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Information brochure for parents and children

Fr1da



Early diagnosis and care of type 1 diabetes

HELMHOLTZ MUNICH 



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Introduction

Dear Parents,

You have probably just found out that your child has been diagnosed with an early stage of type 1 diabetes. This news likely came as a complete surprise to you, just like it does for many other parents in your situation. After all, your child appeared to be developing age-appropriately, is cheerful, and so far. There were no signs of any health issues during regular check-ups. And you hadn't noticed any signs of illness in your child.

Perhaps the diagnosis of “early stage of type 1 diabetes” is still a complete mystery to you, and you may not be able to fully believe this reality yet. Either way, you undoubtedly have many questions:

- **Is our child in danger?**
- **Can we do anything to prevent the diabetes from progressing?**
- **What does the disease mean for our family and our plans for the future?**
- **What's the best way of taking care of our child now and in the future?**
- **Where can we find expert support and advice?**

This guide to the early stage of type 1 diabetes aims to address the questions most parents have after the unexpected diagnosis. These questions often revolve around what type 1 diabetes is, what causes it, how to treat it, and, most importantly, how it affects the daily life of children with type 1 diabetes and their parents – kindergarten, school, holidays, sports, and friends.

This guide also offers suggestions for reliable websites and books where you can find more information. What is even more important, however, is connecting you with a nearby paediatric diabetes centre, where you can find help with all your questions whenever you need it. This guide also describes how these centres provide counselling and care for children and their parents.

On behalf of the **Fr1da** team, treating early stage of type 1 diabetes

yours sincerely
*Prof. Dr. Anette-Gabriele Ziegler
and Prof. Dr. Karin Lange*

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A diagnosis of early type 1 diabetes – what now?

Suddenly type 1 diabetes with no warning or signs?

When your paediatrician offered to perform an extra blood test for early signs of type 1 diabetes as part of regular paediatric screening you probably felt confident that nothing would be found. There's no history of type 1 diabetes in your family, and you probably didn't know that diabetes can affect very young children. And you haven't yet noticed the typical signs such as excessive thirst, frequently needing the toilet or weight loss in your child.

In fact, recent research has shown that changes in blood values, so called islet autoantibodies, occur long before there are any noticeable symptoms of type 1 diabetes. Such islet autoantibodies are an indication that the child will need to be treated for type 1 diabetes in the coming months or years. And that's why your child, like all other children with early type 1 diabetes, doesn't yet show any noticeable signs.



Is our child now seriously ill or in danger?

Absolutely not!

There's no reason to worry about your child, and you don't have to immediately take action or begin a treatment. Preventing risk in the future is precisely the objective of screening for early type 1 diabetes.

In recent years, it has become apparent that children are developing type 1 diabetes at an ever younger age. In Germany, about 2,500 children are diagnosed with type 1 diabetes every year. In some cases, the disease is diagnosed at a very late stage, which is life-threatening for children.

Screening for early-stage diabetes in children is intended to prevent this from happening; it means parents and children can be advised on what to do at the first noticeable signs of diabetes. Screening gives you and your family plenty of time to ask any questions you may have about diabetes.

Your child's paediatrician will continue to take care of you and your child. You will also be provided with the contact details of a paediatric clinic specialised in diabetes in your area.

And finally, the Fr1da team is at your service for advice and support at the website

www.typ1diabetes-frueherkennung.de and via e-mail at **diabetes.frueherkennung@helmholtz-muenchen.de**

You have plenty of time to find out more. Your child is safe!

What you can do in the next few days

First things first – there's no reason to react hastily, and no need to start changing either your own life or your child's daily routine. The most recent findings on early-stage diabetes show that it will take months, or even years, before your child develops signs of type 1 diabetes. Only then, will he or she need treatment.

The best thing you can do right now is to educate yourself and make some preparations. The following sections cover everything you need to know.

When your child is old enough to understand what early type 1 diabetes is, you can read the story of Frida (page 34 onwards) with him or her and look at the pictures. This will normally be at an age when he or she is attending primary school. Younger children are still incapable of grasping the concept of time and – having not yet experienced any symptoms – cannot imagine how diabetes might affect them.



Up-to-date trustworthy information

We know that a diagnosis of “early stage of type 1 diabetes” comes as a shock to all parents, in particular if the child is feeling perfectly well and apparently is in perfect health. Anticipating an uncertain future is always unsettling. We hope the following information about diabetes will help answer your most important questions and give you peace of mind.

It’s likely that many parents will also search the Internet for answers to questions that are concerning them. Unfortunately, in addition to trustworthy information, you’ll also come across a lot of dubious advice, sometimes even dangerous for children. We, therefore, urge you to approach your paediatrician or diabetologist with any treatment recommendations you come across. We have listed a number of websites of specialised diabetes centres at the end of this guide for you.

Be careful – the available information on type 1 diabetes on the Internet isn’t always reliable!

What is type 1 diabetes and what does “early stage” mean?

Type 1 diabetes: a lack of insulin

Type 1 diabetes is a metabolic disorder that occurs when the body can no longer produce enough insulin. Insulin is an essential hormone. Insulin plays a key role in the body’s metabolism. It allows food to be converted into energy. People who have too little or no insulin can’t use the food they eat. They lose weight and progressively, strength.

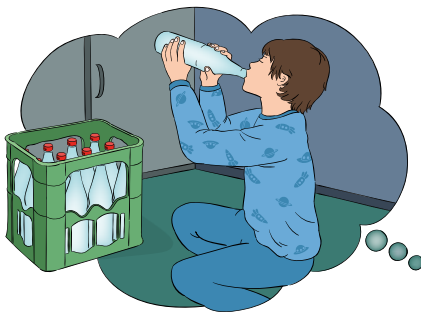
Normally, the body first converts food into glucose, which is an energy source. The glucose is transported in the blood as blood glucose – also referred to as blood sugar – to all the organs and muscles. Insulin ensures that the energy source – the blood glucose – can reach the body’s cells where it can be used.

If, however, there is no insulin there is no way for the blood glucose to enter the cells. It remains in the blood, and the level of glucose in the blood rises ever higher. The table below shows the blood glucose levels of people without and with type 1 diabetes. In the case of children with early stage of type 1 diabetes, blood glucose levels are usually still normal – just as they are in people who don’t have the metabolic disorder.

	In the morning, fasting	After a meal
Blood glucose levels in those without diabetes	Below 100 mg/dl, i.e. below 5.6 mmol/l	unter 140 mg/dl unter 7,8 mmol/l
Blood glucose levels in those with type 1 diabetes	Above 126 mg/dl, i.e. above 7.0 mmol/l	Above 200 mg/dl, i.e. above 11.0 mmol/l

Blood glucose levels rise when the body is failing to produce enough insulin.

