: European Prospective Investigation into Cancer and Nutrition
** GNHIES98: German National Health Interview and Examination Survey 1998

Factors that influence the risk of type 2 diabetes

Different factors affect the risk of type 2 diabetes. Some of these factors, but not all of them, can be altered by a change in behavior and lifestyle.

The factors beneath were considered in the German Diabetes Risk Score.

Age

The risk of diabetes increases with age. Individuals under 40 years very rarely develop type 2 diabetes.

Overweight (waist size)

When excess fat is deposited in the abdomen (waist), there is an increased risk to develop diabetes. Studies have shown that weight reduction can reduce the risk of type 2 diabetes considerably.

High blood pressure

Individuals with high blood pressure may have a higher diabetes risk.

Diabetes in the family

The risk is higher when biological relatives have or have had type 2 diabetes. This increased risk is probably associated with the interaction of genetic and family-specific lifestyle factors.

Height

Body height plays a role in abdominal fat (belly fat) distribution, and therefore has an influence on diabetes risk.

Physical activity

Physical activity affects the risk of type 2 diabetes in several ways. It helps to maintain a lower body weight and thus the waist size. Physical activity also improves the body's insulin efficacy and thus the regulation of blood sugar levels.

Whole grain bread and muesli

Many studies have shown that eating whole grain products, such as whole grain bread and rolls, cereal flakes, grains and muesli, lowers the risk of type 2 diabetes.

Meat

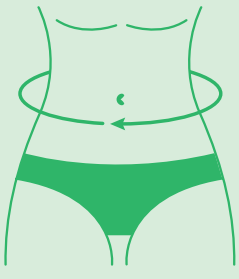
The consumption of red meat, e. g. beef, pork, or lamb, increases the risk of type 2 diabetes. The more you eat these meats, the higher your risk.

Coffee

Studies have found a relation between coffee consumption and a lowered risk of type 2 diabetes.

Smoking

Smoking has been linked to an increased risk of type 2 diabetes. It can also cause cancer and cardiovascular diseases. It is therefore recommended to quit smoking.



How to measure your waist size: Stand facing the mirror with your feet about 15 cm (6 inches) apart.

Where to measure:
Midway between the lower ribs and upper edge of the pelvic bone

Patient questionnaire

The two-stage risk test developed by the German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE) can be used to determine the patient's individual risk of developing type 2 diabetes within the next 10 years.

The test should not be used if diabetes is already known.

How old are you (years)?

< 35	0	55–59	13
35–39	1	60–64	16
40–44	4	65–69	19
45–49	7	70–74	22
50–54	10	≥ 75	25

Are you physically active at least 5 hours a week? (e. g., sport, gardening, cycling)

No	1	Yes	0

Have you ever had or do you currently have high blood pressure?

No	0	Yes	5

How many slices of whole grain bread/rolls and portions of muesli (1 portion = 3 tablespoons) do you eat daily?

0	5	3	2
1	4	4	1
2	3	> 4	0

How often do you eat beef, pork or lamb (not processed meat like hot dogs, bacon, sausage, or salami)?

Never or rarely	0	5–6 times per week	5
1–2 times per week	1	Daily	6
3–4 times per week	3	Several times a day	8

How many cups of coffee do you drink per day?

0–1	3	> 5	0
2–5	2		

What is your smoking status?

I have never smoked.	0
I used to smoke on average less than 20 cigarettes a day.	1
I used to smoke on average 20 or more cigarettes a day.	5
I smoke on average less than 20 cigarettes a day.	2
I smoke on average 20 or more cigarettes a day.	8

What is your height in centimeters?

< 152	11	176–183	3
152–159	9	184–191	1
160–167	7	≥ 192	0
168–175	5		

What is your waist size in centimeters?

< 75	0	100–104	24
75–79	4	105–109	28
80–84	8	110–114	32
85–89	12	115–119	36
90–94	16	≥ 120	40
95–99	20		

Have your biological parents been diagnosed with type 2 diabetes?

No, or I don't know.	0
Yes, one parent has type 2 diabetes.	6
Yes, both parents have type 2 diabetes.	11

Has at least one of your biological siblings been diagnosed with type 2 diabetes?

No, or I don't know.	0
Yes, at least one of my siblings has type 2 diabetes.	6

Add up all the points corresponding to your answers. The evaluation sheet will tell you which risk corresponds to your score.

Sum:

Evaluation

The following tables can be used to determine a patient's risk of diabetes.

The diabetes risk (mean [%]) indicates how many people, out of 100 with comparable information, are likely to develop type 2 diabetes within the next 10 years.

Evaluating the diabetes risk based on GDRS points

GDRS points	20 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	90 – 99	100 – 124
Diabetes risk (mean) [%]	1,3	4,6	11	23	45	76	96	100

Risk evaluation based on GDRS points and fasting glucose or HbA_{1c}

Fasting glucose * [mg/dl] / [mmol/l]	HbA_{1c} [%] / [mmol/mol]	GDRS points 20 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	90 – 99	100 – 124
80 – 99 / 4,4 – 5,5	4,0 – 5,0 / 20 – 31	0,9	2,8	6,2	13	27	51	80	100
100 – 109 / 5,6 – 6,0	5,1 – 5,6 / 32 – 38	1,2	4,1	8,9	19	37	65	90	100
110 – 117 / 6,1 – 6,5	5,7 – 6,0 / 39 – 42	1,5	5,1	11	23	44	73	94	100
118 – < 126 / 6,6 – < 7,0	6,1 – < 6,5 / 43 – < 48	1,8	6,0	13	27	50	79	97	100

* Fasting glucose values are approximate values. If available, please use the HbA_{1c} value.

Risk categories

Low risk:	Still low risk:	Elevated risk:	High to very high risk:
< 5 %	≥ 5 to < 7,5 %	≥ 7,5 to < 10 %	≥ 10 %

Recommendations for counseling

1. The patients should be informed of the significance of their test results.
2. Patients with an "elevated" risk should be advised on modifiable risk factors, in particular waist circumference, nutrition, smoking behavior and physical activity (see the additional Information sheet "Factors that influence the risk of type 2 diabetes"). A follow-up examination should be carried out after a maximum of 3 years.
3. In patients with a "high to very high" risk – depending on their risk profile – measures should be taken towards weight reduction (waist circumference as target parameter), dietary changes (increasing whole-grain consumption, decreasing red meat consumption), ways to quit smoking and increasing physical activity. A follow-up examination should be carried out after 1 year.
4. In the case of clinically manifest diabetes (HbA_{1c} ≥ 6.5 %, equivalent to 48 mmol/mol; fasting blood sugar ≥ 126 mg/dl, equivalent to 7.0 mmol/l), a lifestyle intervention should be carried out. At the same time, a decision should be made on appropriate medication intervention.