If the level of glucose in the blood is too high, the body excretes the glucose in the urine, resulting in urinary glucose. This process requires a great deal of fluid, so patients become very thirsty and need to urinate frequently. People who don’t have diabetes and children with early type 1 diabetes do not excrete sugar in their urine. Only at a later stage of type 1 diabetes, glucose is excreted in the urine.



Glucose only appears in urine when the blood sugar levels rise far too high.

Now that you're familiar with the mechanism of type 1 diabetes, you'll be able to recognise the following warning signs:

- **Sudden weight loss**
- **Fatigue and a lack of energy**
- **Extreme thirst and excessive drinking**
- **Constant need to urinate**
- **Signs of dehydration (dry skin and mucous membranes, cracked lips)**

Up until recently, type 1 diabetes in children was identified only at a very late stage, when such signs became unmistakable. Often, by this time, the children were no longer well, and some were even seriously ill. Their bodies were able to produce very little or no insulin.

Early-stage type 1 diabetes: the body's own insulin decreases

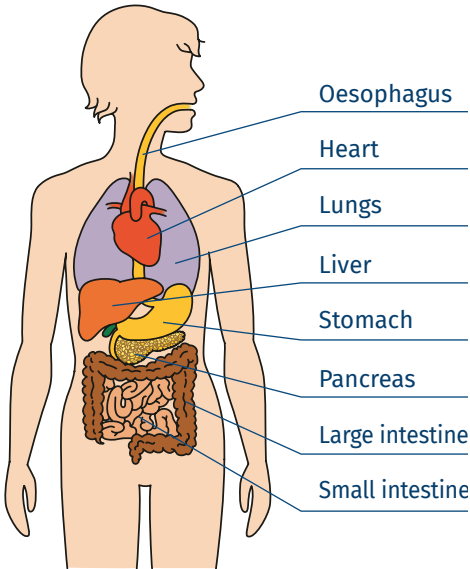
With your child, in contrast, you certainly won't yet have experienced any of these typical diabetes signs. This is because his or her body is still producing enough insulin. Nevertheless, certain blood values (e.g. islet autoantibodies) are already indicating that progressively less insulin is being produced. Up to now, this hasn't had any consequences. Your child's remaining insulin is still sufficient.

But over time, the insulin produced by your child's body will become less and less until it is ultimately no longer sufficient. That's when you'll notice the first signs in your child, and you'll be able to react appropriately at an early stage now you know what to look for.

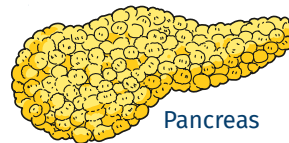
**In the early stage of type 1 diabetes,
your child's own insulin is still sufficient.**

Why is there a lack of insulin in type 1 diabetes?

Insulin is a hormone produced in the pancreas. The pancreas is located well-protected in front of the spine and behind the liver, stomach and intestines. There is no way to feel it from the outside.



The pancreas contains finely distributed clusters of cells the size of a pinhead, containing two different cell types. Of these, the “Beta cells” produce the insulin. This insulin is missing in diabetes. The other type of cells are “Alpha cells”, which produce the hormone glucagon. Both hormones act in concert in the body to control blood glucose levels (the concentration of glucose in the blood): insulin lowers blood glucose levels, while glucagon raises them.



We now know that in type 1 diabetes, the Beta cells of the pancreas gradually perish over a period of months or even years. Less and less insulin is produced. Only when about 80–85% of Beta cells have been destroyed, the typical signs of type 1 diabetes arise.

In the early stage of type 1 diabetes, the stage in which your child is currently in, sufficient insulin is still being produced. However, there are already indications that the first Beta cells are perishing.

Insulin is produced in the Beta cells of the pancreas.

What causes Beta cells to perish?

The causes of type 1 diabetes are complex. It's likely that many factors interact to cause the disease to develop.

1. One requirement is a genetic predisposition. In other words: the DNA contains particular characteristics ("risk genes"). However, such genes alone are by no means sufficient to trigger the metabolic disorder.
2. In addition, environmental factors (such as viral infections and early childhood nutrition) also appear to play a role. Normally these are harmless colds accompanied by coughing, runny nose and malaise, which affect all children to a greater or lesser extent.
3. The process by which Beta cells are ultimately destroyed is highly complicated and has not yet been fully elucidated. It involves a malfunction of the immune system, the body's own defences. The immune system attacks the body's own Beta cells. This leads to inflammation and, ultimately, the destruction of these Beta cells. The immune system reacts as if the Beta cells were foreign "hostile invaders". Diseases caused by such immune dysfunction are known as "autoimmune" diseases.

The Beta cells are destroyed by the body's own defence system (immune system).

Are there signs that Beta cells are being destroyed?

Antibodies can be detected in the blood during the attack by the immune system, showing that Beta cells are being destroyed. If, "islet autoantibodies" are detected in the blood (islet autoantibody positive) in the absence of typical signs of diabetes, this is referred to as an early stage of type 1 diabetes. This is precisely the case for your child. A number of typical antibodies have been identified in his or her blood.

Information for professionals:

The following antibodies indicating type 1 diabetes can be detected in the blood:

- Islet cell antibodies (ICA)
- Glutamate decarboxylase antibodies (GADA)
- Tyrosine phosphatase antibodies (IA-2A)
- Insulin autoantibodies (IAA)
- Zinc transporter 8 antibodies (ZnT8A)

What is type 1 diabetes and what does “early stage” mean?

It’s likely that almost all children will require diabetes treatment after being tested positive for islet autoantibodies, starting anything from a few months until up to 15 years after diagnosis. At the early stage, no treatment is usually necessary. The children feel perfectly well, and their health is not at risk.



Antibodies in the blood indicate that their Beta cells are progressively being destroyed.

Could type 1 diabetes have been prevented

Many parents ask this question, because they’re worried that they might have done something wrong, for instance they fear that the disease has developed because they gave their child sweets or because they did too much or too little sports. Sometimes, parents think that stress – for example a family argument, a move or some other event – may have contributed to the diabetes. We can confidently say that this isn’t the case; the parents haven’t made any mistakes. There is no way of predicting or influencing the change in the immune system. Parents have no reason to feel guilty. That’s something your child should know, as should everyone else who you talk to about your child’s early type 1 diabetes. Nobody has made a mistake or reacted too late!

Neither the children nor the parents have done anything wrong!

You may have older family members who have “type 2” diabetes. This type of diabetes is not related to your child’s condition. It’s a completely different disease, which usually occurs at an older age and is associated with obesity and lack of exercise. Type 2 diabetes can be inherited, nevertheless it has nothing to do with your child’s type 1 diabetes.

How is type 1 diabetes treated?

We now make a distinction between the early stages 1 and 2 of type 1 diabetes. Your child's early-stage type 1 diabetes does not require any treatment. There's no need to change anything in your child's behaviour or lifestyle. It's you who needs to make one single change: please keep an eye out for the typical signs of diabetes and attend regular check-ups with your child.

There are now new treatment approaches for patients with stage 2 type 1 diabetes. It is possible to slow down the progression of the disease. Your paediatrician and your diabetes team will inform you how your child can participate.

Additionally, there are comprehensive training programmes, courses and books for parents and children on how to treat a child with marked insulin deficiency. We've listed several in the bibliography in the appendix. When your child first shows signs of diabetes, you'll be invited to attend a course at a diabetes centre for children and young people.

Can diabetes be cured?

Unfortunately, there is no known way at present to cure type 1 diabetes. When the body is no longer able to produce its own insulin, every child will depend on insulin from an outside source. Nobody can live without insulin. There is no way of directly regenerating Beta cells.

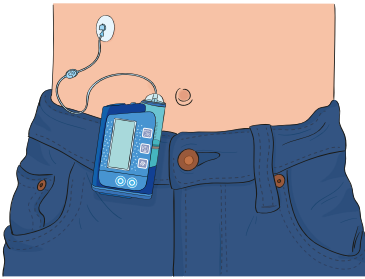
On the other hand, the good news is that nowadays diabetes can be managed so well that children, adolescents and, later, adults with the condition can live an almost normal life. School career, professional development, family life and leisure activities will be little different to those of their peers.

Type 1 diabetes can't be cured, but it can be treated very successfully.

Replacing the missing insulin

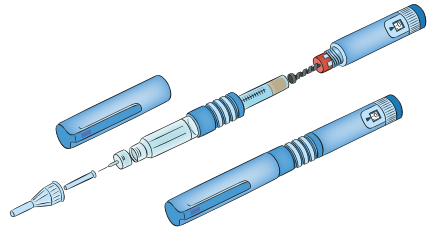
The most important element of diabetes treatment is not hard to guess. The body's missing insulin needs to be replaced by insulin from an external source. The only way to guarantee the correct quantity and timing for the body is to inject it under the skin.

However, the dreaded injections with thick needles are now a thing of the past. Nowadays, children and adolescents administer their insulin themselves with an insulin pump or an insulin pen. Both have very fine cannulas (needles). The prick itself is still noticeable, but not painful.



Most young children with type 1 diabetes wear an insulin pump that contains a reservoir of insulin. The insulin they require is delivered via a fine tube (catheter) into the tissue under the skin. This can be regulated by pressing a button on the pump. Even pre-school / kindergarten children can operate it safely if supported by a grown-up caregiver.

An insulin pen is – as the name suggests – similar in appearance to a fountain pen. The pen contains an insulin-filled cartridge. The tip of the pen contains a fine needle (cannula) through which the insulin is injected under the skin. Today's cannulas are extremely thin and 4–8 mm long. An insulin pen, like an insulin pump, can be easily operated by children during everyday life at school or in their free time.



The pancreas of people who don't have diabetes secretes small amounts of insulin day and night. The quantities depend on what and how much a person has recently eaten or drunk, and whether he or she is exercising or sleeping. Diabetes therapy aims to replicate these changes by varying the insulin doses. Accordingly, all individuals with type 1 diabetes administer themselves with insulin several times a day and adjust the amount (the insulin dose) on each occasion depending on the current situation. If you are interested in learning more about this at this stage, take a look at the diabetes book for children or the training book for parents (see appendix).

Since no one can predict when your child will need external insulin, there's no need to learn the exact rules on insulin treatment at this time. However, when your child starts requiring insulin, you'll receive detailed and up-to-date training and counselling.

Insulin therapy mimics insulin secretion by the pancreas using an external source. For this purpose, there are Insulin pumps which can automatically deliver the appropriate amount of insulin.

Calibrating food and insulin

At present, your child's pancreas is still secreting exactly the right amount of insulin to match his or her food and drinks. And that's why there's no reason for your child not to enjoy its meals and foods to their heart's content. That includes sweets, to the extent recommended for all children. In particular, however, children with early stage diabetes should be physically active and not overweight. Please don't modify any of your family's well-loved eating and drinking habits on account of early stage of type 1 diabetes. There is simply no reason to do so. Even the renunciation of certain foods won't prevent the destruction of your child's Beta cells.

And also later on, when your child needs to receive insulin externally, he or she can continue to eat and drink almost anything they like. There are no longer strict prohibitions or "dietary rules" in modern diabetes treatment.



Together with an experienced dietitian, you will learn and practice how to coordinate your child's meals with insulin doses. And this can be done both with standard recipes and dishes and with exotic dishes from the other side of the world.

Insulin doses and meals are coordinated with each other. Children with diabetes can eat and drink like their peers.

Diabetes treatment in everyday life

The early phase of type 1 diabetes won't affect your child's daily life in any way. Your child will be able to attend a crèche, kindergarten and school just like all other children of the same age. He or she can engage in sport, meet friends, party, go on trips – everything can and should remain the same. Such factors have neither a favourable nor an unfavourable influence on the progression of early type 1 diabetes.

And when, one day, he or she requires external insulin, those activities won't and shouldn't change. Children attend kindergarten wearing their insulin pump, older children attend normal schools, and young people with diabetes go on school



trips and participate in international school exchanges. Some become actively involved in competitive sports, become players in the national football league or Olympic champions. Others have other ambitions, with other interests and favourite things to do. That, also, will be possible. These days, young adults with type 1 diabetes in Germany have an excellent chance of living a happy, self-determined life with a family and a job.

Such positive future prospects are closely linked to modern insulin therapy, which continuously adjusts insulin doses according to needs. You will, likewise, learn and practise how to achieve this in everyday life step-by-step in a diabetes centre for children and adolescents when, at stage 3, your child's own insulin is no longer sufficient. But all in good time.

If you feel like you're facing an insurmountable challenge, know that you share that with almost every parent whose child has just been diagnosed with type 1 diabetes. From our experience over the past decades, we know that parents and children quickly come to grips with diabetes treatment and implement it in their daily lives. They will, of course, experience ups and downs and sometimes setbacks. But that's why each family has the support of diabetes teams 24 hours, day and night, via telephone hotlines or at regular outpatient check-ups.

Parents of children with diabetes can rely on the continuous support of a diabetes team.

Diabetes training for parents and children

Diabetes training courses are an important pillar supporting the long-term care of children and adolescents. They are tailored to the needs of parents, children and young people. Health insurance companies cover the costs. Specially trained diabetes counsellors, paediatricians and other team members conduct the courses. The aim isn't to teach precise medical knowledge; instead, they provide tips on how insulin treatment can be implemented practically into the daily routine and how it can be combined successfully into a child's life.

As a parent of a young child with early stage of type 1 diabetes, you should attend a dedicated introductory course, which will answer any questions you may have. Both parents and other caregivers of the child are invited to attend this.

Schoolchildren and adolescents, such as twelve-year-old Laura, will also learn later how to gradually take charge of their own treatment.



All children with type 1 diabetes and their parents have a right to diabetes training.

Important things to know now in the early stage of type 1 diabetes

Everyday life with family, kindergarten, school and leisure time

At present, your child's life is not restricted in any way, and his or her diabetes is not currently being treated. As such, his or her everyday life should remain unchanged. This includes diet, daily routine, physical activity and all the other things you and your family care about. There are no mistakes you can make here. However, it's helpful if your child remains active and does not become overweight.

The signs of diabetes will develop over a period of a several days. You will have enough time to react calmly. There's no need to monitor your child day and night at this early stage. Informing the kindergarten or the school is also, at present, not necessary. One thing you do need to do is tell your child's caretaker at such facilities to provide support when he or she starts insulin treatment.

Recognising the signs of insulin deficiency

You have already learned the most important signs of insulin deficiency:

- **Sudden weight loss**
- **Fatigue and a lack of energy**
- **Extreme thirst and excessive drinking**
- **Constant need to urinate**
- **Signs of dehydration (dry skin and mucous membranes, cracked lips)**

If you observe these changes in your child, contact the diabetes centre for children and adolescents straight away. You should give special attention when your child is suffering from common infections involving vomiting, fever, malaise and diarrhoea.

The telephone number of the 24-hour hotline is

Monitoring of glucose metabolism

Before these signs become noticeable, you can keep track of your child's metabolism independently at home by regularly monitoring their blood glucose levels.

You will be provided with the materials you need for this free of charge. Your diabetes team will discuss with you:

- how to precisely test his or her blood glucose level, and
- how often and when you should conduct the test.

Blood glucose measurement

Someone whose body is still able to produce enough insulin will have a blood glucose level that fluctuates in a very narrow range between 65 and 140 mg/dl (3.6–7.8 mmol/l). The term used to describe high blood glucose is **hyperglycaemia**. It's something you can determine yourself.

Measuring blood glucose concentration with a blood glucose meter is quick and easy. You will be provided with measuring strips, the necessary device and a lancet to collect blood. You can take the required drop of blood from the side of one of your child's fingertips. Your diabetes team will show you how to do this safely and with as little pain as possible. Many children with type 1 diabetes are already capable of determining their own blood glucose level at kindergarten age.

How to measure blood glucose

- Always wash your hands before performing a test, otherwise you may get an inaccurate measurement.
- The finger must be well supplied with blood. If your child's hands are cold, kneading games with a soft ball or plasticine or briefly bathing his or her hands in warm water for three to five minutes may help.
- Then, place a lancet (a fine needle) on the side of the fingertip. Squeeze the finger lightly towards the tip of the lancet.
- Normally, the first drop of blood is wiped off with a swab, and the second drop is used for the measurement.
- Place the test strip in the device and hold it against the blood drop until the test chamber is full (beep).
- The blood glucose value will be displayed after a few seconds by the device.

When should you check blood glucose?

You should measure your child's blood glucose times per.....

Important times to measure blood glucose:

- In the morning after waking up and before breakfast (fasting), the blood glucose level should be below
- Two hours after a meal, the blood sugar level should be below

Please keep a record of all your child's blood glucose measurements. You'll be given a logbook for this. The values are the most important information for assessing your child's metabolic condition.

If your child's blood glucose levels are repeatedly high, contact your doctor!

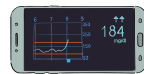
→ If your child has readings above 200 mg/dl (11.1 mmol/l), consult your doctor straight away!

Continuous blood glucose measurement

You may have noticed that many people with diabetes have a "button" on their arm, which continuously monitors their blood glucose level. This "button" is a glucose sensor (a CGM system), which is inserted in the skin, measures the glucose concentration every few minutes and transmits the result to either an insulin pump or a mobile phone. It allows diabetes patients and parents of children with diabetes to continuously check whether blood glucose levels are too high, too low or currently normal.

However, there are many ways that errors can occur and the displayed values may be unsettling, so all users are given detailed training on how to react correctly and calmly to many different readings. When your child needs insulin treatment, your health insurer will finance the costs of a CGM system and training.

In the case of children with early-stage diabetes who don't need external insulin, this method is usually too burdensome and costly. In some cases, however, it may make sense to wear a CGM system for a few days. If so, your paediatrician will discuss this with you.



Check-ups at the diabetes centre and with your paediatrician

Even if you are capable of checking blood glucose independently at home, it is still very important to discuss these measurements regularly with your paediatrician or a doctor at the diabetes centre. Your child's height and weight will always be measured at these check-ups.

The doctor will also take a small amount of blood for a HbA1c test, which is a measure of your child's long-term blood glucose level.

What is HbA1c?

HbA1c is, in effect, a memory of blood glucose levels. It reveals how high the blood glucose levels have been on average over the previous 8–10 weeks. In people without diabetes, the HbA1c value is 4–5%. If blood glucose levels rise and remain elevated for a long period of time, HbA1c can rise to 8, 10 and even 12%. These levels are too high and reveal that a diabetic child urgently needs to be treated with insulin.

An HbA1c of **less than 5.7% (39 mmol/mol)** is acceptable. It's too high if it is **above 6.5 % (48 mmol/mol)**.

HbA1c reveals how high the blood glucose levels were on average in the last 8-10 weeks.

After the doctor has reviewed and assessed the blood glucose levels, he or she may recommend that your child undergo a special test. This test is known as a glucose tolerance test. It assesses how fit the pancreas is, in other words how rapidly and how much insulin the Beta cells are able to produce.

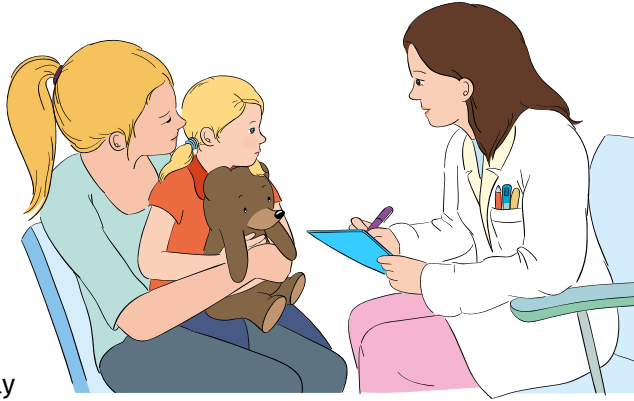
How does a glucose tolerance test work?

Glucose tolerance tests are always performed in the morning, before your child eats breakfast (on an empty stomach). He or she is given a precise quantity of sweet juice to drink based on their weight. Most children like the taste of this sugary juice. After it has been drunk, the doctor measures the glucose and insulin level of the blood every 30 minutes. Each time, this

requires taking a small quantity of blood. The test ends after two hours. The last blood glucose value taken (at two hours) is also the most important. Ideally, it should be below 140 mg/dl, i.e. 7.8 mmol/l. If it is, the body is still producing enough insulin.

What are stage 1 and stage 2 type 1 diabetes?

At stage 1, blood glucose and HbA1c remain within normal levels. At stage 2, increased blood sugar is occasionally measurable. This stage is also known as “dysglycemia” or impaired glucose tolerance. In this stage, high blood sugar levels are repeatedly measured at different times. The distinction between whether your child has stage 1 or stage 2 diabetes can be determined by measuring fasting blood sugar and HbA1c levels with the help of a glucose tolerance test. These measurements are normally performed by your doctor or at your diabetes or study center. There, you will also receive all further information and a detailed explanation of the procedure and the results.



Information for Professionals

	Fasting Blood Glucose	Levels during a glucose tolerance test	HbA1c level
Blood sugar levels in stage 1	< 100 mg/dl (5.6 mmol/l)	and 2 hour level: < 140 mg/dl (7.8 mmol/l) and interim values after 30, 60 or 90 minutes: < 200 mg/dl (11.1 mmol/l)	and < 5.7% (39 mmol/mol)
Blood sugar levels in stage 2	100–125 mg/dl (5.6–6.9 mmol/l)	and/or 2 hour level: 140–199 mg/dl (7.8–11.0 mmol/l) and/or interim values: ≥ 200 mg/dl (11.1 mmol/l)	and/or 5.7–6.4 % (39–47 mmol/mol) or 10 % or higher increase of HbA1c levels

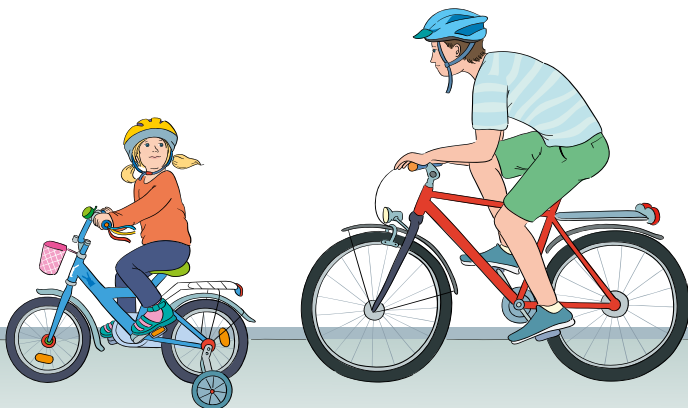
Is there any way of preventing damage to Beta cells?

Based on current research into type 1 diabetes, we know that physically active children at a normal weight have a more favorable course of the disease than children who are significantly overweight. You and your family are already doing something very helpful when you live a healthy lifestyle. Additionally, avoiding high blood glucose levels over a long time point can protect the remaining Beta cells. Because of this, early diabetes treatment is important. This also includes new therapies developed for stage 2 that can delay the progression of type 1 diabetes.

New immunotherapies for stage 2 type 1 diabetes

Various immunotherapies are currently being tested that are designed to delay the destruction of B cells. The first medication for this has been approved in Germany. You can delay the development of stage 3 diabetes by two years on average. Your paediatrician or your diabetes team will give you more information as to whether this treatment is suitable for your child. Under normal circumstances, a child should have reached stage 2 of type 1 diabetes before beginning this treatment. **New immunotherapies at stage 2 can delay the development of type 1 diabetes by 2 years on average.**

HbA1c reveals how high the blood glucose levels were on average in the last 8-10 weeks.



Frequently asked questions

Who needs to be informed that my child has an early stage of type 1 diabetes?

At the moment your child doesn't need insulin treatment, so the only person who needs to be told is your paediatrician. If, for some other reason, your child needs surgery, the doctors at the hospital should also be told. Whether you tell grandparents or friends is entirely up to you. Please do feel free to tell them if it helps, however you don't have to do so. Eventually, when treatment becomes necessary, it will be important that people who care for your child know about the diabetes. This also applies to friends of the same age.

Don't try to hide the fact that your child has diabetes. Doing that would only cause problems for your child.

? What about siblings?

We know that siblings of children with diabetes have a higher risk of also developing type 1 diabetes. If you wish, you can have the child's siblings tested. Talk to your paediatrician about this or contact us.

? Are we allowed to travel?

Of course, children with type 1 diabetes can travel at any stage of the disease. Just remember to take along the blood glucose reader and the test strips. Customs officials are familiar with such devices and won't ask you any special questions. Please don't forget to take the address and telephone number of your diabetes centre with you. In the rare case of an emergency, you can call them for assistance even from your holiday destination.

? Prolonged stays abroad

If you're planning to stay for a prolonged period abroad, please talk to someone from your diabetes centre be-

forehand, who will assist you in establishing contact with an experienced local specialist. Diabetes in children can be treated effectively in most countries around the world.

? Should I have my child vaccinated?

Children with diabetes should receive the same vaccinations and at the same time as all other children, as detailed in the child's vaccination certificate. These vaccinations do not have an adverse effect on the development of diabetes. In fact, vaccinations can protect your child against serious illnesses that can adversely affect his or her diabetes.

? Medications taken to treat other conditions

If your child has been prescribed medication for another condition, you should discuss this with your paediatrician and the diabetes centre. With very few exceptions, medications used to treat children have no adverse effect on the course of type 1 diabetes.



Psychological support for parents and children

Your child is, to all appearances, thriving and shows no signs of diabetes, but the diagnosis of early-stage type 1 diabetes has left you very concerned and worried. Just like many parents in your situation, you'll be feeling anxious about the future, and perhaps confused or just sad. You may also be asking yourself why your child, in particular, was the one to get the condition. Or maybe you just don't want to believe the bitter truth quite yet. All these reactions are normal. Parents and children have a right to express such feelings. Paediatricians know about the special burden on parents during the first phase of a chronic illness. They deeply empathise and are ready to answer all your questions.

It may be a long time – months or even many years – before your child's diabetes becomes apparent and needs to be treated. There is no single recommended way for parents and children to cope with diabetes at this stage when the condition is not yet noticeable. What is not helpful, in any case, is to constantly think about and to reorganise your life around it. Neither should you sacrifice anything that gives you pleasure; instead, you should enable your child to grow up as carefree as possible. Right now you have the right to enjoy your life as a family.

Please understand that in no way have you failed to prevent your child from developing an early stage of diabetes. Now the diabetes is there, and you should try to accept it. That's not easy and it may take quite some time before you can do so.

What's important for the further life of children with diabetes is how their parents deal with these feelings in the long run. The question is whether they allow themselves to become paralysed, or whether they gradually manage to overcome their fears and face the future with confidence and serenity. Many adult diabetics who developed the disease a long time ago, and their parents, report that after a short time, their experience of diabetes changed. From being a major setback, it became just another task in life that they faced with dedication and self-confidence.

What are our child's future prospects?

You may be already wondering about your child's well-being in a few decades. We want to emphasise that your child's diabetes will need to be treated as effectively as possible. However, you shouldn't worry too much about what you may have heard or read about subsequent illnesses or long-term health problems. If your child's diabetes is treated effectively, in other words, if it is well controlled in the future, the chances are very good that no subsequent illnesses will arise. Your diabetes team will actively support you in preventing these complications.



You may be feeling that you won't be able to cope with the challenges facing you in the near future. We want to encourage you. Our experience shows time and again, that parents of children with diabetes are able to develop tremendous strength in effectively managing their child's condition. At the same time, they always succeed, with an abundance of imagination and joy, in enabling their child to grow up just as carefree and happy as other children. Your diabetes team will provide you with support every step of the way.

How to reduce anxiety

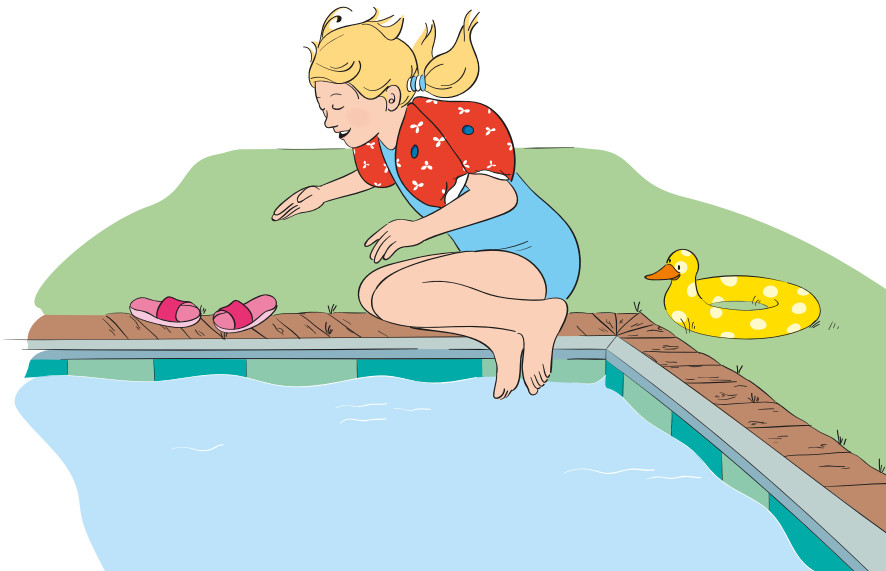
Many fears are the result of insecurity or lack of knowledge. The best way to counter this is to rely on detailed information and to keep asking questions.

- Make a note of everything that comes to mind. There is no such thing as a stupid question! The diabetes team will do their best to resolve any uncertainties.
- Some parents feel guilty about their child's disease because they don't know the answer to why their child has developed type 1 diabetes. They imagine they have provided the wrong food, for example too many sweets, which may have triggered diabetes. Others think that the diabetes could have been prevented if they had only gone to the doctor earlier. Both fears are completely mistaken. Diabetes in childhood and adolescence can neither be caused by a particular lifestyle nor prevented by early treatment.
- In the past, people associated diabetes with a meticulously regulated life and strict dietary rules. Fortunately, those times are long gone. Nowadays, children and adolescents with diabetes can grow up normally and can usually adapt their treatment to suit their family's lifestyle and habits.
- People who have never had to deal with injections or blood draws will find it hard to imagine that both can be part of normal, everyday life. The fear is all too natural. How quickly this perception can change is evidenced by many young people who report their biggest problem is "constantly having to lug around their diabetes stuff". They barely mention pain as an issue.
- Good experiences dispel fears. If you find the idea of having to inject your child very frightening, try it out for yourself. Inserting a fine insulin cannula is much less painful than most people expect.
- In the final analysis, research has shown that children with diabetes, a condition that can now be effectively treated with modern therapies, have every reason to be optimistic about their future.
- However, if you as a parent feel very worried about the future and this is affecting your daily life, please do discuss your fears with your diabetes team. Most paediatric hospitals have psychologists with experience in diabetes who specialise in providing psychological support to parents of chronically ill children. We encourage you to make use of such support at an early stage.

Preventing excessive stress

Many parents feel they need to learn as much as possible about diabetes in the first few days. They let themselves be overwhelmed with information. They are unable to find their way through all the technical terms and contradictory statements.

- During the initial shock of the diagnosis, when strong feelings of grief, despair, fear or anger still dominate, it's difficult to process new information. Give yourself some time to rest and regain your composure. Taking a few days more or less really won't change matters.
- The topic of diabetes also repeatedly comes up in the media. You'll probably be given some well-intentioned advice or newspaper clippings from friends and acquaintances over the next few days. And if you do an online search for "diabetes", you'll find it would take years just to read all the headlines. Unfortunately, some sources of information are outdated or simply wrong. Such false and falsely understood information can be very unsettling. The internet is home to numerous dubious vendors who offer useless and expensive therapies to "cure" diabetes. If you come across such information and would like to find out more, please ask your diabetes team for their opinion.
- If it's not just diabetes that's currently making life very difficult for your family, don't be afraid to tell the diabetes team about it. There are a variety of ways to support families with a chronically ill child. The diabetes team can provide further assistance with everyday life.



Remaining calm

No one can find peace of mind if they are constantly brooding about all the consequences diabetes may have for children and parents in the years or even decades to come. There is simply no way in the present of predicting what might happen in the distant future. For this reason, there is no such thing as a perfect solution. When children were diagnosed with diabetes 30 years ago, no one could have imagined the advances that would be made in therapy. Today, we can see that the supposedly poor outlook of children at the time has failed to come true. Also, you'll discover that your child's treatment and future prospects will continue to improve as time goes on. So focus on the issues and tasks you want to tackle today or in the near future. **The present counts!**

- It's normal for parents to experience strong feelings of sadness or even anger when they discover that their child has suddenly become chronically ill. What often helps is to talk about such feelings with your partner, good friends or other confidants. This can unburden you and encourage you to think about things in a new way. Parents need time for each other, especially in the early stage. Use this initial time to reflect on the new situation privately with your partner.
- The Greek philosopher Epictetus once said: "What upsets people are not things themselves, but their thoughts about these things." If we apply this wisdom to diabetes, it may allow us to also explain why some people are better at living with the disease than others. The fact of diabetes is the same for everyone. Some parents think it means lifelong dependence and disability for their child. They bemoan their fate and find it difficult to free themselves from the vicious circle of negative feelings. Other parents succeed in seeing the positive that comes with insulin: "It's lucky that we have an effective medication for diabetes. Insulin is enabling our child to continue to enjoy life and grow up like everyone else. There's a way that we as parents can successfully help our child."

- Many diabetes teams also include psychologists or other professionals trained in psychotherapy. Their task is to reduce fears, solve difficulties together with the families and help them to find their own way to live well with diabetes. They accompany families at a difficult time in life, usually for only a short period of time. Team members are also there for you if you need advice or help later on with mental health or parenting issues.

We, the authors of this guide, would encourage you to be confident about your child's future. This early detection means you are now aware and can react correctly when the first signs of diabetes become noticeable. In the meantime, you have plenty of time to gather accurate information from experts. Diabetes research is currently making great strides and treatment will certainly be different and even easier in a few years' time than it is today. We sincerely hope that you can not only embrace this justified optimism in your own life, but also convincingly pass it on to your child.



On behalf of the **Fr1da** team,

yours sincerely
Prof. Dr. Anette-Gabriele Ziegler and
Prof. Dr. Karin Lange

A read-aloud book
for children with
early type 1 diabetes:



Hello, my name's Frida!

Guess what my favourite colour is?
That's right: light blue, like my T-shirt and my new hair bands. Sammy, our dog, also has a light blue collar.

I'm almost seven years old, and I am in my first year of school. This summer, I got my seahorse swimming certificate and can now swim properly, even at the deep end.

My favourite things to do at school are drawing and reading stories. Later on, I want to write adventure stories myself. But it's going to be soooo long before I can write properly and finally get to use mummy's computer.

Oh yes, another thing is that I have very early diabetes. My doctor found out about it a bit over a year ago.

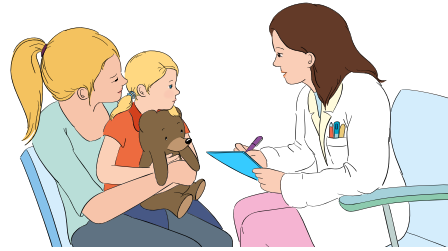
I'll tell you what early diabetes is.

Well ...



How did my doctor find out that I have early diabetes?

Once or even twice a year, I go to my doctor with my parents. She examines me, and I have to do some exercises. After that, she tells me that everything is OK, and I can choose something from her gift box. Last year I took a light blue sticker.



Also, the doctor took blood from me last time. I felt a small prick, but it didn't make me cry.

Then she looked at the blood and found something in it. She could see in the blood that something was different about me.

A few weeks later, she called my parents and told them that I had diabetes. An early diabetes. My parents were really upset and talked to the doctor for a long time. But it was quite complicated, and I didn't understand it properly.

The doctor saw from my blood that I have diabetes.

How to recognize early diabetes

At the time when the doctor took my blood, I didn't notice anything. Like today, there was nothing I couldn't do. I didn't feel any pain – everything was okay. And that's how things still are today. I don't notice anything. And I can do everything that the other children in my class are allowed to do.

You're probably feeling the same way – early diabetes is something you don't notice.

You don't feel that you have early diabetes.

Why does the doctor check my blood?

„Then why do grown-ups check childrens' blood?“, you may be asking. I asked my doctor the same question.

This is how she explained it to me: “In the beginning, children don't notice that they have diabetes. Later, when the children do notice something, the doctors can help them faster, because they already know it's diabetes. They don't need to look for so long.”

“What will it feel like then?“, I asked her.

“Most children notice diabetes, because they get thirstier and have to go to the toilet more often. If the children then tell their parents, we doctors can check if the diabetes needs to be treated.”

But right now, even our dog Sammy with his super nose can't smell the diabetes.



Later on, you'll be able to recognise diabetes, because you'll feel more thirsty and have to go to the toilet more often.

How long will it take before you first notice the diabetes?

The doctor diagnosed me with early diabetes when I was still in kindergarten. I'm now in the first year of school, and I'm still not noticing anything. My doctor told me that she doesn't know exactly when I'll notice anything. With some children it only takes a few weeks, with others longer.

Even the cleverest doctor can't tell you how long it will take.

Even the cleverest doctor can't tell you how long it will take before you feel something.

Why did you get diabetes?

No doctor can explain why you and I got early diabetes. Diabetes just happens. It's never because a child has done something wrong. And the parents didn't do anything wrong either.

So nobody is to blame. It's not because of food, drink, exercise or too much TV. The scientists simply can't answer the question at the moment.

It's never the fault of a child that he or she got diabetes!

So what is diabetes?

I already mentioned that you don't feel anything if you have early diabetes. You only see it in the blood.

Later on, when you first start feeling the effects of diabetes, that means something is missing in your body. Your body isn't making enough insulin.

What is insulin?

Your body makes insulin just like it does spit or blood. You just don't realise it. If it's missing you get very thirsty. You can't live without insulin, so later on you and I will have to give it to our bodies.

Jan will tell you how that works. He's had diabetes for a long time and takes insulin every day.



Diabetes means that, at some point, your body won't be able to make enough insulin. However, all of us need insulin, and that means we'll have to give it to ourselves later.

Is there anything I can do to avoid needing insulin later?

I asked my doctor the same question. She said that many scientists are searching for an answer, so that children with early diabetes won't need insulin later on. But, unfortunately, they haven't found anything so far.

But my doctor told me that I can continue to eat and drink anything I like. I'm also allowed to play sports, go to children's birthday parties and do everything that my class friends are allowed to do.

You can't do anything wrong!

Scientists may, however, eventually find a way for you not to have to take insulin for a very long time. They may even ask your parents if you want to take part in a test. But your doctor will discuss this with them and you.

How long will it take before I notice my diabetes?

I've had early diabetes for over a year now and still don't notice anything. But my doctor says that she can still see it in my blood.

Jan, who has been giving himself insulin for a couple of years, told me that diabetes doesn't just stop. It will never just go away.

But Jan also told me that even though he has diabetes, he can do all the same things other children do. He goes to school, plays football, has friends, has already been on a school trip, and he's even going to England with his club next year.



Once children have diabetes, it doesn't go away.

Are there other children with diabetes?

At the beginning, I thought I was the only child with diabetes in our town. But then I went to a meeting with my parents at the children's hospital. I met a lot of other children there, some younger and some older than me. They all had diabetes, but you couldn't see it.

I found out there that more than 32,000 children in Germany have diabetes. That's like almost a whole stadium full of children! There are over a hundred who go to our children's hospital. So we're far from being the only ones.

Many children have diabetes. You can meet them at the children's hospital or on the Internet.

What should I tell the other children?

When we found out, my parents and I talked about what I should say in kindergarten. Because I don't notice anything and there's nothing I can do about my diabetes, we decided not to say anything at first. At the moment, nothing's changed.

But we've already thought about what we'll tell my class teacher and my friends when I need insulin. For now, I'll wait until I know exactly how to treat my diabetes with insulin. And then I can tell the others.

There was a nurse at the children's hospital who knew about diabetes and was really nice. She promised to come into school with me. We'll explain diabetes together. She also has a video in which children tell you about their diabetes. She'll bring that along.

Have a think about how you want to tell the other children about your diabetes.

What am I supposed to do about my early diabetes?

I went to the children's hospital with my parents. There, a doctor told my parents what he thought was the best thing for us to do.

- He explained again how we'll know that I need insulin. As I told you, I'll get very thirsty and need to go to the toilet a lot.
- He also gave my parents a little machine. It lets us check with a finger-prick whether everything is OK at the moment.
- If we notice anything, we can immediately call the doctor at the children's hospital.



The doctor's name is:

Telephone number:

And otherwise, I should carry on doing everything as before. I can play outside with Sammy, swim, maybe go to ballet or pony-riding if that's what I want, and I also need to go to school.

But I actually like school, ... except for homework.

If you have early diabetes, just do everything you've always done.

Do you want to find out more?

In the diabetes book for children, you can read how Jan and Laura treat their diabetes with insulin.

But because you don't need to take insulin yet, you have plenty of time.

If you need insulin at a later date, the doctors and nurses at the children's hospital will tell you everything you want to know.

I've told you enough for today. Sammy urgently needs to get out ...

So, goodbye!



YOURS, FRIDA

References

For parents of children with type 1 diabetes

Hürter P, von Schütz W, Lange K (2016) Kinder und Jugendliche mit Diabetes [Children and adolescents with diabetes]. Medical and psychological advice for parents. Fourth edition. Springer, Berlin, Heidelberg, New York

Training book for 6- to 12-year-old children with type 1 diabetes

Lange K, Remus K, Bläsig S, Lösch-Binder M, Neu A, von Schütz W (2020) Diabetes-Buch für Kinder: Diabetes bei Kindern: ein Behandlungs- und Schulungsprogramm [Diabetes book for children: Childhood diabetes: a treatment and training programme]. Sixth fully revised edition, 2020. MedtriX Publishing House, Wiesbaden

Type 1 diabetes training programme for young people

Lange K, Burger W, Holl R, Hürter P, Saßmann H, von Schütz W, Danne T (2017) Diabetes bei Jugendlichen: ein Schulungsprogramm. 3. überarbeitete und aktualisierte Auflage. Kirchheim-Verlag, Mainz. Heft 1: Diabetes Basics; Heft 2: Insulintherapie für Profis; Heft 3: Diabetes Specials; Heft 4: Pumpentherapie und CGM

Information materials for educators, teachers and other caregivers

Deutsche Gesellschaft für pädiatrische und adoleszente Endokrinologie und Diabetologie (DGPAED) e.V. (2024) Kinder mit Diabetes im Kindergarten. Informationen für Erzieherinnen und Erzieher. [Children with diabetes in kindergarten. Information for educators]. Eleventh revised edition, www.dgpaed.de

Deutsche Gesellschaft für pädiatrische und adoleszente Endokrinologie und Diabetologie (DGPAED) e.V. (2024) Kinder mit Diabetes in der Schule. Informationen für Lehrerinnen und Lehrer. [Children with diabetes at school]. Information for teachers. Tenth revised edition, www.dgpaed.de

Helmholtz Munich, Auf der Bult Paediatric Hospital, Center of Regenerative Therapies Dresden, German national diabetes information portal diabinform.de, German Centre for Diabetes Research, National AOK Association, German Diabetic Association (DDB) (2022) Finn hat Diabetes [Finn has diabetes], Carlsen Verlag GmbH

Internet

Websites for parents of children and young people with type 1 diabetes

www.fr1da.de

Website of the Fr1da study on early detection and early treatment of type 1 diabetes

www.diabetikerbund.de

Website of the Deutscher Diabetiker Bund (DDB) e.V. with offers for self-help, representation of interests and advice on legal and insurance issues, diabetes journal with news from therapy, research and health policy.

www.diabinfo.de

Website of Helmholtz Munich providing comprehensive information and news on diabetes, current research approaches and living with the disease, free monthly newsletter.

www.hero-k1ds.de/en

Website of the K1DS ARE HEROES campaign, which aims to raise awareness of type 1 diabetes and inform parents about the possibility of early detection. Heroes from the public and research community talk about type 1 diabetes in blog posts and podcasts

www.deutsche-diabetes-gesellschaft.de

Website of the scientific German Diabetes Association (DDG) with comprehensive information on diabetes and a list of addresses of DDG-certified practices and clinics throughout Germany.

www.diabetesde.org

Website of the non-profit organisation Deutsche Diabetes-Hilfe e. V. (formerly: diabetesDE) [German diabetes aid] with comprehensive information on diabetes treatment, everyday tips, self-help, research, healthcare policy and addresses.

www.diabetes-kids.de

Website of an independent group of parents with children with diabetes, which provides a wide range of specialist information, discussion groups, social activities and regional support.

Type 1 diabetes in children can now be detected very early on by means of a blood test, long before there are any noticeable signs. This helps to avoid dangerous situations and to prepare and treat children effectively right from the start.

This guide answers the most frequently asked questions asked by parents whose child has been diagnosed with an early stage of type 1 diabetes:

- **Can we do anything to prevent the diabetes from progressing?**
- **What does the disease mean for our family and our plans for the future?**
- **What's the best way of taking care of our child now and in the future?**
- **Where can we find expert support and advice?**

In addition, in a read-aloud section for children, 6-year-old Frida explains what early type 1 diabetes means for her. Her story can help parents explain early diabetes to primary school children in an age-appropriate way.



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